Primer on Using Excel© in Accounting
By Rex A Schildhouse, LCDR, U.S. Navy, Retired, M.B.A.
Miramar College, San Diego Community College District, San Diego, California

to accompany

Financial Accounting, Seventh Edition

Paul D. Kimmel, PhD, CPA, Associate Professor of Accounting,
University of Wisconsin – Milwaukee, Milwaukee, Wisconsin

Jerry J. Weygandt, PhD, CPA, Arthur Andersen Alumni Professor of Accounting,
University of Wisconsin, Madison, Wisconsin

Donald E. Kieso, PhD, CPA, KPMG Peat Marwick Emeritus Professor of Accountancy,
Northern Illinois University, DeKalb, Illinois
# Table of Contents

The Acknowledgement of Copyrights, Patents, and Trademarks ..................................................... vi
NOTE TO THE INSTRUCTOR ...................................................................................................... vii
INTRODUCTION ............................................................................................................................ ix

**Chapter 1** ....................................................................................................................................................... 1
SOME BASICS OF WINDOWS 7 .......................................................................................................... 1
Chapter Outline...................................................................................................................................... 1
  Microsoft Windows Versions ....................................................................................................... 1
  Windows Explorer ........................................................................................................................ 1
  Copying the Data Files to the Hard Drive..................................................................................... 2
  Copying the Data Files to Personally Transportable Media ......................................................... 3
  Renaming Files within Windows .................................................................................................. 3
  Search within Windows ................................................................................................................ 3
  File Shortcuts ................................................................................................................................ 4

**Chapter 2** ....................................................................................................................................................... 6
INSTALLING, FINDING, AND SHORTCUTS TO MICROSOFT OFFICE ......................................... 6
Chapter Outline...................................................................................................................................... 6
  Terms and Conventions of this Text ............................................................................................. 6
  The Differences between Versions of Microsoft Office ............................................................... 8
  Purchasing Microsoft Office......................................................................................................... 9
  Installing Microsoft Office............................................................................................................ 9
  Opening Elements of Microsoft Office......................................................................................... 10

**Chapter 3** ..................................................................................................................................................... 12
BASICS OF EXCEL ............................................................................................................................... 12
Chapter Outline.................................................................................................................................... 12
  Excel Basics ................................................................................................................................ 12
  Opening Excel ............................................................................................................................. 13
  Workbooks and Worksheets within Excel .................................................................................. 13
  Opening Excel Files .................................................................................................................... 14
  The Exercise and Problem Templates ......................................................................................... 16
  Demo Worksheet ........................................................................................................................ 17
  Excel Worksheets ........................................................................................................................ 18
  Pop-Up Menus ............................................................................................................................ 19
  Drop-Down Menu ....................................................................................................................... 20
  New Workbook ........................................................................................................................... 21
  Help ............................................................................................................................................. 21
  Saving Excel Files ....................................................................................................................... 22
  Formula Bar ................................................................................................................................ 23
  Row and Column Headers .......................................................................................................... 23
  File Extensions within Excel ....................................................................................................... 24
  Sizing Workbook Presentations .................................................................................................. 25
Table of Contents

Chapter 4 ..................................................................................................................................................... 27
BASIC EXCEL DATA ..................................................................................................................................... 27
Chapter Outline ..................................................................................................................................... 27
  Basic Data Entry ................................................................................................................................. 27
  Sum Formula ...................................................................................................................................... 29
  Basic Formulas ................................................................................................................................. 30
  ‘‘Look to’’ Formula .......................................................................................................................... 31
  Mathematical Order of Operation ................................................................................................. 31
  Nested Parentheses ............................................................................................................................ 31
  Recently Used File List ...................................................................................................................... 32
  Undo and Redo ................................................................................................................................. 33
  Add-ins ................................................................................................................................................ 33
Chapter 5 ..................................................................................................................................................... 36
COPY, CUT, PASTE, CLEAR, AND DELETE ........................................................................................... 36
Chapter Outline ..................................................................................................................................... 36
  Copying and Pasting ............................................................................................................................. 36
  Copying a Formula ............................................................................................................................... 38
  Absolute Reference ............................................................................................................................. 39
  Cut Command ..................................................................................................................................... 41
  Clear and Cut ....................................................................................................................................... 41
  Delete and Delete ............................................................................................................................... 41
Chapter 6 ..................................................................................................................................................... 44
LOCATIONS AND LOCATING ...................................................................................................................... 44
Chapter Outline ..................................................................................................................................... 44
  Go To ...................................................................................................................................................... 44
  Find ......................................................................................................................................................... 44
  Find and Replace ................................................................................................................................ 45
  Named Ranges ....................................................................................................................................... 47
Chapter 7 ..................................................................................................................................................... 49
CUSTOMIZING EXCEL ............................................................................................................................... 49
Chapter Outline ..................................................................................................................................... 49
  Excel Defaults ....................................................................................................................................... 49
  ‘‘Save As’’ to Change File Locations and Names ................................................................................ 50
  Excel Workbook / File Naming Recommendations ........................................................................ 51
Chapter 8 ..................................................................................................................................................... 52
PRESENTATION ....................................................................................................................................... 52
Chapter Outline ..................................................................................................................................... 52
  Comments .............................................................................................................................................. 52
  Column and Row Size ............................................................................................................................ 53
  Charting ..................................................................................................................................................... 54
  Pivot Tables ......................................................................................................................................... 56
  Protection .............................................................................................................................................. 58
  Read Only Files and Templates .......................................................................................................... 59
  Drawing on Worksheets ......................................................................................................................... 60
  Macros ..................................................................................................................................................... 62
  Macros on Objects ............................................................................................................................... 63
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>65</td>
</tr>
<tr>
<td>PRINTING ISSUES</td>
<td>65</td>
</tr>
<tr>
<td>Chapter Outline</td>
<td>65</td>
</tr>
<tr>
<td>Page Setup</td>
<td>65</td>
</tr>
<tr>
<td>Page Break Preview</td>
<td>66</td>
</tr>
<tr>
<td>Print Area</td>
<td>67</td>
</tr>
<tr>
<td>Print Preview</td>
<td>69</td>
</tr>
<tr>
<td>Printing</td>
<td>70</td>
</tr>
<tr>
<td>10</td>
<td>71</td>
</tr>
<tr>
<td>INVENTORY</td>
<td>71</td>
</tr>
<tr>
<td>Chapter Outline</td>
<td>71</td>
</tr>
<tr>
<td>Filter</td>
<td>71</td>
</tr>
<tr>
<td>Sort</td>
<td>73</td>
</tr>
<tr>
<td>Master Sort Column</td>
<td>74</td>
</tr>
<tr>
<td>SumIf</td>
<td>74</td>
</tr>
<tr>
<td>CountIf</td>
<td>75</td>
</tr>
<tr>
<td>Subtotal</td>
<td>75</td>
</tr>
<tr>
<td>Vlookup</td>
<td>79</td>
</tr>
<tr>
<td>11</td>
<td>81</td>
</tr>
<tr>
<td>DISPLAY</td>
<td>81</td>
</tr>
<tr>
<td>Chapter Outline</td>
<td>81</td>
</tr>
<tr>
<td>Freeze Panes</td>
<td>81</td>
</tr>
<tr>
<td>Split Pane</td>
<td>82</td>
</tr>
<tr>
<td>Conditional Formatting</td>
<td>83</td>
</tr>
<tr>
<td>Displaying Zero Values</td>
<td>84</td>
</tr>
<tr>
<td>Gridlines on the Screen</td>
<td>85</td>
</tr>
<tr>
<td>Hiding Columns and Rows</td>
<td>85</td>
</tr>
<tr>
<td>Hidden</td>
<td>86</td>
</tr>
<tr>
<td>Indent within a Cell</td>
<td>88</td>
</tr>
<tr>
<td>Truncate</td>
<td>88</td>
</tr>
<tr>
<td>Workspaces</td>
<td>89</td>
</tr>
<tr>
<td>12</td>
<td>91</td>
</tr>
<tr>
<td>ANSWERS</td>
<td>91</td>
</tr>
<tr>
<td>Chapter Outline</td>
<td>91</td>
</tr>
<tr>
<td>Formula Auditing</td>
<td>91</td>
</tr>
<tr>
<td>Formatting Cells</td>
<td>92</td>
</tr>
<tr>
<td>Merge Cells</td>
<td>95</td>
</tr>
<tr>
<td>Formatting within a Cell</td>
<td>96</td>
</tr>
<tr>
<td>Solver</td>
<td>96</td>
</tr>
<tr>
<td>Null Value</td>
<td>97</td>
</tr>
<tr>
<td>Or</td>
<td>98</td>
</tr>
<tr>
<td>And</td>
<td>98</td>
</tr>
<tr>
<td>If Statement</td>
<td>99</td>
</tr>
<tr>
<td>13</td>
<td>101</td>
</tr>
<tr>
<td>TEXT</td>
<td>101</td>
</tr>
<tr>
<td>Chapter Outline</td>
<td>101</td>
</tr>
<tr>
<td>Concatenate</td>
<td>101</td>
</tr>
<tr>
<td>Text to Columns</td>
<td>103</td>
</tr>
<tr>
<td>Paste Special</td>
<td>104</td>
</tr>
<tr>
<td>Today and Now</td>
<td>105</td>
</tr>
</tbody>
</table>
# Table of Contents

**Chapter 14**

DEPRECIATION ................................................................................................................................................. 106

Chapter Outline........................................................................................................................................ 106
  Asset Acquisition Sheet ........................................................................................................................... 106
  Depreciation ........................................................................................................................................... 107
  Straight-Line Depreciation .................................................................................................................... 107
  Declining-Balance Depreciation .............................................................................................................. 108
  Variable Declining Balance Depreciation .............................................................................................. 109
  Sum-of-Years’-Digits Depreciation ........................................................................................................ 110
  Units-of-Activity Depreciation................................................................................................................ 110

**Chapter 15**

LOANS AND THE TIME VALUE OF MONEY .............................................................................................. 111

Chapter Outline........................................................................................................................................ 111
  Cash Flow within Formulas .................................................................................................................... 111
  Loan Payments ....................................................................................................................................... 112
  Payment to Principal ............................................................................................................................. 114
  Interest Payment .................................................................................................................................. 115
  Cumulative Payment to Principal ......................................................................................................... 116
  Cumulative Payment to Interest ........................................................................................................... 116
  Present Value ......................................................................................................................................... 117
  Future Value ........................................................................................................................................ 118
  Bond Table .......................................................................................................................................... 119

**Chapter 16**

ADVANCED EXCEL ................................................................................................................................... 120

Chapter Outline........................................................................................................................................ 120
  Average and AverageA ............................................................................................................................ 120
  Convert .................................................................................................................................................. 120
  Embedded Formulas .............................................................................................................................. 122
  Intermediate Formulas .......................................................................................................................... 123
  Keystrokes and Shortcuts ....................................................................................................................... 125
  Linking Worksheets and Workbooks .................................................................................................... 126

**Chapter 17**

MICROSOFT WORD ..................................................................................................................................... 129

Chapter Outline........................................................................................................................................ 129
  Word File Storage ................................................................................................................................. 129
  Word Tables ........................................................................................................................................ 130
  Word Table Formulas ............................................................................................................................ 131
  Excel Tables into Word .......................................................................................................................... 132

**Chapter 18**

TEXAS INSTRUMENTS BA II PLUS ........................................................................................................... 134

Chapter Outline........................................................................................................................................ 134
  Texas Instruments BA II Plus Basics....................................................................................................... 134
  Days Between Dates with the BA II Plus ............................................................................................... 136
  Storing Values in the BA II Plus.............................................................................................................. 137
  Balloon Payments with the BA II Plus .................................................................................................... 139
  Time Value of Money with the BA II Plus ................................................................................................. 139
  Present Value of a $1 with the BA II Plus ................................................................................................. 140
  Future Value of a $1 with the BA II Plus ................................................................................................. 140
  Present Value of an Annuity of a $1 with the BA II Plus ......................................................................... 141
  Future Value of an Annuity of a $1 with the BA II Plus ......................................................................... 142
  Other BA II Plus Functions .................................................................................................................... 142
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>HEWLETT-PACKARD HP-12C</td>
<td>143</td>
</tr>
<tr>
<td>Chapter Outline</td>
<td>143</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hewlett-Packard HP-12C Basics</td>
<td>143</td>
</tr>
<tr>
<td></td>
<td>Days Between Dates with the HP-12C</td>
<td>145</td>
</tr>
<tr>
<td></td>
<td>Storing Values in the HP-12C</td>
<td>146</td>
</tr>
<tr>
<td></td>
<td>Balloon Payments with the HP-12C</td>
<td>147</td>
</tr>
<tr>
<td></td>
<td>Time Value of Money with the HP-12C</td>
<td>148</td>
</tr>
<tr>
<td></td>
<td>Present Value of a $1 with the HP-12C</td>
<td>149</td>
</tr>
<tr>
<td></td>
<td>Present Value of an Annuity of a $1 with the HP-12C</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>Future Value of an Annuity of a $1 with the HP-12C</td>
<td>151</td>
</tr>
<tr>
<td></td>
<td>Other HP-12C Functions</td>
<td>151</td>
</tr>
<tr>
<td>Index</td>
<td></td>
<td>a</td>
</tr>
</tbody>
</table>
The Acknowledgement of Copyrights, Patents, and Trademarks

This text addresses Microsoft Windows, Microsoft Office Pro, and Microsoft Office, primarily Excel, additionally a little about Microsoft Windows 7. Microsoft Windows 7, Microsoft Windows, Microsoft Office Pro and Microsoft Office and their components are products of Microsoft Corporation of Redmond, Washington, U.S.A. Applications, names, programs, and titles such as “Microsoft,” “Microsoft Windows 7,” “Microsoft Windows,” “Microsoft Office Pro,” “Microsoft Office,” “Microsoft Word,” “Microsoft Excel,” “Microsoft Access,” “Microsoft PowerPoint,” and the names “Windows,” “Office,” “Word,” “Excel,” “Access,” and “PowerPoint” as application names are protected by the copyrights, trademarks and / or patents of the Microsoft Corporation, One Microsoft Way, Redmond, WA 98052-6399 under U. S. and international law.

This text also addresses the Hewlett-Packard HP-12C Programmable Financial Calculator. Hewlett-Packard, HP-12C, and Programmable Financial Calculator are items subject to the copyrights, trademarks and / or patents of the Hewlett-Packard Company, 1000 NE Circle Blvd, Corvallis, OR 97330.

Additionally this text addresses the Texas Instruments TI BA II Plus Advanced Business Analyst Calculator. Texas Instruments, TI, BA II Plus, BA II+, and Advanced Business Analyst Calculator are items subject to the copyrights, trademarks and / or patents of the Texas Instruments Corporation, 7800 Banner Dr., Dallas, TX 75251.
NOTE TO THE INSTRUCTOR

The exercises and problems as Microsoft Excel templates are provided on the student resources web site for the textbook. All the selected exercises and problems are contained within a single file for each chapter. The exercises and problems in the textbook are accompanied by a Microsoft Excel “X”. The template format provides basic guidance in solving the exercises and problems and contains keys for account title placement, value placement, and formula placement. This format is intended to provide your students a structured environment to reduce the time required to accomplish the exercise or problem without reducing the educational challenge and opportunity afforded by the exercise or problem. Very few account titles and few account values are given in this format. Each student template file contains an instructions worksheet and an area for the student to identify him or herself, the date, and the instructor, and the course at the top of the template. This identification information is printed at the top of each page if multiple pages are required by the exercise or problem. Each template is also set up with footers stating the file identification, the page number of page numbers, the time, and the date printed to assist in compiling the pages you may receive.

Solutions for the templates are available as downloads from the textbook’s instructor resources web site. Each solution template contains the instruction sheet given to the student, the exercise or problem as given to the student, and the solution. The solution template matches the placement of data in the student template and closely correlates to the textbook solutions manual. This format is intended to assist you in the evaluation of the student’s accomplishments without presenting an alternative to textbook presented methodology or solutions manual materials. Due to significant digit differences between the textbook, the solutions manual, and Excel, there may be slight differences in values. Most of these are pointed out in the templates.
INTRODUCTION

This book is written to accompany Financial Accounting, Seventh edition, by Paul D. Kimmel, Jerry J. Weygandt, and Donald E. Kieso. Throughout the book numerous subjects are addressed intended to increase your ability and skills in using Microsoft Excel or most other spreadsheet applications in the accomplishment of academic and professional tasks. Many of the later chapters assume that you fully understand and have mastered the skills presented in the earlier chapters. Because of this assumption, it is recommended that even proficient users of Excel read the book as they accomplish the assigned work.

This text addresses Microsoft Office 2010, focused on Excel 2010. Word 2010 is also addressed to some degree. The Hewlett-Packard HP-12C Programmable Financial Calculator and Texas Instruments TI II Plus Advanced Business Analyst Calculator are addressed in the last chapters.

There are numerous exercises and problems within the Financial Accounting, Seventh edition, by Paul D. Kimmel, Jerry J. Weygandt, and Donald E. Kieso that have been selected for presentation as Excel templates. These exercises and problems, put into a single file for each chapter, have been restructured to allow you to use the “look to” and “copy and paste” capabilities of Excel. The restructuring does not change the exercise or problem material and your end result will be the same whether you utilize the textbook as a source document, the exercise and problems information from the template, or from this text. The chapter files are available on the student resources web site for this text. Each chapter’s file contains the selected exercises and problems which are identified on their own worksheets within the chapter file. For Chapter 1 Exercise E1-15, the fifteenth exercise within Chapter 1, the chapter file name is Kimmel_Financial_7e_Excel_Templates_Ch01.xlsx, the worksheet will be titled E1-15. For Problem P3-1A, the first problem in the third chapter the chapter file name is Kimmel_Financial_7e_Excel_Templates_Ch03.xlsx and the worksheet title is P3-1A. All of the data files were constructed in Microsoft Excel 2010 utilizing the “.xlsx” extension. The majority of commands and capabilities are common to many of the various versions of Excel as well as other spreadsheet applications. For earlier versions of Excel you may be able to download a compatibility pack from Microsoft at http://support.microsoft.com/kb/923505 which may allow you to open the “xlsx” extension files with your version of Excel.

Many of the specific subjects of this text have additional data files associated with them to further show or demonstrate the capabilities of Excel. The data file associated with the “Paste” function would be titled as “Paste” for example while the data file for “Pivot Tables” would be “Pivot Tables.” The title of the reference file will be clearly provided in the subject section. These files are available on the textbook student resources web site.

Numerous screen prints have been included to clarify the presentation of the material. If you need assistance on a particular issue you can also accomplish the screen print function and take the document into the classroom, to your information technologies assistance center, or attach it to an e-mail. To perform a screen print most reliably, first, open the application that you wish to receive the screen print. This application is usually Microsoft Word and will be used for the explanation. Then return to the application or screen that you want to screen print. Press the “PrtScn” (Print Screen) key on the keyboard. This key is usually just above the Insert key on the keyboard but may be elsewhere on the keyboard. The image of the screen is now held in the Windows Clipboard. Reselect the receiving application, Word in this case, click into an open document to place the cursor and use the keystrokes Ctrl-V or click the “Paste” icon and the image should be pasted into the document. Now you can save the document as a file for later use and/or print it to show later or to document an event. Applications such as Microsoft Word, Windows WordPad, Windows Paint, Microsoft Excel, and Microsoft Access all accept screen prints. Windows Notepad does not accept screen prints.
Chapter 1

SOME BASICS OF
WINDOWS 7

Chapter Outline

Microsoft Windows Versions Renaming Files within Windows
Windows Explorer Search within Windows
Copying the Data Disk to the Hard Drive File Shortcuts
Copying the Data Disk to Floppy Disks

Microsoft Windows Versions

As the “Microsoft Windows” product develops and computer capabilities expand, Microsoft Corporation progressively releases versions of “Windows.” The more recent releases for the home desktop computing system have included Microsoft Windows XP, Microsoft Windows Vista, and Microsoft Windows 7. This text is written in reference to Microsoft Windows 7. If you are operating in an older version of Windows you may not be able to accomplish some of the items shown in the text. If you are operating in a newer version of Windows or operating a professional version of Windows you may have more capabilities than addressed here. Since this text is written for Microsoft Office, and particularly, Microsoft Excel 2010, only the aspects of Microsoft Windows addressed are those provided to enhance your capabilities within Microsoft Office.

Windows Explorer

The Microsoft Windows Explorer, a tool within the previous versions of Windows has been relocated. The new location is found under the path Start > Computer, from right panel of options as shown on the next page. Then double-clicking or clicking once and right clicking the C drive accesses the disk’s contents and brings up its directories and files. As with previous versions of Windows Explorer, you can select the presentation and detail desired through the drop-down menu associated with the “VIEW” option on the menu bar. This drop-down menu is shown to the right with “Details” his previous page, is usually found as an icon on the desktop of a computer with the Windows operating system. The icon can be double-clicked to get the primary resource of the Windows operating system, a depiction of the data structure of the host computer. This presentation may be graphic in nature or text based. The text based presentation, shown in the top half of the accompanying screen print is attained through the path View > Details. The thumbnails with text titles is attained through the path View > Thumbnails. Both, as well as the rest of the presentation options such as “Tiles,” “Icons” and “List” all show the same basic
information – file name and location. You may use the presentation of your choice. Most presentations within this text will normally be through the “Details” configuration.

**Copying the Data Files to the Hard Drive**

If you are working at a computer lab or learning resource center, do not copy the template files to the local disk drive. Instead, copy the data files onto removable media or other personally transportable media.

Within Windows Explorer is your ability to copy data files from the data disk to the local hard drive or other media available to you. To do this insert your data disk into the CD-ROM drive of the system. This drive is usually the “D:\” drive but may be any letter of the alphabet. This drive may be identified as “CD Drive (D)” where the letter “D” is the specific letter for your drive. When the source drive – where your data disk is inserted, is double-clicked, the contents of the data disk should be shown on the right side of the Windows Explorer display. This list will usually be in an alphabetical order on the disk. This listing will include the data files for the subjects addressed in Section A of the text. If working on your own desktop computer system, click into the “Local Disk (C)” or the local hard drive. Once the local disk or hard drive is selected as indicated by the blue (default value so yours may be different) band, follow the path Files > New > Folder. This may take several moments for your system to respond. Click on the “Folder” option. Windows Explorer will now put a new folder or directory into the “root directory” of the local disk (C) drive. By default this folder or directory is labeled “New Folder.” The title should be highlighted in blue indicating that you can change the title simply by typing into it. If it is not highlighted, you can double click the title and enter the title edit mode or right click on it and select “Rename” from the pop-up menu. By naming this new folder or directory something like “Accounting 2012-01-01” with the values “2012-01-01” being the current date in year, month, and day format, you will know the reference for the file contents and the date the folder was established. Whatever you name the folder remember that you will be entering this folder on many occasions so making it a fourth or fifth level subfolder or subdirectory may make it burdensome to enter.

Once the new folder is created and named, click back into the source drive for your data disk, by default, this may be the “CD Drive (D)” drive. Double-click on the drive to get all the files on the disk shown on the right side of Windows Explorer. While the contents of the data disk are shown on the right side, without clicking on a file or folder icon, use the scroll bars for the left side to move the displayed folders and directories up or down until your new (Accounting 2012-01-01?) folder is visible on left side of the window. Now click once into the right side of the Windows Explorer and use the keystrokes Ctrl-A. To accomplish this, press and hold the “Control” or “Ctrl” key down and then press and release the “A” key. This operation is not case sensitive so upper or lower case is not an issue. This is the “Select all” command and it will select all of the data disk files. Once the files on the right side are highlighted through the “Select all” command, right click once into the listing and keep the mouse button down. This will allow you to drag the files to the new directory with a mouse movement. Drag the files to the left side of the Windows Explorer display and position the mouse cursor so that the new directory is highlighted. Then release the mouse button. A pop-up menu will appear asking what you would like to do. The options are usually “Copy Here,” “Move Here,” “Create shortcuts,” or “Cancel.” If the target folder or
directory “slipped and your new folder or directory is no longer highlighted, select “Cancel.” If the new folder or directory is still selected, click on “Copy Here” and Windows Explorer will copy the data disk files to the new folder or directory. From this point on the data files will be on your local drive and available for use at a location where they can be opened and saved to.

**Copying the Data Files to Personally Transportable Media**

If you are working at a computer lab or learning resource center, do not copy the data disk to the local disk drive. Instead, copy the data files onto personally transportable media by placing your media into the appropriate drive of the computer system. Then open Windows Explorer and locate the data disk files on the CD-ROM drive. Double-click on the CD-ROM or the source drive for the data files. Then select the data files on the right side of the Windows Explorer display by clicking onto the first folder or file and then hold the shift key down and click on the last file in the list. This process will select and highlight all of the folders or files between the two “click points.” If the target media icon or line identification is not showing on the left side of the Windows Explorer display, use the scroll bars for the left side to make the media icon or line visible. Once the transportable media line or icon is visible right click onto the selection on the right side of the window and, without releasing the button, drag the highlighted files to the transportable media icon on the left side of the Windows Explorer display. The transportable media line or icon will highlight when your mouse cursor is over it. When it is highlighted, release the mouse button. The pop-up menu will ask if you want to “Copy Here,” “Move Here,” “Create a Shortcut” or “Cancel.” If the target has shifted off the transportable media, you can cancel. Otherwise select “Copy Here” and Windows Explorer will copy the highlighted folders and files to the transportable media.

If the media fills before the selected folders and files are copied, you can see which folders and files were copied by double-clicking on the transportable media line or icon. The remaining data files will have to be saved to other transportable media. While most of the folders and files are less than 150 KB in size, these files will grow in size while you populate the exercise and problem templates with data. This growth should be accounted for when selecting your transportable media.

**Renaming Files within Windows**

You may have the requirement to rename a file within Windows. This can be accomplished easily within Windows Explorer. Simply locate the file on either side of the Windows presentation. Once located, right-click the folder or file name and then select “Rename” from the pop-up menu options. The folder or file name will be highlighted and you will be allowed to enter a new folder or file name by typing it in. Under the Windows folders and names convention, any letter, upper or lower case can be used, and any number can be used. Additionally, the “-” (dash) can be used as well as spaces. Windows considers the characters of “\”, “/”, “:”, “|”, “<”, “>”, “>” and the quotation marks (“”) as special characters and unacceptable as part of a folder or file name. Other operating systems may consider other characters as unacceptable. The file names can be rather long so titles such as “Student-John Doe–2012-01-01” are acceptable within the Windows environment. These long file names may create problems in other operating systems.

You can also rename a file or folder by clicking on it once on the right side waiting several moments, and then clicking once into it again. This puts you into the “edit name” mode only if the folder or file is on the left side of the Windows presentation. Clicking too soon or rapidly will open the folder or file. If a file is open by an application or a file is open within a directory you cannot rename that file or directory as they are “active.” You will need to close those files first and then rename the file or directory.

**Search within Windows**

Another frequently used tool within Windows Explorer is the “Search” tool. Suppose that you copied the data disk files to your local hard drive and now you cannot locate them. By looking in your textbook you confirm that Problem P3-1A is an Excel problem template. As a Chapter 3 template it should be in the file titled “Kimmel_Financial_7e_Excel_Templates_Ch03.xlsx” and its worksheet title will be P3-1A within
the file. Open up Windows Explorer and click on the “Search” icon or button. From the new menu select “All Files and Folders.” The next menu will ask “All or part of the file name” and populate that window with “Kimmel_Financial_7e_Excel_Templates_Ch03.xlsx” – without the quotation marks and click on the search button. Windows Explorer should return a list of all folders or files which contained the sequence of “Kimmel_Financial_7e_Excel_Templates_Ch03.xlsx” in their titles. The results will also show you the “Path” to that file. You can screen print the results as a record.

While Windows Explorer Search will show you the path, you can also double-click on the target file, “Kimmel_Financial_7e_Excel_Templates_Ch03.xlsx” and Windows Explorer will open the file, if Excel is installed on the computer. Once Excel is open, by following the path “File > Save as” from the menu bar you can also determine the location of file from the dialog box since the “default” or “preferred” action will be to save the file back to where it came from.

Search will also accept “wildcard” characters. Searching for “*.xlsx” will find every file on the drive with an extension of “XLSX” since the “*”, a “wildcard” character means any letter(s), number(s), or character(s) in this position in any order or sequence.

Executing a search for “excel.exe” will find the application file for Excel and all the shortcuts to that file. Selecting “Folders” will restore the normal view of the Windows Explorer.

**File Shortcuts**

File shortcuts are icons you placed or “built” on the desktop which allow you to open a specific file and, therefore, a specific application. For example, you keep your timesheet as an Excel file on the computer’s local hard drive “Documents” subdirectory of the “Libraries” directory. When you arrive at work you log on, open up Excel and then open up your timesheet. A “Timesheet” worksheet is on the “Excel_Primer_Ch01_Data.xlsx” file. When you enter the office to start the day you may have to open Excel, then locate the “Excel_Primer_Ch01_Data.xlsx” file, open the file, enter the “Timesheet” worksheet and enter the date and time of your arrival. Rather than that series of steps, you can place or “build” a shortcut to the “Excel_Primer_Ch01_Data.xlsx” file on the desktop through the following steps that will open Excel and the file in a single set of double clicks. Assume that the “Excel_Primer_Ch01_Data.xlsx” file is stored in the “Documents” subdirectory of the “Libraries” directory. Open up Windows Explorer (Not Internet Explorer). If Windows Explorer fills the screen, reduce the size slightly so that you can see the desktop area next to it. Then click on “Documents” within the “Libraries” directory. You should see the “Excel_Primer_Ch01_Data.xlsx” on the right side of Windows Explorer. Right click your mouse on the “Excel_Primer_Ch01_Data.xlsx” file and hold the right mouse button down. Then drag the mouse cursor to the desktop area and release the right mouse button. A pop-up menu asking what you would like to accomplish will appear. Select the “Create Shortcuts Here” from the options. Windows Explorer will now create or “build” the shortcut to the “Excel_Primer_Ch01_Data.xlsx” file. This shortcut will usually have a name or title such as “Shortcut to Excel_Primer_Ch01_Data.xlsx” attached to it and contain a black sweeping arrow on a white square
background in the lower left corner. This arrow indicates that it is a shortcut to an application or file and not the file itself.

From now on, arrive at work, start up the computer, double-click on the shortcut to “Excel_Primer_Ch01_Data.xlsx” on the desktop and Excel will open and open the file at the same time. This does not restrict you to this file or workbook. Once the application is open, you can open other files or workbooks and close the “Excel_Primer_Ch01_Data.xlsx” workbook without closing Excel.

Since the icon “Shortcut to Excel_Primer_Ch01_Data.xlsx” is a shortcut, deleting it by clicking on it once and then pressing and releasing the “Delete” key or right clicking it and selecting “Delete” from the pop-up menu options will remove the shortcut from the desktop and not the file itself.

This same concept of building shortcut icons is applicable to other files as well. You need to find the file in Windows Explorer, use the right mouse button to drag the file name to the desktop, and then instruct Windows Explorer to create the shortcut. As addressed earlier, shortcuts can be renamed by right clicking them and selecting “Rename” from the options on the pop-up menu. You can also click on the icon title, wait a moment, and click again without moving the mouse. This will take you into the edit text mode on the icon title. You can now edit the title. When complete, simply click elsewhere to complete the process.
Chapter 2

INSTALLING, FINDING, AND SHORTCUTS TO MICROSOFT OFFICE

Chapter Outline

Terms and Conventions of this Text  
The Difference between Versions of Microsoft Office  
Purchasing Microsoft Office  
The Difference between Versions of Installing Microsoft Office  
Opening Elements of Microsoft Office  

Terms and Conventions of this Text

The term “Office Suite” or “Office,” capitalized as shown will infer or refer to the Microsoft Office Pro and Microsoft Office “Suite.” This “Suite” is a complement of applications. The term “office” as shown in lower case is place of business, work, or study as a location. The Microsoft applications and elements of the Office Suite will be shown in “title” case as “Word,” “Excel,” “Access” while typing in a series of letters forms a “word” and unlocking a door will give you “access” to the room. When the phrases such as “Office Suite” or “Office,” (case specific), “Open Word” or “Open Excel” are used, the instructions are generic – open your version of Microsoft Office Pro, Microsoft Office, Microsoft Word, or Microsoft Excel. The standardization of Microsoft products allows the use of this textbook with many versions of the Microsoft Office Pro and Office family. And, where a command installed in data file is not available due to the differences of versions, such as a data file structured with a particular function not available until Word 7 and the data file is being opened with Word 95, Word 95 will usually open the file and ignore that command string. Word 95 may offer an advisory message upon opening the file and formatting may be affected but the file should be available for use and editing allowing a high degree of access and usage.

A “Windows Compliant” application is an application that contains certain structures for performance, operations, and consistencies. For example pressing and releasing the “F1” (Function #1) key in almost every Windows compliant application will result in a “Help Screen” or a “Help Dialog Box” being presented, depending on the application and your position within the application. Pressing the “F5” key will refresh the current view of a directory within Microsoft Windows Explorer while “F5” will bring up the “Find” / “Find and Replace,” and “Go to” dialog box from within Word. However, within Excel the “F5” key will bring up the “Go to” dialog box, shown on the next page.
There are many processes, frequently referred to as “commands” that are accessed through numerous “paths.” A “path” is a way to get to some place such as a command selection. Office 2010 presents many of its paths as icons associated with the tabs of the menu bar. The menu bar is a listing of words such as “Home,” “Insert,” “Page Layout” and “References” near the top of the application, shown in the following screen print. When a tab, such as “Home” is selected, the frequently associated tasks with “Home” are presented immediately below it on the “Home” task bar. Each group of task bar icons has a label such as “Clipboard,” “Font,” or “Alignment” as seen at the bottom of the block for that group. A task bar icon such as the clipboard icon labeled “Paste” is usually a single click action. Assuming that you had copied something into the clipboard, clicking on the “Clipboard” icon would paste that last copied item into the current position of the cursor. Icons within the task bar group may have selectable options accessed by clicking on the drop-down arrow to the right side of its task bar icon as seen to the right of the underline, fill, and font color icons. If you were to click on the drop-down arrow to the right of the underline symbol, you could select from a variety of underline styles. The last underline style selected remains the style imposed the next time that task bar icon is clicked.
At the bottom right corner of many blocks of the task bar icons for a particular action, such as “Font” there may be an arrow in a small box. By clicking on the arrow more options are presented in a pop-up menu as shown in the following screen print where the “Format Cells” dialog box is shown. The dialog box is specific to the task. From this particular pop-up menu you can format the font and cells in many ways including superscript and subscript. The various tabs have different options for the cell and font.

Occasionally one or more items may be “grayed out” or “faded.” This indicates that, while that item is normally available through this particular path, due to your position within the application at this time, this particular option not available. (Note: It may be available via another path or when another action is accomplished.) Paths from the menu bar will be identified as “Home > Font > Pop-up Options” indicating that you click on the word “Home” on the menu bar and then select the pop-up options – the small arrow at the bottom right corner of the “Font” tab. Or the path may be identified as “Home > Font > Bold” which indicated click on “Home” on the menu bar, click on “Bold” in the Font area of the task bar. Another option for a function such as “Bold” is the “Ctrl-B” keystrokes where the control key is held down while the “b” key in upper or lower case is pressed. Whether the path through the menu bar or through the keyboard is utilized is often dictated by where you are and what you are doing at that moment in the document. Many of these commands such as bold are “on-off” switches. “Ctrl-B” keystrokes will bold it, “Ctrl-B” keystrokes a second time will remove the bold, and “Ctrl-B” keystrokes a third time will bold it again.

**The Differences between Versions of Microsoft Office**

Microsoft has numerous combinations of programs available as Microsoft Office with each focused on meeting the needs of a general population group. The “Home and Student” suite on of Office may include Word, PowerPoint, Excel, and OneNote and it may allow installation on three devices while the Office Ultimate suite may include Word, PowerPoint, Excel, OneNote, Outlook with Business Contact Manager, Access, Publisher, Groove, and InfoPath. There is no difference between the applications themselves within the suites, Word is Word, Excel is Excel, and PowerPoint is PowerPoint.

As defined by Microsoft, Word is a writing tool and PowerPoint is a presentation tool. Excel is a spreadsheet application while OneNote is a digital notebook which allows you to gather your notes in one location, preferable online which makes them accessible wherever you have Internet access. Outlook should not be confused with Outlook Express. Outlook is a true time management tool allowing you to control not only your electronic communications (e-mail) but your time and business resources. It will allow you to schedule a conference room for a meeting, invite via electronic invitation attendees, and get RSVPs back from the invitees. Access is a relational database and Publisher is a publications tool. Groove is a collaboration tool which allows numerous individuals to work on a single project in synchronization with each other. InfoPath allows you to create forms and deploy them electronically. Obviously as the capability of the Microsoft Office suite increases, so does the cost. As accountants sensitive to cost/benefit issues, this array of Microsoft Office suites generally allows us to select the appropriate tools as a single, integrated package to increase our efficiency at a reduced price in relation to purchasing each application individually.

**Note:** Most educational and public facilities computer labs and learning resource centers have computer systems that revert to a default configuration upon startup to reduce the probability of virus attacks as well as unwanted software and information from previous users. If you are using one of these systems, you should discuss the procedure of loading, accessing, and saving your data disk and your work with that center’s personnel. In consideration of the copyright laws and privileges provided through this purchase, not copy the data disk to a public system or distribute copies of the data disk to other individuals. You may copy the files from the data disk to other media formats for your own personal use and conveyance.
Purchasing Microsoft Office

Students and faculty are a privileged class for Microsoft applications purchases. They can purchase many of the Microsoft products, including some Microsoft Office suites, through their bookstores and numerous retailers on an “academic pricing schedule.” There are some restrictions and requirements to become eligible for these purchases so read the constraints and restrictions before purchasing these products. When purchasing the software be prepared to show proof of registration in a current term such as student identification card and a current term registration document. Faculty can usually use their faculty identification and a current pay stub or contract. Check with your bookstore or reseller to insure what documents are needed and the date of those documents.

Installing Microsoft Office

This installation sequence addresses a “routine” installation on a desktop system. You may find variances based on your specific system and preferences as well as your specific version. The installation of Microsoft Office is usually an automatic process that requires specific input at numerous points. Normally the media, a CD-ROM disk, is inserted into the appropriate drive and the computer “reads” the disk and initiates an installation process and presents you with an opening screen. This screen will initiate the installation and registration process. The “Product Key” is provided with your software. You will need this number anytime you install or reinstall the Office application.

The second screen is usually a licensing agreement screen that requires acceptance to continue. The third screen, shown here, asks if you want to “Upgrade Now or choose an installation type.” With an “Upgrade” option, the installation will replace previous versions of Office and “inherit” most default settings from those previous versions. The most common selection is “Upgrade Now.” The Microsoft Office suite is a large application and the desire to have two versions on one desktop system may be hard to justify. From this screen you can change the default directory into which the Microsoft Office Suite will be installed through the “Install to” window. If the directory does not currently exist, you can create it through this screen. For example, if you wanted Microsoft Office installed in the “Microsoft Office 2010” directory of the “C:" drive, you would enter “C:\Microsoft Office 2010” and then click the “Next” button.

In the process of installation Office will ask which of the specific applications you would like installed and where you would like to “run” them from. Normally this is all and you would like to run them from your computer. If your system is memory limited you may not want all of the Office Suite’s applications loaded onto the desktop. The bottom right corner of this dialog box also informs you of the space your selections require and the space available.

The Microsoft Office Suite is a large application. It may take in excess of twenty minutes to get the “Successful installation” screen. If the installation process faults out the documentation with the application can usually address the issue. Additionally there is help through “FAQs” (Frequently asked questions) on the Microsoft homepage at www.microsoft.com.
Telephone assistance is also available as listed in your application documentation. Once installed, the Microsoft Office suite will need to be registered for unrestricted use. Upon opening your first Office application the process will be initiated. It can be done via phone or Internet at that time or it can be delayed for several uses. The sooner the Office suite is registered, the quicker the advisory about registration will go away.

**Opening Elements of Microsoft Office**

During the installation of the Office suite icons for the applications may be placed on the desktop. When they are they will normally be a blue “W” for Word, a green “X” for Excel, an orange display sheet for PowerPoint, and a maroon key for Access (not part of the home and student suites), simply click on the application icon you desire to open the application. By default, these will normally be labeled such as “Shortcut to WINWORD” or “Shortcut to Excel.” These icons will normally have a black arrow in a white background square in the lower left corner indicating they are shortcut icons. You can rename an icon by clicking on it once, then right clicking it and selecting “Rename” from the pop-up menu options. To open a Microsoft Office suite element through a shortcut icon simply double-click the appropriate icon on the desktop. If icons are not placed on the desktop you can open the applications through the “Start” icon on the lower left corner of the desktop followed by clicking on the directory into which you have installed the Office suite and selecting the appropriate program.

You can “build” your own shortcuts using Windows Explorer. To open Microsoft Windows Explorer, not Microsoft Internet Explorer, click on the Windows Explorer icon on the start task bar in the lower left corner of the screen. On a desktop system, single click on the “Local Disk (C)” line within the “Computer” group. If Windows Explorer fills the screen or prevents you from seeing the desktop area, use the Maximize/Minimize button (two overlaying sheets shown below) in the upper right corner to reduce its size. Enter the search text such as “excel.exe” in the upper right corner field of Windows Explorer, this window may have “Search local disk” in faded gray text in it. (Enter “winword.exe” for Word, “excel.exe” for Excel, “msaccess.exe” for Access, or “powerpnt.exe” for PowerPoint.) Then press “Enter” to start the search. When the search is complete you need to make sure the results are reasonable. In the following screen print the perfect fit is the first result, “EXCEL.EXE”. The others maybe special applications for the Excel program to run. Click on the first result, “EXCEL.EXE” once, wait a moment then right-click and hold the right mouse button down. Now drag the mouse cursor to the desktop. When positioned over the
desktop, release the mouse button. You will be given several options including “Create Shortcuts Here” from another pop-up menu, shown here. Select the “Create Shortcuts Here” option to create a new shortcut to Excel. Once the operation is complete, you should be able to double click this icon on your desktop to open Excel from the desktop.

You can build shortcut icons for other applications in this manner at will. If the icon carries a title such as “Shortcut to WinWord (2)” that indicates that there is another shortcut with the title “Shortcut to WinWord” on the desktop. You can rename these shortcuts by right-clicking on the icon and selecting “Rename” from the pop-up menu options. You can also left click on the icon’s name once, wait several seconds, then left click again into the name without moving the mouse between clicks. This will take you into the “edit” mode for the title text. When you have finished renaming your icon simply click elsewhere to complete the process. You can reposition the icons by clicking on the icon once and keeping the left mouse button down. Then drag the icon to where you want the icon to be on the desktop. Strictly as a matter of personal preference I put my Office Suite icons in the upper right corner of the desktop and then specific file shortcut icons below them. These shortcuts are discussed under “File Shortcuts” elsewhere in the text.

An additional method of opening the elements of the Microsoft Office is through the Start > All Programs path. Then wait a moment or two for the menu pop-up to appear. From this pop-up menu, partially shown here, you can usually find the application you want, such as Word, Excel, Access, or PowerPoint as shown as components of the Microsoft Office directory here. Simply click on the target application and it will open.
Chapter 3

BASICS OF EXCEL

Chapter Outline

Excel Basics
Opening Excel
Workbooks and Worksheets within Excel
Opening Excel Files
The Exercise and Problem Templates
Demo File
Excel worksheets
Pop-Up Menus
Drop-Down Menus
New Workbook
Help
Saving Excel Files
Formula Bar
Row and Column Headers Excel
File Extensions within Excel
Sizing Workbook Presentations

Excel Basics

This chapter uses the “Excel_Primer_Ch03_Data.xlsx” file. Microsoft Excel is more than a spreadsheet application. The ability of Excel to accept and process numerical data, evaluate text data, have images and objects places on top of the worksheet, and the ability to sort, assembly and restructure data makes it a powerful application than the earlier spreadsheet applications which were limited in handling other than numerical data.

There are numerous terms that need to be appreciated in usage of Excel. First, the basic data file for Excel is called a “workbook.” The exercise and problem templates as well as the data files supplied on the accompanying data disk are all examples of workbooks. It is not uncommon to hear someone speak of an Excel workbook as a “spreadsheet file.” This terminology may describe the general appearance of Excel but Excel has grown far beyond the capabilities of spreadsheet applications of early computers and desktop systems. When Excel is first opened, by default the workbook will be titled “Book1” as shown in the title bar of the following screen print. At the bottom of the screen there are five “tabs” or “worksheets. These are the worksheets within the workbook of “Book1.” To select, switch to, or enter a worksheet, simply click on the “tab” identifying the worksheet. These worksheets, shown here as “Sheet1,” “Sheet2,” and “Sheet3” can be renamed and moved around. This is addressed under the “Excel worksheets” section. Within the worksheet, by default, the columns and rows are identified. The columns are identified as “A,” “B,” “C,” “D” and so on across the top of the worksheet. There are 16,384 columns available in Excel 2010; these are identified as “A” through “XFD.” The rows are identified by numbers down the left side of the worksheet in numerical order starting at “1.” There are 1,048,576 rows available in Excel 2010. This makes a lot (16,384 columns × 1,048,576 rows) of “cells” available. A “Cell” is the area identified by a column and a row identity. In the screen print the column “A” is shown as highlighted and “active” as well as the row “1.” This indicates that “Cell A1” is the active cell. This can be confirmed by the heavy outline around the cell at the intersection of column A and row 1. Immediately above the column A identifier is a window that contains “A1”. This is the “Name Box” and it shows the cell “address,” “coordinates,” or name of the current cell. The cell address is the “coordinates” – the combination of the column and row – “A1”. Names will be addressed in the Name Ranges section of the text.
Opening Excel

To open Microsoft Excel, double-click the icon on the desktop-labeled “Shortcut to Excel.” You may also find the Excel application file (.exe) by using Windows Explorer. To open Microsoft Windows Explorer, (not Microsoft Internet Explorer) click on the Windows Explorer icon on the screen. Click on the “Local Disk (C:)” where “C” is your hard drive letter, then click on “Computer.” Enter “excel.exe” in the upper right window as a search criteria, covered in Chapter 2. When located you can build a shortcut or simply double-click the results “excel.exe” file to open Excel.

Note: If this is accomplished on a computer lab computer or a system that reverts to a default configuration upon each startup, this shortcut may not be available upon the next startup due to the reverting to the default setup.

Workbooks and Worksheets within Excel

Within Excel’s terminology a “Workbook” is the file that Excel utilizes to contain the data the user has entered or Excel has created for the user. This “Workbook” can be saved with a file name such as “Excel_Primer_Ch03_Data.xlsx” which is one of the data files for this book. Within the data file or workbook, there are three worksheets. In the chapter 3 data file the first three worksheets or “tabs” are named “Information,” “Demo File,” and “Instructions.” In the vocabulary of the office or work space you will frequently hear a workbook or worksheet being called a “spreadsheet.” This is a carryover from earlier days when a spreadsheet was very similar in construction to a worksheet – a series of columns and rows forming cells into which numerical data primarily was entered. As computers and programs became more powerful, the restriction of a single spreadsheet within the file had been overcome, the terminology needed to change to reflect that change in capabilities. This resulted in the terms “Workbook” meaning a spreadsheet type file in which more than one spreadsheet was contained and almost all restrictions on text entry have been removed. Since the term spreadsheet was associated with an application restricted to lower power applications, the spreadsheets within workbooks have
become “Worksheets.” In the everyday office usage there is no harm in using the outdated vocabulary but the micro-perfectionist will grid his teeth when you do.

When a new workbook is opened, it will contain the number of worksheets that is determined by a setting on the “Popular” tab of the “Excel Options” dialog box. To change the number of default worksheets within a workbook when it is initially created, click on the four colored Microsoft symbol in the upper left corner then click on “Excel Options” near the bottom, right corner of the pop-up dialog box. Then, if “Popular” is not selected, click on “Popular” in the left column. Near the bottom third of the pop-up dialog box is “Include this many sheets,” shown in the screen print. You can change this value by direct entry or using the up and down arrows. A number from 3 to 6 is very reasonable. Most users do not utilize more than 1 or 2 worksheets and very few users use more than 4 or 5 worksheets within a workbook. This will not have any effect on previously created workbooks.

**Opening Excel Files**

Excel has a default directory that is usually the “Documents” folder of “Libraries.” This is the also the default directory for other Microsoft Office applications. As such, this directory can become rather full with many files that are not associated with each other. To open a file from Excel that has not had the default directory changed simply click on the four colored Microsoft symbol in the upper left corner of the application. The click on “Open” from the drop-down menu options. You can also use the key strokes “Ctrl-O” (hold the control key – Ctrl – down and press and release the letter “O” in upper or lower case and release the control key). Excel will present you with a dialog box as shown on the next page and all files stored within that default directory which are Excel formatted files will be shown.
If your files were saved or copied to the default directory of “Documents,” they should be shown within this directory window. If the target file is shown, you may double click the file to open it or single click it to select it and then click on the “Open” button on the bottom right corner.

If your file is not shown in the default directory it will generally be for one of three reasons. First, the file is not of an extension that will be displayed by default. A file extension is the group of (usually) three or four letters following the last period of the file name. In the name “Excel_Primer_Ch03_Data.xlsx” the “xlsx” is the extension and it is created by the preceding period. In the default presentation, Excel will show all files with the file extensions such as “XLSX,” “XL*,” “XLS,” and “XLT.” The “XLSX” extension is the usual Excel 2010 extension. What an extension does is to tell the computer what type of file this is before opening it. By default, when a computer opens a file with an “xlsx” extension, it will utilize Microsoft Excel to open that file. If the computer would be asked to open a “doc” or “txt” extension it would most likely open the file in Microsoft Word since these extensions tell the computer that these particular files are text documents. In the presentation screen print below, only files with Excel extensions such as “xlsx,” “xls,” or “xlt” are shown as possible selections. If your target file has an extension other than an Excel extension such as “xlsx,” “xls,” or “xlt” or you are unsure of the extension, you can change the files shown by using the drop-down arrow to the right side of the “Files of types” window to select the appropriate type of extensions. One option and one of the best alternative selections is the top selection “All files (*.*)”. This is the top selection of the listing and may require scrolling to see it. Once this selection is elected by clicking on it, all files, regardless of extensions, will be shown. If the file is shown and you select it, that does not mean that Excel can open it. If the data structure of the file is incompatible with Excel, Excel may try to import it, may present you with a dialog box that says the data is unreadable, or it may ask for further guidance.
The second reason you may not see your file in the “Open” dialog box may be that the file is located somewhere other than the current or default directory. To change the directory, click on the “Local Disk (C:)” line of “Computer” if the directory or file is on the “C:” drive. Other options, not seen in the “Open” screen include network drives on other removable media. Select the appropriate location and with each double-click the directories will open allowing you to “drill down” to the target file. When the target file is located, double-clicking it will open it into Excel. Directories and subdirectories of Windows are shown as yellow notebooks partially open, as “Downloads” is in the “Open” screen print.

The third reason a file usually cannot be found is the file is not there in the first place. Most computers and computer users are good at keeping order to their files whether by default, by accident, or on purpose. One of the great aids in finding a missing but recently used file is to click on the “Microsoft Circle” in the upper left corner of the application and you will normally see “Recent Documents” to the right side of the drop-down menu, as shown here. If your target file is shown, you can double-click on it and retrieve it. Now you have the option of using “Save as” to read where it is saved or to save it to a known or common location. The number of files shown is a function set under “Excel Options” at the bottom of the drop-down menu box.

If the file still cannot be located you may have to used the Windows Explorer search capability, addressed earlier, to locate it.

Once located, as discussed earlier, a file can be opened by double-clicking it or by clicking on it once to select it and then clicking on “Open” on the dialog box. If the file is located through a search process, you can double-click it to preclude having to memorize the location.

Once files are open, incremental saving will update the current file in its established location.

**The Exercise and Problem Templates**

The templates can be copied from the computer media and saved to a local hard drive such as the “C” drive or hard drive.

*Note:* Do not do this procedure on a computer lab or networked computer. If the computer to be used is a computer lab or networked computer, the files should be copied to personally transportable media in quantities not to exceed those of the media remembering that as data is entered the files will increase in size.

To open the template for Chapter 3, Problem P3-1A which is contained within the Chapter 3 data file, file name “Kimmel_Financial_7e_Excel_Templates_Ch03.xlsx,” open Excel, click on the round Microsoft symbol, click on “Open,” and follow or create the path to the directory or subdirectory where you saved the templates to. You can also use the keystrokes Ctrl-O (letter "O" for open in upper or lower case). When presented with the “Open” dialog box, use the drop-down arrow on the right side of the “Look In” window to expose all of the drives available. Locate and select the drive that contains the templates by clicking on that drive with the left mouse button. The displayed
files will change to those of the templates directory. Use the slide bars on the bottom or side of the display to move the display until you locate the file titled “Kimmel_Financial_7e_Excel_Templates_Ch03.xlsx”. When located, double clicking the target file will open the file immediately without further action. Clicking it once will require the “Open” button on the bottom right corner of the dialog box to be clicked as well. The template will load automatically into the display.

To move around the template you can use the arrow keys, Page Up/Down, Tab, Enter or click the left mouse button while the cursor is over the target cell. Alphabetical characters or numerical values can be entered into a cell simply by typing them in. If an entry starts with an arithmetic function symbol (=, /, *, + or -), preceding it with a single apostrophe (’) will force Excel to read it as text. Otherwise, an error message may appear in the cell unless it is a proper formula.

To save the data, click the “Save” icon (a disk icon) on the toolbar, follow the path File > Save or utilize the keystrokes Ctrl-S. All of these actions will use the default location and name—where it was opened from and its opening name—to save the file. If you desire to save the file elsewhere or with a new name follow the path File > Save As. This will bring up the “Save As” dialog box and allow you to assign a new name and/or designate a new save location. This dialog box will also appear when you save a newly created workbook for the first time.

**Demo Worksheet**

Within the “Excel_Primer_Ch03_Data.xlsx” file there is a demonstration worksheet of Excel basics titled “Demo Worksheet” which has quick and easy examples of how Excel can assist you in accomplishing the exercises and problems. The Demo Worksheet shows how the “Look-to” formula works and how it can be integrated into your work. Because you can do “add-ons” to the look-to formula you can utilize this to do math within the templates such as calculate the interest due on a note payable. It is suggested that you open this file, read both the information and instructions worksheets and then study the Demo Worksheet itself. This worksheet gives an example of a fully completed process of reading the presented material, entering it into a structured general journal, posting the transactions into a ledger, and then creating a trial balance. Very little of the data entry was accomplished through direct entry typing. The extensive use of the look-to formula also reduces the probability of keying errors. The templates have been set up slightly
different than the textbook so that the look-to formula can be used extensive throughout the exercises and problem. This formatting provides much of the numerical data in cells that can be referenced by formulas. As such you will see breaks in the text to provide this data block or statement. Some exercises and problems are reworded and the numerical data is placed to the right of the text. Advanced formulas such as concatenate are utilized in the demo worksheet. These are explained in their own sections within this book.

One of the features shown in the demo worksheet is the split screen presentation of Excel. This is fully explained in the Split Pane section of the book. It is a useful tool since you can maintain the presentation of the data of the exercise or problem in the upper pane while working in the bottom or vice versa. Each pane moves independently and you can reference or look-to the other pane while working. This feature will save time and allow you to maintain your orientation while solving the exercises and problems.

**Excel Worksheets**

By default, the worksheets of an Excel workbook are labeled “Sheet1,” “Sheet2,” “Sheet3” and so on. The number of worksheets appearing is controlled through the path “Excel Options” after the round Microsoft symbol in the upper left corner is clicked. Within “Popular” you can set “Include this many sheets” within “When creating new workbooks” to the number of worksheets you desire within each workbook. If you set this value to “6” and open up a data disk template you will only see the worksheets created by the author within the template or workbook since the workbook is structured that way and it is not a new workbook. This value affects only new workbooks. Since very few users use more than three worksheets and worksheets can easily be inserted into a workbook, this number can be low, such as three without restricting later action.

You can also rename a worksheet within a workbook to better describe the worksheet within the workbook. Suppose that you are tracking checks written within the calendar year of 2012. You could
name the workbook “Checks Written 2012” and label the worksheets “Jan 2012,” “Feb 2012,” “Mar 2012” and so on. To change the name of a worksheet you can click on the worksheet and then double-click the worksheet to enter the edit mode and change the text as desired. Or you can click onto the worksheet, then right click the worksheet and select “Rename” from the pop-up menu. If the entire worksheet name is highlighted, simply typing will replace the text. If the “insert” cursor – a single vertical line, is in the text, you can use the backspace and delete keys to remove letters and characters on the worksheet. There is a limit to the number of characters in the worksheet tab of about thirty. There are a few “special” characters that cannot be used in the naming of worksheets. Most of these are “above” the numbers on the keyboard.

The templates files all have their worksheets named for the exercise or problem presented on them. These worksheets can be referenced through page setup to assist in identifying the worksheet printout. This is addressed in the “Page Setup” section.

**Pop-Up Menus**

Excel will frequently respond to an action with a pop-up menu. This menu seems to appear out of nowhere and be anchored to nothing in particular. Usually it is associated with the currently active object. The most common pop-up menu is the one associated with the active cell, shown here:

This particular pop-up menu displays the most common commands for the active cell including cut, copy, paste, format cell, and insert comment. All of these commands are available through other paths but the action of right clicking the cell or range of cells to gain access to this pop-up menu is the quickest. Pop-up menus are not anchored to a specific item as drop-down menus are.
Drop-Down Menu

The drop-down menu is associated with another item such as the “Font” task bar items of the “Home” title on the menu bar. The drop-down menu from the “Font” menu, shown here, provides access to common file commands like Number, Alignment, Font, Border, Fill, and Protection. Other options on the menu include Strikethrough, Superscript, and Subscript as well as Underline options and (font) Color. On this menu the selections can be made on multiple tabs before invoking the changes by clicking “OK” which also dismisses the menu box.
New Workbook

In the process of accomplishing your work with the templates you may want an area to do "scratch" work not to be incorporated into the finished template or file. This can easily be accomplished in the area outside the gray borders of the exercise or problem or by opening up a new workbook within Excel. To open the new workbook click on the four colored Microsoft symbol in the upper left corner of the workbook, then click on “New” from the drop-down menu options, as shown in the screen print to the right. Excel will normally assign the new workbook a title like “Book2” or “Book3” upon opening. To switch between the workbooks click on “View” then click on “Switch Windows” within the Windows task tab and select the workbook you want to be active from the drop-down list as shown in the screen print below. All commands issued to Excel while two or more workbooks are open will only be effective on the active workbook. Commands such as copy, paste and format painting are available from one workbook to another while they are open. The title bar of Excel will reinforce the active workbook by showing the name in bright or full color while inactive windows are faded.

Help

The Help menu of Excel is very useful and gives you several options. Each version of Excel has its own methodology of presenting help so one explanation will not address all situations you might encounter. Within the Microsoft Office 2010 products Help is invoked by pressing and releasing the F1 key, the standard help key in a Windows environment. And Excel will present you with a dialog. With this dialog box open, you can type in your question, problem, or desired action and press “Enter” to start the search. Excel likes to search online so Internet access is helpful while using Help. When Excel presents you with a solution, you will need to evaluate it before implementing the proposed solution. If you like the solution, you can print it out for record keeping and reference later. If Excel cannot find an exact match, Excel may present you with several options to choose from. If Excel cannot find a match or has no idea of your question, it will ask that you rephrase the question. Your best responses come from active tense questions. If your first effort does not provide a reasonable response, try changing the question. For example, if you are trying to format a header, typing “Header” into the help menu will result in one array of options. However, entering “Format headers” will present a different array of options. An alternative is to change the plurals to singulars and the singulars to plurals in your query. The Microsoft homepage, www.microsoft.com, has additional help and assistance options. Some versions of Excel will ask if you want to continue your data search on the Internet and the Microsoft homepage.
On the Excel worksheet itself, inside the Excel application, in the upper right corner there are four buttons. The first is a question mark which brings up Help. The second button minimizes the worksheet, not the Excel application. The third button reduces or increases the size of the worksheet within the Excel application. The fourth button closes the worksheet, not the Excel application.

**Saving Excel Files**

The motto of “Save early and save often” of days gone by of desktop computing are not lost with today’s increased reliability of computers, operating systems, and applications. Excel offers numerous ways to save a file. The most common method of saving is to simply click on the 3.5” disk icon on the toolbar. This will save the file back to its original source making it easy to locate a second time or for later use. This may be done with the Excel templates accompanying this book if they have been copied to a recordable location. You can also use the keyboard command “Ctrl-S” to invoke the save command. When using “Save” the file is copied back to its original source in the original format.

A third option is available by clicking on the four colored Microsoft symbol in the upper left corner of the workbook and then clicking on “Save As” from the drop-down menu options as shown in the screen print to the right. This option allows you to change the name and type of file. Excel will save files in numerous formats including XLS – pre-Office 2010 format, XLSX – Office 2010 and beyond, text – txt, or csv – a comma delimited or separated value format.

In selecting the name for the file there are a few special characters that cannot be used. These include most of the characters above the numbers on the keyboard and several others. The availability of characters is ample. It is also a good idea to date files that are used often. This allows you to simplify backup and recovery from a previous point if something goes awry. For example, you are using Excel to keep your checkbook and each day you enter the checks and transactions into the file called “Checks.” By modifying the title to include Friday’s date each week you will retain the file in its previous week’s status even if this week’s file is lost. By using the dash or hyphen and spaces, legal characters within a file name within the Microsoft Windows environment, you can label the file “Checks 2012-01-06” for the first Friday of January 2012. The following Friday using File > Save As you would modify the file name to “Checks 2012-01-13.” The file “Checks 2012-01-06” is still in the directory if “Checks 2012-01-13” is no longer available for some reason. While you may have lost one week’s worth of data input, you have a defined point to recover from. If you are working on a professionally maintained IT system, your system administrator may be backing up your data for you. You should contact him or her to discuss the matter.

You can also change the file type to a text type, comma delimited, another spreadsheet format, or a multitude of other file types as shown in the “Save As Type” drop-down menu from the “Save As” dialog box. Use caution when saving as non-Excel file formats since many of the features of Excel are not data or formatting features that can be saved into these data structures. Thus, when saving an Excel file as a text or document file, the formatting and tables within the file may be lost and not recoverable. In this case, it is best to save the file in its default Excel structure first and then save it in its alternate structure. Then, if editing is needed, it can be done within Excel and exported again as the specific data structure format.
When the save command is used Excel may reset the “Undo” command. That is, if you conducted an event that could be reversed through the “Undo” arrow (addressed elsewhere in the book) the ability to recover through “Undo” may be lost when you save the workbook. Undo and Redo are discussed in the Undo and Redo section of the text.

**Formula Bar**

One of the presentations on the “Home” tab is the current cell and formula bar as shown in the following screen print. The active window area, showing “J39” in the screen print tells you where the cursor is at the moment and will provide the range name if the cell has a range name. The formula bar is where you write and view formulas. In the screen print it is showing “=D11*D12”. While the formula is showing in the formula window you can modify it or delete it.

![Formula Bar Screen Print](image)

**Row and Column Headers**

The presentation of letters for the columns and numbers to identify the rows is controlled through the “Formulas” section of “Excel Options” accessed through the Microsoft four colored symbol in the upper left corner of the workbook and then “Excel Options” at the bottom of the drop-down menu. The default is Column then Row – A1 for the first column, first row. By entering a checkmark in the “R1C1 Reference Style” option, shown in the screen print below, you can change this to rows then columns as 1A for the first row, first column.

![Excel Options Screen Print](image)
Another option through “Excel Options” is to show row and column headers and to change the color of the Gridlines within Excel. These options are under “Advanced” within the “Excel Options” as shown in the following screen print.

**File Extensions within Excel**

Excel will open files which have numerous file extensions. The default is to display all Excel files with the extensions of “xl” and most of the common Excel extensions starting with “xl” such as “xlsx,” “xls” and “xlt”. You can change what is displayed within the “Open” dialog box, shown at the right, by clicking on the down arrow to the right of the “All Excel Files” text, which is the default selection, and then selecting “All Files” or the particular file type you want to open. The top option in the listed stack is “All Files (*.*)”. With this option all files will be displayed within the “Open” dialog box. From this display you can instruct Excel to open any displayed file. Not every displayed extension can be opened by Excel but if it can, Excel will open it. If Excel has to “import” the data, Excel may ask some basic questions about the import process before the completing the process. Not all imports and opening events will result in good data presentations. If you open a file through an Excel import or opening process and the resulting data display is unusable, try opening the source application again and exporting the data as “CSV” – comma separated values, or “TXT” which Excel can handle very well.

Some of the files that Excel can handle are database files from common database programs such as Microsoft’s Access and other spreadsheet/workbook programs such as Microsoft Works. Excel can also open files with extensions such as “csv” – comma delimited or separated values, “txt” – text files, and “prn” – print files. This allows a maximum capability and flexibility of Excel as it can interact with these other programs through this capability.

Excel can also save files in many of these formats. This capability increases Excel’s versatility. As an example, to save an Excel workbook as a text or “txt” file, first save the workbook as an Excel file since this file will retain all of the applied formatting information. Then use the “Save As” function to save the file with the “txt” extension. In this operation you can keep the same file name since “extension.xls” and
“extension.txt” are two different files and Excel will not confuse them. However, as just implied, when you save the file as a text file, something may happen to the file. Excel may be required to remove Excel formatting structures that are not compatible with the file standards for text or “txt” files. Excel will normally advise you that it is removing that special formatting before it completes the operation. Since you probably wanted this formatting, as recommended, you should first save the file as an Excel workbook file and retain these for later availability.

Just because the file was saved in another application in an Excel format or in a format Excel can open or import does not mean that the data will be usable in Excel once opened. It may be unusable, require modification, or require editing prior to use. One way to minimize this is to paste it from one application to another – a subject covered elsewhere in this text.

**Sizing Workbook Presentations**

You can size the Excel application to fill the screen, fill part of the screen, or minimize it to a tile on the taskbar. You can size the worksheet to fill the display area of the application, partially fill the display area of the application, or minimize it to a tile inside the Excel display area.

The appearance of the Excel application is controlled by the first of the two buttons on the upper corner of the Excel applications window. The first button, an underlining type bar, minimizes Excel to a tile with a large green “X” and smaller green icons on the task bar. To restore it simply click on the taskbar icon. Clicking on the second button, a box shape, changes to size of Excel on the desktop. As a toggle, clicking on the second button once maximizes the size of Excel, clicking a second time restores it to its original size.

The third button, a red “X” closes Excel, usually with a warning if a workbook has not been saved since its last changes. If Excel does not fill the screen moving your cursor near any edge of the Excel application will cause the cursor to turn into a double-headed arrow. While the cursor is in this mode you can drag the Excel application window to a new size by holding the primary, usually left, mouse button down while moving the mouse to the new window size. On the left or right borders the cursor will display arrow heads going left and right indicating you can change the width. Near the bottom or top borders the arrow heads will be up and down indicating you can change the application’s height. Near the corners the arrow heads are diagonals indicating you can change height and width at the same time.

On the individual worksheet there are four buttons, as shown in the screen print above. The first brings up Help. The second, an underlining type icon, minimizes the worksheet within Excel. To get it back to presentation size simply click on either of the box type tiles on the icon with the file name in the display area. The third button, a box type button, changes the size from filling the Excel display area so a size smaller than the Excel display area. This will let you display two or more worksheets within one Excel application window. When the worksheet is not filling the Excel display area you can resize it by moving the cursor near its edges until the cursor turns into a double-headed arrow, just like the application earlier, and then holding the primary, usually left, mouse button down and dragging the worksheet to a new size.

The fourth button, an “X”, closes the worksheet, not the Excel application. If the workbook has had changes since the last save operation, Excel will usually ask if you want to save the changes.
Chapter 4

BASIC EXCEL DATA

Chapter Outline

- Basic Data Entry
- Sum Formula
- Nested Parentheses
- Basic Formulas
- Recently Used Files
- Look to Formula
- Undo and Redo
- Mathematical Order of Operations
- Add ins

Basic Data Entry

The reference file for this chapter is titled “Excel_Primer_Ch04_Data.xlsx” within the data set. This section uses the Basic Data Entry worksheet within the data file. Usually the best way to input data into Excel is in its most basic form and then let Excel format it through default or manually imposed formatting. Suppose you are asked to enter the value “123456.789” into Excel. **Note:** Within Excel you do not enter commas, Excel will when asked. You may get “123,456.7890”, “123,456.789”, “123,456.79”, “123,456.8”, “123,457” or something else as Excel complies with its constraints of formatting and column width as shown below.
In cell A1 of Basic Data Entry worksheet on the screen print the value is shown to four significant digits with Excel adding the zero as this cell is formatted to display. As you work your way down the rows in column A the cells are formatted to show one less significant digit than the preceding cell and Excel starts rounding values off as necessary. In column C the same values are presented formatted not to show commas as separators. Part of this formatting is done quickly by the “Increase” or “Decrease” decimal buttons which are circled in the “Number” tile of the “Home” menu. If you input “123456.789” and Excel does not automatically insert the comma you can select the cell after input and click on the comma icon on the toolbar, shown in the screen print as one of the common formatting task, Excel will insert commas automatically. Once the commas are inserted, you can click on the decimal display icons, one to increase the significant digits displayed and one to decrease the significant digits displayed, to attain the correct number of decimals. Each click changes the decimal places by one place.

**Note:** Changing the significant decimal places displayed does not change the significant digits held by Excel for computational purposes.

The only value actually entered in Excel is the “123456.789” value in cell A1. All of the other cells look to another cell. This shows that Excel is format sensitive to the cell, not the source.

Suppose that you had entered the “123456.789” into cell S1 on the Basic Data Entry worksheet. In this cell there appears to be “####”. This is an indication by Excel that the numeric value in this cell exceeds the width or displayable area of the cell. If you click into this cell and make it the active cell, you will see in the formula bar that this cell contains the full value as keyed in. To resolve this presentation issue you can manually resize the column by placing your cursor over the small vertical line between the “S” column and the “T” column header markings. Your cursor will become a double-headed arrow with a vertical line through it such as:

Once the arrow appears you can hold your left (primary) mouse button down and drag the column to the right into a greater width. This should permit the full display of the contained value. You can try this on the “S” column of the Basic Data Entry worksheet of the Excel_Primer_Ch04_Data.xlsx workbook. You can also auto format the width of the column to the width of the widest data within the column by placing your cursor over the vertical line between the “S” and the “T” column and double-clicking the left mouse button when it becomes a double-headed arrow. This may not give you the full three significant digits as cell formatting may overrule the presentation. However, as discussed earlier in this item, you can change the decimals displayed and then auto format the width again.

You can also right click the letter identifying the column, “S”, a couple of times and then select “Column Width” from the pop-up menu. Since there are ten digits and a decimal point in the value, try a width of “12” and see if it displays acceptably.

Suppose that the input was $123,456.78. One recommendation is that you input the value as 123456.78 and then click the “$” formatting button on the taskbar. This will place a dollar sign in the front of the value and place two decimal places into the format. This process will also normally format the width of the column to display all significant digits. This applied formatting is called “Accounting” and places the dollar sign in front of, and away from, the first digit, the one in this case. This formatting can be applied by clicking into a cell to make it active, then right clicking the cell and selecting “Format Cells” from the pop-up menu. Then selecting the “Number” tab and selecting “Accounting,” the fourth selection on the list. Through this dialog box you can override the default of two decimal places and change the currency sign to “None” or other common currencies. Additional formatting capabilities are explained in the formatting cells section elsewhere in the text.
Note: The formatting within the Excel templates is already accomplished. Most of the values are formatted with the “Currency” selection. The presence of dollar signs is on or off as appropriate and the establishment of decimal places is correctly set.

NOTE: IT IS RECOMMENDED THAT YOU NOT REFORMAT THE EXCEL TEMPLATES OR CHANGE THE COLUMN WIDTHS. THESE HAVE BEEN SET WITH PAGE, PRESENTATION, AND PRINTOUT CONSIDERATIONS.

Sum Formula

This section uses the “Basic Formulas” worksheet of the “Excel_Primer_Ch04_data.xlsx file. The “Sum” formula of Excel is an easily utilized tool. When the entry of data into a cell starts as “=SUM(“ Excel is looking for a math function to follow, not just “add” as “sum” implies. You can enter basic data as “=SUM(2+3+4),” as shown in cell A1 and “effective” in cell M5, and Excel will calculate the answer as 9. You can also reference cells such as the formula in cell A3 and “effective” in cell M3. This cell contains the formula “=SUM(W3+W4+W5).” This formula adds the value in cell W3 (2) to the value in cell W4 (3) and then adds the value in cell W5 (4) to calculate the amount of 9. You must determine the appropriate formula to place into the cell and the appropriate references. While “sum” implies add from grammar school days, as shown in cells A5, M5, A7, M7, A9, and M9, Excel simply uses “sum” to indicate a following math operation.

In the cell range from A16 through AC22 the transaction states that the company initiated business on January 1, 2012, by issuing 40,000 shares of $1 par Share Capital – Ordinary for $50,000 cash. The formula in cell T20 is a “Look-to” formula “=P17”, addressed in the “Look to” section of this book. It simply references cell P17 which contains the cash contributed, $50,000. In cell Y21 the formula determines the amount to be credited to Share Capital - Ordinary by multiplying the number of shares, a value contained in cell V16, by the par value of the shares, a value contained in cell D17. The result of this mathematical operation is $40,000. Since you determined and placed the amount of cash contributed to the company in cell T20 through the “Look to” formula and you determined the value of the Share Capital – Ordinary issued in the transaction in cell Y21, the amount going to Share Premium – Ordinary for shares issued is the result of subtracting the Share Capital – Ordinary value from the Cash value. This formula is “=SUM(T20-Y21)” and results in $10,000. This is what the formula in cell Y22 does. There are other ways that formulas can be used to determine these values but subtracting the first of two credit values from the only debit value of the journal entry assures you that the debits will equal the credits within the journal entry. This does not guarantee you that the values are correct. That is part of the challenge of the exercise or problem.

With the “=SUM(“ you must contain the formula with parenthesis marking the beginning and end of the formula run. You can also use parenthesis to contain and isolate the math operations precedent within Excel. Excel will do operations of parenthesis, multiplication and division before operations of addition and subtraction – “Please My Dear Aunt Sarah” (Parenthesis – Multiply – Divide – Add – Subtract) as a memory clue. Therefore the formula =SUM(3*4+1) will result in 13, cells A26 and M26. Excel reads and acts in the order of 3 multiplied by 4 and then 1 is added to the result of the multiplication operation. If you had wanted to multiply the sum of 4+1 by 3 the formula could be written as “=SUM(3*(4+1))”, “=SUM((4+1)*3),” or “=SUM((4+1)*3).” The result of these formulas will be 15 as shown in cells A28 through M32. The use of multiple or “nested” parentheses is common and accepted within Excel as it is in any other discipline of basic math operations. There is a maximum of 7 “nestings” within some versions of Excel. If this is a problem you can reference one formula in another formula making the process rather large.

If the formula is simple you can shorten the sum formula to =2+3+4 and the result will be 9, cells A36 and M36. In this case, Excel can understand the basic formula and the use of “SUM” to start the formula is unnecessary. As shown in cells A38 through M44, the “SUM” is often optional.
Excel will also mix constants with cell references within the formula. For example, in cell M48 of Basic Formulas worksheet of the Excel_Primer_Ch04_Data.xlsx file is a formula with “hard values” (=PMT(8%/12,30*12,250000,0,0)) entered that calculates the payment on a mortgage. Cell M50 utilizes the values in the following table, cells A52 through M56, (=PMT(M52/12,M53*12,M54,M55,M56)) to compute the values. The formula takes annual interest rate in cell M52 and divides it by twelve to compute the period (monthly) interest rate. The formula then takes the life in years, thirty, and multiplies it by twelve to generate the number of periods (payments) of the mortgage. Then the principal of the mortgage, $250,000, cell M54, is introduced. Cell M55 tells the formula that there is no balloon payment and cell M56 tells the formula that the payment is made at the end of the interest period. This utilization of “look to” allows you to easily change the values utilized by the formula. Suppose you wanted to see the difference in payments of making the payment at the beginning of the period (month) and the end. Simply change cell M56 from “0” to “1”. Since only the formula in cell M50 is “look to” only that cell’s value changes. To accomplish this in cell M48 you need to “enter” the formula and change the correct “0” value, which could be either of the last two zeros (it is the last zero). Excel, in utilizing annual values for interest and life, converted these to monthly values by dividing or multiplying by twelve.

**Basic Formulas**

The basic Excel formula is the summing of two numbers such as “2 + 2.” Within the “Basic Formulas” worksheet of the “Excel_Primer_Ch04_Data.xlsx” workbook on the data disk, the cell A60 contains a statement that identifies what is in cell M60. The basic formula written in cell M60 is actually “=2+2”. The “=” (equal sign) tells Excel that an executable function is following and Excel is expected to do something. The “operator” of “+” tells Excel to add the preceding and succeeding values together. The presentation within cell M60 is not “=2+2” but is “4”, the result of the operation. If Excel had been asked to add 2 and the letter “a” together without Excel knowing the value of “a”, as shown in cell M62 the result will be “#NAME?”. Excel was told to perform the executable function of addition through the “=” and the “+” however, one of the values, the “a”, has no numerical value and therefore Excel cannot complete the function. In this event Excel provides you with the “#NAME?” enunciator. This is one of the ways Excel tells you that it is unable to complete what it thinks you asked for.

There are some variations of the simple or basic formula “=2+2”. For example, if you entered the formula “=sum(2+2)” Excel would provide the answer of “4” as shown in cell M64. The term “Sum,” which indicates that the operation asked for is an addition, subtraction, division, or multiplication operation. The “Sum” may be entered in upper or lower case, or in mixed case and Excel will convert it to upper case. An input such as “=SuM(2+2) will result in “=SUM(2+2)”. You can also enter “+=2+2” or “+=+(2+2)” and Excel will display the answer of “4” as shown in cell M68. Excel, as stated, is rigid in its input formatting but, if it can figure it out, Excel will either modify the input, offer a formatting modification, or complete the operation. These inputs are shown in this screen print.

Other math operations such as subtraction can be written as “=4-2”, “=+4-2”, and “=SUM(-4-2)” as shown in cells A73 through M77. Multiplication can be written as “=4*2”, “=+4*2”, and “=SUM(4*2)” as shown in cells A79 through M85. Notice that Excel removes the plus sign between equal sign and the first value of the formula.

Excel uses the “/” as the indicator or command for division operations. To divide the value of 4 by 2 the formula within Excel would be “=sum(4/2)”, “=4/2”, or “=+4/2” in cells A90 through M98. The “+” (plus sign) will not interfere with the division operation and placed there as a matter of habit by many
individuals. Excel will remove it upon completion of data processing. Excel will handle references within division just like other math operations. You can divide the contents of cell W106 by the contents of cell W105 through the formula “=SUM(W106/W105)”. You can also mix references and hard values in the division formula such as “=SUM(W104/6),” cell M105.

“Look to” Formula

The process of writing a formula such as “=2+2” can be referred to as entering “hard numbers” into a formula. This process is rather restrictive while it can accomplish almost everything a professional has to do within Excel. The process of entering hard numbers increases the amount of keystrokes and increases the probability of errors. Even though Excel is rather rigid in its input criteria, if you understand the capabilities of Excel, you will find that the methodology of getting numbers or values into Excel is almost unlimited. One of those methodologies is the “Look to” formula. This formula, used earlier in this section, is actually a command to Excel to accept the value inserted in another cell at this point of the process. In cell M112 of the Basic Formulas worksheet of the “Excel_Primer_Ch04_Data.xlsx” file the formula “=W113” was entered. The value displayed in cell W113 is the same as the value in cell M112 through this “Look to” formula. In cell M114 the “Look to” formula reads cell W112 and results in the text “Source Values”.

The “Look to” formula can be utilized wherever the values are available in cells as specific values. In cell A121 there is a sentence that contains the value of $50,000. This single value cannot be “looked to” since it is within a text string – a sentence and cannot be read as a single value. However, the sentence presentation starting in cell A125 is slightly different – the text starts, then stops so that the value can be inserted into its own cell then the text continues in the next cell. This allows the $50,000.00 value to be “read” by a “Look to” formula as shown in cell T129. And this value, $50,000.00, can be used in the formula in cell Y131, which contains the formula “=SUM(P126-Y130)”. The Excel templates are structured to utilize this “look to” capability as much as possible.

Mathematical Order of Operation

This section uses the “Math Order” worksheet of the “Excel_Primer_Ch04_Data.xlsx” file. Excel has a very specific order of operations in mathematical functions. The order of operation will be within contained parenthesis in the order from the deepest interior set of parenthesis first to the most exterior set of parenthesis. Within the parenthesis Excel solves mathematical operations in the order of Multiplication ~ Division ~ Addition ~ Subtraction. This can be remembered by “Please My Dear Aunt Sarah” (Parenthesis – Multiply – Divide – Add – Subtract). In this example =SUM(2*(2+4*(5 -1)-2)*4) the correct answer is “128,” as shown in cell M1. The order of events is (5-1) or 4, then this four is multiplied by the preceding four resulting in sixteen. Then two is added resulting in eighteen and two is subtracted resulting in sixteen. Then the sixteen is multiplied by the preceded two resulting in thirty-two and this thirty-two is multiplied by the succeeding four resulting in one hundred twenty eight. Had this problem been solved from left to right the answer would have been sixty-four. When more than one set of parenthesis is utilized within a formula they are referred to as “Nested.”

Nested Parentheses

This section uses the “Math Order” worksheet of the “Excel_Primer_Ch04_Data.xlsx” file. Nested Parentheses is the use of more than one set of parentheses within a formula. These are required in the complex formula structure of Excel and help establish the order of precedence for data manipulation. For example, the formula for the interest payment of an interest bearing note payable is “=IPMT(Interest rate for the periods specified, the payment number for which you want the interest payment for, the total numbers of payments for the note payable, the principal amount of the note payable, the future value of the note payable, and a statement of whether the payment is made at the beginning or the end of the interest period). It is shown in cells A4 through T6. To determine the interest paid in the second payment of the third year (the 26th payment) for a loan at 8% annual interest with interest compounded monthly
where payments are made at the end of each month over a life of 30 years with a zero future value – no balloon payment, the formula could be “=IPMT(8%/12,(12*2)+2,12*30,150000,0,0)”. This structure requires Excel to divide the annual interest rate of 8% by 12 months to apply the monthly compounding factor, then the second payment of the third year is twelve months times two years plus another two months, the next set provides twelve months per year for thirty years, then a principal value of $150,000 – 

**Note:** Do not use dollar signs or commas within the dollar value of this entry, it will cause Excel to fault the formula, there is not balloon payment so the value of zero (0) must be entered, and the last zero tells Excel that the payment is being made at the end of the month. Had this last value been a one (1) Excel would have calculated the interest payment as if the payment was being made at the beginning of the payment and interest accruing period. The result of this formula, a negative $981.81 is shown in cell P6 of the Math Order worksheet. The reason for the negative value is since the principal was a positive value indicating cash flows in, then the interest payment would be a cash flow out – a negative value. Had the principal been negative indicating cash flows out, then the interest payment would be positive indicating cash flows in. This will be addressed in the Cash Flow within Formulas section elsewhere in the text.

However, the issue is nested parentheses. The parentheses surrounding the twelve months times the two years assures you that Excel will multiply the months in a year by the number of years before adding the months of the third year. As addressed earlier, Excel works on an order of precedence for mathematics of parenthesis, multiplication and division operations before any addition and subtraction operations. So Excel should do the multiplication of the months and years before adding the third year months but the use of parentheses assures that it will.

The formula “=SUM(2*(2+4*(5-1)-2)*4)” utilized in the Mathematical Order of Operation section earlier can only be accomplished through nested parentheses. This example is shown in cell M1 on the Math Order worksheet of the Excel_Primer_Ch04_Data.xlsx workbook. One of the very helpful events that occurs within Excel while utilizing nested parentheses is the coloration of parentheses that Excel provides when closing them. If you were to enter the formula =SUM(((1)+(2)+(3)+4)+(2+3)+6+8+7) as entered in cell P9 and then click into the formula window you will notice that Excel adds coloration to matching parentheses to provide guidance as to where the opening parenthesis is for the closing parenthesis you just added.

**Recently Used File List**

As discussed earlier, one of the things Excel will do is present the predetermined number of previously used files if the “File” title is clicked on the menu bar. The number of files presented is controlled through the “Excel Options” path from the four colored Microsoft symbol in the upper left corner. This brings up the “Excel Options” dialog box. On the “Excel Options” dialog box, click on the “Advanced” option and you can change the number of files shown by increasing or decreasing the “Show this number of Recent Documents” number within the “Display” group. Excel will number the first nine of the list. These items are shown on the screen print provided. This is a very useful function. A number from 3 and 10 seems to be most reasonable but it can be set to your preference.
**Undo and Redo**

With the versatility and power of Excel and the Microsoft Office products, errors are bound to occur due to the capability to manipulate data. When going to copy a cell and using keyboard commands of Ctrl-C, the keystrokes of Ctrl-V may be struck instead, resulting in a paste operation rather than a copy operation. To correct this event utilize the curling to the left blue arrow, the “Undo” arrow, on the toolbar. Clicking directly on it will reverse the last action taken. This arrow can be clicked numerous times to reverse a series of previous events. There is a drop-down menu selection available with “Undo” through the small arrow pointing down just to the right of the symbol. With the selection of one of the events depicted you can reverse not the last event but an event that occurred three, four, or five events ago. In earlier versions of Excel, the “Save” function will preclude undo’s from the period prior to the last “Save” operation.

“Redo” will reinstate an “Undo” action. This icon is a blue sweeping arrow to the right, a mirror image of the “Undo” arrow. It also has a drop-down menu associated with it to select prior events.

**Add-ins**

Excel has many functions and formulas that are not loaded by default to save memory. This is a simple procedure that will ensure that all of the functions and capabilities of Excel addressed in this book are available to you on your system. Click on the four colored Microsoft symbol in the upper left corner of the Excel application and click on
“Excel Options” near the bottom right corner of the pop-up menu. Click into “Add-ins”. The objects in the upper portion are currently active while those in the lower block are available but not active. To install an Add-in, such as the “Analysis TookPak,” click on it, then click “Go”. Excel will show you several application options and tell you it is not installed and ask if you want to install it now. Consider selecting the Conditional Sum Wizard, the Euro Currency Tools, the Lookup Wizard, and the Solver Add-in. Click on the affirmative response and Excel will whirl and spin while it installs the add-ins. The add-ins will be seen in the tiles of the menu bars as you work with Excel. The actual size of Excel will grow very slightly and it might take momentarily longer for Excel to load but neither are appreciable values. Once loaded into Excel, their capabilities will be available to every workbook and worksheet.
Chapter 5

COPY, CUT, PASTE, CLEAR, AND DELETE

Chapter Outline

Copying and Pasting
Copying a Formula
Absolute Reference

Cut Command
Clear and Cut
Delete and Delete

Copying and Pasting

You can utilize the “Excel_Primer_Ch05_Data.xlsx” file as a reference for this chapter. This section utilizes the “Copying and Pasting” worksheet. Excel allows you to copy and paste both cells and data from within cells. Both of these functions can be used in accomplishing the tasks of the templates. The first function to be addressed is copying a cell. This function is accomplished by “activating” the cell you would like to copy. To do this, select the cell in any way you desire. The options are put your mouse cursor over it and click into it, use the arrow keys on the keyboard to move from your currently selected cell over to the desired cell, strike the tab key to advance the active cell, or strike the enter key to advance the active cell. When striking the enter key, the cursor will advance or move as controlled by the setting under “Advanced” and “Editing Options” of the Excel Options addressed earlier. (Click on the four color Microsoft symbol in the upper left corner, then click on “Excel Options” in the lower right corner of the drop-down menu.) The active cell can be identified by the heavy or accented outline such as the cell containing the 6 in the presentation here:

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
</tr>
</tbody>
</table>

A range may be selected clicking in a corner cell of the square or rectangle and then by sweeping from that corner of the square or rectangle of cells to the opposite corner of the square or rectangle with the cursor while the left (primary) mouse button is being held down. It does not matter in which direction you sweep to select the range, down and right, down and left, up and right, or up and left. In the example on the next page the range selected will be highlighted such as cells 25, 26 and 27 as shown on the next page.
Once a cell or range of cells is selected, you can copy it by clicking on the two overlaying sheets of paper on the “Clipboard” tab of the “Home” toolbar or by right clicking the cell or cells and selecting the “Copy” command from the pop-up menu. You can also utilize the keyboard command of “Ctrl-C”. When copied, the cell (or range of cells) is carrying its (their) formatting details with it (them). This feature is very convenient since you would normally want copied data to be presented in the same manner as the original presentation. The data is now in your clipboard and ready for pasting. Move your cursor to the desired pasting location and click on the Clipboard icon of the Clipboard tab on the Home toolbar or right click on the cell and select the “Paste” command from the pop-up menu. You can also use the keystrokes “Ctrl-V” to paste the copied data.

If you selected more than one cell, the group or range of cells copied will be pasted in the same orientation as those from the upper, left most cell of the selection. When pasting, if you have selected to paste over a cell or range of cells containing data, Excel may not warn you that you are pasting over data. In this event, the existing data will be overridden by the paste operation. However, all may not be lost – you may be able to use the “Undo” command, addressed in the Undo and Redo section of this book, to recover the data. When working with Microsoft Office XP or newer versions of Excel there may be more than one item on the clipboard at a time. To view the various items on the clipboard click on the arrow at the bottom right corner of the Clipboard tab on the Home toolbar. And the items on the clipboard will be displayed. The clipboard function can hold up to 24 objects from any of the Microsoft Office products registered to the system so you can open up Microsoft Word, copy multiple items out of a document, open up Excel, and paste those items into Excel in any order you desire from the clipboard. The clipboard will retain its contents through save operations and, as stated, it displays all of the information from all of the registered products allowing it to be used as an import/export tool for multiple items.

A feature associated with “Copy” is the “Insert” function. There are at least two “Insert” functions within Excel. One inserts graphics, graphs, text boxes, headers/footers, etc. through the “Insert” toolbar. The other “Insert” is a function to insert cells and it is accessed by clicking into a cell or range of cells and then right clicking to get the pop-up menu. Then selecting “Insert” from pop-up menu. And Excel will ask, as shown in the screen print to the right, whether you want to shift the cells down or right or if you want to insert a new row or column at this position. Excel will warn you if you are going “push” data off the workbook because you have data in the cells that are at the edges that will be replaced with the insert action. If an entire row or column is copied by placing the cursor on the row or column identifier instead of within a single cell or range of cells, when you click on the new position of the row or column data, right clicking on the identifier will ask you if you want to insert the data or paste the data through a pop-up menu. Pasting replaces the current data,
inserting the data inserts a new row or column at that position and pushed the other data at and below it down for a new row and right for a new column. Formulas associated with the copied cells will be relational unless they were absolute referenced in the source. (See Absolute Reference section elsewhere in the text on this matter.) If the copy command is initiated and not completed with a paste command, simply striking the “Esc” (Escape) key a couple of times will cancel the operation.

You can copy and paste a cell, a group of cells, a row or rows, or a column or group of columns utilizing the Copying and Pasting worksheet of the Excel_Primer_Ch05_Data.xlsx file.

**Copying a Formula**

This section utilizes the Absolute Reference worksheet of the “Excel_Primer_Ch05_Data.xlsx” file. Excel has several ways of copying formulas and functions. Most of them are considered “relational” in their operation. This effect is explained and shown in detail in the “Absolute Reference” section of this text. The quickest and easiest way to copy a formula within Excel is to click into the cell containing the formula and use any of the numerous ways to copy the cell such as Ctrl-C to copy the cell. Then move into the target cell and paste the formula there via any of the numerous ways to paste data such as Ctrl-V to paste the value into the cell. To COPY (not cut) the formula and not have it read relational to its target cell requires a little bit of technique unless the formula is absolute referenced. Open the “Excel_Primer_Ch05_Data.xlsx” file and select the “Absolute Reference” worksheet. Click into cell A4 which contains a formula summing cells A1 through A3 to make A4 the active cell and have its formula displayed in the formula entry window. In the formula entry window at the top of the screen, click into the formula entry window to the right of any data or text displayed and then sweep from right to left with the left mouse button down, highlighting the entire formula entry window. When the entire formula in the formula window is highlighted, use any of the copy commands of Excel such as Ctrl-C to copy the data. Press the “ESC” (escape) key so Excel “releases” cell A4 or Excel will change the formula in cell A4. Move to the target cell, C5, click into it to make it the active cell. Now click back into the formula window and paste the formula with any of the paste commands of Excel such as Ctrl-V and press and release the “Enter” key or move out of the cell in any manner you desire. The formula is now in the target cell with its original references, not relationally moved. In this process, you copied the contents of the cell, not the cell, to a new location.

To show the difference of a relational move, click into cell A4 and use any copy command to copy the formula. Click into cell A5 and use any paste command to paste the formula. While the formula result in cell A4 is 6, the formula result in cell A5, with the formula copied from cell A4, is 11. This is because the formula in cell A4 is “=A1+A2+A3” and, relationally moved down one row, the formula in cell A5 became “=A2+A3+A4”. This is (was) a relational move of the formula. If you copy cell A4 and paste it into cell A6 the result will be 20 – the formula is now “=A3+A4+A5”.

This technique of entering the formula bar and copying a formula will also allow you to copy a formula out of one cell and paste it into another cell as part of a new, larger formula. Remember that the “=” (Equal sign) is not used within embedded formulas. If you are building embedded formulas, as addressed in the Embedded Formulas section of this text, you can proof the formula segment in one cell, use this concept to copy that segment, and then paste it into the embedded formula cell. For example, contained within cell A10 is a formula summing cells A11 through A16. Copy the formula from cell A10 using the technique discussed above. Now click into cell S11. Remember to press the Esc (Escape) key to “release” the original cell reference and insure that cell S11 is the active cell. Click into the formula entry
window to the right of the formula text contained in cell A10. Then use any of the “Paste” commands such as Ctrl-V to paste the formula from cell A10 into cell S11. Click into cell G10, click at the right of the formula shown in the formula window and copy the formula. Click into cell S11, remember to “release” cell G10, and click into the area to the right of the already entered formula. Then paste the new formula onto the end of the previous formula. Your formula should look like “=SUM(A11:D16)=SUM(G11:J16)” in the formula window and it should read “False” in the cell – Excel says the sum of cells A11 through D16 is not equal to the sum of cells G11 through J16. Copy the formula from cell M10 and paste it onto the end of the formula in cell S11 and your formula should look like “=SUM(A11:D16)=SUM(G11:J16)=SUM(M11:P16)” and again, Excel should be showing “False” as an assumed logical answer.

When this is accomplished, click into the formula window and change the second and third “=” (equal) sign in the formula to a + (plus) sign to have the formula read “=SUM(A11:D16)+SUM(G11:J16)+SUM(M11:P16)” and Excel will respond with the sum of the three columns, 579. Remember that “=” (Equal signs) within formulas may cause an Excel error or fault message. And you have summed three distinct areas of the worksheet with only a few key strokes.

Using this technique you can copy a portion of a formula and paste it back onto itself to build larger formulas and functions. This was done extensively on the “Concatenate” worksheet. It reduces keystrokes and it assures that you have an operational formula segment being placed into an operational formula segment reducing troubleshooting.

**Absolute Reference**

Excel has a function called “Absolute Reference.” This function will maintain cell reference by column, row, or both when the formula or function is copied or moved. To understand the function, you need to appreciate how Excel copies and pastes or moves things, which are two different operations. On the “Absolute Reference” worksheet of the “Excel_Primer_Ch05_Data.xlsx” file there is a small range of number and some formulas to show how Excel handles “Absolute Reference,” “Copy and Paste,” and “Cut and Paste” or “Move.” In cell G1 the formula is totally relational. The Excel formula reads “=A1+A2+A3,” what Excel is really saying is look six (F, E, D, C, B, A) columns to the left (formula in column G, first value in column A,) then, do not change rows, (both formula and first row reference is row 1), and add that value to the value six columns to the left and one row below the formula row, and add that sum to the value found in the cell six columns to the left, and two rows down. This is “Relational Referencing.” To prove this concept out, click into cell G1 to make it the active cell and then use the keystrokes “Ctrl-C” or right click the cell and select the copy option off the pop-up menu to copy the formula (contents) of the cell. Now move your cursor over to cell G6 and click into cell G1, activating that cell. Now right click the cell and select “Paste” from the pop-up menu or utilize the keystrokes Ctrl-V to paste the formula into cell G1. When you complete the paste operation, the value returned by the formula is not the “6” of cell G1 because you are telling Excel to mathematically add the three cells, A6, A7, and A8. You moved the formula relationally.

Click back into the cell G1, click into the formula window to the right of any text, then select and copy the formula in the formula window. Click into cell G6, remember to “release” cell G1, and click into the formula window. If there is text there, click to the right of it, and sweep the cursor with the left (primary mouse button down) the text to highlight it. Now paste the formula from cell G1 into the window and press Enter to complete the process. The response is the same 6 shown in cell G1 as the formula was not relationally copied and pasted, it was “text copied and pasted.”

To overcome relational reference factors Excel allows you to place a special character – the dollar sign ($) in front of the column identifier, the row identifier, or both the column and row identifier changing “Relational Reference” to “Absolute Reference.” In the “Absolute Reference” worksheet of the data file click into cell G2, this formula is absolute reference to the column only and is relational to the row. The formula is “=$A1+$A2+$A3.” Copy the formula, do not enter the formula window to copy it,
and paste it into cell M6 and watch the results. The formula returns a value of zero. However, inspection of the formula will show that while moved right several columns the formula remained referenced to column A – “=A$5+A$6+A$7” – even though the rows relationally shifted. Remember, the dollar signs are only in front of the row references of the formula.

Click into cell G3 and copy the formula, do not enter the formula window to copy it. Then paste it into cell M7 and the result is most likely 18. The formula changed relationally from “=A$1+A$2+A$3” to “=G$1+G$2+G$3” where the rows are absolute referenced, not changing with copy and paste due to the dollar signs, while the columns remain relational.

Copy, without entering the formula window, cell G4, and paste it into cell M8. The formula result is the same 6 shown in cell G4 – because, with absolute reference imposed on both the columns and rows in cell G4, “=A$1+A$2+A$3”, the formula copied and pasted into cell M8, “=A$1+A$2+A$3” is the same.

Imposing absolute reference can be a powerful tool as you control which references – column, row, or column and row are maintained. You can mix absolute and relational references as shown and you can absolute reference one value and relational reference the next. For example, there is a mini tax table on the “Absolute Reference” worksheet. The formula was placed into cell E29 was written to absolute reference the tax rate cell, cell F27, and then relational reference the purchase amount in column A starting at row 29. The formula was then dragged down the column. In the drag process, it maintained the absolute and relational references and produced the tax amount. The formula in cell E29 is “=F$27*A29,” in cell E30 it becomes “=F$27*A30,” in cell E31 it becomes “=F$27*A31” and so on.

**Hint:** Suppose you write a long formula and now have to make it absolute reference. You can use “Find and Replace” – Ctrl-H - to do the work but be aware of what it may do against you. Using this capability, ALWAYS SELECT A RANGE TO CONTROL IT – if only one cell is selected “Find and Replace” can run the entire worksheet without control. Look at the formulas on the “Absolute Reference” worksheet in cells A45 through D48. If copied to a new location, the calculations will fail or be incorrect as they are totally relational to the range A1 through A3. Select the range A45 through D48 on the “Absolute Reference” worksheet. Then use the keystrokes Ctrl-H to bring up the “Find and Replace” dialog box. In the “Find What” window enter the letter “A” without quotation marks. In the “Replace With” window enter “$A” without the quotation marks. Then select or click on “Find Next” (for the most protection possible) and Excel will highlight the formula it is about to edit. You can see this in the formula entry window. Click “Replace” and Excel advance automatically after the replacement option. Continue to review and replace the “A’s with “$A”s and Excel will complete its operation on the range or “fault” out and give you an advisory when four replacements have been accomplished. If you had selected “Replace All,” Excel would have accomplished all four replacements on the selected area without you having the ability to bypass or decline a replacement. Remember to select a range with this function or every letter “A” (in this case) will be subject to replacement with “$A”. Excel will generally not “damage” a formula with “Find and Replace” but to rely on Excel for data management and protection is bad technique. Now you can “Copy and Paste” the formula and it will be absolute referenced. If you had wanted only absolute column reference you would have used “$A” as the replacement value. If you had wanted only absolute row reference you would have used “A$” as the replacement value.
**Cut Command**

The “Cut” command is accessible from the keystrokes Ctrl-X, right click on the cell or range of cells once they are highlighted and selecting “Cut” from the pop-up menu, or click on the scissors icon on the taskbar of the Home tab on the toolbar. To “Cut” a cell or a range of cells, highlight the cell or range of cells. If the cells are not adjacent to each other you will have to do more than one cut operation to get them as “Cut” will not accept nonadjacent cells. When you cut a cell or range of cells from an Excel worksheet they will not disappear immediately from the worksheet. The cut cells will remain encircled by a dancing daisy chain, sometimes referred to as “marching ants,” until you paste them into their new location. When you use the “Cut” command to put the cells in the new location you may not receive any warning about over printing existing data. If you want to place the data in more than one location you will have to highlight it again, easy since it will remain highlighted after the “Paste” operation, then copy it and place it in the new location. Cut is a one-time operation, you can paste several copies of a cell or range of cells from a “Copy” operation - but not from a “Cut” operation.

*Note:* When you cut a cell containing a formula with the “Cut” command and paste it into a new location the formula retains its original references even if it was relational.

**Clear and Cut**

To Excel “Clear” and “Cut” are two different commands. The “Clear” command is on the pop-up menu you are presented with when you right click a cell or range of cells as “Clear Contents”. Clear Contents deletes the information from the cell or range of cells without posting it to the clipboard for later use. If you want to recover the information, it may be available through the “Undo” arrows or command.

The “Cut” command is available on the pop-up menu you are presented with when you right click a cell or range of cells, or by using the Scissors icon on the Clipboard tab of the Home toolbar when a cell or range of cells is active or highlighted. The item or items in the cut cell or cells is not moved until you select a target cell or range of cells and paste the cut cells in. “Cut” is a onetime pasting event. If you want to paste the cell or range of cells in several locations, “Cut” is not the tool, use “Copy.” However, once pasted from a “Cut” process, the new area is currently highlighted so you can copy it without reselecting it. Formulas moved by “Cut” retain their original references, even if relational, formulas copied and pasted are moved relationally unless the reference values are absolute references in the original cell.

**Delete and Delete**

This section utilizes the “Delete and Delete” worksheet of the “Excel_Primer_Ch05_Data.xlsx” file. There are actually two “Deletes” within Excel. The first is the keyboard “Delete” key. This key will simply remove data from the worksheet without removing cells or their formatting. Any formula referencing the deleted cells may or may not continue to work correctly. This depends on how the formula works and where the value of the deleted cell was in the formula. If the deleted value is an element in a summing formula, that formula should continue to function properly since 1+0 is 1, a defined and acceptable process. If the formula added the values contained within three cells together and then divided that sum by the value in a fourth cell and one of the numerator values is deleted the formula should continue to work. If the denominator was deleted the formula will generate an error or fault since division by zero and null values is undefined.

The second “Delete” is from the pop-up menu found by right clicking a cell, range of cells, a row or range of rows, or a column or range of columns. When this option is used the selected cell or cells will actually be removed from the worksheet. This command will result in a pop-up dialog box asking what
movement you would like to occur as the cells are deleted – would you like the remaining cells to fill in the void you are creating by moving to the left or by moving up. If you are deleting a row or a column the movement will always be up for a row and left for a column.

These deletes are two totally different functions – the “Delete” key clears data but does not clear formatting or remove cells. The “Delete” selection on the pop-up menu removes cells from the worksheet and causes other worksheet cells to be repositioned.

The “Delete and Delete” worksheet within the “Excel_Primer_Ch05_Data.xlsx file has been structured so that you can delete the contents of cells and delete various rows and columns to see what will happen to sum and division formulas. The “Sum” formula generated values will change as ranges deleted (cleared) or deleted (removed). If row 9 is left untouched the division operations in row 25 will continue. However, deleting row 9 will remove the sole element of the denominator of the division formula within row 25 and this will cause a “fatal fault” or error in the formulas of row 25. The division operations on row 28 utilize a sum of the range of rows from 12 through 14 as a denominator factor. Deleting a numerator row should not affect the formula’s operation nor should deleting any one or two rows of 12 through 14 since a value is still in the denominator. However, deleting all of rows 12 through 14 will cause an error.

Look at the formulas before and after the operations and you will notice that Excel updates the formulas as you restructure the worksheet.
Chapter 6

LOCATIONS AND LOCATING

Chapter Outline

Go To
Find

Find and Replace
Name Ranges

Go To
You can use the “Excel_Primer_Ch06_Data.xlsx” file with this chapter. This section uses the “Named Ranges” worksheet of the data file. With Excel worksheets as large as they can be you frequently traverse to various areas via the scroll bars, the “Tab” key, the “Enter” key, or the arrow keys. Excel has a “Go to” function accessed by the keystrokes Ctrl-G (Go to), through “Find and Select” on the “Editing” worksheet of the Home taskbar, or the “F5” function key. The pop-up dialog box asks where to? You can enter a cell address such as A4 and click “OK” and you are there. If you have named ranges, as exists on the “Go To” worksheet, when you invoke the Ctrl-G (Go to) command, you will be presented with those areas in the dialog box for quick and easy selection. The ability to use “Go To” to move to a cell labeled “NetIncome,” “AdvertisingExpense,” or “GrossSales, (named ranges cannot have spaces) is another reason to name a cell or a range of cells within Excel. Obviously, using abbreviations would make the issue easier.

Click into the “Named Range” worksheet of the data file and bring up the “Go To” dialog box by using the key strokes “Ctrl-G.” Select named ranges and you will notice that Excel moves you to the range and highlights not one cell if the range has more than one cell, but all the cells. When a cell, such as A1, is sought, “Go To” takes you to that single cell even though it is part of the named range of “Red”. (Spaces are not acceptable in the names of ranges.)

Find
This section uses the “Find” worksheet of the “Excel_Primer_Ch06_Data.xlsx” file. With Excel worksheets being as large as they can be and the display screen as small as it can be, it is often hard to find a specific item quickly. Particularly if a prankster has hidden it by changing its font to white on a white background filled cell. There are four hidden text strings on the “Find” worksheet. Two cells have the value “Hi!!!!” and two cells have the value “You found it!!!!” in them. By using the keystrokes Ctrl-F for “Find” or using “Find and Select” in the “Editing” tab of the Home taskbar you will be given the Excel “Find” dialog box. In the “Find What” window of the dialog box enter “Hi” – without the quotation marks. You do not have to put any “!” (Exclamation points) but if you do, do not put more than four. When “Find Next” or “Find All” is clicked, Excel will initiate the search and find one of the two strings.
The cell that Excel locates will contain no visible text since the text coloring and the cell background are both white. However, in the formula window you will read “Hi!!!!”.

At this point, close the dialog box. When the dialog box is closed, look at the borders of the cell just below the cell that contains the “Hi!!!!”. Something is causing the right side of that cell not to display properly. By clicking into the cell you will find the first of the “You found it!!!!” text strings. Click into a cell 3~5 cells above and to the left these two cells and then highlight the cells down and to the right for about ten rows and ten columns. Look closely and you will see the text strings appear in the blue highlight as white text.

**Hint:** Looking for something hidden and do not know where it is? Try highlighting the cells. Excel will tell you about how much of the worksheet has been used by the scroll bars. The more the scroll bars can move, the larger the worksheet data range. In the data file there appears to be no reason for such “long” scroll bars.

**Tip:** If a range of cells is highlighted when the “Find” function is activated, it will only search those cells. Excel will frequently ask if you want to search the rest of the worksheet but there are instances where you do not get that advisory because you closed the function prior to the function completing the find on the selected cells.

You can also specify conditions or parameters on the “Find” function through the “Options” button near the bottom right of the dialog box. The options include searching the entire workbook from that worksheet and instructing Excel to search in a vertical – by columns, or horizontal – by rows routing. You can also specify if the search is case sensitive or if you are only interested in cells that contain all and only the input you have instructed. If you select “Case Sensitive” and “Match Entire Cell Contents,” the “Find What” of “Apple” will not return “apple,” “apples” or “Apples.” Through the “Format” options you can find italics text only, left or right justified text and other formatting conditions. Remove any text from the “Find What” window for this as it will find only that text with that format if entered and you want to find the format, not text. On the “Find” worksheet there are some formatted cells. Try a search for cells formatted to “Times New Roman.” When searching for formatting the cells located may or may not contain data or text.

**Find and Replace**

This section uses the “Find and Replace” worksheet of the data file. Excel has a “Find And Replace” function that is considered an added option of the “Find” function. This function is activated by the keystrokes Ctrl-H or by using “Find and Select” in the “Editing” worksheet of the Home taskbar. When called up you will be given the same basic dialog box as “Find” but you will be on the second, back, page – “Replace”. You can utilize the Ctrl-F keystrokes and then select the “Replace” page. The “Find and Replace” function is powerful and dangerous as well as extremely useful.

**Tip:** One of the safest ways to control “Find and Replace” is to limit its range by selecting a column, a row, or a range of cells rather than letting it roam the worksheet. The second safest thing (not in any order) is to utilize the “Find Next” button and then determine if you want the item found replaced or not.
If you do, click the “Replace” button and Excel will replace that one item and then find the next item and ask for approval before replacing that item. If you do not want that one item replaced, click the “Find Next” button and Excel will move on without replacing it.

The “Find and Replace” worksheet is available within the “Excel_Primer_Ch06_Data.xlsx” file for a minor exercise. Select the “Find and Replace” worksheet and click into cells C5 and D5. This range selection will contain Excel’s find and replace powers to two cells for the demonstration. Use the keystrokes Ctrl-H to bring up the “Find and Replace” dialog box. Since you want the formula in cell D5 to be absolute referenced so you can copy it to other locations without changing its relational reference, tell Excel to find the letter A in the “Find What” window. Upper or lower case does not matter. In the “Replace With” window tell Excel to replace it with “$A$”. This will establish absolute reference for both column and row as the resulting formula will be “=SUM($A$1:$A$5)+SUM($A$7:$A$11)+SUM($A$13:$A$17)”.

However, when “Replace All” is clicked cell C5 changes from ABCabc to $A$BC$A$bc. Had only one cell been selected on the worksheet Excel would have replaced every letter A on the worksheet, upper or lower case, with $A$ as fast as your processor can process the request. Excel will correct the situation by clicking on the “Undo” arrow on the toolbar. A “Save” operation in earlier versions of Excel may preclude recovery by “Undo”. Since the goal is to make the formula in cell D5 absolute reference from relational and we do not want any other cells to be affected, and if only one cell is selected, Excel will find and replace on the entire work sheet the key is to utilize “Find Next” rather than “Replace All.” With “Find Next,” Excel will identify the next letter found and “ask” what you want done – “Replace,” “Replace All,” “Find Next,” or “Close.” By selecting “Find Next” and then “Replace,” Excel is contained appropriately. With a cell such as D5 all of the “A”s will be replaced at one time when “Replace” is clicked.

Excel’s “Find and Replace,” through “Options,” will also find formats and specific conditions. Click into cell D5 and bring up the “Find and Replace” dialog box. Click the “Options” button on the dialog box and click to insert checkmarks into “Match Case” and “Match Entire Cell Contents.” Then click on “Replace All.” Excel will replace only one item on the entire worksheet – cell D13 if your “A” was upper case and cell D14 if your “a” was lower case. Remove these two checkmarks for the next exercise.

This worksheet is formatted to Arial and 10 point font. However, one cell is formatted to Times New Roman and 12-point size font. The goal is to change that unique formatting to the Arial and 10 point font formatting through “Find and Replace.” Clear the entries in the “Find What” and “Replace With” windows since these are “limiters” and the goal is to replace all of the font with this unique formatting with Arial and 10 point formatting. Click into “Format” on the “Find What” line and set the font to “Times New Roman” and “12” point size. Then click “OK.” Click on the “Replace With” line’s “Format” button. Set the font to “Arial” and the point size to “10” and click “OK.” Then click “Replace All.” Excel should find one occurrence to replace. Major power here is that you do not have to limit the “Find and Replace” function by input values in the “Find What” and “Replace With” windows. You can search for borders, fills, font colors, and other options without regard as to where it is or how it is utilized.
Also available is the ability to control the direction of processing – by rows or columns. With “Find” you can control whether Excel will look in formulas and comment boxes. With “Find and Replace” Excel will process all elements meeting its criteria so self-control is important.

**Tip:** Use your imagination to control “Find and Replace” or your results may not be what is expected and the Undo arrow may be the final solution. Excel’s “Find and Replace” is powerful and quite useful.

**Tip:** When finished finding and finding and replacing formats remember to click on the drop-down arrow on the right side of the “Format” button and click “Clear Find Format” and OK out of it. Excel will remember your preferences even if you don’t. And it will affect your next find or find and replace action.

**Clue:** One of the options in “Find and Replace,” like in “Find,” is to do a find and replace on the entire workbook. While powerful, workbooks may contain many more relationships than visible on the worksheet. This function is very powerful – and dangerous.

**Named Ranges**

Excel allows you to name a range as shown on the “Named Ranges” worksheet within the “Excel_Primer_Ch06_Data.xlsx” file. Access the Named Ranges worksheet for this example. For Excel a named range is a single cell or multiple cells identified through the naming process with a unique name. Naming a cell or range of cells has some controls and restrictions such as no spaces and no use of what Excel classifies as a special character such as !, @, or $ type symbols - usually the symbols above the numbers on the keyboard. To name a cell or range of adjacent cells, highlight the individual cell, or for a range click into the upper left, upper right, lower left, or lower right cell and sweep the range. If the range of cells are not adjacent cells, click into the first cell and highlight it or highlight the first range, then release the mouse button, press and hold the Ctrl (Control) key down and click into the second cell or highlight the second range, release the mouse button, continue to hold the Ctrl (Control) key down and continue to highlight the cells or ranges with the mouse releasing only the mouse button after each cell or range of cells. You can right click into the range and select “Name a Range” from the pop-up menu. You can see, and verify, the defined cells in the “Refers to” window at the bottom of the box. You can also enter the name directly into Excel by clicking into the “Cell Identity” window on the formula bar and entering the name while the range is selected. By clicking on the drop-down arrow to the right of this box you will see the other named ranges for the worksheet.

On the Named Ranges worksheet the ranges have been named for their fill colors. The ranges of Red, Yellow, Blue, and Green are all adjacent cells for their ranges. The ranges Purple and White are non-adjacent cells. Excel will include only the values identified by the range in the summation and math functions utilized by formulas calling for the range Purple or White. That is, when range Purple is cited in a formula, the values contained in the White cells are not taken into account even though they are amongst the Purple cells, they are not members of the Purple range. The cell C25 contains a formula summing all of the cells within the range of A18 through A25. This value is 76. However, only the cells A18, A20, A22, and A24 are considered and identified as participants within the range name Purple. The sum of Purple is only 36 as shown in cell C24. The formula to sum the range Purple is =SUM(Purple). In this situation, Excel is not case sensitive with SUM or Purple.
To the right of the cells are formulas showing different ways of summing the values of the cells. As you can see, you can address the range of Red several ways – “A1+A2+A3+A4”, “A1:A4”, or “Red.” You can see how Excel will add the values of Red and Yellow together and how it will add the rest of the ranges together as well as you look down columns C and D of the worksheet.

**Tip:** Within Named Ranges a cell can be a member of two or more ranges. This does not bring in the values of other cells in the separate ranges.

**Tip:** Within a workbook, the name of a range can only be used once. You cannot have “Red” on Sheet 1 and on Sheet 2 within the same workbook.
Chapter 7

CUSTOMIZING EXCEL

Chapter Outline

Excel Defaults Edit through Options
View Tab through Options Save As to Change File Locations and Names
Calculation Tab through Options Excel Workbook / File Naming Recommendations
Changing the Default File Directory

Excel Defaults

This chapter uses the “Excel_Primer_Ch07_Data.xlsx” file as a reference. The “defaults” of Excel specify and control how Excel is going to respond in situations where the response is not specified by the user. For example, clicking on the “Save” icon on the shortcut bar, the 3 ½” disk icon, will result in the current workbook being saved back to the original location if it has been saved before. If it has not been saved before, Excel will look at the defaults and accept that the directory of the workbook should be utilized as controlled through the path from the four colored Microsoft symbol in the upper left corner and then “Excel Options” at the bottom of the drop-down menu followed by selecting “Save” on the dialog box’s menu as seen below. In this tab there is a window labeled “Default file location.” By changing this window’s values you can change the default location. Through a standard installation of Microsoft Office this location may be “Documents and Settings.” This same location is utilized by Word and other programs as their default save location. However, due to the large number of Excel files generated, I have chosen to change the default location to a new directory called “Microsoft Office Excel Files” on the local “C” drive. The average user may not need to change the default values of Excel but knowing how to “read” them will enable the user to follow the path to the dialog box to see where Excel is saving their data.

Another default established through this path on the “Popular” tab is the font style and font size as well as how many worksheets to place in a new workbook. There are many fonts installed into the Office Suite through the default loading process. Almost all of these are available to Excel by changing the value of the “Standard font” selection. By changing the font and the size to that font to the values to your most
commonly used, any new workbooks opened will utilize those default values to establish the style and size of the font.

On the “Advanced” tab you can set the direction of movement for the selection when the “Enter” key is pressed under the “Editing Options.” Under the “Display options for this workbook” options you can choose whether the vertical and horizontal scroll bars are shown and whether you want to show the sheet tabs or not. Under the “Display options for this worksheet” options you can select to show row and column headers and show zeros in cells with zero values. And you can select whether you want to show gridlines and the color of those lines.

On the “Customize” tab you can add or remove tools from the Quick Access Toolbar at the very top of the Excel window. The Quick Access Toolbar, shown in the top portion of the screen print to the right allows single click access to your popular tools. The lower section of the screen print is the currently installed tools. These are totally user selectable and can set to your preference.

“Save As” to Change File Locations and Names

The “Save as” tool is available from the drop-down menu associated with the Microsoft four colored symbol in the upper left corner. During the “Save as” operation you can change the name of the file, location of the file, and the format of the file. To change the name, access the “Save as” dialog box and enter the new name in the “File Name” window. Excel will keep it while you make other changes such as location and format. To change the location of the file upon saving, use the scroll bar on the left pane of the dialog box to show your location. If it is on the local drive or on the home group network, you may have to click or double-click on the location to expose directories in the left pane or in the right pane of the dialog box. As a Windows compatible system, you can drill down into subdirectories by double-clicking on the directory titles in the path. To change the format of the file during the save operation select the format from the drop-down menu associated with the “Save as type” window. Some formats, such as PDF, may require additional cost add-ins before they function correctly.

When file name, location, and format are set clicking “Save” completes the operation. Once opened a simple click on the “Save” icon will save the file back to its original location without closing it. The key strokes Control-S will also save the file.

One of the advantages of “Save as” is it will identify where a currently open file is residing if you cannot locate the file other than from the “Recent documents” listing.
Excel Workbook / File Naming Recommendations

There are many ways to name an Excel Workbook file. In this text, reference files are saved in workbooks titled to match the chapters – “Excel_Primer_Ch07_Data.xlsx” and “Excel_Primer_Ch08_Data.xlsx” type naming. Excel will understand that it is an Excel file through the extension of “xlsx”. Depending on how your specific default and viewing preferences are set in Windows Explorer you may see the file as “Excel_Primer_Ch07_Data.xlsx” or “Excel_Primer_Ch08_Data.xlsx”. These titles tell you what the relational reference of the workbook is. Had these files been named “File01” and “File02” you would have to look through every workbook file to find the material referenced in the chapter seven or eight of the text. In most cases capitalization is not an issue so a search for “Excel_Primer_Ch07_Data.xlsx” will return the same results as a search for “excel_primer_ch07_data.xlsx” would unless special conditions are set. If you are working across a network with a file server such as you might find in a computer lab or business environment, capitalization may be an issue due to your operating system. The “07” format is utilized so that Windows and Excel stack the files correctly – Ch01, Ch02, Ch03 ... Ch10, Ch11 etc. You can use the “Sort” function on the columns F and G on the “Sort” worksheet of the “Excel_Primer_Ch07_Data.xlsx to see the differences in how standard sorting methods sort two file naming options. The chapters are not sequentially sorted when preceding zeros are not used.

Suppose that you are working on an inventory workbook for finished goods and you chose to call the file “fg inventory” which Excel would make “fg inventory.xlsx”. This file may contain all activities within the subject area and would be required for a long period of time as both an active file and as a reference file. If the file is continuously opened and saved as “fg inventory” and that file is lost or corrupted by some action such as a hardware failure, software failure, or virus, the file and all of its data may be lost. However, if you back this file up through a system back up function on a recurring basis, you should be protected to some degree. If you add a date to this file name such as “fg inventory 2012-05-08” and after working with it for some period of time such as a week, and use the “Save as” function to save it as “fg inventory 2012-05-15” you have built your own backup into the system. If “fg inventory 2012-05-15” file is not available for some reason you may be able to revert to “fg inventory 2012-05-08” for usage. Upon opening the “fg inventory 2012-05-08” file, you should immediately use the “Save as” function to save it as your new working file such as “fg inventory 2012-05-07” to protect your base file of “fg inventory 2012-05-08”. You must understand that you have lost data entered only into the “fg inventory 2012-05-15” file and will have to reenter that data but one week’s worth of data is less than all of the data in history of the file. The “2012-05-08” string is year in four digit format, month in two digit format, and day in two digit format. This gives proper stacking in date order of the files in the directories.

Suppose that you are required to submit the “fg inventory 2012-05-08” file to an instructor or to your boss in an electronic format. You could save the basic file as “fg inventory 2012-05-08” and then use the “Save as” function to save it as “fg inventory 2012-05-08-Schildhouse” (Your last name) so that upon receipt the instructor (or the boss) can immediately identify the file as to subject and ownership. If you had to make a revision on the same day and resubmit it, try something like “fg inventory 2012-05-08 Schildhouse Rev a” to indicate the revision status and preclude overwriting the original file.

In naming files there are a few constraints. A file name may contain more than one period such as “fg inventory.2012-05-08.xlsx” but this may confuse several operating systems and users. It is best to avoid multiple periods. The forward or backwards slashes, “/” or “\”, should not be used as this indicated different levels of directories to an operating system. Some networking systems and operating systems are restricted to lower case letters or to not more than 8 characters in a file title. Excel will assist you in this matter if it detects what are referred to as “special use characters” in a file title. Due to these types of restriction dates should be put into file names as “2012-05-08”, “120508”, or as “May 08 12”, not “05/08/12” or “05.08.12”.
Chapter 8

PRESENTATION

Chapter Outline

Comments                      Read Only Files and Templates
Column and Row Size            Drawing on Worksheets
Charting                      Macros
Pivot Tables                  Macros on Objects
Protection

Comments

The data file “Excel_Primer_Ch08_Data.xlsx” file may be used with this chapter. Frequently the presentation of purely numerical data is insufficient for the effective communication of financial data within a worksheet. At other times you want to document where the data came from or what the data represents. Excel, as shown, will accept text entry into the cells easily and effectively and you have vast formatting capabilities on that text and numerical data. Additionally, Excel presents you with another very effective text presentation mode referred to as “Comments.” Comments are “Pop-up” blocks associated with a particular cell. They can contain a wide variety of information and the text within the block can be formatted with many of the commands and features found elsewhere in Excel. The “Excel_Primer_Ch08_Data.xlsx” file has a “Comments” worksheet which contains examples of what can be done with comments. These examples can be and are extreme for presentation purposes. Comments have icons on the “Comments” tab of the “Review” toolbar as shown in the screen print below.
To attach a comment to a cell make that cell the active cell by clicking into it or advancing to it with “Enter” or “Tab.” Then select “Insert Comment” from the pop-up menu accessed when you right click the cell or click on the “New Comment” icon on the “Comments: tab of the “Review” toolbar. The “Comment Box” will pop-up attached to the cell. Contained inside the comment box may be the owner’s name of the Excel program by default. This name can be left in place or removed. To remove the ownership name from the comment box simply highlight the text and delete it with the “Delete” key or, after highlighting the name, simply type over it. Enter the text and data as you desire. The comment box can be resized to show only part or all of its comments. It can also be repositioned as to the location that it appears in by using standard Windows drag techniques. When the data entry is complete simply click on the worksheet outside the comment box and the comment box will disappear. Any cell with a comment attached will bear a red triangle in the upper right corner. You can place your cursor over a comment triangle and the comment will pop-up and remain in view until you reposition the cursor. You can also select “Show All Comments” on the Comments tab to show all comments at one time. When you do they may overlap. Use standard Windows drag techniques to move them around. The Review toolbar need not be active or available to read comments.

If you desire to edit the comment click into the cell and right click it. Then select “Edit Comment” from the pop-up menu. Or select the cell then click on “Edit Comment” on the “Comments” tab of the “Review” toolbar. In the edit mode, you can still resize or reposition the comment box or reformat the contents. There is a “toggle” icon to “Show All Comments” – one click shows all, another click on it hides all. There is also a “Delete” comment icon on the tab. Delete comment is also available through right clicking the cell and selecting that option.

The text within the comments boxes can be formatted within the font formatting capabilities of Excel. Simply highlight the text, all or some, and apply the desired formatting to the selected text. The text box itself can be formatted by clicking on the border and then using many of the formatting tools within Excel.

The default factors of Comments is contained in the Display section on the Advanced tab of the Excel Options dialog box.

Tip: Spell check will scan comment box contents as well as the rest of the worksheet.

**Column and Row Size**

**DO NOT DO THIS ON THE EXERCISE OR PROBLEM TEMPLATES**: Many of the templates have long text strings in them with specific justification and this will cause rapid growth of the worksheet.

You can utilize the “Size” worksheet of the “Excel_Primer_Ch08_Data.xlsx” file for this section. The size of the columns and rows can be adjusted within Excel in several manners. The first is to “grab” the right border of a column identifier or the bottom border of a row identifier with the left mouse button depressed when it becomes a double headed arrow and drag it (or them), or collapse it (or them), to the size you desire by moving the mouse. If you highlight more than one column or row at a time, whether adjacent or not, they will all resize to the same dimension at the same time. Remember that you can select or highlight nonadjacent areas by holding the control key down while clicking the columns or rows with the mouse.

An alternative is to “Autosize” the column or row by placing your cursor over the right border of a column identifier or the bottom border of a row identifier and double clicking it with the left mouse button when the cursor becomes a double headed arrow, as shown. This changes the column or row’s size quickly to the largest item in the column or row. Another method of sizing a column or row is to highlight the column or row and then right click the column or row. From the pop-up menu select the “Column Width” or “Row Height” option. Unless the default measurement unit is changed in Excel Options, the default column width is approximately 8.43 characters wide and the row height is just over one character.
high for spacing and appearance. And a character is approximately 8.43 points wide with relational height dictated by style. While there is debate as to the length of a cubit – something between eighteen and twenty-two inches, a point is a defined printer’s measurement of approximately 1/72\textsuperscript{nd} of an inch or approximately 0.035 cm in length. Remember when setting the width of a column or the height of a row that its appearance on the computer screen may be different than its appearance on printed documents as the sizes are not always the same.

If you have a column or row highlighted you will also find width and height setting options on the pop-up menu and checking “Column Width” or “Row Height” if you right click the highlighted column or row.

There are no hidden columns or rows in the exercise and problem templates but there are merged cells. Merged cells are covered elsewhere in the text.

**Charting**

Excel will assist you in making charts through the ability to select a chart, see if it portrays the information properly, if not, “undo” the action, and try again with another type. Excel’s charts are on the “Charts” tab of the “Insert” toolbar as shown here. There are functional examples of charts on the “Charting” worksheet of the “Excel_Primer_Ch08_Data.xlsx” workbook data file. One of the highest concerns in charting is picking an appropriate chart type for your data. In the examples on the “Charting” worksheet the information supplied is “Sales Item,” “Cost of Sales,” “Sales Revenues” (per sale item), and “Gross Profit.” This information is charted as examples in several ways.

The use of the two charts titled “Sales Revenues” and “Cost of Sales,” both pie charts, may be appropriate for the conveyance of the specific information of relationship of one sales item’s values to another sales item’s values, and it may be clear, and somewhat attractive, it does not convey the relationship of one sales item’s sales revenues to its own cost of goods sold since they are not on the same chart and may not be relationally sized. When the goal is to show the relationship between sales revenues and costs of goods sold of the individual items the goal is not accomplished by these two pie charts. Both charts would be 360 degrees if one contained $1 and the other contained $1,000,000 so the relationship BETWEEN the charts is not clear. To portray the information required, additional charts must be constructed and a pie chart format may be inappropriate. By utilizing the Column (Vertical bars) chart, shown on the worksheet in “Bad Columns” (off to the right), the sales revenues and cost of sales relationship is clear and distinct in a single chart but, by default, the data is incorrect. When left to the defaults, “Charting” actually summed the sales revenues and cost of sales into a nonsense number. It is corrected by computing the “Sales Revenues less Cost of Sales equals Gross Profit.” So another column or field was constructed to be referenced – the “Gross Profit” column. While the charts utilize “Sales revenues” for a title, “Gross Profit” is utilized for numerical data. You can see this by right clicking on a blank area of the “One More Option” chart and then selecting “Select Data” from the pop-up menu. Utilizing “Column Chart,” you can see how, by selecting a different chart type, value-on-value type presentation rather than side-by-side, you get a better picture of relationships as the height of the column
is sales revenue as the sum of gross profit (sales revenue less cost of goods sold) and cost of goods sold. The relationship of sales revenues – total height, to cost of goods sold, is now clear.

On the “Charting” worksheet is an area chart and a surface chart. The area chart infers that there is a flow over a span of time or a link in the chain of events that may not correct. So, while the chart looks nice, what does it convey without explanation? For this example data, the bar chart which sums values may be a better visual presentation.

**Tip:** To obtain the best guidance as to which chart type to use to convey what information, scan your textbooks as well as professional publications conveying the same type of information and look at the chart or graph styles used by the professionals.

The quickest way to build a chart within Excel is to highlight the data range before selecting any of the chart types. This simplifies chart construction and confines your data without interaction with the chart construction process. On the “Working Chart” worksheet within the chtr08 data file there is data within the cells A1 through D6 for this work. The incorporation of the totals line, row 7, may add an additional, unwanted, field that may have to be removed later. Highlight the data region, cells A1 through D6. Now click on the “Column” chart icon on the “Charts” tab of the “Insert” toolbar. From the pop-up options, select the “Stacked Column in 3D” chart from the options, most likely the second chart in the 3-D Column area. And Excel will create the chart from the data and present it to you. The initial presentation of the chart is shown in this screen print.

Since charts are easily made, edited, and removed, you can try any chart type you desire and select a different type from the toolbar that appears as soon as you start the charting process. Excel cannot hurt your computer so play freely.

Notice that this chart, shown here, has bad data within it. It sums cost of sales, sales revenues, and gross profit into a single column. We know that sales revenues is equal to cost of sales and gross profit so this column total is bad as shown. But, a feature we like is the dollar values on the left. To correct the problem, click on the reddish column values representing sales revenues and, once selected, either delete them with the delete key or right click and select “Delete” from the pop-up menu. And result is a new presentation, shown in this screen print.

And now the values make sense and are relational. Cherries have a total sales revenues of approximately $220, the raw data shows $227.65. This is the sum of approximately $150.00 from the chart, $157.00 from the raw data, and approximately $70.00 in gross profits, $70.65 from the raw data.

Relationally, gross profit on cherries is approximately one third of their cost of sales while the gross profit on broccoli is one twelfth of the cost of...
sales. Bananas and cherries have a better relationship to each other in cost of sales and gross profit than cherries and pears.

If you don’t care for the colors Excel has chosen, click into a field, such as the blue of cost of sales, to select it, then right click the field, and chose “Format Data Series” from the pop-up menu. And in the new pop-up menu, select “Fill” and change the color. There are other options such as shapes, changing 3D effect, changing borders and shadows and much much more. Be cautious about adding “splendor” to your data as viewers will stop looking at the data and start wondering how you built the chart.

If your chart is against an edge you can drag the chart away from the border of the worksheet. If your chart does not seem large enough – not all of the data is visible, you can change its size by clicking on the chart and getting “Frame ears” or “handles” to appear on the exterior borders of the chart, then grab one of these frames or handles with the mouse and drag the chart into a larger (or smaller) size. Be aware that the chart consists of many objects and clicking “into” the chart and getting “Frame ears” or “handles” inside the exterior frame means you have grabbed an object in the chart, not the overall chart.

Your chart is finished but if you selected an inappropriate chart presentation for your data, your chart does not clearly portray the information, no problem. Like many things in Excel, your chart is a dynamic, live, object. Right click into the chart and select “Chart Type” from the pop-up menu. You are back into selecting the chart type and can select a more appropriate chart type and work with it again if desired. By right clicking the chart you can gain access to many of the chart functions, features and capabilities. This includes being able to format fonts. You can also add, remove, and reposition labels. Try clicking on a label, once “Frame ears” or “handles” appear, strike the delete key and the label goes away.

The chart can be copied and pasted elsewhere. The chart is “live” – if the source data changes, the chart changes. Be sure to save your work.

**Pivot Tables**

A pivot table is the presentation of data with multiple classifications such as district, salesman, and quantity of various items sold into a logical matrix. The Pivot Tables worksheet within the “Excel_Primer_Ch08_Data.xlsx” file contains a data matrix for the construction of a pivot table. One of the requirements of a pivot table is that you must have two layers of classification on the left side, at least one layer of classification on the top, and data at the intersections of the classifications. This is met with “Region” and “Salesman” in columns A and B and the identity of the tools across the top in columns C through I in row 1. This data need not be presorted or arranged, the Pivot Table Wizard will handle that for you. For the example column A is region – North, South, East, or West, column B contains the salesman’s name, row 1 contains the items sold, and the data for each region is contained in the matrix defined by the cells C2 through I32.

As with charting, it is handy to highlight the information before you start creating the pivot table. So, highlight the range from A1 through I32. This will incorporate labels, titles, and data. Then select the “Pivot Table” icon on the “Insert” toolbar. And Excel will open a “Create Pivot Table” dialog box. Since you have already selected your data, making the process easier, verify that the data range is from A1 through I32. Excel will allow you to change the data range in this window if needed. Ensure that “New Worksheet” is selected in the lower portion of the dialog box before clicking “OK”.

Excel presents another dialog box listing all of the labels from your data range. Select all of the items – Regions, Salesman, Augers, Blades, Crunchers, Drills, Extractor, File, and Grinder. As you select the items Excel starts building the pivot table and adding data features. Since “Regions” is in column A Excel handles it first. But we want to know how salesmen are doing in regions, not how regions are doing in relation to salesman. If the “Pivot Table Field List” is not showing click back into the newly created pivot table. Near the bottom, left corner, there should be a “Rows Labels” which shows Regions above Salesman. Click on the drop-down arrow to the right of Regions and move it down or click on the drop-down arrow to the right of Salesman and move it up. And Excel modifies the table to meet your criteria.
Clicking outside the pivot table makes the “Pivot Table Field List” disappear; clicking back into the table brings it back up.

You can format the table with standard Excel formatting techniques. By default, there are not gridlines on the table. Select the range and format it by adding borders as shown in the screen print below if it makes a better presentation.

You cannot delete or modify data within the pivot table as it is a product of Excel. However, you can select the data within the table that Excel is using. For example, assume that Bob is a contract salesman and the others are employee salespersons. In the “Pivot Table Field List” dialog box, click on the label “Salesman,” not the checkmark box to its left. Then click on the drop-down arrow that appears to the right and deselect “Bob” from the pop-up menu, and click “OK.” And Excel updates the pivot table removing Bob from the presentation.

If you want Region as the primary category and Salesman as the secondary, you can change this by dragging and dropping the “Row Labels” in the Pivot Table dialog box.

The data presented by the pivot table needs to be appreciated for the time saving value it is. In several seconds and key strokes you know how each salesman is doing in each region and the sale of each item. And there are subtotals and totals. Andy sold twelve augers in the east, five in the north, twenty-five in the south, and nineteen in the west for a total of sixty-one. And the total augers sold were three hundred and forty-one.
Protection

On the “Protection” worksheet of the “Excel_Primer_Ch08_Data.xlsx” file search for the text strings “Hi!!!!!” and “You found it!!!!!” and you will find them in cells R545 and R546 respectively. However, there is one more occurrence of each on the worksheet. The “Protection” worksheet has had the cells round cells Y560 and Y561 formatted to “Locked” and “Hidden” through the “Protection” tab of the “Format Cells” dialog box which is brought up by right clicking a cell or a range of cells. The worksheet, not necessarily the workbook, was protected through the “Protect Sheet” option on the “Changes” tab of the “Review” toolbar. There is no password so you may remove the protection if you desire. Even clicking into the cells will not reveal their contained text in the formula input window of Excel, but that text will be visible in the cells when the cells are highlighted. This text has been additionally hidden with white text formatting to make it harder to find, had it been black or another color text, it would have been visible without highlighting.

Why have a “Protection” capability within Excel? You have assembled a large worksheet of inventory data consisting of thousands of lines of data and are about to distribute it for a meeting to be held in three days after the participants have had time to review it. “Protection” will preclude them from modifying the received file providing you a common reference document in the meeting. Everyone will have the same page five or page two. Or, because you are building templates and standardized worksheets and workbooks such as a travel claim form for the organization, you can structure the worksheet or workbook as you like and then protect the areas you do not want modified leaving the user input areas open and available. Starting at the cell A34 and continuing down and right, part of a demo file is pasted. The entire range of the demo file was protected, (for speed). Then the protection was removed from cells with the yellow highlighting by clicking into one cell and holding the Ctrl (Control) key down and clicking into the rest of the cells one by one. Once all the highlighted cells were selected, one cell was right clicked and through the “Format Cells” option and the “Protection” tab, the “Locked” and “Hidden” formatting check marks were removed. Then the worksheet was protected – without a password through the “Protect Worksheet” icon of the “Changes” tab on the “Review” toolbar. As an exercise, enter your name in the “Name:” entry area identified by the yellow filled highlighting. Not a problem. Try to change the title “Instructor:” to “Professor:”. Excel gives you an advisory that the worksheet is protected and that capability is not available. This maintains standardization of the worksheet. The rest of the demo problem is protected so that data can only be placed in the yellow highlighted cells. Restricting your ability to edit or change the data.

Note: None of the exercise and problem templates are protected so you have maximum flexibility within the data files. So exercise due care when working with these data files.
“Protection” requires several actions to be effective. First, the general default of Excel is that every cell, if protection is invoked on the worksheet, will be protected. A good, safe, default but seldom a valid statement. Since you want to insure the configuration of all of your cells, select the entire worksheet through the “Select all” button above the row 1 and to the left of column A indicator or use the keystrokes Ctrl-A. Next, right click the worksheet to get the pop-up menu and select “Format Cells”. Then, with the assumption that you want to protect most of the worksheet, ensure that the “Locked” option is checkmarked. Hidden is optional and prevents the reader from reading the formulas in the cells. Then click “OK.” Remember, your worksheets’ cells are not protected at this time, the worksheet must have “Protection” set. Now, if you selected “Locked” while the worksheet was selected, click into the cells to select the cells you want the user to have access to and, with access to the “Format Cells” dialog box, through a right click on a selected cell, remove the checkmark from “Locked.” You can access and format more than one cell at a time by holding the Ctrl (Control) key down while selecting cells by clicking on them. Again clicking “OK” at the completion of each selection process. If you unlocked all of the cells and then select the few cells you want to protect, you would place a checkmark in the “Locked” window after selecting the cells you wanted locked. Then you would click “OK” to complete the selection process.

After all the cells have been configured as “Locked,” or not locked by removing the checkmark in locked, click on the “Protect Sheet” icon on the “Changes” tab of the “Review” toolbar to invoke protection. The resulting pop-up dialog box will ask what privileges you wish to make available to the user and if you want to utilize password protection. If you do not provide a password, the simple process of clicking on “Unprotect Sheet” (a toggle icon) will remove the protection. This was the level provided on any protected worksheets on the data disk. If a password is utilized, make sure you can recover the password later as recovery of the worksheet may be very difficult without it. Clicking “OK” will complete the process and activate the protection. The workbook now needs to be saved to record this configuration into the file on the computer media. This does not make the workbook a template or make the workbook a read only document.

**Tip:** By accepting the defaults of allowing a user to select locked and unlocked cells you can copy a protected worksheet and paste it into a new document recovering part of your “frozen” work if you lose the password.

**Read Only Files and Templates**

The data file titled “Excel_Primer_Ch08_Data_Form.xltx” with the extension of “XLTX” is a special type of Excel file called a “Template.” This type of file has a special property associated with it in that, when opened within the later versions of Excel, it will create a standard Excel file titled “Data Form1.xlsx” when opened the first time. When opened the second time it will create “Data Form2xlsx.” These files can be saved by their default names or can be saved with a new name and in a new location by using the “Save As” function to alter the title and / or path. In some versions of Excel you will receive an advisory screen pop-up that states this is a template and has “read only” properties. In these versions of Excel simply acknowledge the advisory pop-up and use the “Save As” function to save the file as a new name and, if desired, to a new location.

This feature of read only capability was built into Excel to allow you to build one standard reference and structure file, a template, such as a travel claim form, and be advised that you do not want the core or base file to be populated with data since you will using that structure again with new data. Templates are frequently used for files that are used time and time again with one structure and new data, such as time sheets, travel / expense reports, and job logs.

**Note:** The use of “Exercise and Problems Templates” as provided with this book simply means a standard data file that everyone in the class, course, or program will be using. The data files accompanying this book are not read only and can easily be written over.
Drawing on Worksheets

This section uses the “Drawing” worksheet of the “Excel_Primer_Ch08_Data.xlsx” file. The first and foremost item to remember in this section is that most, if not all, of these items are “on top” of the worksheet. They are not in cells or attached to cells. You can enter data beneath them and around them without a problem. To draw on an Excel worksheet access the “Illustrations” tab on the “Insert” toolbar. Through the “Shapes” icon, Excel gives you many preformatted and adjustable capabilities as well as some degree of free hand modifications. The first item to be addressed is the ability to draw arrows. To draw an arrow, click on the “Shapes” icon and Excel gives you an underlying toolbar. Select the arrow of your choice and move your cursor to the worksheet. Your cursor has become a cross. Click where you want the arrow to start and “draw” the arrow to where you want it to go to with the left mouse button down. Once the arrow is drawn you may be required to press the “ESC” (escape) key to release it, usually just clicking somewhere else on the worksheet stops the drawing process.

Once the arrow is drawn, place your cursor back on top of it and move the cursor slightly until you get a four headed arrow for a cursor. At the point that the cursor changes, left click the mouse to “grab” the arrow then right click it and a pop-up menu will appear. From this menu select “Format Shape.” The “Format Shape” dialog box, shown in the screen print to the right, allows you to change the color, thickness, and beginning as well as end of the arrow, among other things. The arrowheads are from the drop-down menu associated with “Begin Type:” options.

Different arrows and lines have different properties. For example, selecting the squiggly line option shown in the smaller screen print With this option active, you start to draw your arrow by clicking at the start point. Then “draw” (drag) to your next position. At “turn point” click the mouse button once and the arrow starts a new segment from that position. The thick black arrow starting at approximately B15 and ending at F2 while winding through B4 was drawn with this tool. Then it was formatted. This tool allows you to click back onto the arrow and, through the right click associated pop-up menu, edit the points and smooth the curves. If you place your cursor over a corner point, shown only while the arrow is in “Edit” mode, you will see a “line handle” appear, grabbing and moving this line handle changes the aspects of the corner. Whether you have an arrow or line selected, they work the same; you can change the weight, pattern, and color through the “Format Shape” dialog box.
There is a “Text Box” icon on the “Text” tab of the “Review” toolbar. It is a white sheet of paper with a letter “A” in the upper left corner and lines making it appear like a newspaper. Click and release on this icon and then click into the worksheet and keep holding the left mouse button down. While you are holding the left mouse button down, drag the cursor away from the point of origin to create a text box. At any time, you can drop the text box drag by releasing the left mouse button and start to enter text into the box. If the box was created to wrong size, click near the borders of the text box to get the handles or ears active, then grab a handle or ear and drag it to the correct size. To move the box, select the box, then move your cursor near the edge until it becomes a four arrow headed object, while the cursor is a four headed arrow, left mouse button down and drag it to the new location. Just like dragging other objects such as arrows and lines. Spell check will check the spelling inside text boxes. You can fill the box by selecting it and then selecting a “Fill” color. You can change its borders by selecting the box and selecting a line weight and texture from the toolbar while the box is the selected object. Additional formatting options are available by right clicking the text box and then selecting “Format Shape” from the pop-up menu that appears.

There are preformatted rectangles and ovals on the “Illustrations” tab. Simply click on the icon then click into the worksheet and start to drag them around until you get the shape you want. You can drag them to a new location by moving your cursor near an edge looking for the four headed arrow before left clicking down, just like arrows, lines, and text boxes.

**Hint:** If you hold the shift key down on the keyboard while creating a rectangle it will remain a square as you resize it. If you hold the shift key down while creating an oval, it will remain a circle while you resize it. Holding the shift key down while drawing lines and arrows will give you straight lines.

To delete an object, select it by clicking on it when the mouse cursor becomes a four headed arrow and hit the “Delete” key. Using the cut command will allow you to paste it somewhere else – once. Using the copy command will allow you to paste it in numerous locations. It can be repositioned by dragging it once placed.

**Hint:** If you want the object moved from its original location but placed in numerous other locations “cut” it from its original location. The paste it into its next location. While Cut to Paste is a one-time event, the object is still selected by default. Now you can simply copy it with Ctrl-C, or right clicking it and selecting “Copy” or any of the other copy methods and then move to the next points to paste it repetitively without going back to the very first (original) location to delete it.

An important issue with drawings, images, clip art, and pictures is their positioning within the presentation’s other objects. On the “Drawing” worksheet of the workbook is a color JPEG image of a mechanical pencil. Click on the pencil to select it. Then right click the pencil. From the pop-up menu select the “Bring to Front” option. This establishes where the image will be in relation to other objects. And the pencil will no longer be hidden behind the other objects. Many of your objects within Excel and Word have this option available to them.
There is a “Clip Art” icon on the “Illustrations” tab of the “Insert” toolbar which allows you to insert pictures and clip art onto the worksheet. This is a great feature to document fixed assets or merchandise for inventory type issues but the file sizes get large very quickly. Inserted here is a scanned image of a mechanical pencil. It is saved as a JPEG file and inserted into the text through the same process as it was inserted on the Excel Drawing worksheet. WordArt is also available for use through the “WordArt” icon on the “Text” tab of the “Insert” toolbar. Do not miss the opportunity to play with the “SmartArt” and its many options including organizational charts.

**Hint:** These tools can be very effective when used well. It is recommended that you review professional magazines, newspapers, and textbooks to get examples of good presentation techniques. None of the examples on the “Drawing” worksheet would be used in a professional format, they are provided as examples of the power (and the abuse of power) available in Excel.

**Macros**

This section uses the “Macros” worksheet of the “Excel_Primer_Ch08_Data.xlsx” file. Macros are small programs that you can build out of keystroke modeling – you record them by doing what you normally do for later, repetitive, use. When needed you activate the macro and have it do the task for you. To use macros you must enable or empower the “Show Developer tab in the Ribbon” option on “Top Options for Working With Excel” under “Excel Options” accessed by clicking on the four colored Microsoft symbol on the upper left corner of the workbook. This will put a new toolbar, the “Developer” toolbar into Excel. To record a macro ensure you need to know the keystrokes and commands you desire to utilize in the macro. If you record an error in a macro you may have to edit the macro to remove the error or rerecord it. If not corrected, the macro will commit that error every time it is run. If the correction of the error is in the recorded keystrokes, it just consumes time and memory as the macro makes the error and corrects it every time it is run. You will build a simple macro for demonstration purposes that formats the cell to bold, italics, and underline in a single event. Place your curser into cell A10 of the Macros worksheet to make that cell the active cell. Access the “Code” tab of the “Developer” toolbar. Then click on the “Record Macros” icon which brings up the macro dialog box. You will be asked for the name of the new macro and where you would like it stored. The name should not have spaces or special characters in it. Excel will tell you if the title is unacceptable. The demonstration macro is named BoldItalicsUnderline so try BIU for your macro. In the “Store Macro In” window select “This Workbook.” This will contain the macro to the data file allowing it to move with this Excel workbook. The dialog box asks if you want to assign a control key to the macro – enter the character “m” as a lower case letter without striking any other key. Click on the “OK” and Excel will commence recording the macro.

**Tip:** To see if a control key is assigned a function in Excel, click into Excel and try the key sequence. If Excel gives you a dull thud response, the key command was not recognized, or it is unavailable at the moment.

Once Excel starts recording the macro, everything you do will be recorded. Click into cell A2 then click the “Bold” icon, the “Italics” icon, and the “Underline” icon on the “Font” tab of the “Home” toolbar. Then click on the “Stop recording” icon on the “Code” tab of the “Developer” toolbar. When you click the “Stop Recording” button your macro is stored and available for use.
Now click into cell A3 and run the macro through the keystrokes Ctrl-m or by clicking the “Macros” icon on the “Code” tab of the “Developer” toolbar and click on the “BIU” select and click “Run.” The macro is doing exactly what it was told to do – go to cell A2 and puts bold, italics, and underline on it. This is because the first thing you did in recording the macro was to do was go to cell A2. You could have avoided this by being in the target cell at the time you recorded it – this was intentional.

Now we will edit the macro to preclude it from moving to cell A2 each time. Click on the “Macros” icon to bring up the selection dialog box. Then click on your macro, “BIU” once and click “Edit”. The macro tools and the Microsoft Visual Basic window will open and you will see the macro command strings. One of the command strings reads “Range("A2").Select.” Highlight and delete this one line then close the window. You have now edited (corrected) the macro. Save the macro by clicking on the “Save” (3 ½ inch disk icon) and close the Visual Basic windows. Click into cell A3 and invoke the macro with the keystrokes Ctrl-m and cell A3 should become bold, italics, and underlined.

Macros are powerful tools. They can be absolutes – go to cell A2 – as we originally recorded BIU. Or they can be focused on the target cell or the active cell as BIU was edited to. Macros will format worksheets, enter data, run spell check, and almost any other repetitive task you have.

You can save the macros you build to the workbook or in a personal macro notebook. If the macro is saved to the personal macro notebook, it may not be available on the workbook if the workbook is distributed or transmitted.

**Clue:** When a workbook contains a macro, there may be a warning about its presence. Unless you know the nature and intent of the macro it may be best to decline the macro’s enablement. You may be able to review the macro’s properties while disabled through the edit function on the macro dialog box.

**Tip:** You can assign a macro to an object. This is addressed next in “Macros on Objects.”

**Hint:** Macros are usually relational. To ensure that the macro goes where you want it to as the first step try Ctrl-G and select “A1” as the destination. This will ensure that the macro will go to the appropriate cells since the starting point is always cell A1.

### Macros on Objects

Once an object is drawn in Excel it is possible to attach a macro to it. By doing this, clicking on the object will activate and run the macro. The “Macros on Objects” worksheet in the “Excel_Primer_Ch08_Data.xlsx” workbook has a mechanical pencil as an object on it, and a macro is attached to it. Place your mouse cursor over the pencil and the cursor will become a hand. At that point click the left mouse button to activate the macro. You can reset the macro by running another macro which is attached to the “Reset pencil macro.” text box.

To accomplish this task, click into the “Macros on Objects Playground” worksheet. As an exercise, draw or place an object on the worksheet. Then record a macro by following the path “Developer” then “Code” and “Record Macro” as discussed in the “Macros” section. Assign a name such as “ObjectText” to the macro. No shortcut key is necessary. Once the macro starts recording, utilize the Ctrl – G sequence of keystrokes and instruct the “Go To” dialog box to go to cell A1. Now click into a cell below your object and type in a short text string such as “This object works just fine.” and press and release the “Enter” key to complete the text entry. Click back into the chosen cell to make it the active cell. Then
highlight the cells about 5 columns across and two or three rows down. While still within the macro, click into the “Home” toolbar then click on the font selection window of the “Font” tab. Within the font selection window select “Script” for a font, then adjust its points or size to “18”. On the “Alignment” tab, select “Merge Cells,” “Wrap Text” (the two sheets above the merge command icon) and then, set both horizontal and vertical placement factors to “Center” and click “OK.” Now click “Stop recording”.

The macro is recorded. You can edit it as explained in the “Macros” section if needed. Right click on the object you built or inserted. From the options select “Assign Macros” and the select your macro from the list shown and click “OK.” Then click on your object to see if it works.

The pencil has a macro assigned to it. You can right click the pencil and see which macro is assigned. You can access the macros through the “Macros” icon. By selecting the macro assigned to the object, you can read it through the “Edit” button. You can click on the pencil to run its macro. To reset the pencil macro, click on the pencil’s macro reset button. Lower in the “Macros on Objects” worksheet there is a “test” which shows two powers of macros and the convenience of objects as buttons. There is a reset button for the test.

**Hint:** Macros are usually relational. To ensure that the macro goes where you want it to as the first step try Ctrl-G and select “A1” as the destination. This will ensure that the macro will go to the appropriate cells since the starting point is always cell A1.
Chapter 9

PRINTING ISSUES

Chapter Outline

<table>
<thead>
<tr>
<th>Page Setup</th>
<th>Print Preview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Page Break Preview</td>
<td>Printing</td>
</tr>
<tr>
<td>Print Area</td>
<td></td>
</tr>
</tbody>
</table>

Page Setup

This chapter and section uses the “Demo File” worksheet of the “Excel_Primer_Ch09_Data.xlsx” file. The printed presentation of Excel data is dependent on page setup and page break positioning. The access to the Page Setup dialog box can be accomplished through small arrow at the bottom right corner of the Page Setup tab of the Page Layout taskbar. The dialog box the pops up appears here.

There are four tabs on this dialog box. The “Page” tab asks straight forward questions – Portrait (taller than wide) or Landscape (wider than tall) for the paper size selected. The “Scaling” section is an important “flexible” tool. If you select “Adjust to” and set a percentage Excel will print within your defined margins and can consume tons of paper quickly. When selecting “Fit to” you are telling Excel the number of sheets you do not want to exceed. If you select “Fit to” and set it for ten pages wide and ten pages tall and at the current size, Excel needs only one page, Excel will print your document on one page. An annoyance here it that if you change the print area of the worksheet Excel may reset this selection to “Adjust to”. For paper size, U.S. standard letter and legal as well as European standards of A3 and A4 are selectable. “Statement” sized paper is 8.5 × 5.5 inches and “Executive” sized paper is 7.25 × 10.25 inches. “Print” starts the printing process for your default printer and the key to the process is “Print Preview” which shows you the expected results if you select “Print” – a wise and frequently needed tool. From “Print Preview” the “Adjust to” and “Fit to” values can be reset to obtain the proper results. “Options” are associated with your printer. Portrait is set on most of the templates as appropriate. Landscape is set on several of the worksheets as required. Most of the templates have “Fit to” values set. This setting, when coupled with setting page breaks, addressed elsewhere, allows clean and associated page breaks for the most part – the title of the income statement is not on page 1 and the rest of the report on page 2.

The “Margins” tab controls margins on all four sides, and they need not be the same as well as if you want the print area centered on the page horizontally, vertically, or both. And margins do not need to be mirrored – same left to right, same top to bottom. The “Header” and “Footer” options establish printing areas if you are using headers on the page such as the book title on this page, or footers such as the page
number on the first page of each chapter. The margins for the templates are generally set at one inch on all four sides for the most part as almost every printer can print these margins. Occasionally a template may have special margins for presentation purposes.

The “Header/Footer” tab allows you to enter headers – top text, and footers – bottom text, on the printed worksheets. You can select to have different first, odd, and even pages, as this Word document has. Scaling keeps the sizes relational to the worksheet and aligning with the page margins insures that the header will be in the printed area. With “Align with page margins” selected you can still select left, right, full, or center justified. Associated with drop-down arrows for Headers and Footers, there are standards – Page #, Page # of Pages # type options as well as previously used headers and footers making the insertions more standardized. There are headers and footers on each template.

On the “Sheet” tab are several rather critical items. First, the print area of the worksheet need not be continuous – from B2:K173 as identified by cells. If you had three areas of the worksheet you wanted printed, you can identify them as “A1:D43, M23:Z200, A55:K75”, upper left cell of the first range followed by a colon then the location of the lower right cell followed by a comma, then upper left to lower right of the next area, and so on until all your print areas are included. And, assume you are printing a multiple page inventory report, the “Sheet” tab allows you to identify the rows, (Maybe column titles?), at the top of each sheet, and the columns, (Maybe reference lines?), on the left side of each page. So you do not have to worry about where the data splits as Excel will put the column titles and row reference numbers on each page. If you want a clean report ensure “Gridlines” is not checked on the “Sheet” tab but, if your worksheet has gridlines from its “Excel Options” setup, they will print unless you remove them in both places. As addressed elsewhere, you can put comments on Excel worksheets. “Sheet” tab allows you to select if you want those printed or not. And very high in the standings of importance, how do you want your worksheet printed? If the report is wider than one sheet of paper portrait, try landscape, if it is wider than landscape, try “Fit to page” and set it to landscape with one page wide and five pages tall, Excel will “trim” excess pages off. Still too small? Maybe fit two wide and five high. The templates have several of the “identification” rows printed on each page as necessary. Most of the template printing is down the pages, then to the next column and down again where necessary.

There is a “Set printing area” option on the “Page Setup” tab of the “Page Layout” taskbar. When used, you need to highlight with the mouse – click into any corner cell of what you want as a print area, then, left (primary) mouse button down and sweep to the diagonal corner highlight the entire print area. Release the mouse button, without clicking back into the worksheet, click on the “Set Print Area” icon of the “Page Setup” tab. From the drop-down menu, click on “Set Print Areas.” The “Clear Print Area” option is also available.

If no print area is manually defined, Excel will consider the print area to be from the left most column used to the right most column used, from the first row with data to the last row with data. If you were working in the range A1:Z100 and jumped to BF2500 to do a test calculation, even though you deleted it, Excel knows it was used and may print a VERY LARGE worksheet. It is recommended you manually set print areas AND use “Print Preview” to verify what you are going to print is what you want.

**Page Break Preview**

Reference the “Demo File” worksheet of the “Excel_Primer_Ch09_Data.xlsx” file for this section. “Page Break Preview” is found through the “Workbook Views” tab of the “View” taskbar as shown in this screen print. It can also be placed on the “Quick Access Toolbar” immediately to the right of the four colored Microsoft symbol by clicking on the drop-down arrow to the right of the Quick Access Toolbar and adding it through “Customize Quick Access Toolbar.” When you click on “Page Break Preview” in the “Demo File”
worksheet you will see blue (default coloring) solid and dashed lines forming grids over the worksheet as well as page numbers. The solid blue lines indicate the outer borders of the print area. The blue dashed lines indicate the breaks between pages and the pages contain page numbers such as “Page 1” and “Page 4.”

You can move these page breaks by placing your mouse over the dashed line, when the mouse cursor turns into a double-headed arrow, left mouse button (primary mouse button) down, and drag the page break to the new position. This may reset all other page breaks on the worksheet as they are relational – where Page 1 ends, Page 2 starts, where Page 2 ends, Page 3 starts unless you have set non-continuous areas as the print area. The framed material identified as Page 1, Page 2, etc is defined by the order you are going to print pages in – down, then across, or across then down, as set on the “Sheet” tab of the “Page Setup” dialog box accessed through “Page Setup” tab of the “Page Layout” taskbar. To close “Page Break Preview” choose another option on the “Workbook Views” tab such as “Normal.”

**Hint:** When resetting page breaks start in the upper left corner and work down and to the right if your print order as shown in the Page Setup is down and right. If the print order is across and then down, reset page breaks in that order. Each page setting affects the following pages so setting Page 10 to an ideal presentation and then changing Page 9 may cause Excel to reset your work and preferences on Page 10. Starting at the bottom may also result in too much or too little on Page 1. Page breaks were utilized on many of the worksheets for logical presentation – the title block of the income statement on the same page of the print out as the revenues and expenses of the income statement.

**Note:** “Page Break Preview” is dependent upon page setup and printer functions. Many, but not all, printers can accept print to ½” of each edge of an 8 ½ × 11” sheet of paper. There are printers that require larger than ½” margins.

**Tip:** The Excel templates for the exercises and problems provided on the computer media have been designed to provide the largest application usage so the standards of 1” margins are seldom violated.

**Print Area**

As addressed previously, Excel can, and will, consume as much paper as instructed or needed (if left to default setting) to print a worksheet. Sometimes this is not necessary. For example, you have constructed a large worksheet computing the data but the actual data presentation is only one physical page. In construction of the worksheet you have identified various areas to clarify your calculations and work. Contained in these areas you have extensive detail and support material that is not required for the printed presentation. If not provided with parameters for printing, Excel will print in an 8 ½” × 11” format for standard paper a range from the upper left cell, usually cell A1 in a rectangular or square profile through the further right and lowest cells with data entered. So, if you have data in cell A1, cell Z1, and cell A55, your print area may default to A1 through Z55. This is using the upper most row – row 1, the lowest row, row 55, the left most column – A, and the right most column – Z. Some versions of Excel may trim the last page or two from the printout if there is nothing on that page, to the right of that page, or below that page. It is safer not to assume what Excel will and will not print by defining your print area. In your large worksheet example, all of your supporting calculations are going to be printed and the printing will normally be in a vertical then left to right format in portrait mode.

Redefining the print area is easily handled within Excel. The “Print Area” worksheet of the “Excel_Primer_Ch09_Data.xlsx” file has a displayed print area to preclude this and can be used as an example. On the “Print Area” worksheet you will notice that the worksheet is outlined by a gray border. This border has no function with the challenge or the print area, it is merely provided as a visual reference of the print area. Anything you enter inside the gray border will be printed with the worksheet. Any item on or outside the border will not be printed on the worksheet printout. To examine the worksheet’s predefined printed area look at the “Sheet” tab of the “Page Setup” dialog box accessed by clicking on the small arrow in the bottom right corner of the “Page Setup” tab of the “Page Layout” taskbar and read the
values contained in the upper window of the “Print Area” window. This value should be “B2:K173” or from cell B2 down and right through and including cell K173. If you know the print area you want, you can enter it directly into the “Print Area” window on the “Sheet” tab of “Page Setup” by using cell references and separating them by a colon such as “B2:K173” and capitalization is optional – Excel accept lower and convert it to upper case for presentation consistency.

However, you can also define the print area from the worksheet itself. To demonstrate this, click into and make cell A1 of the “Print Area” tab the active cell. When this is done the cell will have a heavy border around it. Now, press and hold the left (primary) mouse button down, while holding the left mouse button down, sweep the mouse cursor down and to the right to highlight all of the cells down to and over to the right to include cell L20. Once the cells are highlighted, release the mouse button and do not click back onto the worksheet or your highlight will be lost. Click on the “Print Area” icon followed by “Set Print Area” on the “Page Setup” tab of the “Page Layout” taskbar. Now you have redefined the print area without entering data or keystrokes. Utilize the “Print Preview” button or icon, discussed elsewhere in this book, to see the redefined print area. Most of the “Print Area” tab is not available in the print version since your print data selection is from cell A1 through L20. Also, the gray borders are now part of the print area. Close the Print Preview screen by selecting “Normal” on the “Workbook Views” tab of the “View” taskbar. Then reset the print area by clicking on the small arrow at the bottom right corner of the “Page Setup” tab of the “Page Layout” taskbar. On the “Sheet” tab of the “Page Setup” dialog box enter “B2:K173” into the “Print Area” window overwriting the “A1:L20” value and then clicking OK. And you have reset the print area to the full challenge area.

**Note:** All of the Excel templates have the print area defined for reasonable presentation of the exercises and problems.

You can also print areas that are not adjacent to each other. For example, assume that you want to print the range from B2 through L50, and the range from R55 through Q90. Open up the “Sheet” tab of the “Page Setup” dialog box, click into the “Set Print Area” window, click into cell B2 on the worksheet and highlight down and right through cell L50, now type in a “,” (comma) to define and instruct Excel that you have identified the first area and are now identifying a second print area, then click into cell R55 and highlight through Q90 and click “OK.” Excel will identify these two ranges in the window separated by a comma as “B2:L50,R55:Q90”. You can define multiple ranges this way. Remember that after highlighting and identifying the first area, you must insert a comma. You can use the arrow keys and / or the scroll bars to move to the second, third, and following areas.

You cannot define one portion of the worksheet to be printed portrait and another landscape thru one page setup. Your solution may be to have one worksheet inside the workbook setup with landscape and the second worksheet setup portrait as the setup is to the worksheet, not workbook. Then simply have “Look to” formulas on one worksheet referencing the source worksheet so data does not have to be entered more than once. When this is accomplished, you can define how each worksheet will be printed without affecting the defaults and settings of the other worksheet. Once the first worksheet is printed, select the second worksheet and print it. Or, once the first page is printed, highlight the data for the second page and set your preferences through the “Print” dialog box by changing the printer’s preferences to the values and presentation techniques you desire – including landscape for the second print run. It is best if you always preview the worksheet before printing to avoid paper consumption.

**Tip:** Once printed, review the document to insure that it is correct and complete. Just because a computer printed it does not establish or verify its accuracy.
**Print Preview**

With “Customize Quick Access Toolbar” options accessed through the drop-down menu associated with the arrow to the right of the Quick Access Toolbar you can add the “Print Preview” icon to the toolbar. You can also utilize the “Preview” button on the “Print” dialog box which appears when you begin the printing process. By clicking on the “Print Preview” icon on the toolbar, a white sheet of page with the upper right corner turned over and a magnifying glass overlaying it, you will access the print preview of your document. If there is more than one page, there will be a scroll bar on the right side of the screen which allows you to scroll through the various pages. If the print preview presentation fills the page you are probably in the “Zoom” mode. Simply click on the sheet or on “Zoom” on the menu bar and you should be presented with an overall presentation of your document. If there is more than one page or it is larger than the screen you should have scroll bars to maneuver through the document.

**Clue:** In order for “Print Preview” to work, your system must have a printer installed in the operating system. The printer need not be available but Windows, Word, and Excel all provide “Print Preview” based on the defaults and settings of the currently selected printer.

From this screen you will see how the document will appear in its printed mode. This includes features such as headers and footers as well as margins. You can also adjust the page while in this presentation. By clicking on the “Show Margins” button at the top of the menu bar to place a checkmark in the box, you will be given a presentation of current placement of the margins and columns. You can adjust the margins and column widths at this point by placing the mouse cursor on the margin or column marker and getting it to change to a double headed arrow and then pressing and holding the left mouse button down. While the mouse button is being held down, drag the cursor left, right, up, or down, as desired. The margins at the outer areas of the sheet at the top and bottom of the sheet are those of the page and are defaulted to the values found under the “Page Setup” options. These margins are fully adjustable but will usually be at or outside of the file margins. If the worksheet data is printed on top of the header and footer data, utilize this presentation to move the data margins off the header or footer margins. The area between the page margins and the file margins is where the headers and footers are placed at the top and bottom.

There are numerous changes you can make within print preview besides margins and column width. By clicking on the “Page Setup” button or icon you can adjust almost every item accessible through “Page Setup.” Some options are grayed or faded out as they are not available at this time but selection the Page Setup dialog box through the normal view and then “Page Setup” will usually present them as these particular items must be set from the normal view mode or from the page break view mode. Remember that under the “Margins” tab within “Page Setup” you can center your page horizontally, vertically, or both if you desire.
Printing

Excel will print from several different commands and paths. The quickest while using the templates is the “Ctrl-P” (Control P) command from the keyboard. This brings up the same print dialog box as clicking on the four colored Microsoft symbol in the upper left corner of Excel and then clicking on “Print” from the drop-down menu options as shown in the screen print. You can also customize your “Quick Access Toolbar” with a “Quick Print” icon or a normal “Print” icon. When you initiate the printing process Windows and Excel will print the currently active document utilizing the document settings under “Page Setup” through the default printer as established by the Windows Control Panel settings for printers. When printing other worksheets this command may result in excessive paper being used in the printing process. The difference is that the Excel templates accompanying this book already have predefined layouts and paper breaks. For original worksheets, the layout and print area should be verified and adjusted as described in the “Print Area” and “Print Preview” sections elsewhere in this book.

If you do not desire the Windows default printer you can change the printer in the “Name” box of the “Print” dialog box, as shown here.

From the “Print” dialog box, you can select printers installed on the desktop system, on the network, or fax drivers that may be installed. If your worksheet consists of multiple pages, you can select any relevant range of pages. For example, if your worksheet consists of five pages, you can select “All” to get pages 1 through 5, select from pages from 2 through 4, select from 3 to 3, or elect to print only the highlighted or selected area through the “All” or “Pages” options of the “Print Range” area of the dialog box. This area also lets you set the number of copies you want and whether those copies are collated or not. The default is to collate multiple prints. This may not be desired if presenting a large amount of information to a group as they may become involved in scanning the depths of the document during your presentation of Page 1. By not collating the documents, you can pass single sheets out, containing exposure without having to resort the document.

The “Print What” section in the bottom third of the “Print Dialog” box is powerful. You can select to print not the pages as you have set them up but on the data that you have highlighted or the currently active sheets.

After all selections have been made, printing is initiated by clicking “OK.” Excel and Windows will normally print the document to the selected printer without further action.
Chapter 10

INVENTORY

Chapter Outline

<table>
<thead>
<tr>
<th>Filter</th>
<th>CountIf</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sort</td>
<td>Subtotal</td>
</tr>
<tr>
<td>Master Sort Column</td>
<td>Vlookup</td>
</tr>
<tr>
<td>SumIf</td>
<td></td>
</tr>
</tbody>
</table>

Filter

Utilize the “Excel_Primer_Ch10_Data.xlsx” file for this chapter and the “Filter” and “Multiple Filters” worksheets. Another excellent Excel tool has is the “Filter” function. When a worksheet is selected or when specific columns are selected select the “Filter” option on the “Sort and Filter” tab of the “Data” toolbar. And an “auto filter” is be imposed on the worksheet by Excel. A filter is a tool to screen and restrict the presentation of data. On the “Filters” worksheet of the “Excel_Primer_Ch10_Data.xlsx” file data has been provided to impose filters upon. Select columns A and B by placing your cursor in the “A” identifier of column A and then, after releasing the mouse button, press the mouse button again and then drag the mouse cursor to highlight both columns A and B. With columns A and B highlighted, click on the “Filter” icon of the “Sort and Filter” tab of the Data toolbar. Unless restricted, through “AutoFilter,” Excel will put a filter on each (every) column. This may be unnecessary or inappropriate as all data is not appropriate for sorting or the data may not be “normalized” – converted to consistent presentation for analysis in this case. For example, the yellow highlighted cells with red text on the “Filter” tab is a data entry error that most likely should be normalized to “Apples” for consistent data analysis. However, before that is done, you need to ensure that normalizing the data is appropriate. Maybe the data entry was done by someone who “knows” that anyone who sees “Apple” in the inventory is going to realize that this is the caramel apple which is sold in its own presentation container while all the other apples are fruit and vegetable department items in quantity sale plastic bags.
When filters are imposed on a worksheet, Excel puts an additional button on the top of each column with a filter. This button has an arrow pointing down on it and is contained in the first row of the column. By clicking on this arrow, you activate a drop-down menu showing a complete listing of every text and numerical data entry in the column. This menu is shown on the next page. It allows you to select which data you want to present. On the Filter tab, click on the drop down arrow in column A and click on “Apples.” All of the items not meeting the criteria of “Apples” in column A are hidden and every row meeting the criteria is moved to the top of the worksheet. This compresses the data and hides the non-relevant data but it does not move the data out of its sort row. Look at the rows presented – 2, 3, 4, 5, 10, 15, 22, 25, and 33. By clicking on the drop-down arrow again and selecting “Select All,” all of the data is presented in the order that as it was held before the filtering action was invoked. Utilize the filter arrow for column B and see the number of options available due to the large number of unique values contained in the column. The filter database is automatically created by Excel. As noted earlier, this may be unnecessary.

Filters can be placed on every column in the worksheet and multiple criteria filtering is possible. In a worksheet containing parts locations by state, county, city, warehouse, row and rack, you could filter column A to only your part number, then filter column B to the State you wanted, column C to the county, column D to the city, column E to the warehouse. That could easily and quickly take thousands of rows down to one or two. With only one or several columns containing active filters Excel will maintain row integrity of data. That is, Excel moves the entire row when a filtering action is imposed on one column of the worksheet. The “Multiple Filters” worksheet on the chptr10 data file is an example of this capability.

Filters are removed in the same manner they are invoked – click on Filter on the Sort and Filter tab of the Data toolbar. This is called a “Toggled” function – selecting it while it is active turns it off, selecting it while it is off turns it on.

You can filter by more than data. “Filter by Color” offers you the option to, as it says, you can filter to show or not show that yellow (example) highlighted data line for “Apple.” By setting your filter criteria and then selecting “Sort A to Z” or “Sort Z to A” Excel will sort your data as instructed – Ascending or descending order.

**Note:** It is important to remember that Excel is not deleting or reorganizing any data within the worksheet through “Filters.” However, if you were to highlight the all of the “Apples” rows of a filter results for “Apples” and copy and paste it elsewhere, Excel will usually only copy and paste the “Apples” data, not the hidden rows related to the other objects in the data file.
Sort

Excel will also allow multiple layer sorts. In a “Sort” function no data is hidden and the order of presentation has several options. On the “Sort” worksheet of the “Excel_Primer_Ch10_Data.xlsx” file there is a data group to show this function. With “Sort” it is necessary select the worksheet, the columns, the rows, or the cells that you would like sorted. A caution that Excel will usually provide for you is that if selecting less than entire rows or columns, Excel will sort only the selected cells. This may destroy the integrity of the data if completed. The “Undo” arrows may recover your data but should not be relied upon.

The most convenient way to utilize “Sort” is with titles in row 1 and then “freeze” (set display to keep in sight) row 1 through the “Freeze Top Row” icon on the “Windows” tab of the “View” toolbar. This will cause Excel to freeze row 1 and at the same time help row 1 to be identified as labels. You will see a line immediately under the frozen row. The safest way to utilize the sort function is by selecting all cells within the worksheet that contain data by selecting entire columns rather than selecting the entire worksheet by clicking on the “Select All” button above the row 1 number and to the left of the column A letter. To select or highlight the columns, using the “Sort” tab as an example, is to click on the column identifier for the first column – A. Then reclick onto the “A” column identifier holding the mouse button down, and sweeping right to highlight and select the columns through “E”. After the data area has been selected click on the “Sort” icon on the “Sort and Filter” tab of the “Data” toolbar. And a pop-up menu will appear. Excel will usually assume that the first row of a frozen pane display is titles so “My data has headers” should be selected as indicated by the checkmark. If not, select it to preclude your headers or column titles from being sorted into your data. This option is reinforced by whether the header or column titles are still highlighted after you click on the “Sort” icon. If they highlighted Excel does not automatically recognize them as titles so ensure that checkmark is in place. When the sort dialog box opens it usually has only “Sort By” row. As shown in the following screen print, for this example, set the first sort by value to be “Part Nbr:” and ensure that it will sort on values and in A-Z order. To add the second sort line click on the “Add Level” icon towards the left side of the dialog box and sort by “State” based on values and in the A-Z order. Continue to build your sort dialog box as shown in the screen print – Part Nbr, State, County, City, and Warehouse before selecting “OK.” Clicking on “OK” will result in a sorted worksheet by your selected criteria. Worksheets can be sorted time and time again in different manners without restrictions. This will change the order of the rows, which, if important may not be recoverable unless a technique such as “Master Sort Column,” discussed elsewhere, is used.
Note: If the worksheet is not saved upon exiting, it will be in the same configuration and data arrangement as the last save operation point.

Note: Debating how to sort an office file? Does “1” come before “A”? Plug sample data into Excel and follow its results. Excel’s sort functions follow office sorting standards.

**Master Sort Column**

The “Master Sort Column” is a technique rather than an Excel function or formula. If you are going to sort worksheets you may be required to return them to their original order for a function such as auditing. For example, you have entered 41 inventory items into the “Master Sort Column” worksheet of the “Excel_Primer_Ch10_Data.xlsx” workbook. (This is done for you on the Master Sort Column worksheet.) In the process of working with the data you discover what appears to be data entry errors that you want to verify. Once sort has been invoked on a worksheet it is not easy to restore the input or original order. So try putting a “Master Sort Column” on the worksheet and possibly additional sort columns as required for other reports, sort preferences, or users. To do this, insert a column at column A by clicking on the column A identifier. Then right click on the highlighted column and select “Insert” from the options. This will insert a new column and “push” the highlighted column one column to the right. The only time Excel will not do this is if every column to the limit of the worksheet has been utilized. Title that new column “Master Sort” (or anything else you desire) and insert indexed numbers starting in the first data row. You can utilize the row number, such as “2”, as your first number to keep a match between worksheet row numbers to master sort numbers as shown in the Master Sort Column data file. Drag or fill this column through the data entry range. Now, whenever you need the data back into data entry order simply select the worksheet and sort by the Master Sort Column, column A, in ascending order, and it is back in data entry order.

Suppose that the director of sales wants the inventory file in Part Nbr (Number) order frequently. Insert a new column B pushing the existing column B one to the right, and label the new column “Sales Sort,” sort the worksheet by Part Nbr (Number). Now, while in sorted presentation, put sequential numbers into column B as you did in column A with the master sort. Now any time the director of sales wants his presentation, select the worksheet and sort by column B in ascending order, his special order.

Hint: Remember that as the data within the worksheet changes, the sort may need to be run and the sort index may need to be refreshed. Any party requesting special presentation of the data can have their own sort row and these columns need not be printed by excluding them from the print area. This exclusion capability is discussed in the “Print Area” elsewhere in this book.

**SumIf**

Excel has many excellent tools to assist in analytical and mathematical valuations. Using inventory as an example, if the inventory count sheets are entered into Excel worksheets the “SumIf” (“=SUMIF( )”) function can be utilized to find the individual items and sum the total number of those parts that appears within the worksheet. This is not counting the number of times the item or value appears within the Excel worksheet, that function is accomplished through the “CountIf” function. The command string for this function is =SUMIF(Reference range, selection criteria, sum range). If the selection criteria is text rather than a number, it must be enclosed within quotation marks such as “Boxes–10”×10”×5”.

Note: Numbers such as “123-456-789” should be handled as text to assure the proper results.

For example, the “SumIf” formula that would locate the number “4” within the range of B2:B100 and then sum the values within the range of C2:C100 would be =SUMIF(B2:B100,4,C2:C100). The “SumIf” function to locate the text string of 123-456-789 within the same range would be =SUMIF(B2:B100,“123-456-789”,C2:C100). On the “SumIf” worksheet of the
“Excel_Primer_Ch10_Data.xlsx” file there is an example of the “SumIf” function counting apples, berries, and cakes. The caution with this function is that “Apple” and “Apples” are two different text strings so data entry discipline is required.

On the “Sum If” worksheet is a sample of three “SumIf” formulas contained in cells G2, G3, and G4. These formulas look to column F to determine what they are each looking for – Apples, Berries, or Cakes. The range they are looking at is column A, rows 2 through 250. The values these formulas are summing are the corresponding values in column B, rows 2 through 250. Notice that there is one line identified as “Apple.” This entry, row 26, is filled and font colored for easy locating. If you sum the individual quantities and include this line in the grouping of “Apples,” you will find that your result and Excel’s results do not agree. To Excel, “Apples” and “Apple” are two distinctly different items. This is verified with other formulas on the page and subtotals for your own verification.

These formulas, as provided, all utilize “Look to” formula capabilities as shown in the text presentation of the formulas in column H. This capability reduces typing, increases speed, and improves accuracy. In rows 15 through 22 of the formulas columns the text values have been entered with the required “Apples” type formatting. Excel is not case sensitive as to “Apples” or “apples” with the “Sum If” formula.

**Hint:** When using “Sum If” for formula work where all of the items of a column will be placed and counted into one or more categories make sure that all values are counted with a technique similar to that used in cells G5 and G9. This reduces the probably of missed data.

**CountIf**

The “Count If” function of Excel will count the number of occurrences of the specified value. On the “Count If” worksheet of the “Excel_Primer_Ch10_Data.xlsx” workbook the function is shown in operation. The formula is “=COUNTIF(range for the count, reference value)”. The Count If range can be cells, single a column, multiple columns, a single row, or multiple rows. This is shown on the “Extended CountIf” worksheet of the “Excel_Primer_Ch10_Data.xlsx” workbook.

**Subtotal**

“Subtotal” is a tool that requires more show than tell to explain. What does “Subtotal” do? It tells you, for example, all of the flight time Adam, Ann, and the rest of the pilots have flown, what airplanes they flew in as well, the flight time for the aircraft and the total flight time. “Subtotal” requires that the worksheet be sorted by the basic order for the subtotaling operation since “Subtotals” only works on the rows format and has no sorting capability within itself. The “Subtotal” worksheet of the “Excel_Primer_Ch10_Data.xlsx” file was built for this purpose. With the “Subtotal” data file you will need to first sort the data by your primary element of change and that is “Charged Pilot,” in this case followed by the secondary element of change, the “Aircraft,” in this case, and then by the third element of importance – the “Date.” This will structure and sequence the data to be “subtotaled” by Excel.

**Hint:** If you click and highlight your data area to confine the process and avoid taking in extra rows and columns, Excel may give you an advisory about header rows when you initiate “Subtotal.” Usually simply acknowledge the message if you know what caused it. If you simply click on a cell and then click on the “Subtotal” icon on the “Outline” tab of the “Data” toolbar this advisory message will usually not appear, but you may end up with extra rows in your data matrix.

**Tip:** Identify the data rows by highlighting them and accept/acknowledge the message.

Highlight the rows from row 1 through and including row 147. This may cause an advisory message about header rows that is not a factor in this data structure. Then click on the “Subtotal” icon on the “Outline” tab of the “Data” toolbar. And the “Subtotal” dialog box will pop up. Within this dialog box, set the “At Each Change In” window to “Charged Pilot” through the drop down menu list accessed by
clicking on the drop down arrow to the right side of the window. Other options are available but the data file must be sorted to handle the selection sequence – if you sort the data file by “Date” and then subtotal by changes in “Charged Pilot” the resulting matrix will be useless.

In the “Use Function” window ensure that it reads “Sum.” There are other mathematical operations available and you should check these to see your options but you will be using “Sum” in this example.

In the “Add Subtotals To” window scroll up or down to see and select “Time” from the selection. Ensure that all other items are clear of checkmarks. Then ensure that “Summary Below Data” is checked. This, while not important now, will be important shortly.

Before you click “OK,” what has been done is, you have sorted (earlier) a data matrix into the order of “Charged Pilot,” “Aircraft,” and “Date.” Now you are telling Excel to determine the amount of hours each pilot has flown for this data period. Click “OK” on the dialog box and watch the worksheet change.

The worksheet has new “scroll” bars (discussed soon) to the left and new rows inserted. These rows contain the data you asked for in the first run of the “Subtotal” dialog box. Each pilot’s total flight time is now in the “Time” column. Looking at the screen print of the results you can see that “Adam” flew a total of 2.0 hours and Ann flew 7.4 hours.

Now, using technique rather than Excel, add a data management feature to the worksheet. In the “First Subtotal” column enter a “2” in row 2, in row 3 enter a “3”, in row four enter a “4” and then highlight these three cells and drag and fill the cells down by grabbing the bottom right corner of the highlighted box when your cursor becomes a heavy dark cross. You should be dragging down through the bottom of the data matrix, now row 210. You may use this later.

The next subtotal process will address the next issue. Each aircraft has its own billing rate and numerous pilots flew several aircraft during the period. So, select the rows from 1 through 210 – the subtotal process increased the number of rows as it added Adam’s and Ann’s subtotals as well as everyone else’s. Follow the path to the “Subtotal” icon on the “Outline” tab of the “Data” toolbar again. This time in the “At Each Change In” window select “Change in Aircraft,” ensure that the function is still “Sum,” and the “Add Subtotals To” is “Time.” This time, you do not want to remove the previous subtotals so ensure at there is not a checkmark in the “Replace Current Subtotals” box. If there is or if there is a faded one there, mouse click it until the box is clear. Now click “OK” and watch the worksheet change again.

Now put a “2” in row 2 of the “Second Subtotal” column, a “3” in the third row, and a “4” in the fourth row. Then highlight these three cells and drag and fill the column through the data matrix and down through row 303. Excel and Subtotal has added numerous rows to the basic file. Use any of the “Save” procedures to save the workbook.
Now the worksheet has more “scroll” bars to the left and more inserted lines. In this process, use the scroll bars to the right and scroll through the data. You will see that, where a pilot has flown more than one aircraft in the period, such as Deanna, Excel has subtotaled her flight time in N72RAS as 4.4 hours, N78CHS as 1.5 hours, and N81JLS as 0.9 hours. Excel also tells you that Deanna flew a total of 6.8 hours.

Another data management issue, column J is titled “Names.” In the J1 cell, enter the formula “=IF(D2="",J1,D2)” and drag it down through row 301 of the matrix. If you drag this formula into row 302 in this example you will “credit” Zoë with the grand totals. Not harmful as long as you don’t bill Zoë, just incorrect. This column will be discussed shortly. Save the workbook to protect and preserve your work.

Now, those new “scroll” bars to the left. At the top of those bars are some new blocks with numbers indicating levels of data that can be presented. In this example, level 4 is “Full Detail Shown,” the default screen. Click on the level 3 box in the data file and you have a good presentation to do billing from. Detail is gone but subtotals are clean and crisply presented so you do not need to find the subtotal within the detail. Printing at this point will be what you see – summary down to pilot and aircraft. Make sure you define the print area as you do not need sort columns and unnecessary data. Click on the level 2 box and you can verify the total hours flown by each pilot, and you are not looking at the subtotals by aircraft detail. Click on the level 1 box and you are told that your total billing for this period should be 183.7 hours. A nice cross check. Click back into the level 4 box to get full detail shown again. By clicking on the minus signs on those new scroll bars data will disappear through their associated rows and the minus sign will be replaced with a plus sign. The horizontal position or orientation in relation to the level boxes at the top clue you into which data will be hidden or exposed by your clicks.

Click into the “Time” cells of any of the new rows where data appears and you will see new Excel formulas within the cells. In cell G3 Excel and the “Subtotal” has inserted the formula “=SUBTOTAL(9,G2:G2)”. The “9” within the formula tells Excel this is a summing formula. The range is G2 through G2. If you open Excel help and type “Subtotal Worksheet Function” you will see the numerical drivers for the other subtotal functions – if you are interested.

This worksheet contains a lot of formulas and dynamic worksheets can lead to problems. To address this minor issue, click into the Subtotal’s worksheet and select all cells by clicking on the “Select All” button or the keystrokes Ctrl (Control)-A. Then copy the worksheet through any of the numerous copy methods such as Ctrl (Control)-C, the copy icon on the toolbar, or clicking on the two overlaying sheets on the “Clipboard” tab of the “Home” toolbar. Now click into the “Invoicing” worksheet of the data file. Make cell A1 the active cell. Right click cell A1 cell, select “Paste Special” from the options and select “Values” from the dialog box. Now the Subtotals worksheet is pasted into the “Invoicing” worksheet without the formulas.

Select row 2 and then freeze the top row by using the “Freeze Panes” icon on the “Windows” tab of the “View” toolbar. If row 1 is already frozen through the paste process, this is not necessary. This will “freeze” row 1 as a header row. To remove subtotal bars from the “Invoicing” worksheet click back into the “Subtotal” icon in the “Outline” tab of the “Data” toolbar. With the pop-up dialog box available, this time select the “Remove All” option and click “OK.” Excel removes the subtotal features. No values are lost since “Subtotals” will only remove formulas it placed and the new “Scroll Bars” it inserted and you removed those formulas with the Paste Special > Values operation just performed.

Now the reason for that “Name” and those various “Sort” columns. Select the entire worksheet in any manner you like and sort the data using “Name” as the first criteria. follow the path Data > Sort. Ensure “Header Rows” is identified on the dialog box. Then select “Sort Column,” (column A of the worksheet) which represents the original data input sequence. Select “Names” in the “Then By” window. The last “Then By” window can be left blank. Then click “OK” and watch the results.
You now have original data entry sequence in rows 2 through 147. In rows 148 through 303 you have pilot subtotals by aircraft and totals flight times – without formulas. However, notice that the presentation of data is not real good. The detail of aircraft is in column B and the hours are in column G. To solve this issue, write the following formula in cell K148

```
```

Remember that "" is the null value while " " is a space. This formula will look at cell D148 to see if there is anything there. If there is not the formula will “Concatenate” or make a text string out of the contents of cells D148 and G148 separated by a space. These cells contain the pilot’s name with the word “total” inserted by the subtotal operation and the total flight time. If there is anything in cell D148, this formula will “Concatenate” or make a text string out of the contents of cells J148, C148, and G148 (in that order) and separate them by a space. These cells contain the pilot’s name, the aircraft identification, and the flight time for that aircraft by that pilot. Since the formula is relational, it can be dragged down through row 301. Since it is a formula, copy column K and utilize Paste Special > Values to paste it back in as values. Now the text strings can be moved or copied and they will retain their value. This gives nice summary presentation for invoicing and records.

Save the data file in its current format to protect your work to this point.

Now that you have pilot invoicing detail on the pilots, you need activity by aircraft. Click into the “Subtotal” worksheet and access the “Subtotal” dialog box. Click on the “Remove All” button. None of your data is lost since you copied it as “hard values” to the “Invoicing” worksheet. Select all the cells and sort the “Subtotal” worksheet by “Aircraft” and “Then By” “Tach Out.” This will sort the data by the aircraft and by the sequence of utilization in the event that the data entry order was not sequential. Once again populate the “First Subtotal” column’s row two with “2”, row three with “3”, and row four with “4” replacing any data there and then drag down the column through row 147 (in this example) to populate the cells.

Select the entire worksheet or all the rows of the data matrix. Then utilize the “Subtotal” function with “Change In” “Aircraft,” “Use Function” of “Sum,” and “Add Subtotal To” of “Time” and remove all other checkmarks in this category. Then click on “OK.” Subtotal will again insert new features on the worksheet. In the “Second Subtotal” column, once again populate row two with “2”, row three with “3”, and row four with “4” and then drag down the column through row 154 (in this example) to populate the cells, replacing any data existing there. If there is data below the current data matrix from an earlier process, delete or erase it. Select the entire worksheet and “Copy” the worksheet. Now select the “Aircraft Activities” worksheet. Utilize Paste Special > Values in cell A1 to place the data and remove the dynamic or live formulas into the worksheet. Then remove the “Subtotal” function through Data > Subtotals > Remove All. Now, ensure all cells are selected and resort the worksheet with “Sort By” set to “First Subtotal” and “Then By” set to “Second Subtotal.” The second “Then By” can be set to “None.”

The result will be a sequential presentation of aircraft utilization by aircraft in rows 2 through 147 and a nice summary of aircraft utilization in rows 148 through 153. You could place the formula “=CONCATENATE(C148," ",G148," hours")” in cell J148 (of this example) to make a nice text string presentation and drag that formula through row 153 if desired. If you do, consider Copy > Paste Special > Values to remove the formulas.

Save your data again to protect your efforts. You can return to the “Subtotal” worksheet and removal all the “Subtotal” functions and resort by the “Sort Column” which will return your data matrix to input order. No data will be lost since the aircraft activity data is now on the “Aircraft Activities” worksheet as “hard values.”
Vlookup

Vlookup is another powerful analytical tool of Excel that takes more show than tell to explain. There is a “Vlookup” worksheet in the “Excel_Primer_Ch10_Data.xlsx” file for this explanation. There is a “Lookup” icon on the “Solutions” tab of the “Formulas” toolbar. This is a walkthrough “Wizard.” This example will show you how to right the formula. In cell G5 of the “Vlookup” worksheet the formula looks like this:

=VLOOKUP($F5,$A$5:$E$6,2,FALSE)

The “decode” of this formula is that cell F5 contains the “Look up value” that Excel and “Vlookup” is seeking in the data matrix. The range $A$5:$E$6 defines the table array where Excel and “Vlookup” are seeking a match. Excel will only look DOWN the first column, the A column in this case, to find the match even though the matrix extends to column E.

Hint: Excel does not put absolute references into the formula so these were inserted so the formula could be dragged down the “Vlookup” worksheet. The absolute reference on the “seeking value,” the $F5 was manually absolute referenced by column so the formula could be copied right into the next two columns.

The “2” is telling Excel to return the value found in the second column of the data table array on the same line if it finds a match to the “lookup value,” the value contained in cell F5 in this example. The response will not be column B of the worksheet except by coincidence here. Excel counts columns from the left most column of the data table array towards the right. This value will not change as the formula is copied or dragged from cell to cell since it is not “relational.” The “False” tells Excel and “Vlookup” that if it does not find an exact match to the “lookup value,” return nothing other than an “Alert” message. If this field is left blank Excel and “Vlookup” will return the preceding value to the seeking value not to exceed the seeking value. This can be dangerous and, as an accountant, do you want formulas returning unknown assumptions? The “false” declaration will return a #N/A# if no exact match to the “Seeking value” is found in the data matrix.

On the “Vlookup” worksheet there is are several data matrices so the data matrix identification changes with the “Vlookup” formula location and purpose. In cells G5 through H14 “Vlookup” is looking at the matrix defined by “$A$5:$E$6” which allows the part to be identified as a pen or pencil part. In cells J5 through K14 “Vlookup” is looking at a matrix defined by “$A$9:$E$12” which defines the finish of the pen or pencil. In cells M5 through N14 “Vlookup” is looking at a matrix defined by “$A$15:$D$16” which informs the part reader if the part is an upper or lower assembly of the pen or pencil. In cells P5 through Q14 “Vlookup” is looking at a matrix defined by “$A$19:$E$27” which defines the actual pen or pencil part.

When the formula is written in cell G5 as “=VLOOKUP($F5,$A$5:$E$6,2,FALSE)” it can be dragged down the rows through 14 and maintain correct orientation and alignment. If you had not made data matrix absolute reference, when you dragged the formula from cell G5 down to G14, the data matrix rows would have indexed accordingly and alignment would have been lost. Now you can copy the formula in cell G5 to cell H5. If the column reference of F had not been absolute, it would have incremented to the right by one and that integrity would have been lost since you are not seeking a match to the value in cell G5. Now you can change column value within the “Vlookup” formula to return from “2” to “4” and the formula will return the value in the fourth column of the matrix when it finds a match. Since this matrix contains merged cells – columns B and C were merged into one column, the next column over is considered column number 4. When this change is made, the formula can be dragged from row 5 down through row 14 and it will maintain proper alignment. Now the formula can be written into cell J5 as “=VLOOKUP($J5,$A$9:$E$12,2,FALSE)” and dragged down and then copied from cell J5 into K5 and edited to seek the fourth column and dragged down through row 14.

Since the formulas are “live” or “dynamic,” you can change any of the values that the “Vlookup” formula is seeking and you can see the results change almost instantly. Written into the table array
defined by G2 through I20 is a grouping of “Vlookup” formulas looking at this feeder matrix. Replacing a number in column F will cause the “Vlookup” formulas in columns G through I to scan the first column and first column only of the table defined in the formula as A1 through D71 for that number. If the function finds an exact match, as controlled by the true/false statement, Excel will return the values of the second column of the table in column G, the value found in the third column in column H, and the value found in the fourth column in column I.

**Tip:** Important issue with “Vlookup.” If you are seeking a value that appears in the data matrix more than once “Vlookup” will complete its search on the first value found. If you are using the “True” in the formula instead of “False,” make sure your data is sorted in ascending order since “Vlookup” will complete its search upon finding the first value equal to or exceeding its “seeking value” and return the (first) the exact match value or (second) the highest value not to exceed the seeking value. Even if an exact match is lower in the data matrix.

There is an area on the “Vlookup” worksheet that shows how “Vlookup” can be used to assemble a mailing label by entering one number in cell G37. Reading the formula will tell you where the “seeking value” is, the data matrix, and verification that you only want exact matches.

**Hint:** “Vlookup” is structured for data in a vertical format. If your data is in a horizontal format, utilize “Hlookup” which works in the same manner for data in a horizontal format.
Chapter 11

DISPLAY

Chapter Outline

Freeze Panes
Split Panes
Conditional Formatting
Displaying Zero Values
Gridlines on the Screen

Hiding Columns and Rows
Hidden
Indent within a Cell
Truncate
Workspaces

Freeze Panes

The “Excel_Primer_Ch11_Data.xlsx” file can be utilized with this chapter. Freeze panes is actually “freeze rows or columns.” What this process does is keeps a specified set of rows, columns or both rows and columns available and viewable at the top for rows, at the left for columns, or at the top left for rows and columns while you move throughout the worksheet. Open the “Excel_Primer_Ch11_Data.xlsx” file. In this workbook you will be working with the “Freeze Panes” worksheet to freeze rows, columns, and rows & columns. First, on the “Freeze Panes” worksheet click onto the row 4 identifier then click on the “Freeze Panes” icon on the “Window” tab of the “View” toolbar. From the drop-down menu click on “Freeze Panes.” At this point Excel will “freeze” all of the rows above the line highlighted since there were no columns selected. As you move throughout the workbook you will notice that the first three rows are always in visible. This is excellent for titles. To unfreeze the panes, follow the same command path and you will be presented with “Unfreeze Panes” as this icon is a toggle – Freeze/Unfreeze Panes depending on the configuration at the moment.

Without any panes (rows or columns) frozen on the “Freeze Panes” worksheet, click into the title tile for column B to highlight the column. Then access the “Freeze Panes” icon on the “Window” tab of the “View” toolbar. From the drop-down menu select “Freeze Panes.” Since there were no rows identified the column or columns left of the highlighted column will remain visible as you move throughout the worksheet. Move through the worksheet to see the effect. You can unfreeze the columns with the “Freeze/Unfreeze Panes” toggle icon.

Without any panes (rows or columns) frozen on the “Freeze Panes” worksheet, click into cell B5 to make it the active cell. Then access the “Freeze/Unfreeze Panes” icon toggle to freeze both columns and rows at the same time. Since a cell with both column and row identity was active at the time the process was invoked, the rows above row 5 and the columns left of the B column are now “frozen” into place. As
you move right, column A will always remain in view. As you move down, rows 1 through 4 will always remain in view. This provides you with column and row identity. This capability is excellent for large worksheets where columns and rows are both elements of identity such as multiple salesmen in rows and multiple sales items in the columns. By freezing the columns, the salesman’s identity will always be visible, by freezing the rows, the title of the sold items will always be visible.

While “freeze pane” is invoked on a worksheet Ctrl-Home will normally take you just below the frozen rows and just to the right of the frozen columns as the frozen columns and rows are considered title areas not normally used for data. You can still enter these areas by simply mouse clicking into them.

**Split Pane**

Utilize the “Split Pane” worksheet of the data file for this section. This function splits the single worksheet into two or four separately displayed panes. This view is controlled through one of four methods. First, just above the scroll bar to the right of the worksheet is a “dash” in a small rectangle, shown in the top tile of the screen print. By placing your cursor over this icon and then left mouse button (primary mouse button) down, you can drag it down into the worksheet area. As you do the worksheet area will “split” into an upper and lower area, each independent of the other for movement even though they are the same worksheet. Once the worksheet is “split” you can grab the split bar and move it up or down as you desire. If you move it to the very top or bottom of the worksheet it will be “absorbed” and you will have to go back and “build” a new split. This split concept offers only a horizontal split into two windows.

The second method splits the screen left and right. There is a similar rectangle to the vertical split just addressed, with a vertical dash, to the right of the horizontal slide bar near the bottom. It works the same way for splitting the worksheet into a left and right pane.

The third method is to impose either a vertical or horizontal split and then impose the other split with the manual tiles just addressed.

The fourth method is through the “Split” icon on the “Window” tab of the “View” toolbar, shown in the lower tile of the upper screen print. Place your cursor in cell D12 of the “Split Pane” tab for this example. Then click on the “Split” icon. And Excel splits its display area into four panes as shown in the screen print here. And there are two scroll bars at the bottom that scroll the left and right panes left or right independently and two scroll bars to the right that scroll the two panes up and down independently. As with the single split pane addressed in the first paragraph, you can drag the split bars around and
move them off the display area to close them out. The “Split” icon on the “Window” tab is a toggle – once on, next off, once again on.

This display capability is very useful in working with the Excel templates where you can display the data in the upper pane and scroll through the lower pane and do data entry. To demonstrate a further enhancement of this function, with access to the Split Pane worksheet, scroll down the worksheet so that row 7 is the first row visible. Then “pull down” the split screen bar from above the right scroll bar until it is just below row 15. Now, with rows 7 through just below 15 “frozen” in the upper portion of your display, scroll down in the lower portion of the display until the first journal entry area, rows 36 through 40, are visible. Click into cell I37 to make it the active cell, press and release the equal sign (=), then click into cell D12 in the upper pane followed by pressing and releasing the Enter key. And without numerical data entry and without extensive scrolling, you have put the value of the cash received into the journal entry. Complete the values of the journal entry by placing the values into cells J38 and J39 as appropriate.

To post the cash value of the journal entry, use the scroll bar to the right of the upper pane to display the first journal entry in the upper pane. Scroll down in the lower pane until the general ledger account for Cash is shown, rows 75 and below. Click into cell B77 and press and release the equal sign. Then click into the date of the first journal entry in the upper pane followed by pressing and releasing the Enter key. And Excel places the date into cell B77. Again, without extensive scrolling.

Click into cell H77, press and release the equal sign, and then click into cell I37 in the upper pane. When the Enter key is pressed and released, Excel places the value of the cash into cell H77. Again, without extensive scrolling. This use of split panes and the look to formula or function still require you to make the decision of what date, account title, and value go into what cells but the probability of error for typos and transposition are reduced.

**Conditional Formatting**

Excel will accept several levels of conditional formatting for a cell through the “Conditional Formatting” icon on the “Styles” tab of the “Home” menu. The drop-down menu associated with conditional formatting is shown here. On the “Conditional Formatting” worksheet of the “Excel_Primer_Ch11_Data.xlsx” file there is an example in cell A1. If the value is less than 1 the cell appears normal, if the cell contains a value between one and ten, the formatting is horrible, if the value is greater than 10 the formatting gets worse. While this was done for effect, if you were inputting mark-ups for retail and wanted no percentage less than 50% nor more than 150%, you could format the cell to go red if the percentage is not within this range, as cell A3 is formatted to do. To “read” the formatting of cell A1, click into cell A1, and then click on the “Conditional Formatting” icon on the “Styles” tab. Then click on “Manage Rules” from the drop-down menu.

By examining the drop-down menu selection choices of the operator, defaulted to “between” you will see that you have a wide range of operators to work with. You can impose up to three levels of conditional formatting on a cell by clicking on the Add button at the bottom of the dialog box. If you have imposed conditional formatting on a cell you can remove one or more levels of formatting by “managing” the rules while the target cell is selected and clicking delete on which level of formatting you want removed.
Displaying Zero Values

The “Show a zero in cells that have a zero value” option is in the “Display options for this worksheet” section of the “Advanced” tab of the “Excel Options” which is accessed through the four colored Microsoft symbol in the upper left of Excel and then by clicking on “Excel Options” near the lower right corner of the drop-down menu. This setting determines whether zeros will or will not be displayed as a result of a formula or as a direct entered value. If a checkmark is in the box, zeros will be shown, if not selected (no checkmark in the box), zeros will not be shown. An interesting, and sometimes, confusing event occurs when “Zero values” are not selected for display. The user will see a “0” (the numeral zero) when he expected to eliminate these values from the presentation through his setting. This happens when the actual value in the cell is below the level of presentation, 0.49 with no significant digits set for display. Excel will round this value off to “0” for display, it is not a “zero” value. If data entry or a formula calculation results in a value below the displayed decimal places Excel will display the “0” or “0.00” (the numeral zero) value – not because it is zero but because it is smaller than displayable. If the decimal setting is set to 2 significant digits such as 0.00, the value of 0.00 would not result in a presentation if the “Zero values” option is deselected. However, if the value in the cell were 0.001, the presentation of Excel would be “0” or “0.00” since this is a value not equal to zero and it is below the displayed value setting. If Excel is set to two decimal places and the actual value is 0.005, then Excel will show 0.01 as it rounds up the value for presentation. However, it will utilize the real value of 0.005 in any calculations.

The screen print to the right is without zero values displayed in the upper tile and with zeros displayed in the lower tile. Both contain the same formula. It is recommended that “show zero values” be selected for most accounting work within Excel and this option is set for the Excel templates.

The Display Zeros worksheet in the chapter data file has numerous math operations in the upper left cells. Changing the display zero values back and forth will show how this can change the displays.
Gridlines on the Screen

There are two sets of gridlines for Excel. Gridlines are the vertical and horizontal lines on the screen that create the frame of the cells. The first set appears on the screen while you are working with Excel and they and their color are controlled through the “Display options for this Worksheet” section of the “Advanced” tab of the “Excel Options” accessed through the four colored Microsoft symbol at the upper left corner of Excel. These gridlines are those seen only on the screen presentation of Excel and greatly aid you in maintaining a positional reference within the rows and columns of Excel. Gridlines on the printout are controlled through “Page Setup” dialog box accessed through the small arrow at the bottom right corner of the “Page Setup” tab of the “Page Layout” taskbar. Below the selection to show gridlines is the ability to change the gridline colors through the “Show Gridlines colors” dropdown window. This selection will usually remain selected except when using Excel for a screen presentation.

By default, if gridlines are set on the screen display they will appear on the printed worksheet. If you want a “clean” print out, one without gridlines, you need to remove the checkmark from both the “Display options for this Worksheet” section and the “Sheet” tab of “Page Setup.”

Change these settings on the “Display Zeros” worksheet of the chapter data file. You will notice that manually set frames such as those around cells A1 through D6 are not affected by these selections. “Frames” may appear to be gridlines but Excel treats them differently.

Hiding Columns and Rows

You may use the “Hiding Columns and Rows” worksheet of the “Excel_Primer_Ch11_Data.xlsx” file with this section. Excel will allow you to hide a column, columns, a row or rows. The methodology is to highlight the column, columns, row, or rows you want hidden. This demonstration will use rows as an example while columns work the same way. The first step is to select the row by clicking on its numerical identifier – 3, 4, 5, etc. If you want more than one row and they are contiguous, 6, 7, 8, 9, and 10 type event, click on the first or last row than sweep with the mouse button over the rest of the rows desired. If they are not contiguous, 3, 5, 9, and 13 type thing, click into the first row, hold the control key (CTRL) down, and click on the rest of the rows individually. Once the rows are highlighted, right click into any of the highlighted areas and from the pop-up menu, click on “Hide”. And that row or those rows are now hidden. If you left click on the highlighted area you will lose all of your selections and select only that cell, column, or row. Excel will let you know that rows or columns are hidden a couple of different ways. First, as shown in the screen print, the numbers are not sequential – 3, 4, 7, 8, 9. Second, look at the double-line immediately under the row number 4 and its different
presentation than the lines separating other row numbers. The screen print also has columns hidden – the sequence is A, C, E, G, H, etc.

Hidden cells remain active in all formula and will still be active for functions like Go to, Find, and Find and Replace. This technique is excellent for extended calculations that are not desired in the presentation. However, copy and paste commands are active on these cells and caution needs to be exercised when a cell or cell is hidden. If you were to highlight rows 4 through 7 of the screen printed worksheet and copy them, even though rows 5 and 6 are hidden, when you paste the copied cells elsewhere rows 5 and 6 will appear.

To unhide a column(s) or row(s) you have several options. Highlight the predecessor through successor columns or rows that border the hidden columns or rows through a sweep operation, right click the highlighted area, and select “Unhide” from the pop-up menu. You can also click on the “select all cells” block – above the number 1 for rows and to the left of A for columns, then right click the highlighted area and select “Unhide” from the pop-up menu.

Hidden rows and columns are not exposed when the document is printed. There are no hidden rows or columns in the Excel templates.

**Hidden**

Utilize the “Hidden” worksheet of the “Excel_Primer_Ch11_Data.xlsx” file for this section. The “Hidden” capability within Excel is controlled through a two part process which starts with the “Protection” tab of the “Format Cells” or “Custom Lists” dialog box. This dialog box is accessed by right clicking a cell or a range of cells and then selecting the “Format Cells” from the pop-up menu followed by selecting the “Protection” tab from the pop-up “Format Cells” or “Custom Lists” dialog box. Then ensuring that a checkmark is in the “Hidden” option as shown in the following screen print.

![Custom Lists dialog box](image1)

![Protect Sheet dialog box](image2)

The second step of the “hidden” process is to protect the worksheet or the workbook through the “Changes” tab of the “Review” toolbar. For this exercise utilize “Protect Sheet.” With cells which contain formulas set to “Hidden” and having clicked on “Protect Sheet” you will be given another dialog box which is asking, “What would you like to protect and how?” Normally the default selections of “Select locked cells” and “Select unlocked cells,” which addresses every cell in the worksheet, are acceptable so you can click “OK.” A password is not required; if you utilize a password, make sure you can recover the password. Then save the workbook again to ensure that the changes are retained in the file.
You can utilize the “Hidden” worksheet of the chapter data file for this work. Click through the cells and examine the formulas. Then select all of the cells by clicking on the “select all” tile above the row 1 identifier and to the left of the column A identifier, or by “Ctrl-A,” and then right click to get the pop up menu leading to the “Format Cells” dialog box. Utilize the “Protection” tab of the dialog box to set “Hidden.” Notice that at this point the formulas are still visible in the formula window. Use the “Protect Sheet” icon on the “Changes” tab to complete the operation.

Why would you hide things? Assume you are giving a presentation and using Excel as a presentation tool. The worksheet is extensive and has numerous large formulas contained within it. The object of the presentation is to convey the information, not have the audience to stare in awe of your formula construction while you are trying to convey your message. So you can make the formula bar and formula input window disappear by changing your options in “Excel Options” and “Display” and removing the checkmark from “Show Formula Bar.” To reduce the size of the toolbars or “ribbons,” right click on a clear section of the taskbar, such as to the right of “Developer” in the screen print above, and click on “Minimize the Ribbon” from the pop-up menu. And your presentation of Excel is greatly simplified as shown in the following screen print.

To unprotect the worksheet click on the toggle – “Unprotect Sheet” on the “Changes” tab of the “Review” toolbar.

By formatting any unnecessary for presentation intermediate formulas and unwanted text and cells to a text coloring the same as the background or fill coloring before protecting the worksheet these unnecessary items will cause less distraction as they will be hidden - white ink on white paper type printing. To remove this later simply select the entire worksheet and format all text coloring to “Automatic” or whatever color you choose through the “Format Cells” dialog box.

The “Hidden” worksheet is provided so you can change the locked and hidden values as you desire. There is no password on the worksheet.

**Tip:** You can also use “Full Screen” on the “Workbook Views” tab of the “View” toolbar. With default settings this not only fills your screen but minimizes the toolbars or ribbons and hides the formula bar. To return to “normal” presentation, right click on the title bar and click on “Restore” from the pop-up menu.

**Clue:** The Excel scroll bars will tell you the general data area of a worksheet. If you open a worksheet and the scroll bars fill the slide area, you are generally looking at the total data entry area. If the scroll bars are little bars in a large slide area, the data area is rather large. Excel remembers where the data is.
and allows you to use the scroll bars to get to it. And, even a “ ” (space) inserted 250 rows below the last data row and 50 columns to the right of the last data column will cause the scroll bars to change and represent this placement.

**Indent within a Cell**

Utilize the “Indent within a Cell” worksheet of the “Excel_Primer_Ch11_Data.xlsx” file for this section. To indent within a cell without using spaces use the “Indent” icon on the “Alignment” tab of the “Home” toolbar. This is the second icon from the left in the bottom row of icons on the screen print. Each click on the icon moves the start of text and numerical data about 2 spaces. Remember that by default, text is left justified and numerical data is right justified. Asking Excel to indent numerical data to the right in a default formatted cell may result in an interesting move. The “decrease indent” icon is the first one. The arrows are keys to appreciating the movement — the left pointing arrow icon moves the indent left, the right pointing arrow icon moves the indent to the right. The Indent within a Cell worksheet is available for you to check the operation of the Increase and Decrease Indent buttons. Column A is default justified left because it contains text. Column B is specifically formatted as right justified even though it contains text. Column D is specifically left justified even though it contains numerical data while column E is default right justified as numeral data. Click into various cells in these columns and click on various combinations of the Increase and Decrease Indent buttons and watch the Excel response.

**Hint:** Excel will indent a cell that contains a formula looking to another cell or computing a value.

**Note:** If spaces are used to indent a value, that “value” becomes text and cannot be used in formulas as numerical values.

The exercise and problem templates provided on the data disk are set up to have the “Look to” formula or function such as “=F12” used extensively to save keystrokes and reduce errors. However, how do you handle journal entries with a “Look to” reference? On the “Indent within a Cell” worksheet in rows 2 through 5 of column H is a mini chart of accounts. The task is to purchase $800 in supplies for cash and make the journal entry in cells H8 and H9 with the values in columns M and N. Utilizing the “Look to” formula of =H4 in cell H8 you get the presentation of “Supplies” as the debit. In cell H9 you enter =H2 for Cash but it is flush with the left side of the cell while as a credit account it should be indented. Click on the “Increase Indent” button and it is. Now enter the value of $800 in cell M8 and have N8 look to cell M8 to ensure that the cells are always the same.

Now, starting at row 14, purchase $1,000 in supplies by paying cash of $250 and the balance on account. Utilize Increase Indent to get the proper presentation of credit entries and formulas to have the cash paid subtracted from the total purchase for the value on account.

Many of the cells within the exercise and problem templates provided have indent functions imposed on them in their construction for proper presentation. This is because “ 250” — a space or spaces preceding the “250” turns the “250” into text, not a numerical value. So, since spaces cannot be utilized for indents, the increase or decrease indent icons are.

**Truncate**

Truncate reduces the number of significant digits from one calculation to another. Within the “Truncate” worksheet of the “Excel_Primer_Ch11_Data.xlsx” file, is a math computation that was utilized to determine the flight time for each flight by each pilot. This formula took a value such as (Tach In – column E) tachometer (engine) hours of 553.0 as recorded at the completion of the flight and subtracted the (Tach Out – column D) beginning tachometer (engine) hours of 551.4 to determine that Calvin should be charged with 1.6 hours for this flight as shown in cell F2. This same formula is also in G2. The formulas in column G was then copied and with Paste Special > Values turned into hard
numbers. When those hard numbers are looked at, the values don’t make sense. The formula values are 551.4 hours subtracted from 553.0 hours and the results should be 1.6 hours but the answer as shown in Excel to fourteen significant digits is “1.60000000000002”. To avoid passing values that appear this way you can use the “Truncate” formula as written in cell I2, “=TRUNC(G2,1)”. This formula will take the value in cell G2 and reduce it to one significant digit as instructed by the “1” following the cell reference and comma, trimming those extra zeros and that inappropriate “2” from the number. However, this is once again, a formula so it needs to be copied and pasted through Paste Special > Values to eliminate this presentation.

To save the steps, you can use an embedded formula such as shown in column J, “Calc Time 2” to do the job in one process. The embedded formula is “=TRUNC(E2-D2,1)” which truncates the results of subtracting the out time from the in time and reducing or trimming the significant digits to one in a single step. You now need to copy and “Paste Special > Values” only column J to complete the process of eliminating formulas for your worksheet.

The balance of the worksheet in columns I, J, and K are available for your practice.

Note: The use of “Precision as displayed” through the “Excel Options” dialog box addressed part of this problem but removes non-displayed values and detail from the workbook.

Workspaces

Before building your “Excel_Primer_Ch11_Data_Workspace Example.xlw” file ensure that:
Excel_Primer_Ch11_Data_Departments.xlsx
Excel_Primer_Ch11_Data_Description.xlsx
Excel_Primer_Ch11_Data_Unit of Measure.xlsx

are all located in the same directory. A workspace within Excel is a structure of more than one workbooks within a preformatted presentation. The example of a workspace, shown below, is the combination of the three files referenced here and saves as “Excel_Primer_Ch11_Data_Workspace Example.xlw.”
The first step of creating your workspace is to open the three files:
Excel_Primer_Ch11_Data_Departments.xlsx
Excel_Primer_Ch11_Data_Description.xlsx
Excel_Primer_Ch11_Data_Unit of Measure.xlsx
and ensure that all other Excel files are closed (for convenience.)

Next, use the “Restore” or “Maximize” buttons in the upper right corner of each workbook’s worksheet to size the workbooks so they are all seen at one time. Once sized so you can see all three at one time you can use the borders and your cursor to size them to your preferences. When they resemble the screen print on the previous page click on the “Save Workspace” on the “Windows” tab of the “View” taskbar. And Excel will present you with a “Save As” dialog box. Make sure that you know the target directory, Excel may accept its default directory, not the data directory you are using. And give it a name such as “Excel_Primer_Ch11_Data_Workspace Example.” Excel will add the file extension of “XLW” to the name in the save process.

So what do you have? You have data file which, when opened, provides you with three other (in this example) workbooks at one time. Each of the original three workbooks still exists and this new file merely presents them at one time. If you close your “Excel_Primer_Ch11_Data_Workspace Example.XLW” and open any of the three source workbooks you will find each is independent of the other and of the workspace file. Change the data to something distinctly visible – format a cell by filling with a color for example and save the change upon closing. Now go into your directory and open the workspace file. The change you made to the source workbook is depicted.

Change the presentation in the other two source files with something visually distinct and save the changes upon closing the workspace. Now open each individual source file and the changes are there.

Why would you use a workspace? Assume that you are working with inventory and all costs are saved in “Inventory Costs.XLSX” by Arlene while all quantities purchased is saved in “Inventory Purchases.XLSX” by Bud and quantities issued are kept in “Issued Quantities.XLSX” by Charlene. When you need to compute availability, you can open your workspace and have all three reference files available to you. You can insert a new workbook into the workspace which can “look to,” Vlookup, and Hlookup formulas to the three reference workbooks. And when you save it and exit, Arlene, Bud, and Charlene have access to their files without your workspace affecting them.

While working in the workspace, you can maximize or minimize individual workbooks by clicking on the maximize or minimize buttons of that workbook. The active workbook within the workspace is controlled by you clicking into the workbook you desire. If you desire to make an entry into the Excel_Primer_Ch11_Data_Departments.xlsx workbook, click anywhere on the workbook and the banner or title bar will become bright while the others will be faded. This indicates that the Excel_Primer_Ch11_Data_Departments.xlsx workbook is the active workbook. You can now click into the worksheet and maneuver around in the normal manner of movement. As stated, if the size is too small or it is simply easier to work with a larger workbook, use the maximize button in the upper right corner of that workbook to increase its size. The active workbook/worksheet is the only workbook/worksheet with scroll bars. While the workbook is active within the workspace, all of the menu and taskbar commands are applicable only to that workbook allowing you to save or format the workbook as required or appropriate.

It is important to remember that a workspace is really a structure that contains other workbooks. There are no restrictions placed on the individual workbooks because they are part of a workspace. Upon closing a workspace Excel will normally ask you if you want to save any of the contained workbooks that you have changed since the last save or opening action.
Chapter 12

ANSWERS

Chapter Outline

- Formula Auditing
- Formatting Cells
- Merge Cells
- Formatting Within A Cell
- Goal Seek

Formula Auditing

Utilize the “Excel_Primer_Ch12_Data.xlsx” file for this chapter. Excel has a very useful aid for assisting you with the checks of your formulas and logic. The audit tools are accessed through the “Formula Auditing” tab of the “Formulas” toolbar. On the “Formula Auditing” worksheet is the formula to compute the monthly payment on a mortgage. The payment is computed by referencing cells F3, F7, F10, F13, and F16. Click into cell F19 which contains the payment (PMT) formula utilizing the worksheet data. Then click on the drop-down arrow associated with “Formula Auditing” on the “Formula” toolbar. The screen print has an insert showing you the default response. Click on “Trace Precedents” to see which values are utilized in the formula. And Excel runs arrows from (trace precedents) cells F3, F7, F10, F13, and F16 to F19. To remove the arrows drop-down the menu from “Formula Auditing” and click on “Remove Arrows.”

To verify that the annual rate is the source for the monthly rate, click into cell F2 and click on “Trace Dependents” from the drop-down menu options of “Formula Auditing.” And Excel draws an arrow from cell F2 to cell F3. And to remove the arrows click on “Remove Arrows” from drop-down menu options.

There are other options associated with the “Formula Auditing” menu you can experiment with.

There are terms associated with formulas which confuse a fair percentage of students and they are “Independent,” “Dependent,” “Parent,” and “Child”. First,
“Independent” and “Parent” are the same and “Dependent” and “Child” are the same. Consider these terms to be right to left actions only. Using the example formula of “2 × 3 = 6” the answer “6” is dependent or the child of two independent factors – the “2” and the “3”. Neither the “2” nor the “3” are dependent on each other. Just because you picked “2” for the formula, does not mean you MUST pick “3,” you could have picked any number. And just because you picked “3” for the formula, does not mean you MUST pick “2,” you could have picked any number. The “2” and the “3” are independent of each other. However, the “6” is “dependent” or the “child” of BOTH the independent values of “2” and “3.” Changing either independent or parent will change the child and the child does not determine the parent.

**Formatting Cells**

You may work with the “Formatting Cells” worksheet of the “Excel_Primer_Ch12_Data.xlsx” file for this section. Excel has several ways to format cells and the data within a cell. To format a single cell, click into that cell to make it the active cell. If the format is intended for a single range of cells, click into the upper left, upper right, bottom left, or bottom right cell and sweep the range with the left mouse button down, highlighting and selecting all of the cells in the range. Formatting can be applied to more than one cell or one range by holding the Ctrl (Control) key down while selecting the sequential cells or ranges. Formatting can also be applied to a single column by clicking on the column identifier, a single row by clicking on the row number, or on multiple columns or rows by clicking on the column or row and then sweeping to right, left, up, or down to highlight all the columns or rows or holding the Ctrl (Control) key down while selecting non adjacent columns.

Once the cell or cells are selected, right click into the highlighted cell or cells and Excel will present you with the “Format Cells” pop-up dialog box with the formatting options available at the time. That dialog box appears here. From this dialog box you can select any of the many formatting features available at the moment. If a feature is grayed out or faded, that feature is not available at the moment. For the Excel templates, the formatting is generally Currency with either zero or two decimal places as appropriate. Occasionally 3, 4, or 5 significant digits are set as required by the exercise or problem. Currency symbols such as the dollar sign or euro symbol are controlled through the “Symbol” window and are only shown when needed.
In selecting numerical formatting Excel positions the right hand number in relation to the edge of the cell appropriate for the formatting selection as to how negative values are presented. Provided below is a display of numerous Excel formats in positive and negative numbers. A close examination of this screen print will reveal that not all of the numbers are aligned in the same vertical plane at the right side of the column. This occurs when Excel is formatted to display negative numbers with a preceding “-” negative sign in some cells while other cells display negative numbers contained within parenthesis “( )”. Excel will position the numbers farther to the right if a preceding negative sign is used since the space is not needed to the right in the event of the closing parentheses. The solution for a ragged display of numbers that do not right align correctly is to check that the formatting of the numbers is all the same by selecting and highlighting the cells and right-clicking them followed by selecting the desired format even if it appears correct. Excel will occasionally only show the formatting of the upper left hand cell of a range or multiple selection.

The “Format Cell” dialog box also contains the “Alignment” tab. From this tab, you can align the contents of the cell in numerous horizontal and vertical formats as well as change its orientation and stack it. Through the “Orientation” formatting function you can rotate your data through various angles. The insert, shown here, contains an orientation sample. Another mode shown here is referred to as “Hotel signage,” referring to the letters H-O-T-E-L will be printed vertically on the sign in front of the establishment. This is also shown in the insert. Text wrap will try to keep the preset column width while creating a second, third, and fourth row presentation within the cell of long data.

**Tip:** You can force line breaks in a cell, as done here, by the keystrokes “Alt-Enter” within a cell rather than of simply “Enter” or a space. In the screen print, “Alt-Enter” produces the same presentation as text wrap except that you control the break points with “Alt-Enter” whereas text wrap makes its own decisions.

The functions of “Font” are as expected in any Windows standard application. You can change style, size, and color through this tab. It is on this tab that you will find “Superscript” and “Subscript” functions as well as “strike through.” You can also underline the text contained within a cell from this tab including single and double lines for accounting. However, if underlining is selected, it is only effective on cells with content in them, including spaces, and is only applicable to the cell. That is, if your entry covers two, three, or four columns, only the column or columns selected will be underlined and then, only if data actually appears within them. You can also highlight specific text within the Excel formula window and underline or format only that text such as shown here: (Addressed in length later.)
The “Borders” tab allows you to place borders and intermediary lines to the highlighted cell or cells. You can put a thick line on the outer edges by selecting the heavier line first and then clicking the “Outline” icon on the tab. You can then select a thinner line and place lines within the range. Excel will allow you to place vertical, horizontal, and diagonal lines through a range. The functions available through this tab are directly associated with the cell or range selected at the moment. Excel will not allow you to place vertical or horizontal intermediary lines within a single cell through this method, you can draw a line through the cell as explained in the “Drawing” section of the book.

On the “Fill” tab of the “Format Cells” dialog box you will find the colors and effects of the colors to fill a cell. These functions were used on the templates to define the work area, outlined in gray, and the student focus areas, filled in light yellow. To remove a color, simply select the cell or range of cells, right click the selected cell or range, select format cells, select “Fill” on the “Format Cells” dialog box and then select “No Color” in the “Background Color” area of the tab. This will remove both color and texture or pattern. You can also select the drop-down arrow associated with the “Fill” icon which is a paint bucket icon on the “Font” tab of the “Home” toolbar and then select “No Fill.” Limited colors can be quickly added to a cell or range of cells through the “Fill” button or icon on the toolbar, more colors can be added by clicking on the “More Colors” option of the toolbar icon. All colors can be removed through this button. Fonts can be colored quickly, to limited number of colors, with the “Font Color” button or icon on the “Font” tab of the “Home” toolbar. As with the “Fill” icon, the drop-down menu associated with the font color icon provides more options. The bar at the bottom of the “Fill” and “Font Color” icons is the currently set color and can be imposed on the selected area simply clicking the icon.

The last tab is the “Protection” tab. This tab allows you to invoke a minor level of protection on the worksheet or workbook, as addressed elsewhere in the text. If you did not want another party to have the privilege of modifying your worksheet you can select the entire sheet by using the keystrokes Ctrl-A or by clicking on the cell above the row 1 number and to the left of the column A letter, then right click the worksheet and select “Format Cells.” After selecting the “Protection” tab, select the “Locked” option. Ensure that the appearing checkmark is clear and distinct. A faded checkmark indicates that the selected area contains more than one level of protection – some protected, some not protected. Also on this tab is the “Hidden” option. If “Hidden” is selected and activated any functions or formulas will be hidden from the viewer – that is, even if the cell contains a formula, the viewer will not see it in the formula window. Neither of these options are active until empowered by using “Protect Sheet” or “Protect Workbook” on the “Changes” tab of the “Review” toolbar. When “Protect Sheet” or “Protect Workbook” is selected you will be presented with a pop-up dialog box asking what privileges you want to grant the users and asking if a password will be utilized. You can leave the password blank if you desire and it will still be protected or hidden. If a password is provided and later forgotten, you may not be able to recover the workbook or worksheet. As a matter of technique, if distributing a password protected workbook or worksheet, you may want to preserve an unprotected copy in a secure location. None of these protection levels is sophisticated and they can be broken by an individual with intent, therefore, these levels of protection should not be relied upon to protect sensitive data.
Merge Cells

You may work with the “Formatting Cells” worksheet of the “Excel_Primer_Ch12_Data.xlsx” file for this section. The “Merge Cells” command is on the “Alignment” tab of the “Home” toolbar. It is also available on the “Alignment” tab of the “Format Cells” dialog box of the pop-up menu when a cell is right clicked. This function will create one cell that occupies two or more rows or two or more columns or, as one group, multiple rows and columns. This function is used in many of the templates to present instructions and text data in one, large, cell. For example, the “Name” area is one cell while occupying the range D2 through F2 in this screen print. To utilize the “Merge cells” function, click into the cell that you want to be the upper left most location of the merged cell. Then, with the left mouse button held down, sweep right, down, or down and right highlighting and selecting the cells you want to be replaced by the new, larger, merged cell. When the area is highlighted, right click the highlighted area, select “Format Cells,” select the “Alignment” tab, and select “Merge Cells” in the “Text Control” area. The highlighted cells now become one single cell when the “OK” is clicked. Invoking the merge cell function will result the loss of all data but the data in the upper left most cell of the selection. Excel will usually advise you that this is going to happen but it is poor data management to rely on Excel’s protective features for this. If this function is invoked, it can be revoked by selecting the affected cell and then removing the check mark from the “Merge Cell” option. Selecting “Wrap Text” and/or “Shrink To Fit,” both “Text Control” options on the “Alignment” tab will help to confine the data to the merged cells. The “Wrap Text,” discussed elsewhere in this book, it will allow multiple lines of text for a single line of text entry. The “Shrink to Fit” selection will automatically change the size or “points” of font to present all of the text into the cell.

There is a merged cell area on the Formatting worksheet from F1 through H2. You can merge the cells from F3 through H4 and watch the results. There is no data in any of this range. To “unmerge” the cells, click in to make them active, then click the “Merge Cells” icon again. Now try and merge the area from F3 through H5. The warning Excel most likely gave you is because there is a space from the space bar in cell G5 and Excel considers that data. Delete the entry, which you cannot even see, from cell G5 and try the merge operation again on cells F3 through H5.

Try merging the range from F6 through H9 and “OK” (approve) the advisory. Undo will frequently work with merge cell operations.
Formatting within a Cell

You may use the “Formatting within a Cell” worksheet for this section. You can also invoke many of the formatting capabilities for cells onto the specific elements contained within a cell. For example, you want to enter into an Excel cell that the interest on the note payable is due on the 30th of each month. When the text is entered as “Interest on note payable is due on the 30th of each month” the text may not automatically superscript. For this presentation, select cell A1 which contains the text, then, inside the formula window, highlight with the mouse the two characters “th” within the text, then right click the highlighted selection and select “Format Cells,” then select “Superscript” on the “Font” tab. Notice that not all of the tabs that appeared when “Format Cells” was selected while entire cells were selected are visible now that you have only a portion of the text selected. Since the additional capabilities are not available, they were not presented, even grayed out or faded. Many of the formatting features can still be invoke upon the text within a cell.

There are other lines to format words within text in a cell to work with. For underlining, utilize the drop-down arrow to select “Double-Underlining.”

Solver

You can use the “Solver” worksheet of the “Excel_Primer_Ch12_Data.xlsx” file for this section. Solver is an analysis tools add-in and must be “added in” through “Excel Options” and “Add-ins” before it available. “Solver” will, as stated, try to solve your problem. It is still up to you to determine if the Excel provided solution is acceptable. With “Solver” available on the “Analysis” tab of the “Data” toolbar, click into cell E23 of the “Solver” worksheet. Cells E15 through E20 contain the prices of the items purchased. Cell E21 contains the subtotal of the sale before taxes. Cell E22 computes the sales taxes at 8.75%. And cell E23 contains a formula which sums cells E21 and E22 for the total due. With the values provided the total due is $102.93. However, your dedicated customer only has a $100 bill in his wallet. So you know what the total is. What about the subtotal and the tax amount?

Click on the Solver icon on the Analysis tab of the Data menu bar. Make the “Set Target Cell” value E23 by entering it or clicking into that window on the dialog box and then clicking on the E23 cell. Then select “Value of” and set the value to “100” on the “Equal To” line. Next, click into the “By Changing Cells” to E21 by direct
entry or by clicking into the window and then onto cell E21. Now click on “Solve.” And Solver provides an answer of $91.95 and a tax of $8.05 for a total of $100.00. The data is contained in cells A1 through E9 for comparison.

**REALLY IMPORTANT:** In this solution Excel computed the purchase price, and replaced the formula with a hard value, and recomputed the sales tax. Sales tax is dependent on purchase price and rate.

Clue: You now need to do a “Solver” on the purchase price to change the value of one or more purchased items to adjust those values to total the new purchase price of $91.95.

For Solver to work the target cell must have a formula and that formula must reference the cell in the “By Changing Cells” window. There are other “stacks” of data on the worksheet. Solver does not seem to like merged cells where formulas appear as “=SUM(W1:Z6)” and you may get it to work correctly by modifying the formula to read “=SUM(W1:W6)”.

**Null Value**

The “Null Value” is a special term – it is not a space as imposed by pressing and releasing the space bar, it is not a letter or character such as a, b, or c, it is not a number such as 1, 2, or 3, nor is it a punctuation mark or symbol such as !, ?, @, or #. It is the double quote symbol followed immediately by the double quote symbol such as “” without anything separating them. The best way to define the “Null Value” is it is nothing and it is not anything else. It is used frequently within formulas to return a “clean and clear” presentation. On the “Null Value” worksheet of the “Excel_Primer_Ch12_Data.xlsx” file the use of the Null value is demonstrated. The worksheet is defaulted to show “0” values through the path Excel Options. This “show zero values” is also the default setting for most of the exercise and problem templates. This option or selection will provide you with the presentation of:

<table>
<thead>
<tr>
<th>Vice:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales:</td>
</tr>
<tr>
<td>$100</td>
</tr>
<tr>
<td>Less: Cost of goods sold:</td>
</tr>
<tr>
<td>$100</td>
</tr>
<tr>
<td>Gross profit:</td>
</tr>
<tr>
<td>$0</td>
</tr>
</tbody>
</table>

In the first example it is clear that the value being presented is “0”, it the second example it is not clear if the formula has even been entered.

The null value is frequently used in “If Statements” as a response. On the “Null Value” worksheet, the worksheet determines and presents appropriate periods for depreciation. In cell B4 you enter the life of the asset in years. In cell B5 you enter the periodicity of depreciation – annual, semi-annual, quarterly, or monthly. The formulas in columns B and E starting on row 12 to determine if the period is applicable and enter a period number or return the null value, as instructed through cells B4 and B5. Based on the availability of depreciation periods, the concatenate formula in columns C returns a text string or the null value while column F returns choice of text strings. As you scroll down the columns to see the difference, where the periods are not available in the null value column, the columns are blank and appear to be empty. In the “zero value” column, the response of non-available periods is “0”, an unnecessary and cluttered display and an unnecessary text string.

Assume that the “ ” (space) is utilized instead of the null value or a 0. Almost the same thing will happen. The appearance will be clean and crisp as shown in columns H and I. However, now Copy > Paste Special > Values all three examples and you will find the difference. Inside the rows that are not relevant to the “Null Value” columns, there is nothing – the value the “If Statements” were returning was
“” – Null – nothing. Inside the rows of the “0” Value columns there are a number of zeros since the “If Statements” were returning zeros. Inside the space columns are a lot of cells with a bunch of spaces in them.

**Tip:** Spaces and formulas whether they return the null value or a space do affect the default page size in printing.

**Or**

The “Or” function, found under the “Logical” formulas of Excel will return a “True” response if any one or more of up to thirty conditions specified are true. This is shown on the “Or” worksheet of the “Excel_Primer_Ch12_Data.xlsx” file. This worksheet is a copy of the “And” worksheet with the “Or” function rather than the “And” function so you can see the relationship and differences. Some of the results are the same, some are different. For example, now that the formula in cell D1 is saying if any one or more of the cells A1 through A5 are greater than “2”, return “True.” And, since cells A3 through A5 are all greater than “2”, the “Or Statement” is returning the “True” value.

However, cell G14 now has a minor problem in its resulting logic. Since any one of the conditions is true, that is, the number of apples equals or exceeds the minimum inventory level, the statement is returning a “True” to the “If Statement” and the “Concatenate” function is telling you to go skiing when in reality you must order berries.

The “Or Statement” is cell specific as shown in cells D1, D2, D3, and D5. It does not accept ranges such as “A1:A5”. So you can ask it if A1 is less than, if A2 is more than, if A3 is equal to, if A4 is equal to or less than, etc., and if any one of those statements is true, it will return a “True” even though the rest of the answers are false. The true response may give you a false confidence and the “Or Statement” should be used with this understanding.

**And**

There is an “And” worksheet in the “Excel_Primer_Ch12_Data.xlsx” file for this section. The “And” function is found under the “Logical” category of Excel’s formulas and functions. It can compare up to 30 values against your specified requirements and return a “True,” “False,” numerical, or text string response depending on your requirements. On the “And” worksheet you will find several examples of this formula in operation. In cell D1 the “And” function is being instructed to check cells A1 through A5 to ensure that they are all greater than 2. Since only cells A4 and A5 are greater than 2 (cell A3 is equal to 2), the “And” function returns a “False.” In cell D2 the “And” function is being asked if A1 is equal to 1, if A2 is equal to 2, if A3 is equal to 3, if A4 is equal to 4, and if A5 is equal to 5. Since they are, as supplied on the data file, the function returns a “True.” Since the “And” function by itself can only return a “True” or a “False” in cell D3 the “And” function is embedded within an “If Statement” to return a text string – if all of the cells A1 through A5 are greater than 3, return a “Good,” if they are not all greater than 3, return a “Bad.” The “And” function is providing the “If Statement” a “True” or “False” determination. With the large number of “If” levels you can have and the large number of “And” evaluation statements you can have in a single formula, you have a great degree of latitude in your evaluations.

In cells G10 through G12 the “And” function is being utilized with the “If Statement” and the “Concatenate” function to make a determination and return a clean cell or a text string and a value. (This is being done for demonstration purposes as an “If Statement” and “Concatenate” function can accomplish this as shown in cells G20 through G22.) The “And” function determines if it is a true statement that counted inventory is equal to or greater than the minimum level located by the “SumIf” formula. If the statement is true, the quantity of the specific item on hand is equal to or greater than the minimum level, a blank cell is shown. If the quantity of the specific item is less than the minimum level the formula returns instructions on the quantity that must be ordered. The “” in the formulas following
the math of values such as “F11-E11” is a space which appears after the number of the items that has be ordered and the description of the item.

The “And” function does not have to see if all numbers or values are greater than a specific value or less than a specific value. You can mix them up as needed. Inside cell D5 the following formula is placed: “=AND(A1=1,A2<>3,A3>=3,A4<=4,A5<>A1)”. This formula asks if cell A1 is equal to 1, if cell A2 is not equal to 3, if cell A3 is equal to or greater than 3, if cell A4 is less than or equal to 4, if cell A5 is not equal to cell A1. If ALL terms are true, the “And” function will return a “True,” if any one or more are false, the “And” function will return a “False” response. The “And” function will also compare text strings as required.

**Tip:** Make sure the question you are asking will provide the answer you need.

**If Statement**

There is an “If Statement” worksheet on the “Excel_Primer_Ch12_Data.xlsx” file for this section. As shown throughout this text and as utilized extensively throughout the exercise and problem templates, the “If Statement” is a very powerful and easy to use logic tool. The “If Statement” works on the principle of comparing term one with term two and if the terms make the condition true, it replies with the first field after the comparison, if the comparison is false, it replies with the second. The first and/or second response field can be another “If Statement,” a value, formula, or text. The formula format is “=IF(2=2,4,0)” and is in cell A1.” In this simple “If Statement” if 2 equals 2, which it does, the formula will put “4” in the cell, if 2 does not equal 2, the formula will put “0” in the cell. Since “2” does equal “2” the response will be “4”. The important issue to understand here is “2” is not a value, or text, or anything other than “2” and the statement is comparing it to “2”. Do not “read” anything into what an “If Statement” “sees”.

Cell A2 contains the statement “=IF(2=“Two”,4,0)” which is false since the numerical value of “2” is not equal to the text string, as defined by the quotation marks, of “Two”. So the “If Statement” returns a false response of “0”. As stated earlier, Excel does not read English and does not truly think, but it can compare text strings through spell check, F7, which is in reality a big “If Statement” – if the text string being evaluated matches text strings found in the reference file, look at the next text string, if the text string is not in the reference file, bring up the dialog box and ask for help – “Which word would you like?”

Excel will compare text strings and provide responses as instructed as shown in cell A3. For example, the “If Statement” says “=IF(“Two”=“Two”,4,0)” and it will return the value “4”, as shown in cell A3, not because it is the sum of Two + Two, but because the two text strings being evaluated are equal, as asked, so the first field or the “True” term, following a true statement, is returned – “4”.

**Tip:** There is a detail of Excel that needs to be appreciated in all of the comparative statements. If the value of 123.451 is entered into a cell with formatting to display two decimal places the entered value will display as 123.45 but Excel will remember and respond as if it is 123.451. If the value 123.451 displayed as 123.45 is compared to a displayed value of 123.45 which is in a cell formatted to display two decimal places but that value is actually 123.452, the values appear to be equal, as presented in the formatted cells, but they are not. Examine the data in the range of E1 through F2 on the “If Statement” worksheet.

When Excel compares values and the formatting of numerical information is different, for example “Accounting” with 2 decimals and “Currency” or “General” to 4 decimal places, Excel will ignore the formatting and compare the values. However, it is possible to have what appears to be a numerical value such as the 25 contained in cell J1 not be equal to the 25 in J2 since cell J1 as formatted to text before the 25 was entered and, since cell J2 is formatted to General by default, that 25 is a numerical value and text string “25” are not equal so their comparison is false.

**Hint:** Try to think of questions that are answered True/False or Yes/No with “If Statements.”
The following is a table containing most of the comparison operators available to the “If Statement”:

= (equal sign) if the first comparative term is equal to the second comparative term, the first field or the true field will be returned, if the comparison is false, the second field or the false field will be returned. Your question is “Is it true that the first comparative term is equal to the second comparative term?”

< > (not equal to sign) (The order of the operators is important!) If the first comparative term is NOT equal to the second comparative term, the first field or the true field will be returned, if the comparison is false, the second field or the false field will be returned. Your question is “Is it true that the first comparative term is NOT equal to the second comparative term?”

> (greater than sign) If the first comparative term is greater than the second comparative term, the first field or the true field will be returned, if the comparison is false, the second field or the false field will be returned. Your question is “Is it true that the first comparative term is greater than the second comparative term?”

< (less than sign) If the first comparative term is less than the second comparative term, the first field or the true field will be returned, if the comparison is false, the second field or the false field will be returned. Your question is “Is it true that the first comparative term is less than the second comparative term?”

>= (greater than or equal to sign) (The order of the operators is important!) If the first comparative term is greater than or equal to the second comparative term, the first field or the true field will be returned, if the comparison is false, the second field or the false field will be returned. Your question is “Is it true that the first comparative term is greater than or equal to the second comparative term?”

<= (less than or equal to sign) (The order of the operators is important!) If the first comparative term is less than or equal to the second comparative term, the first field or the true field will be returned, if the comparison is false, the second field or the false field will be returned. Your question is “Is it true that the first comparative term is less than or equal to the second comparative term?”

“If Statements” can be imbedded in other formulas and can be embedded within themselves. The maximum is seven layers deep. However, with the ability of Excel to run an “If Statement” on the results of an “If Statement,” the seven layer depth restriction is of little concern. If you examine the formulas in the range of D21 through M26, the “If Statements” are embedded upon each other to respond to the input of cell D22. If the answer is not contained within E22’s string of “If Statements,” then E22 looks to E23 for an answer. If E23 does not know the answer, E23 looks to cell E24 for the answer. And it continues down into cell E26. If all of the possibilities are exhausted, E26’s last option is to respond with the phrase "I asked you to pick a letter, not a number or a special character. Please try again.", which is the last false condition respond for the chain.

**Hint:** Read the section on the “And” function as an additional capability for the “If Statement.”
Chapter 13

TEXT

Chapter Outline
Concatenate Text to Columns Paste Special Today and Now

Concatenate
Utilize the “Concatenate” worksheet of the “Excel_Primer_Ch13_Data.xlsx” file with this section. “Concatenate” is a powerful function for joining two or more strings of “data” into a single cell. On the “Concatenate” worksheet you will find a string of text entered into the individual cells of column A. In cell B1 the “Concatenate” function is written as:


The result reads: “The quick brown foxes were chased by the slow black dogs.”

This function is taking the contents of cell A1, placing a space as shown by the “ ” presentation, then showing the contents of cell A2 and so on. However, the text string shows that the foxes, no number specified, were chased by the dogs, no number specified. Since “Concatenate” is classified as a “text” formula, this would appear to be its limitations. However, as earlier stated, Excel will frequently allow embedded formulas and “Concatenate” is not the exception to that rule.

In cell B17 several embedded formulas have been added to put numbers into the statement. The formula now reads:

"
 ,SUM(A12+A14), ",A15, ",A16, ",A17, ".")

This formula or function results in: “The 2 quick brown foxes were chased by the 4 slow black dogs.” Which includes the number of foxes and dogs as summed by the embedded formulas of “Sum.”

**Hint:** Embedded functions and formulas do not get introduced with an “=”.

With this function you can create the mailing label string for invoicing as shown in cells A21 through E24. In this situation, since the data is intentionally entered horizontally, the “Concatenate” formula was written into cell E21 and dragged through rows 24. The formulas are shown in column H of their row.
Assume that you are making custom pens and pencils and using “Smart Part Numbers” – numbers that indicate through a consistency of presentation what they are or what they do. The code is:

First Part:
PN – Pen part
PL – Pencil part

Second Part:
G – Gold
S – Silver
B – Black
N – N/A – No color

Third Part:
UP – Upper portion
LP – Lower portion:

Fourth Part:
TB – Tube
BK – Blank
TP – Top plug or insert
CL – Clip
MB – Middle band
NB – Tip
PNR – Pen refill
OM – Operating mechanism
PLR – Pencil refill

Starting at row 28 of the “Concatenate” worksheet the part numbers are established by whether it is a pen or pencil part, by its plating, whether it is an upper or lower portion part, and then the part itself. When the part numbers are set into the matrix of cells H29 through K39, the “Concatenate” formulas in column L assembles the number into a string of numbers (hard to remember for inventory – use alphanumeric combinations in real life). The “Concatenate” formulas in column M reads the part number matrix and then assembles the “code” of two and three letter identifiers through “Vlookup” functions. Lastly, the “Concatenate” formulas in column O reads the part matrix and through “Vlookup” assembles the text description of the parts necessary for the pen or pencil. The dashes and spaces are put in as a portion of the “Concatenate” formula. Through the use of relational and absolute references, the formulas can be dragged and moved without changing the values of the references. While this “little” inventory table may be quicker to build in pure text, how about a car manufacturer or aircraft builder’s inventory?

Hint: Once the text string is built and looks good – good data management requires that they be inspected for validity – you can use the “Copy” and then “Paste Special > Values” functions to eliminate the formulas and stop the transition any time something changes.

If text is entered directly through the “Concatenate” formula it must be included in double quotation marks – “ ” as the dashes and spaces were. If embedded formulas and functions are utilized such as the “Vlookup” function, do not precede it with an equal sign (=), Excel will present you with an error message. The comma is used to separate portions of the “Concatenate” formula. “Concatenate” will operate with “Look To” bringing the results of other formulas and cells into one string. That is, you can use “Concatenate” to assemble text strings generated by other “Concatenate” formulas as shown in cells H44 through H52 where “Concatenate” assembles the part number, the alpha number, the description, and the cost into one string of text. The “Fixed” function is utilized to insure that the presentation of the values remains constant – with commas and two decimal places.
**Text to Columns**

The “Text to Columns” icon is found on the “Data Tools” tab of the “Data” toolbar. Through this tool you can “unassembled” text strings such as those that were built by “Concatenate” in the “Concatenate” workbook. Access the “Text to Columns” worksheet of the “Excel_Primer_Ch13_Data.xlsx” workbook for this section. Much of the data is copied from the “Concatenate” worksheet to demonstrate how “Text to column” works. Column A contains a copy of the data in column B. This will allow you work with column B and then copy column A to column B later if you want more practice. Click into cell B1 to make B1 the active cell. Click on the “Text to Columns” icon on the “Data Tools” tab of the “Data” toolbar and you will be presented with the “Text to Columns” dialog box. The first choices you are presented with is “Delimited” or “Fixed Width.” Delimited means that your data can be dissected or cut apart by some specific character or event such as a space, a comma, a tab, or other, identifiable character. Fixed width means that your columns will be 1, 2, 3 characters wide, or as you state by moving margins, to accept the data. And each column can be set to a different width. You can select more than one row and accomplish the process on a range.

For the data in cell B1, a pure text string with spaces between each word and words of inconsistent length, select “Delimited” and click on the “Next” button. The next dialog box will ask that the delimiting values be defined. To do this, ensure that all checkmarks are removed from the dialog box except for the checkmark for “Space.” The checkmark in “Treat consecutive delimiters as one” means that if two spaces are found next to each other, they will be treated as if they were single space. This is handy and important as Excel is going to remove the delimiter in accomplishing this process. In this example, the spaces separating the words will “disappear” from the text as it is processed. At this point “Text to Columns” will give you a preview of the possible results. To advance to the next step, click on “Next.” At this point you are offered additional options – you can select a column by clicking on it and format that column in the import process to a limited number of specific formats such as general, text, or date, or you can select not to import the column at all. You can also change the starting point of the “dissection process” on this screen. If you choose a cell other than the origin cell, B1, the data will be left in B1 and “dissected” into the cell in you specify and to the cells to the right of that cell. If the process is going to overwrite existing data contained within those cells, Excel may provide you with a warning but relying on this degree of data protection is a risky policy. The result of clicking on the “Finish” button is that the sentence is “dissected” into individual words placed in cells to the right and the spaces that had previously separated those words have been removed.

Click into cell B5. This is an address cell that contains two delimiters that you want removed from the text in the process. They are the comma and the space. Click on the “Text to Columns” icon on the “Data Tools” tab and select “Delimiters” and “Next.” This time ensure that the space and comma are checkmarked and then click “Next” or “Finish.” If you clicked “Next” you will have to click “Finish” to complete the process. This time the data has been dissected into neat, clean cells for later processing with both the commas and the spaces removed. Had you executed “Text to Columns” with only commas or spaces rather than both commas and spaces, you would have to execute another “Text to Columns” process to separate the remaining text.

Click into cell B21. Analyze this cell for delimiters and the logical choices are commas and colons. The use of spaces as a delimiting value will break apart the alpha numbers and descriptions. While this may leave the cost issue together, you can run another “Text to Columns” process on the cell that contains those values later. There may be other options.
The “Fixed Width” option will work on text and numerical values and can be used to dissect one or more cells just like the delimited option. Click into cell B31, which contains a numerical value. These values are summed in row 35 to prove they are numerical values. Click on the “Text to Columns” icon on the “Data Tools” tab of the “Data” toolbar. In the “Text to Columns” dialog box select “Fixed Width” from the options and then click “Next.” In the resulting dialog box you see the whole number since it is not apparent to Excel how this number should be dissected. Place your cursor between the “2” and the “3” and click once to insert a “dividing” line. Click into the space between the “3” and the “4” to insert a “dividing” line. Since the goal is to dissect the whole number into two number groups, this line is placed incorrectly. Click the line once and hold the left mouse button down and drag the “dividing line to the right between the “4” and the “5”. Click between the “5” and the “6”. Again, bad placement. Double click the bad line and it will be removed. Continue to place lines so that the number is dissected into two number groupings. Once complete, click “Next.” From the new dialog box you can change the formatting of the columns and select columns not to be imported through the process if required or desired. You can also select a new starting point for the dissected data to be placed. Remember that if you choose a cell other than the origin cell, the data will remain in the origin cell for later use. Click on “Finish” to complete the process. Is the result what you expected through your settings?

**Paste Special**

When you generate a formula within Excel it is dynamic or “live” and dependent upon its referenced cells. If you change a value in a referred cell, the results of the formula will change according unless “Manual Calculations” has been invoked through the “Excel Options” settings. As shown in the “Concatenate” function and worksheet, changing a cell will change the text string produced by the function. There is a way to convert formulas into their results which stops this without retyping or reentering all of the data. Copy the target cell, in this case, click into cell B1 on the Paste Special worksheet of the “Excel_Primer_Ch13_Data.xlsx” file, which is a copy of the “Concatenate” worksheet. Cell B1 contains a live formula or function of Excel that creates the text string about foxes and dogs. In the formula window you will see the presentation of the formula. Use the keystrokes Ctrl-C, click on the copy icon (two overlaying sheets) on the toolbar, or right click and select...
the “Copy” option from the pop-up menu to copy the cell. This copies the formula or function onto the Windows clipboard. Click into cell B2 and right click the cell to get a pop-up menu or click on the drop-down menu option arrow below the “Paste” icon on the “Clipboard” tab of the “Home” toolbar. From the pop-up menu select “Paste Special.” And Excel will present you with the dialog box shown in this screen print. Since the goal is to remove the live formula and replace it with values, insure that “Values” is selected and insure that “None” is selected under “Operations.” Click “OK” and Excel will replace the formula or function with the results of the formula or function. The “Concatenate” function is gone, the resulting string is no longer dependent upon the referenced or parent cells. So, changing cell A17, the word “dogs” to “house” will not change the text string in cell B2. However, the text string in cell B1 is still dynamic or “live” and it will change with the text change. You can “Paste Special” over the original formula if desired.

“Paste Special” is a handy function for workbooks and worksheets that are going to be distributed to individuals who like to “play” with your extensive formulas and functions. By selecting the entire sheet, copying, and pasting the data back through “Paste Special > Values” the data will be static and not dependent upon the source cells. This process also reduces the size of large Excel worksheets significantly making them easier to attach for transmission and distribution. This feature or function also helps when the values within the worksheet are built on values contained within other workbooks that the recipient may not have access to.

The “Concatenate” worksheet was copied as the “Paste Special” worksheet so you can practice “Paste Special” on its numerous dynamic or “live” formulas. Try “Paste Special” on an “intermediate” formula – one that is called upon by another “Concatenate” function such as those formulas where part numbers are assembled and watch the results of the costing formulas when the parts grid is changed.

**Today and Now**

Excel has two functions that will assist you in inserting current dates and current dates and times. By utilizing the function “=TODAY()” Excel will present the date in the current default value for the worksheet. On January 1, 2012, this function would return 01/01/12 if that was the default of the worksheet and no other formatting had been applied to the cell. If the cell had been formatted to MMM D, YYYY format under “Custom” through the Format > Cell path the function would return Jan 1, 2012. Once the function is put into a cell, that cell can be formatted to present the date in the desired format.

**Tip:** This function does not present time correctly. Excel makes a distinction, correctly, between “Today” and “Now” in the same manner as the timeline for mowing the lawn.

To present date and time via a formula function use the “=NOW()” function. This function correctly inserts the current date and time. Like the “Today” function, the “Now” function can be formatted to obtain the precise desired format for the date and time, date only, or time only if desired through “Custom” cell formatting.

**Note:** These values may be updated by Excel upon opening the file later so they should be converted to “hard values” (non-formula or function) through direct entry type in or through the Paste Special function addressed elsewhere in this book.
Chapter 14

DEPRECIATION

Chapter Outline

- Asset Acquisition Sheet
- Variable Declining Balance Depreciation
- Depreciation
- Sum-Of-Year’s-Digits Depreciation
- Straight-Line Depreciation
- Units-Of-Activity Depreciation
- Declining-Balance Depreciation

Asset Acquisition Sheet

The acquisition of a plant, property, equipment, intangible, or natural resource asset is seldom a simple one-page document event. Take for example the acquisition of a land plot, the construction of the new plant building, and the purchase of equipment for that plant. The land may have purchase price, commissions, back taxes, current taxes, survey costs, title searches, title insurance, and court and filing fees associated with it. The construction of the plant may have survey costs, architectural and design costs, environmental impact statement costs, construction fees, insurance during construction, interest and finance fees incurred during and after construction, legal fees, filing fees, and bonding fees. The purchase of a piece of major equipment for the new plant may have purchase price, commissions, site surveys, transportation, insurance during transportation and installation, installation costs, bonding of installation contractor, licensing and certification costs, costs for test materials, costs of training materials and labor while training line personnel and other costs. Some of these costs can be “capitalized” – put on the balance sheet and taken to the income statement over a period of time through depreciation. Others are period expenses and immediately taken to the income statement through an expense account. Payment of these fees and costs may be convoluted. One check paid to an escrow agent may address several issues on property acquisition – some to be capitalized, some to be expensed. A payment to a building fund trust agent may have the same issues – some to be capitalized, some to be expensed costs. The documentation of what check paid for what items and whether it is capitalized or expensed becomes important as these issues will most certainly be reviewed later and are taxation issues in this, and many following taxation periods.

The logical solution is to use a powerful tool, such as Excel, to retain the information and values as well as other information. In the “Excel_Primer_Ch14_Data.xlsx” file there is a sample of what is possible for this purpose. It is not complex or complicated, it is simple and effective. It contains areas for identification of the machine, the supplier and point of contact information, capitalized and period costs detail, and where the documentation of those costs is retained. The recovery of documentation is simplified since the file states that the purchase paperwork is being kept in a fixed asset file in Accounting while the certification paperwork is being kept in the Floor Supervisor’s office for access and presentation during inspections.

While this could become a “standard form”, it can easily be changed to meet the requirements of the acquisition since, as an Excel document, it can be easily edited. To preclude editing the base copy, it
could be saved as an Excel “Template,” discussed elsewhere, making it a “Read Only” file requiring renaming before saving after data is entered.

**Clue:** The titling of “Template” as utilized for the exercises and problems of the text means that all of the students have the same starting document. Within Excel, “Template” is a (normally) read only document that is kept in this status to maintain standardization and preclude the population of these forms.

This table, contained on the “Land” worksheet of the chapter data file, utilizes “Sum If” capabilities to determine the totals of costs that can be capitalized and costs that are period expenses.

<table>
<thead>
<tr>
<th>Asset:</th>
<th>Land plot at 3rd and B Streets</th>
<th>Date:</th>
<th>January 2, 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item:</td>
<td>Classification:</td>
<td>Amount:</td>
<td>Paid to:</td>
</tr>
<tr>
<td>Purchase price</td>
<td>Acquisition</td>
<td>$75,000</td>
<td>Mrs. J.K. Conners</td>
</tr>
<tr>
<td>Commissions</td>
<td>Acquisition</td>
<td>$3,750</td>
<td>Valley Realty</td>
</tr>
<tr>
<td>Back taxes</td>
<td>Acquisition</td>
<td>$4,200</td>
<td>San Diego County</td>
</tr>
<tr>
<td>Current taxes</td>
<td>Period</td>
<td>$1,250</td>
<td>San Diego County</td>
</tr>
<tr>
<td>Title search</td>
<td>Acquisition</td>
<td>$750</td>
<td>County Title Svc</td>
</tr>
<tr>
<td>Title insurance</td>
<td>Acquisition</td>
<td>$1,500</td>
<td>State Title Insurance</td>
</tr>
<tr>
<td>Survey costs</td>
<td>Acquisition</td>
<td>$2,000</td>
<td>Inland Survey Svc</td>
</tr>
<tr>
<td>Filing fee</td>
<td>Acquisition</td>
<td>$45</td>
<td>San Diego County</td>
</tr>
<tr>
<td>Prepaid interest</td>
<td>Period</td>
<td>$425</td>
<td>Lenders Banking Ltd</td>
</tr>
</tbody>
</table>

| Acquisition costs: | | $87,245 |
| Period costs: | | $1,675 |
| Total: | | $88,920 |

Since Excel can “Link” or “Look To” other worksheets and workbooks, the values in these tables can be used to provide information to the depreciation schedules as appropriate. The key to success is knowing what you did and being able to prove it. Excel can become a database for information using techniques like this even though other programs are more effective; user familiarity, user comfort, and stability are keys with retrievability and recover.

**Depreciation**

All depreciation worksheets in the “Excel_Primer_Ch14_Data.xlsx” file utilize the same data drawn from the “Input Worksheet” values. Only the values in the yellow highlighted cells on the “Input Worksheet” and on the “Units of Activity” worksheet can be changed. Each methodology has its own worksheet for value calculations with the formulas available for viewing. And each method computes an annual depreciation amount and divides that value by twelve for monthly depreciation. And, for comparison, each method utilizes a month based life depreciation value as well. This makes them comparable since all the methods will portray values based on the same inputs in their own methodology.

There are some assumptions imposed on these sheets. There are no assets that have a life greater than 40 years and the units of activities will be fully depreciated through the number of activities within 40 years of acquisition.

**Straight-Line Depreciation**

The straight-line depreciation concept is handled through the “SLN” formula of Excel. The formula is “=SLN(cost, salvage value, life)”. Since each period’s depreciation is the same value, this is a simple formula for Excel. This formula is shown in use on the “Straight-Line” worksheet of the “Excel_Primer_Ch14_DATA.xlsx” workbook. The “Straight-Line” worksheet receives its inputs from the
“Input Worksheet.” The example takes advantage of absolute references and embedded formulas to generate the period expense per month for the life of the asset, the accumulated depreciation to date, and the book value of the asset at the end of each period. The straight-line depreciation formula of Excel is found under the financial category and requires asset cost, asset salvage value, and life. Remember that Excel will not accept commas or dollar signs within formulas. The formulas in the “Straight-Line Depreciation” worksheet utilize “Look To” and “Absolute References” extensively. When using the formula for business assets the life of the asset must be stated in the same factor or terms that you wish to record the depreciation in. If you record depreciation monthly, state the life in months, if you record depreciation quarterly, state the life in quarters, if you record depreciation annually, state the life in years. For an asset with a cost of $2,400, a salvage value of $300, and a life of 120 months, the formula is =SLN(2400,300,120). Because straight-line depreciation is simple math the formula can be manually entered as =(2400-300)/120. Both will result in approximately $17.50 per month.

The way that the Straight-Line worksheet works is the formulas is column A checks to see if depreciation periods are still available through the formula in cell A13 is =IF(COUNT($A$12:A12)>=B$5,””,A12+1). If there are available periods, the formula increments the previous value by 1. If no periods are available the null value – “” is put into the cell. So, this formula is saying, if the count of the periods prior to this cell are equal to or greater than cell B6, return the null value, if not, increment the preceding cell value by 1.

Note: The “Null” value is not a space or character. It is actually “nothing.” This formula basically says, if there are no periods available, return “nothing.” The null value is addressed in its own section of this book.

The formula in cell B13, =IF(A13="",SLN($B$2,$B$4,$B$5)), looks at column A for the row and if it “sees” the null value (“” is there, it puts the null value in its cell, B13. A null value just gives you a clean presentation for “no relevant data.” If the null value is not in column A for the row, the SLN formula calculates period depreciation.

Column C simply adds the depreciation recognized through that row’s period.

In cell D13 the formula is =IF(A13="",B$2-C13). Again, the first part of the formula sees if it is an available period, if not, it returns the null value for a clean presentation. If there is a period available as indicated by a value in the A column of the row, the formula subtracts accumulated depreciation to date from acquisition cost for end of period book value. The other periodicity options for straight-line depreciation utilize the same concepts for presentation with monthly values.

Declining-Balance Depreciation

Excel handles declining balance depreciation through the “DDB” formula found in the financial category. The formula requires asset cost, asset salvage or residual value, life, period of life, and depreciation factor. Excel expects the number 2 or the percentage 200% to represent double-declining depreciation. Depreciation at 150% declining balance would be input as 1.5 or 150%. Excel will accept and work with any schedule entered in these formats.

The “Declining Balance” worksheet in the “Excel_Primer_Ch14_Data.xlsx” file shows the formula in action with the same basic values as utilized for the straight-line depreciation above. The “Declining Balance” worksheet looks to the “Input Worksheet” for values and factors. The “DDB” or double declining balance formula requires the cost of the asset, the salvage value, the life, the period depreciation is asked for, and the factor. Even though the title of this formula is “DDB” indicating double declining balance, it will accept any logical factor you input. In cell B13 the formula reads “=IF(A13="",DDB($B$2,$B$4,$B$5,A13,$B$7))”. The “If Statement” checks for available periods as explained in the “Straight-Line Depreciation” section. It then looks to cells B2 through B7 for cost, salvage value, and the declining factor. The factor will default to 2, (200%) if left blank. Since declining
balance depreciation is sensitive to the period for valuation, the “A13” reference provides the period reference.

**Clue:** Utilizing the DDB formula may require an adjustment at the end of the life of the asset to get the asset to fully depreciated amount of “0”. The table below shows double-declining depreciation by “Pencil and paper” without salvage value and no adjustment. If the adjustment is held until the last period of a 5-year life, the last year’s depreciation is $12,960 while the fourth year’s depreciation expense is only $8,640. This type of adjustment is not uncommon with accelerated depreciation schedules.

The “VDB,” or “Variable Declining Balance,” concept partially addresses this situation as it is capable of converting to straight-line depreciation when that method is more beneficial. The Variable Declining Balance method is addressed later.

<table>
<thead>
<tr>
<th>Book Value:</th>
<th>Period Depreciation:</th>
<th>Book Value:</th>
</tr>
</thead>
<tbody>
<tr>
<td>$100,000.00</td>
<td>$40,000.00</td>
<td>$60,000.00</td>
</tr>
<tr>
<td>$60,000.00</td>
<td>$24,000.00</td>
<td>$36,000.00</td>
</tr>
<tr>
<td>$36,000.00</td>
<td>$14,400.00</td>
<td>$21,600.00</td>
</tr>
<tr>
<td>$21,600.00</td>
<td>$8,640.00</td>
<td>$12,960.00</td>
</tr>
<tr>
<td>$12,960.00</td>
<td>$5,184.00</td>
<td>$7,776.00</td>
</tr>
</tbody>
</table>

Had the salvage or residual value of this asset been $5,000, the last period’s depreciation expense would have been $7,960, not the $5,184 value computed by the mathematical operation.

**Variable Declining Balance Depreciation**

Excel has a formula that will handle the concept of accelerated depreciation at the outset of the schedule and then converting to straight-line when straight-line depreciation becomes beneficial. This is accomplished through the “VDB” formula or “Variable Declining Balance.” Like the “DDB” formula, “VDB” requires cost, salvage value, life, period reference, and factor. “VDB” also requires a specific statement if you want to switch to straight-line depreciation or retain accelerated depreciation throughout the schedule. By inserting a 1 (one) into the “No Switch” window, Excel will maintain accelerated depreciation through the life of the asset, by inserting a 0 (zero), Excel will switch to straight-line depreciation when it provides a greater benefit (more depreciation in the period) than continued accelerated depreciation. The “Variable Declining Balance” worksheet in the “Depreciation” data file shows this formula in action.

The way the formulas in column A works is explained in the “Straight-Line Depreciation” section – it determines if there are depreciation periods available. The depreciation formula in cell B13, reads “=IF(A13="","",VDB($B$2,$B$4,$B$5,A12,A13,$B$7,0))”. After checking to see if depreciation periods are available through the “If Statement,” the “VDB” formula looks for cost in cell B2, salvage or residual value in cell B4, the life in cell B5, the start period – 1 (one) in this case since it is the second period, later lines will read the previous period from the row above, then the period on its row, then the ending period, 2 in this case, the factor from cell B7, and the instruction to switch to straight-line when it is more beneficial. In the templates, this is not changeable – it is set to “Switch.” A word about the periods issue – since every period of declining balance depreciation has its own unique value the formula must know what depreciation period it is in. This formula is capable of determining the accumulated depreciation between any two points of the asset’s life. Assume you are preparing to sell an asset under “DDB” depreciation scheduling at the end of the 8th year of its 10 year life. You can use this formula written as =VDB(100000,50000,10,0,8,200%,1) to determine that accumulated depreciation to date would be $83,222.78. In the data file you are trying to determine each period depreciation so you use 0 for the
start of the first period and 1 as its end. For the second period you are using a reference to end of period 1 as the start of this period and a reference to period 2 as the end of this period.

**Tip:** It is very dangerous to use the “VDB” formula to determine accumulated depreciation for declaration of gain and loss on asset disposal since this mathematical calculation may not match the actual journalized values for depreciation.

By using the “VDB” formula and enabling it to switch to straight-line depreciation when more beneficial there is no need for the adjustment required at the end of the life cycle as shown in the “DDB” formula section. Additionally, this formula will not violate salvage value if the switch is enabled. Look that the differences in the values at the end of the life on the “Declining Balance” and “Variable Declining Balance” worksheets to see the differences.

**Sum-of-Years’-Digits Depreciation**

Excel handles sum-of-years’ digits depreciation through the “SYD” formula. On the “Sum of Years’ Digits” worksheet of the “Excel_Primer_Ch14_Data.xlsx” file you will see this formula in action. The sum-of-years’ digits formula requires the cost, the salvage value, the life, and the period. With the “SYD” formula it is recommended that you remain with years as life and divide the annual amount of depreciation by 12 if you are posting depreciation monthly or divide annual depreciation by 4 if posting depreciation quarterly. Monthly depreciation is provided on the worksheet as annual depreciation divided by 12 as well as monthly depreciation based on monthly life for comparison.

Like the previous formulas, the “SYD” formula in the worksheet looks like “=IF(A13="","",SYD($B$2,$B$4,$B$5,A13))” where absolute references acquire the values from the top of the worksheet and relational references get period references. This allows the formula to be written in the second row of the matrix and dragged down the worksheet.

The “SYD” formula will not violate salvage value or require an adjustment at the end of the asset life as “DDB” and “unswitched” “VDB” may.

**Units-of-Activity Depreciation**

Excel does not have a formula to handle units of activity depreciation. While the concept is rather simple, the sum of acquisition cost less salvage value divided by the expected units yields a per unit of activity depreciation value, that value is multiplied by the units of activity in the period to get period depreciation expense. Excel formulas to handle these issues get rather complicated if written to provide period depreciation, calculate book value, and calculate accumulated depreciation without violating the concepts of salvage or residual value. The “Units of Activity” worksheet within the “Excel_Primer_Ch14_Data.xlsx” file has a working model of how this function can be written into Excel. This model makes extensive use of embedded formulas to ensure that depreciable value is not exceeded either in total or in a period entry. Examination of the formulas in row 12 will show that the initial formulas in this row are different than the formulas on row 14. This difference allows for a single period to fully depreciate the asset – it should have been a period expense if that were possible, then it checks and provides the appropriate depreciation for the period. In rows 14 and below, the formulas evaluate accumulated depreciation of prior periods to determine available depreciation then it determines period depreciation and precludes the violation of salvage value. When utilizing this worksheet you can enter the period activity in the yellow highlighted cells to determine period depreciation. The option of entering annual data and having Excel divide that value into 12 evenly valued units for monthly data entry is provided off to the right of the annual matrix. A monthly input matrix is also provided. Then the worksheet subtracts accumulated depreciation from cost to get book value.

This worksheet does not utilize the concept of “If Statements” referencing the life or period column since they are not relevant to units of activity depreciation.
Chapter 15

LOANS AND THE TIME VALUE OF MONEY

Chapter Outline

Cash Flow within Formulas  Cumulative Payment to Interest
Loan Payments  Present Value
Payment to Principal  Future Value
Cumulative Payment to Principal  Bond Table
Interest Payment

Cash Flow within Formulas

There are many formulas within Excel, particularly those regarding the payment of notes – “PMT” (payments), “PPMT” (principal payment of the payment), and “IPMT” (interest amount of the payments) that are sensitive to cash flow issues. For example, the formula to calculate the payment for a notes payable issue would be “=PMT(interest rate for the compounding period, the life of the note payable in the same periodicity as the interest rate, the principal amount, the future value or balloon payment, and whether the payment is made at the end of the interest period – 0, or at the beginning of the interest period – 1. In cell W4 on the “Cash Flows” worksheet of the “Excel_Primer_Ch15_Data.xlsx” workbook the formula is written as “=PMT(I4,I10,I16,I19,I22)”. The formula “looks to” the cells from A1 through L33 to read inputs. The annual interest rate is placed in cell I4 and a formula in cell I7 divides that value by twelve for monthly interest. The life in years is placed in cell I10 and a formula in cell I13 multiplies that value by twelve for periods in months. The present value is entered in cell I16. If entered as a positive value it indicates cash in, you are getting a loan to purchase something, if entered as a negative number you are loaning someone money indicating cash out. The future value is entered in cell I19. As with the present value entry, positive values indicate cash flows in while negative numbers indicate cash flows out. Type can be blank which defaults to zero or is set to either zero or one. Blank or zero indicates payments are made at the end of the interest period while one indicates payments are made at the beginning of the period.
IMPORTANT: The interest rate must be in the same periodicity as the life of the note payable as shown here – annually or monthly. Interest is normally stated in an annual rate while payments and interest compounding may be monthly, quarterly, semi-annually, annually or some other appropriate value. There is a double-check to assure the values are correct. If annual interest is eighteen percent and compounding is monthly,

\[
\text{Annual interest} \times \text{Annual payment} = 18\% \text{ annual interest} \times 1 \text{ annual payment} = 18\%
\]

\[
\text{Monthly interest} \times \text{Monthly payments} = 1.5\% \text{ monthly interest} \times 12 \text{ monthly payments} = 18\%
\]

Results match, 18\% and 18\%, good check.

Bad results = Monthly interest \times Monthly payments = 1.75\% \text{ monthly interest} \times 12 \text{ monthly payments} = 21\%

21\% does not match 18\%, bad double-check. 18\% annually divided by twelve monthly payments is 1.5\% not 1.75\%. Since Excel is restricted to annual and monthly payments in this worksheet and Excel is handling the math for monthly interest rates and the number of monthly payments, there should be no errors in computing the interest rates or number of payments.

As stated, if the present value is positive (cash in), the results will be negative (cash out). If the present value is negative (cash out), the results will be positive (cash in). Since the easiest data entry is positive and most individuals ignore the positive and negative presentation, many individuals will simply enter a positive value “350000” into the formula, cell I16 in this worksheet, and appreciate that they are either making a loan (cash out) or getting a loan (cash in) without regard to the indications of the results – fewer keystrokes and common sense. While the issue of positive or negative results of these cash flow sensitive formulas are important, the presentation of negative numbers may be undesirable regardless of the nature of principal value, the payments and the cash flows of each. The “Boss” knows the cash flow as “in” when the note payable was signed and he knows the cash flow for payment is “out” or negative and he wants positive values for a “nice” presentation. One option is to write the formula with an additional factor imposed making the input negative within the formula or making the result positive through a secondary formula. By adding “*(-1)” to the principal portion of the formula as shown in cell AK4, “=PMT(I4,I10,I16*(-1),I19,I22)” the result will be the same as the statement of the present value in cell I16. The problem with this is, enter a negative value in cell I16 and watch the results of cell AK4. They are also negative. Not what the boss wanted.

To solve this issue you can add a secondary formula making an absolute value of the answer regardless of the input value in cells A1 through L33. As shown in cell AK8, the formula contains “ABS” (absolute) as “=ABS(PMT(I7,I13,I16*(1),I19,I22))”. Change the present value in cell I16 to positive and negative values and watch the changes – all results in cells AK8, AK16, AK20, AK28, and AK32, all with “ABS” imposed upon them, are always positive.

NOTE: Remember that features making the results of cash flow sensitive formulas always positive may be nice looking and may be required by “The Boss,” they are theoretically incorrect and may present a loss of points on homework and criticism in other presentations.

### Loan Payments

Excel has numerous formulas that address loan payments. The most commonly used formula is the “PMT” (Payment) formula. This formula is under the “Financial” category. With “PMT” you provide Excel with the period interest rate, the number of periods, the present value, the future value if any, and determine if the payment is made at the beginning or end of the period. The quickest way to access this formula is by clicking on the fx of the formula entry window and “search for” “PMT” (Payment). Excel will present you with the “PMT” (Payment) dialog box which looks like the box presented on the next page.

The “Cash Flows” worksheet of the “Excel_Primer_Ch15_Data.xlsx” file contains an example of this formula in cell W4. You can view the dialog box by clicking into cell W4 and then on the fx of the dialog box. The formula is referencing the values in cells I4 through I22.
Excel, and most financial functions, requires the interest to be expressed in the same manner as the periods and the periods are determined by the compounding feature of the loan. If the interest rate is 18% annually and compounded monthly you can enter “18%/12” or 1.5%. The entry of “18%/12” should be considered safest since you do not have to do math outside the formula to determine the values and Excel will handle the significant digits and rounding issues in accordance with industry standards. If the loan is a 30-year loan with monthly payments you can enter “30*12” into the Nper. This keeps the periodicity issues even – divide by twelve in Rate, multiply by twelve in Number of Periods (Nper). The principal amount is entered in the Pv (present value) window. As typical with Excel, no dollar signs or commas are appropriate.

Enter the value “350000” in the “PV” (present value) window for this example. This indicates we are taking out a loan, cash in for us. Remember, no dollar signs, no commas.

Clue: The cash flow direction of the principal is important to Excel. Addressed earlier in the chapter.

The “Fv” window is for future value, if the loan has a balloon payment, the value of that payment would be placed in this window. As with principal value, Excel is sensitive as to whether the balloon payment is cash out – negative, or cash in - positive, and this determination will affect the final results.

The “Type” window is where the schedule of payment, at the beginning or the end of the period, is established. The default is 0 (zero) and is assumed to be payment at the end of the period if not provided.

If populated with the provided data, clicking on the OK button will post the formula, =PMT((18%/12,30*12,350000,0,0), to the worksheet. A review of this formula confirms your data entry. A quick check of the result, “-5,274.80.” When multiplied by the 360 payments it appears you will be paying $1,898,927.57 over the life of the loan to resolve principle and interest obligations. The worksheet shows the annual and month solutions in cells W4 and W8.
**Payment to Principal**

The “Payment to Principal” formula is utilized on “Cash Flows” worksheet on the “Excel_Primer_Ch15_Data.xlsx” file. Payment to principal of a loan payment for a period can be determined by the Excel “PPMT” (Payment to Principal) formula. The data windows for this formula are very similar to the data entry windows for the “PMT” (Payment) formula detailed above except that “PPMT” asks for the period that you want the payment to principal for. This can be period 1, period 2, period 360, or any other period in the applicable range of the loan. This is because the interest obligation decreases as the principal is paid down and, since payment is constant, the payment to principal increases with each additional payment. On the “Cash Flows” worksheet the period is entered in cell I28 for the annual results and in cell I31 for the monthly results. These are not related as interest rate and number of periods are. The output value is under the same logic as “PMT” – if the principal is positive, the payment will be negative.

When writing journal entries for loan payments the “PPMT” formula will assist you in determining how much of a loan payment will reduce the obligation of the loan with the payment, the debit value to the liability.

The screen shows the references of payment to principal for the annual results shown in cell AK16.
Interest Payment

The payment to interest of a loan payment for a period can be determined by the “IPMT” (Payment to Interest) formula of Excel. The dialog box for this formula is very similar to the data entry windows for the “PPMT” (Payment to principal) function detailed earlier in that the payment to interest is period sensitive as addressed in the payment to principal section. This can be period 1, period 2, period 360, or any other applicable period within the range of the loan for the loan example. In the “Cash Flow” worksheet, the period is defined in cell I25 for the annual payments and in cell I31 for monthly payments. The output value is under the same logic as “PMT” – if the principal is positive, the payment will be negative, if the principal is negative, the payment will be positive indicating cash flows in and out.

The formula for the annual payment to interest is contained within cell W28, “=IPMT(I4,I28,I10,I16,I19,I22)” and is shown in the following screen print.

![IPMT Formula Screen Print](image)

The “IPMT” formula will assist you in determining how much of a loan payment will be the interest cost value associated with the loan with the payment.

When writing journal entries for loan payments the “IPMT” formula will assist you in determining how much of a loan payment will be debited to interest expense which reduces the amount paid to result in the amount paid to principal.
Cumulative Payment to Principal

The formula “CUMPRINC” will generate the cumulative principal paid or received to date if all payments were made or received appropriately. The dialog box for the “CUMPRINC” formula is shown here. The input values are similar to other loan associated formulas and functions. While this is an easy formula to set up, it does not take into account or have the capability of addressing loans with balloon payments. The “CUMPRINC” (Cumulative Payment to Principal) formula is in cell W40, “=CUMPRINC(I4,I10,I16,I37,I41,I22)” and it references cells I45 and I49 for the start period and end period. As explained in payment to principal and payment to interest, the cumulative payment to principal is sensitive to periods as interest payments decline as the loan payments progress which results in payments to principal increasing since payments are constant. The annual and monthly cumulative payments to principal are shown in cells O37 through AP46. These formulas reference the same information as the other loan formulas for consistency. No balloon payment data can be input on this worksheet.

Cumulative Payment to Interest

The “CUMIPMT” (Cumulative Payment to Interest) formula will generate the interest for a range of periods rather than one specific period. Its dialog box is very similar to the “CUMPRINC” (Cumulative Payment to Principal) discussed earlier. As with the “CUMPRINC” (Cumulative Payment to Principal) formula, this formula does not take balloon payments into account. The “Cumulative Payment to Principal” formula is used in the range from O49 through AP58 of the “Cash Flows” worksheet of the “Excel_Primer_Ch15_Data.xlsx” workbook. The formula for monthly cumulative payments to interest is “=CUMIPMT(I7,I13,I16,I45,I49,I22)” which references cells I45 and I49 for the start and ending periods.

The screen print of the formula window is on the next page. Notice the scroll bars to the right which indicates not all data windows are shown.
Present Value

Excel has a very powerful and easy to utilize formula for present value calculations under the title of “PV” in the financial category. This single formula will handle present value calculations of single sums or annuities as well as adjust them for payment at the beginning or the end of the period. The inserted screen print shows the “PV” (Present Value) dialog box.
The “Present Value” worksheet in the “Excel_Primer_Ch15_Data.xlsx” file has numerous examples of this formula. The basic formula is \( PV(\text{Period interest}, \text{Number of periods}, \text{Amount of each payments}, \text{Future value}, \text{Payment at the beginning or the end of the period}) \) with payment at the end of the period indicated by a 0 (zero) and payment at the beginning of the period indicated by a 1 (one). Leaving the “Type” (Payment type) window empty causes Excel to default to payment at the end of the period. If the data window is not relevant, such as “PMT” (payments) on a single payment at the end of the loan obligation, a “0” (zero) should be entered into the data window. By placing the amount of an individual payment of an annuity in the “PMT” (Payment window), the formula will produce the present value of an annuity. For annuities due place a 1 (one) in the “Type” window to indicate payment at the beginning of the period, for an ordinary annuity, place a 0 (zero) in the “Type” window or leave it blank to indicate payments at the end of the period.

**Hints and Tips on utilizing the dialog box** – First, if you establish the data matrix as shown on the “Present Value” worksheet in cells A1 through I7 you can have formulas installed that will take the life in years and multiply it by the compounding factor for Nper (number of periods). You can also divide the interest rate by the compounding factor to get the value for the period interest rate. Remember that, as with working with the tables in the textbook, the interest rate and the number of periods must be expressed in comparable values. If the document states that interest is 8% annually and it is compounded quarterly and that the life of the annuity is 10 years, the effective values are 2% interest per period (8%/4 quarters per year) and 40 periods (10 years \( \times \) 4 quarters per year). Excel can do this within an input matrix or within the formula by entering a value such as \( \frac{8\%}{4} \) or \( 10\times 4 \).

The formula will also produce the value of $1, just like the tables in the textbook by placing the value of 1 (one) in the “PMT” (Payment) or “FV” (Future value) window as appropriate. This value will be carried out to more significant digits than the textbook’s tables even if formatted to show the same since Excel keeps the real value in its “mind” even with trimmed or formatted presentations.

Excel works with standard finance and math logic. If the “PMT” (Payments) values are positive indicating receiving cash or value, the “PV” (Present value) will be negative indicating cash or value flowing out. If the “PMT” (Payments) are negative indicating cash or value flow out, the “PV” (Present value) will be positive indicating cash or value flow in.

This worksheet has extensive “Concatenate” formulas to rephrase the statement for each formula. You can read the “Concatenate” function explained elsewhere in this book.

**Future Value**

Excel has a formula similar to “PV” (Present Value) for “FV” (Future Value) located under the Financial formulas category. This formula is demonstrated on the “Future Value” worksheet of the “Excel_Primer_Ch15_Data.xlsx” file. The formula is written as \( =FV(\text{Period Interest}, \text{Periods}, \text{Payments}, \text{Future value}, \text{Payment at the beginning or the end of the period}) \). As with the “PV” (Present Value) formula, interest rates and periods must be stated in the same terms. The appearance of the dialog box is very similar to the “PV” (Present Value) dialog box with various inputs that will provide the “FV” (Future Value) of a single sum or a series of payments - an annuity. It will accept payments made at the beginning or the end of the period. As with the “PV” (Present Value) formula, the “FV” (Future Value) formula will produce the value for the sum of $1. This value will be kept within Excel to a greater number of significant digits than your textbook’s tables. This may cause a slight difference between Excel generated “PV” (Present Values) and “FV” (Future values) but the differences will not be material in nature – pennies on thousands of dollars.
### Bond Table

Excel will handle the task of a bond issuance, determination of present value of the issue and both effective and straight-line amortization of the premium or discount through numerous formulas including present value. The application of these formulas is on the “Bond Table” worksheet in the “Excel_Primer_Ch15_Data.xlsx” file. This presentation meets U.S. GAAP not IFRS requirements for journal entries. For IFRS journal entries only the bond liability for cash received is required when bonds are issued and the bond liability is adjusted for the difference between contract/stated/face rate and market/effective/yield interest values with each interest payment. The essential pieces of information for a bond issuance are face interest rate, market interest rate, periodicity of bond interest payments, life of the bond, number of bonds issued and the face value of each bond as well as whether the amortization will be effective or straight-line amortization. The essential information is contained in cells B4 through B8 of the upper portion of the “Bond Table” worksheet and these values are used throughout the worksheet. By using the “PV” formula of Excel you can determine the present value of both the principal and the interest payments. This is done on cells B11 and B12 of the worksheet using the values in cells B4 through B8. The sum of these two values is the present value of the issuance, shown in cell B13. The difference between the present value of the issuance and the face value of the issuance, (or the difference between face or stated interest and market interest) determines whether the bond was issued at a premium or discount and the amount of that premium or discount. The cell C10 contains an evaluating function to determine if the bonds were issued at a premium or discount based on the information in cells B6 and B7. Values within the worksheet formulas have been presented as positive values to make a “neat and clean” presentation. Contained on the right side of the worksheet is a straight-line amortization schedule of the premium or discount on that issue. With the power of worksheets available on the desktop system effective interest amortization computation is almost as easy as straight-line amortization – except that because of the varying amount per period for effective interest method the journal entry cannot effectively be memorized.

In rows 17 through 19 the journal entry for the issuance of the bond is shown. In cell B24 you can enter the period of interest and see the journal entry for that period. This is done through “Vlookup” formulas in cells E24 through F26. “Vlookup” formulas are discussed elsewhere in the text. “If Statements” and null values are utilized to keep the presentation clean for periods not required by the life and periodicity of the bonds.

If you manage to “float” a bond with face at market this worksheet has no problem with that issue either. In rows 17 through 19, the proper journal entry will be structured through “Look to” formulas and “If Statements” which contain text responses containing account titles and placements for all three possible issuance conditions. In rows 24 through 26 the period journal entries can be brought up by entering the period number in cell B24. In the matrix itself, the “If Statements” in column B present the period increments appropriate to the life of the bond or the “Null Value.” This “If Statement” process determines if the rest of that row will display making the matrix neat and clean for lines not relevant to the life of the bond issue. Inside the columns sensitive to premium and discount issues such as interest expense, “If Statements” determine if the issue is a premium or discount and then provide the math for that specific issue.

**NOTE:** To the right of the effective interest table is a straight-line amortization table for comparison. This table looks at the effective interest rate data so you can do a comparison of the two methods.
Chapter 16

ADVANCED EXCEL

Chapter Outline

Average and AverageA  Intermediate Formulas
Command Access  Keystrokes and Shortcuts
Convert  Linking Worksheets
Embedded Formulas  Macros

Average and AverageA
Within Excel there are two “Average” functions under the “Statistical” category. The first is “Average” and returns a simple average of an identified range. This formula is shown in operation on the “Average” worksheet of the “Excel_Primer_Ch16_Data.xlsx” file. The function written in cell E2 determines the average number of the category “Apple” – cell B2. Cell E3 determines the average number of “Apples,” a range from cell B3 through B11. The formula in cell E4 determines the average number of “Berries,” a range from cell B12 through B23 while the formula in cell E5 determines the average number of “Cherries” in a range from cell B24 through 33. This formula is simply written as “=AVERAGE(Range)”. The range can be a continuous string of cells in a column or row or can be a range of cells such as columns and rows such as the formula shown in the range of F10 through M31. Average will not count text strings into its averages.

The second formula is “AverageA”. With this formula you can even account for text strings in your average such as “True” – a value of 1, “False” – a value of 0, while the occurrences of text strings such as “N/A” get counted in the denominator of the average equation but there is no value for them in the numerator of the equation. This is a handy tool for the average number of correct answers on a “True/False” question as shown in column O of the “AverageA” worksheet.

Convert
Utilize the “Convert” worksheet of the “Excel_Primer_Ch16_Data.xlsx” file with this section. The “Convert” function will accept one value and then convert that value from one measuring standard to another measuring standard. Tired of trying to remember that 2.2 pounds is roughly 1 kilogram and have to convert 825 pounds to kilograms for a shipping invoice? Try the “=SUM(CONVERT(825, "lbm","g")/1000”. One of the requirements for this function to work is that the “Unit Id” must be in double quotation marks and in the proper case – some upper case, some lower case. For example, while Excel ignores “=CONVERT(”,”=Convert(”,”=convert(” upper or lower case issues, it will “fault out” if the formula is written as “=CONVERT(825,"LBM","g)” since it will not recognize the unit ID of upper case “LBM” because of the upper case issue. Nor will it recognize the lower “g” without the double quotation marks.
Utilize the “Help” screen for “Convert Worksheet Function” from Microsoft Excel for more units and information. This table is a brief listing of the values that Excel can convert from and into:

<table>
<thead>
<tr>
<th>Unit Id</th>
<th>Unit Title</th>
<th>Unit Id</th>
<th>Unit Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;g&quot;</td>
<td>Gram</td>
<td>&quot;C&quot;</td>
<td>Degree Celsius</td>
</tr>
<tr>
<td>&quot;lbm&quot;</td>
<td>Pound mass (avoirdupois)</td>
<td>&quot;F&quot;</td>
<td>Degree Fahrenheit</td>
</tr>
<tr>
<td>&quot;ozm&quot;</td>
<td>Ounce mass (avoirdupois)</td>
<td>&quot;K&quot;</td>
<td>Degree Kelvin</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Distance</th>
<th>Unit Id</th>
<th>Unit Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;ft&quot;</td>
<td>Foot</td>
<td></td>
</tr>
<tr>
<td>&quot;in&quot;</td>
<td>Inch</td>
<td></td>
</tr>
<tr>
<td>&quot;m&quot;</td>
<td>Meter</td>
<td></td>
</tr>
<tr>
<td>&quot;mi&quot;</td>
<td>Statute mile</td>
<td></td>
</tr>
<tr>
<td>&quot;Nmi&quot;</td>
<td>Nautical mile</td>
<td></td>
</tr>
<tr>
<td>&quot;yd&quot;</td>
<td>Yard</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Liquid Measurement</th>
<th>Unit Id</th>
<th>Unit Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;cup&quot;</td>
<td>Cup</td>
<td></td>
</tr>
<tr>
<td>&quot;gal&quot;</td>
<td>Gallon</td>
<td></td>
</tr>
<tr>
<td>&quot;l&quot;</td>
<td>Liter</td>
<td></td>
</tr>
<tr>
<td>&quot;oz&quot;</td>
<td>Fluid ounce</td>
<td></td>
</tr>
<tr>
<td>&quot;pt&quot;</td>
<td>U.S. pint</td>
<td></td>
</tr>
<tr>
<td>&quot;qt&quot;</td>
<td>Quart</td>
<td></td>
</tr>
<tr>
<td>&quot;tbs&quot;</td>
<td>Tablespoon</td>
<td></td>
</tr>
<tr>
<td>&quot;tsp&quot;</td>
<td>Teaspoon</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Unit Id</th>
<th>Unit Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;day&quot;</td>
<td>Day</td>
<td></td>
</tr>
<tr>
<td>&quot;hr&quot;</td>
<td>Hour</td>
<td></td>
</tr>
<tr>
<td>&quot;mn&quot;</td>
<td>Minute</td>
<td></td>
</tr>
<tr>
<td>&quot;sec&quot;</td>
<td>Second</td>
<td></td>
</tr>
<tr>
<td>&quot;yr&quot;</td>
<td>Year</td>
<td></td>
</tr>
</tbody>
</table>

On the “Convert” worksheet of the “Excel_Primer_Ch16_Data.xlsx” file there is a data matrix of common convert terms or “Unit IDs.” The values within column B cannot be utilized as “Look to” values since they are in quotation marks, the way you are required to type them into Excel. However, the column is duplicated in column C without quotation marks. This allows you to write a formula such as “=CONVERT(B1,C11,C10)” in cell C1 to convert the value of 825 contained in cell B1 from pounds as identified through the value contained in cell C11, to grams through the value contained in cell C10. Had you utilized the column B values of the “Convert” data file for these references you would get a fault indication such as “#N/A” or “#Name”. By looking at the dialog box you would see that Excel is interpreting the formula as “=CONVERT(B1,"B12","B10")” which contains too many double quotation marks around the values – so the double quotes are removed from column C for your ease of use.
Embedded Formulas

As addressed elsewhere in this book, the prefix of “=SUM(“ starts Excel into the “I have to do something with formulas and functions” mode. As shown elsewhere in this book, Excel will perform functions and formulas within other functions and formulas. This embedding capability generates a power and flexibility within Excel that greatly aids the professional. The way to embed a formula or function is relatively simple. First and foremost, understand the functions and formulas you are utilizing. For example, if you are using the “Count If” function on an inventory sheet to find the total number of apples, your results will be incorrect. This is shown on the Embedded Formulas data file where the desire was to sum the number of apples, berries, and cakes but the “Count If” formula resulting in finding out how many times the text apples, berries, and cakes each occurred in the data field.

In the Embedded Formula worksheet of the chapter data file the first task is to establish a value for inventory by finding the value of the apples, the berries, and the cakes and then summing those subtotal values. In cells G23 through G25 and G27 Excel finds the number of each item. The values for these items as individual elements is contained in cells H23 through H25 and H27. In cells I25 through I25 and I27 the “Sum If” formula determines the sum total of each element and then Excel multiplies it by the element value contained in the H cell ranges. For the apples on row 23 the formula is:

\[=\text{SUMIF}($A$2:$A$250, F23, $B$2:$B$250) \times H23\]

This embedded formula is the “Sum If” formula and a multiplication function by adding the “*H23” at the end of the previously discussed “Sum If” formula. By using the “Look To” capability you can change the element value of the inventory items and see the results immediately.

Suppose that we wanted to be alerted if the value of any inventory category exceeded $20,000. This can be accomplished through conditional formatting – covered elsewhere, so utilize “Concatenate,” a function discussed shortly, and “If Statements.” The formula in I23, broken down into three lines due to its length, reads like this:

\[=\text{IF}((\text{SUMIF($A$2:$A$250, F33, $B$2:$B$250) \times H33}) \gt $I$31, \\
\text{CONCATENATE("", Fixed(SUMIF($A$2:$A$250, F33, $B$2:$B$250) \times H33), 4, 0), \\
" Exceeds target value"), SUMIF ($A$2:$A$250, F33, $B$2:$B$250) \times H33)}}\]

To understand this function appreciate that Excel looks at the deepest pair of parentheses and then starts working its way outward. In this case those parentheses are contained within the “Sum If” function. So in line 1 of the formula Excel sums the number of directed inventory items, those identified in cell F33 – Apples, and multiplies the summed number by the value in cell H33 - $0.12 per element item as supplied on the data file. Then Excel is instructed to compare this total value to the value in cell I31 and determine if the summed value is greater than the value in cell I31. If the summed value is greater than the value in cell I31, $20,000, as supplied on the data file, Excel moves to the set of parenthesis inside the formula – those of the “If Statement.” Since the statement is false (9,674 apples at $0.12 each total $1,160.8800) Excel executes the function contained in the second part of the “If Statement.” This is actually a repeat of the “Sum If” formula summing the number of referenced inventory items and multiplying that sum by the element cost contained in cell H33.

However, in cell I35 the statement is true. The 15,771 cakes at $1.87 each total to $29,491.7700 which exceeds the reference value in cell I31. Since this “If Statement” is true, Excel executes the first half of the “If Statement” – the concatenate function. This function is set to sum the total number of referenced inventory items – cakes, and multiply that sum by the cost in cell H35. Then Excel is told to format this value to 4 decimal places and with commas through the “Fixed” function. Concatenate adds a dollar sign as text in front of the total value for a presentation of “$29,491.7700”. The concatenate function adds spaces and a text string saying that this value exceeds the limit. While not real useful in life,
as will be shown in the Intermediate Formulas section to follow, this string of formulas and functions demonstrates the power Excel can provide if the user has imagination and knowledge.

Notice that the only equal sign in the formula is the one at the beginning of the long formula string. An equal sign buried within the formula such as in front the “Sum If” or “Concatenate” formulas and functions will result in an error message from Excel.

The actual solution to this problem could have been conditional formatting of the cell or an “If Statement” as shown in cells F40 through J45 where both “If Statements” and Conditional Formatting are used on the values resulting in easier to write and troubleshoot the formulas.

**Intermediate Formulas**

Excel has many built in formulas and functions which can be found through the $f_x$ icon on the formula toolbar. Shown here is the dialog box that is presented when you click on the $f_x$ icon and then search all functions or the Math and Trig functions. This dialog box provides an index of most of the structured Excel formulas and functions. Two very nice features of this dialog box are (1) the ability to select “All” as a category and scroll through every function and formula, and (2) the brief summary of actions and capabilities of the formula or function in the lower third of the dialog box, shown inside the rectangle on the screen print. In this screen print the “Sum If” function is selected. The dialog box tells you that it adds the cells specified by a given condition or criteria. Exactly what we were seeking in the “Sum If” tasking for the valuation of inventory earlier.

This dialog box can be narrowed down in its search through the selection made in the “Or Select A Category” window in the upper third of the dialog box. The categories include financial, math & trig, statistics, lookup and reference, text, and logical. Selecting one of these categories will narrow your search but may preclude you from seeing a viable option contained under another category.

Formulas and functions in Excel normally start with the equal sign, “=”, which keys Excel into expecting to accomplish something through a formula or function. From this point, text, data, and reference information is provided. The simple Excel formula of =B2, a “Look to” formula or function, placed in cell C1 would simply provide you with the contents of cell B2 being presented again in cell C1 as shown on the “Intermediate Formulas” worksheet of “Excel_Primer_Ch16_Data.xlsx”. This formula can be used through many of the exercise and problem templates as the dates and values as well as some account titles are available in a “clean target” or source presentation. Excel will also do “Look to” on text values as shown in cell D2.

When text is incorporated as part of a formula or function within Excel it must be enclosed within double quotation marks or Excel will produce an error message. In the “If Statements,” a logic function or formula, shown in cell E12 in the “Intermediate Formulas” worksheet, you will see a word. You can enter “apple,” “apples,” or something else and see what the “If Statement” in cell E12 does. The formula or function, an “If Statements,” in cell E12 is looking at cell D12 and responding based on the value in D12. If the value is singular – “apple,” Excel hopes it’s a Washington State Apple. If the text is “apples” – plural, Excel hopes they are all Washington State Apples. However, if the text string is neither “Apple” or “Apples,” Excel tells you that it is not apples. Excel cannot really read, it is comparing text strings for validity. The formula says if you find the text string of “Apple” respond with the first of the “true” statements, if the text string is not equal to “Apple” Excel executes it false statement which is another “If Statement” to see if the text string is equal to “Apples.” If Excel finds a matching text string, Excel responds with the second true statement in the formula, the plural response for “Apples.” If Excel did not
find the text string “Apples” on the “second look,” it responds with the false response which declares they are not apples.

As addressed elsewhere in this book, there is a nesting limit of 7 levels within some versions of Excel. Can Excel determine what letter of the alphabet you entered and respond based on your input if there are 26 letters to choose from? Certainly. Enter a letter (A to Z in upper or lower case) in cell D21 and watch the response. Excel will determine the letter and respond for that letter. To overcome the 7 layer restriction on nesting, after 6 levels, the formula looks to the next line – hidden by making the text white – for an answer. All of the lines, 4 in total, look to cell D21 and evaluate the value. If the value exceeds the limits of the first line in cell E21, the formula in the first line looks to cell F22. If the value in cell D21 matches one of the values in cell F22’s range, cell F22’s formula responds, if cell F22’s range is exceeded, cell F22 looks to cell F23, and then cell F23 looks to cell F24. This process can continue until you run out of cells in the worksheet. If cell F24 has the valid answer, it passes it to cell F23 which passes it to cell F21 which displays the valid response as the “False” response to its own “If Statement.” The “False for cell F21 is look at cell F22. After filling a worksheet with chained references you can reference the next worksheet in the workbook. After the number of worksheets is exceeded, you have Excel reference a second, then third, then fourth workbook and so on. So, while there may be a nesting limit within a cell of Excel, there is no true nesting limit if you “Look To” the next cell, worksheet, or workbook.

Often a formula can be set up in a “template” format for frequent use without new formula structures being required. Suppose that you did a lot of work with the Present Value formula. Set the formula up as shown in cells D31 to G35. In cell G32 the present value formula resides and looks to the cells D31 through D35 for information. Anytime that information is changed the formula recalculates the present value. (Almost) Instant answers to a formula with little typing once the formula is set up.

Occasionally Excel will have problems with formulas that you think should yield specific results. The frequently effective solution is to ensure that the formatting of the cells is not precluding the formula or function action. For example, click into cell H38 of the “Intermediate Formulas” worksheet. Once the cell is active, click on the Sigma symbol (Σ) for quick sum and Excel looks over to column A and generates a formula of =SUM(A38:G38) while you would have expected Excel to generate a value of 28 (1+2+3+4+5+6+7) the response is only 17. A check of the formula in cell H38 shows a correct formula - =SUM(A38:G38), the sum is obviously wrong. Click into cell H39 and click the Sigma symbol (Σ) for quick sum and Excel looks over to column A and generates a formula of =SUM(A39:G39). And the response is 28, the correct sum of 1+2+3+4+5+6+7. Now click into cell A38. Once the cell is active, left mouse button down and begin to sweep right on row 38, when cells A38 and B38 are highlighted, the sum at the bottom, right side of Excel shows “3”, the correct answer. As you sweep right into C38 the sum increases to and then to 10 as you continue to sweep. When you sweep into cell E38 containing the value of 5, there is no increase, there is no increase when you sweep into cell F38 with the value of 6, but sweeping into the cell with the value of 7 results in a sum of 17 appearing at the bottom of the screen.

Time to troubleshoot and the focus has been identified. Click into cell D38. Then right click the cell and read the formatting – it is “General.” Click into cell E38 and check its formatting – it is “Text.” In the “Format Cells” dialog box Excel tells you that even though a numerical value may appear in this cell, it is text and will not function as a number or value. The same for cell F38. Reformat the cells as “General” or a numerically acceptable format – number, currency, or accounting, and then reenter your data and the sum is correct – as shown in line 39. Excel had the numbers 5 and 6 entered after the cells were reformatted to text so even reformating the cells to “General” does not change the data – text images of 5 and 6, to numerical data until the cells are reformatted and the data is reentered.

Scrolling through the “All” formulas and functions category of Excel will reveal many useful formulas and functions applicable to the exercises and problems of the textbook. However, Excel is a tool and the results of every Excel formula and function needs to be evaluated for reasonableness. When
working on extensive and intricate data proof the concept with basic data and simple values. For example, with the “DDB” function to handle double-declining depreciation of an asset, verify it with a $10,000 asset, $0.00 salvage value, 5-year life at 200%. This should return a value of 40% of $10,000 (100% / 5 year life × 200%) or $4,000 for the first period. If another value is returned, something is wrong with the formula selection, the data input, or formatting. In this formula, Excel is not expecting 200 for 200%, it is expecting either “2” for twice straight-line or “200%”. Excel also is not expecting commas to be entered into the values.

Tip: While working on formulas and functions, you can insert a single text character in front of the equal sign and the formula or function becomes a text string and will not process. This does not reformat the cell and preclude later mathematical operations. This is a handy “escape” while troubleshooting problems and situations that may arise during entry. Excel does not want you to leave the cell with a formula or function it cannot handle. Excel may present you with proposed resolutions and trouble screens. Just because Excel presented it, does not mean it is correct or acceptable. By inserting a character in front of the equal sign this can be stopped. As a matter of presentation, if the character is a single or double quote, Excel will not show that character in the display of the cell data. This makes the single or double quote presentation neat and clean. You can see many of these inserts through the data files.

Keystrokes and Shortcuts

There are many keystrokes that work in a standard Windows format regardless of the program. Some are unique to the program. Here are some simple and useful keystrokes for Excel:

The keystrokes of Ctrl-Home (key / keystrokes not type in entry) will take you to cell A1 unless the upper row(s) or left column(s) frozen through “Freeze Pane.” Then Ctrl-Home will take you to the upper, left most cell not frozen. Ctrl-Home will not take you into frozen columns or rows.

The keystroke of Home will take you to column A of the row with the currently active cell. It will not take you into frozen columns.

Page up will change the screen displayed up one “pane” of cells. If the top row is row 128, page up will make the bottom row on the new screen 127. If there is not enough rows available because of the upper or lower limit of Excel, nothing will happen. It will not take you into frozen rows.

Page down will change the screen displayed down one “pane” of cells. If the bottom row is row 128, page down will make the top row on the new screen 129. If there is not enough rows available because of the upper or lower limit of Excel, nothing will happen.

Arrow keys will move you one cell up, right, down, or left for each striking, if held, they will scroll you in the selected direction. If you have edited the data within a cell, the use of the arrow keys will not let you leave the cell. “Tab” or “Enter” must be struck or you must click into another cell with the mouse.

Ctrl-A selects all cells on the worksheet.
Ctrl-B toggles the selected cell or range of cells into and out of bold text mode.
Ctrl-C copies the selected cell or range of cells.
Ctrl-D is fill down – starting with the source cell, highlight the range you want filled in and press and release Ctrl-D for the fill to occur.
Ctrl-F brings up the “Find” and “Find and Replace” dialog box.
Ctrl-G brings up the “Go to” dialog box.
Ctrl-H brings up the “Find” and “Find and Replace” dialog box.
Ctrl-I toggles the selected cell or range of cells into and out of italics text mode.
Ctrl-K brings up the “Hyper link” dialog box.
Ctrl-N opens a new worksheet.
Ctrl-O brings up the “Open Workbook” dialog box.
Ctrl-P brings up the “Print” dialog box.
Ctrl-R is fill right—starting with the source cell, highlight the range you want filled in and press and release Ctrl-R for the fill to occur.
Ctrl-S saves the file if it has been saved before, it brings up the “Save” dialog box if this is the first save operation.
Ctrl-X is cut the cell or range of cells.
Ctrl-Z is “Undo.”
Ctrl-` - the accent character on usually to the left of the 1/! Key brings up the audit toolbar.
Ctrl-1 (The number one) is format cell or cells.
F1 (The number 1) brings up the Help screen.
F5 is refresh.
F7 starts spell-check.
F12 brings up the “Save As” dialog box.

Linking Worksheets and Workbooks

Excel can utilize the “Look to” function as a quick link between worksheets within the same workbook and link between worksheets in different workbooks. This is different than a link or hyperlink which provides the path which opens a target document. If you are working within the same workbook but different worksheets within Excel simply enter the equal sign into the target cell, select the source worksheet and click into the source cell and press and release the “Enter” key. This is demonstrated in the “Linked Worksheet” worksheet of the “Excel_Primer_Ch16_Data.xlsx” file. On the “Linked Worksheet,” the “=” (equal sign) was entered into cell A1. Then cell A1 of the “Linking Source” worksheet was selected and was clicked into to make it the source cell and “Enter” was struck. This returns you to the “Linked Worksheet” as the function is complete. Then cell A1 as selected and the formula within cell A1 was dragged down through cell A5. The dragging operation is relational as explained under Absolute References so the cells A1 through A5 of the “Linked Worksheet” are now “children” or “dependents” of the “parent” or “source” cells of the “Linking Source” worksheet.

Notice the special format and sequence of the linking formula, “=Linking Source’!A1.” This can be typed in manually if desired but it is quicker and less troublesome to let Excel write the formula. You can utilize these cells for data within other formulas and you can add functions and formulas to the linking formula. In cells L6 through O10 additional math actions are added to the linking function.

Linking can also be accomplished through “Copy” then “Paste Special” and selecting “Paste Link” on the bottom left corner dialog box. When done with this method the references are created as Absolute References by Excel, the absolute reference function can be inserted on the “Look to” method as well. This allows the “dependent” or “child” cell to be moved, copied and pasted, or dragged to another location without losing its reference.

When Excel links between two workbooks the formula becomes slightly more complicated. The formula “=[Book3]Sheet1!$A$1” inserted into a cell in a workbook other than Book3 would look to Book3 and return the data entered in cell A1. In this formula, the parent and child workbooks are within the same directory. Utilizing the “Linking Source” worksheet of the “Excel_Primer_Ch16_Data.xlsx” file and the “Excel_Primer_Ch16_Linking Dependent.xlsx” file you can see, and practice linking workbooks. Both workbooks need to be in the same directory for the dependent to find the source. This is not a restriction of Excel as Excel will look to other directories if they are provided in the linking process. Upon opening Excel will ask if you want to update the link. Select “Update” and Excel will “read” the “Linking Source” worksheet for changes. It will not open the “Excel_Primer_Ch16_Data.xlsx” workbook or the “Linking Source” worksheet to read the linked data. Assume that the child or dependent file is closed and the source or parent file, “Excel_Primer_Ch16_Data.xlsx” is open and the “Linking Source” worksheet is being edited. The child or dependent will not be updated upon saving the source or parent.
file. However, when the child or dependent file, “Excel_Primer_Ch16_Linking Dependent.xlsx,” is opened, Excel will ask if you want it updated and check for changes if you do.

**Tip:** You have a big, dependent or child file that is critical and numerous individuals can make changes to the parent or source file. Upon opening the file you can select not to update the file and, once open, use “Save As” to save the file as a new name. If you desire you can Copy and Paste Special > Values the entire worksheet to remove the links and turn all the formulas into hard values. Then reopen the linked child or dependent file, update it, and inspect it. If unacceptable changes have been made to the parent or source data file you have the child saved in a previous, unaffected condition through this technique.

Excel will allow you to link between directories as long as you can define the path or generate the path through Windows movements. With the ability to link the worksheets and workbooks you can build subsidiary ledgers containing accounts receivable and accounts payable data and then link it to the general ledger of accounts receivable and accounts payable in another directory. The subsidiary ledgers would be the source or parent with the general ledger being the child or dependent cells. You would not have to have the general ledger open to make entries into the subsidiary ledgers. But when the dependent or child workbook, the general ledger file is opened, Excel would ask if you would like to check for changes and update the file. This capability is demonstrated with the data disk directories “Linking Source” worksheet and “Linking Dependent.xlsx” file. If the links have difficulty in reestablishing upon opening, you can reinstate them by opening both files, clicking into cell A1 of the “Linking Dependent.xlsx” entering an equal sign in cell A1, then clicking into cell A1 of the “Linking Source” worksheet of the “Excel_Primer_Ch16_Data.xlsx” file and striking the “Enter” key. Now that the formula is in cell A1, remove the absolute reference dollar signs from the cell reference of “$A$1” to make it a relational “A1” and drag it down 35 or more rows to bring in the populated cell range of the “Linking Source.xlsx” data file. And the links are reestablished.

**Clue:** The cell A1 to A1 relationship is not required. You can link any cell to any cell through this process.

The “Linking” and “Look to” capabilities makes Excel a powerful tool for data management. There is a danger created in this manner that the data being utilized to generate values on your worksheets and in your workbooks may not be easily reviewed or visible for review and audit. And, as a professional, you are responsible for the work you provide, regardless of the validity of the source.
Chapter Outline

Word File Storage  Word Table Formulas
Word upon Opening  Excel Tables into Word
Word Tables

**Word File Storage**

During an initial installation Word will bring in the defaults of the installation process for file storage and document setting. If the installation is an upgrade installation the installation process will incorporate the previous file storage and document settings. The location of Word files can be left at “Default” which may be in the “My Documents and Settings” directory. You can determine the actual storage location of your installation by checking the directories specified in the “Save Documents” section of the “Save” tab of the “Word Options” which is accessed through the drop-down menu associated with the four colored Microsoft symbol in the upper left corner of Word. The screen print below shows the (non-standard) directories of the author.
**Word Tables**

Word has the ability to generate basic tables on its own through the “Table” icon on the “Tables” tab of the “Insert” toolbar. The table inserted below was created with this function. While it does not have all of the features of Excel, it is a good tool for the presentation of limited material or materials not found elsewhere and not necessarily needed later. When the “Table” icon is clicked, you can select the number of columns and rows you want in your table and once constructed you can add or subtract columns and rows. By telling Word through the dialog box that you want a table with 5 rows and 5 columns the result is:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td></td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>11</td>
<td>22</td>
<td>33</td>
<td>44</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>12</td>
<td>144</td>
<td>1728</td>
<td>20736</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>33</td>
<td>60.33</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

By default, Word will make these columns fill the width of the page. You can select the table by clicking into the table and then moving your cursor to the upper left corner area. While moving your cursor in that area, you will see a four-headed arrow appear. Click on that arrow and you will have selected the entire table. You can also sweep and highlight the table from one corner to another if desired. When the table is selected, you will activate the tab markers in the ruler/measurement bars at the top and side of the page. By moving these tab markers with your cursor (select them by left mouse click and hold the left button down) you can change the column width and row height by dragging them. You can also change row height and column width by selecting the row(s) or column(s) by highlighting them, then right clicking on the highlighted cells and following the path to Table Properties and selecting the Row or Column tabs and changing the values there.

The borders on the table can be formatted by highlighting the specific cell, cells, or the entire table and using the borders icon on the paragraph tab of the “Home” toolbar or right clicking and selecting “Borders and Shading” from the pop-up menu. The borders of row 3 have been removed through this process and the double lines under row 5 were placed there by the same process. Under this tab, the line weight and characteristics can be modified as desired to include dashes, dots, and mixes of other symbols. Row 2 was modified in this manner.

The background and text coloring of the cells and their data are controlled as other formatting features that are in Word. You can select the table, the row, the column, or the cell and invoke the colors and features through the toolbar icons or by utilizing the options on the pop-up menu when a cell or group of cells are right-clicked.

Once a table has been inserted you can select a row or column and right click the highlighted area and select “Insert” from the pop-up menu. Then select what you want from the second pop-up menu. Word will insert the new rows or columns in the highlighted area and “push” the highlighted area right for columns and down for rows. To insert a specific number of rows or columns, select/highlight that number of rows or columns and then right-click the highlighted area and select “Insert” and “Rows” or “Columns.
from pop-up menus. Rows and columns can be deleted through the highlight, right click method and selecting “Delete” from the pop-up menu.

**Tip:** The entire row or column need not be selected to insert or delete rows or columns, only cells representing the number of rows or columns you desire to have Word insert or delete. However, the technique / habit of highlight all of the cells reinforces what will be inserted or deleted before the action is invoked.

**Word Table Formulas**

Microsoft Word tables have their own formulas within the “Layout” toolbar and the “Data” tab which are only accessible with the Word table is selected. Word formulas do not follow the same structure as Excel, as seen in the screen print of the “Formula” dialog box. And once a formula has been “written” it cannot be “read” in a formula or data entry window like Excel. Word table formulas are done similar to Excel formulas in that they use cell references of columns and rows. The upper left most cell is cell A1, the cell to its right is B1, the cell below cell A1 is A2 and so on. In a Word table though the formula to add the contents of cells B2, B3, and B4 is “=SUM(b2,b3,b4)” and the formula to multiply the contents of cells C2, C3, and C4 is =PRODUCT(d2,d3,d4). Notice that the operation is controlled by the leader – Sum or Product and that the cell references are separated by commas, not attached to each other by math operatives such as the + or * symbols. The following table contains the formula =SUM(b2,b3,b4) in cell B5 and it adds the rows 2 through 4 into cell B5, the formula =AVERAGE(c2,c3,c4) in cell C5 and it calculates the average of the values within cells C2, C3, and C4 into cell C5, and the formula =PRODUCT(d2,d3,d4) in cell D5 which multiplies the value in cell D2 by the value in cell D3 and the product of that operation by the value in cell D4 and places the final product in cell D5. These mathematical operations statements are entered in the “Formula” window of the “Formula” dialog box, not in the table itself as Excel’s direct entry process.

<table>
<thead>
<tr>
<th></th>
<th>A1</th>
<th>B1</th>
<th>C1</th>
<th>D1</th>
</tr>
</thead>
<tbody>
<tr>
<td>A2</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>A3</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>A4</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>A5</td>
<td>9</td>
<td>4</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>A6</td>
<td>Sum</td>
<td>Average</td>
<td>Product</td>
<td></td>
</tr>
</tbody>
</table>

Word formulas are not “live” like Excel when manual calculation is not invoked. That is, if you had access to this table and changed the value in cell B2 from 2 to 20, the value shown in cell B5 would not change.

**Note:** It is frequently easier to create the table within Excel and then copy and paste it into Word.
Excel Tables into Word

While Excel may be a major tool for accountants, communication of information is the key to success. Once an Excel worksheet is populated with data its presentation can be adjusted through hidden columns and rows, paste special, and other tools such as “look to” formulas from a specific area of the worksheet or a new worksheet to give clean presentation. However, this may not suit the complete requirement and the constraints of Excel may hinder the presentation. Much of the work presented within this text was accomplished by entering the data, such as an exercise or problem, into Excel, then highlighting the data, copying it through the keystrokes Ctrl-C, clicking the copy icon on the toolbar, or some other copy method. Then the data is pasted into Microsoft Word by selecting Word, placing the cursor into the appropriate area, the target zone, and using the keystrokes Ctrl-V, clicking the paste icon on the toolbar, or following some other paste command. Once placed in this manner, the data is “static” in nature. If the source within Excel changes, the data within Word will retain its original value without update.

From this point, the data is normally contained within a table which can be formatted as many other Word objects can be with borders, fill colors, fonts and sizing. To move this inserted object place your cursor near the top of the table and a square with a four headed arrow, as shown in the screen print will appear. When it does, click on it and the table will be selected. While the table is selected, it will highlight to emphasize the fact that it is selected. By right clicking on the highlighted table, you will be presented with a pop-up menu which has formatting options on it. While it is highlighted, you will see a new set of “blocks” or “cubes” appear in the ruler bar of Word. These blocks or cubes, as shown in the screen print, are the margin tools for the table. You can justify the table by clicking on the Word left, right, center, or fill justify buttons. You can also reposition and resize the table by dragging these margin tools left or right with your mouse.

Additionally, Excel and Word have the ability to paste the data as “linked” information from Excel into Word. With this feature, when the source data in Excel is updated, the Word data will be updated upon the next opening of the file Word file. This feature makes your data dynamic. Word of caution, while being a “really neat” feature, it may not be appropriate for all situations so its use needs to be appropriate. To link the data in Word back to the source in Excel, copy the data as previously explained from Excel, open Word and locate the target area within Word and follow the path Edit > Paste Special, then select Paste Link from the lower left side of the pop-up dialog box and select Microsoft Excel Worksheet Object in the “As” window. The data, as copied, is pasted into the document and linked back to its parent or source.

Reading the information below it becomes immediately apparent that its presentation is unclear and does not convey the complete data as words are chopped and lost.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>40,</td>
<td>Shares</td>
<td>$1</td>
<td>par value</td>
</tr>
<tr>
<td>$50</td>
<td>Amount</td>
<td>$12</td>
<td>rate per</td>
</tr>
</tbody>
</table>
If the cells in Excel’s source data are reformatted to increase their width, the “trimming” problem is resolved. But this may not be practical as resizing cells would affect the rest of the parent or source worksheet presentation. This trimming is because the cells are shown as they are in Excel and numerous empty cells were copied and pasted, that is, while all of the data has been entered into the cells, the data exceeded the cell width of the column and the Word page and flowed into the areas of other columns. By copying and pasting the link with a smaller range of cells, the presentation is:

- 40,000 shares purchased
- $1 par value per share
- $50,000 amount contributed to RAS, Inc for the shares
- $125 rate per flight hour flown

Once pasted through the linking operation you can select the data in Word and add additional formatting to it as mentioned earlier without it affecting the source data but that capability is limited. Fill, borders, and font coloring from the toolbar are the easiest to invoke. This is done below.

<table>
<thead>
<tr>
<th>40,000</th>
<th>shares purchased</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1</td>
<td>par value per share</td>
</tr>
<tr>
<td>$50,000</td>
<td>amount contributed to RAS, Inc for the shares</td>
</tr>
<tr>
<td>$125</td>
<td>rate per flight hour flown</td>
</tr>
</tbody>
</table>

The copied and linked blocks can be moved around once placed by selecting the matrix of linked cells and then moving the tab markers on the index markers.
Chapter 18

TEXAS INSTRUMENTS
BA II PLUS

Chapter Outline

Texas Instruments BA II Plus Basics
Days Between Dates With The BA II Plus
Storing Values In The BA II Plus
Balloon Payments With The BA II Plus
Time Value Of Money With The BA II Plus
Present Value Of A $1 With The BA II Plus

Present Value Of An Annuity Of $1 With The BA II Plus
Future Value Of An Annuity Of $1 With The BA II Plus
Other BA II Plus Functions

Texas Instruments BA II Plus Basics

The Texas Instruments TI BA II Plus Advanced Business Analyst Calculator is a powerful tool that, if learned, can greatly assist you in your academic endeavors, accounting, financial, and business career. The BA II Plus has an extensive manual and many features, only a few will be addressed here.

First, the BA II Plus default for significant digits displayed is two shown as “0.00”. In most academic, accounting, financial, and business situations four or five significant digits are appropriate. And, when the requirement is less, the few extra digits displayed can easily be ignored. They will also be hidden if the BA II Plus needs more display room for whole numbers. To set or change the number of decimal places displayed in the BA II Plus’ display follow these steps:

1. Turn the BA II Plus on by pressing and releasing the “On/Off” button on the upper right corner of the key pad.
2. Press and release the yellow “2nd” key once. This key is in the first column of the second row.
3. Press and release the “Format” key. This is in yellow text above the “.” (period) key in the center of the bottom row. The yellow text above the key is used since you are in the “2nd” keyboard option as selected in step 2.
4. Press and release the “4” key, if four significant digits are desired, or, press any number from 0 through 8.
5. Press “CE/C” on the lower left corner of the keyboard to clear the display and return to normal operations.
6. Press “CE/C” on the lower left corner of the keyboard to clear the display and return to normal operations.
7. Now test the calculator, if you chose “4” as the significant digits, dividing 0.025 by 30 is actually 0.000833333…. When the BA II Plus is asked for this calculation while set to four significant digits the response should be “0.0008” since the trailing 3s round down and therefore, “off” the display. This value is still held in memory, without rounding, for future calculations. Multiply the display by 100,000 and the result should be 83.3333 – demonstrating that the non-displayed values are not lost.
8. Now divide 0.025 by 26. The BA II Plus should return “0.0010” while the actual value is 0.00096154 and it has been rounded up to “0.0010”. Multiply the display by 100,000 and the result should be “96.1538” – again demonstrating that the non-displayed values are not lost.

Second, the BA II Plus comes defaulted to compute the time value of money with monthly payments and interest compounding – set for car dealers and real estate agents. In the academic, accounting, financial, and business world, interest is frequently compounded in daily, monthly, quarterly, semi-annual, and annual terms. To insure that the BA II Plus will handle most of these options without getting them confused it is recommended that you set the payments and compounding periods (P/Y = Payments per year and C/Y = Compounding periods per year) to “1” so that you can control the payment and compounding periods as follows:

1. Turn the BA II Plus on by pressing and releasing the “On/Off” button on the upper right corner of the key pad.
2. Press and release the yellow “2nd” key once. This key is in the first column of the second row.
3. Press and release the “P/Y” key, this text is shown above the “I/Y” key on the third row in the second column. The yellow text above the key is used since you are in the “2nd” keyboard options as selected in step 2.
4. The display should show “P/Y=” and a value such as “12”. Enter “1” and then press the “Enter” key.
5. Press the up arrow or down arrow on the first row in the third or fourth column.
6. Check the value of “C/Y” and insure that it is also “1”. If it is not, enter “1” and then press the “Enter” key.
7. Press “Clear” to return to the normal operations mode of the calculator.

As a test, you are going to determine the payment for a $35,000 vehicle, the loan term is 60 months, the interest is 6.9% annually and payments are made monthly. The BA II Plus time value of money keys are the five keys in the third row labeled “N” for number of periods, “I/Y” for the interest rate, “PV” for the present value, “PMT” for payments, and “FV” for future value.

**Tip:** When using the time value of money function on the calculator develop the habit of entering values in all “fields” from left to right or right to left even if that value is “0” (zero). This should preclude any old values from entering the equation unexpectedly.

For the example loan, enter 60 into the keypad and press and release the “N” key in the first column of the third row. Then enter 6.9% by typing in 6.9 then press and release the division (÷) key and type in 12 followed by the equal sign. This provides the period interest rate (6.9 / 12) of 0.5750. Enter this into the interest field by pressing the “I/Y” key in the second key in the third row.

**Clue:** “I/Y” converts the value input into a percentage so had you entered 6.9%/12 or 0.00575, the final calculation will be off.

Type in the $35,000 as 35000 and press and release the “PV” key, the center key in the third row. Since the object is to compute payment (PMT), type in “0” (zero) and press the “PMT” or payment key, the key in the fourth column of the third row. This will preclude any residual value from carrying over. Since there is no balloon payment on this loan, type in “0” (zero) and press the “FV” or future value key. Now press and release the “CPT” (compute) in the upper left corner of the keyboard. Now press and release the “PMT” or payment key. The BA II Plus should calculate -691.3918 indicating that for only $691.39 a month you can have that used, minimum option, SUV hidden on the back lot.

**Clue:** The asterisks appearing above the value of the payment indicates that this value is computed, not inputted by you.

The payment is negative since the present value or principal was entered as a positive indicating a cash or value in to you. If you wanted true discipline, you would enter the present value (in this example)
as positive number since it was value inflow to you and cash outflow in payments will be negative. However, if you were the used car salesman and wanted discipline, in the data enter, type in 35000 and then press the +/- key just inside the bottom right corner of the keyboard. This will convert a positive display to a negative value (or a negative value to a positive value). Rerun the calculation simply by placing a -35000 (negative) into the present value field and recompute the payment. This time the BA II Plus should show 691.3918, a positive value since the present value is negative and it indicates the payments will be cash or value inflows.

Annuities can be paid at the beginning or the end of the payment period. To make this change there is a “Toggle” function – the same keystrokes once will place it in the opposite mode of what it was in. So if you run this set of keystrokes from the default of “END,” the BA II Plus will be switched to “BGN” or “Beginning” for annuity due. If it was in “BGN” for annuity due, the process will switch it to an ordinary annuity or one paid at the end of the period. The keystrokes for this toggle on the BA II Plus are:

1. Turn the BA II Plus on by pressing and releasing the On/Off button on the upper right corner of the key pad.
2. Press and release the yellow “2nd” key once. This key is in the first column of the second row.
3. Press and release the “BGN” key, this text is shown above the “PMT” key on the third row in the fourth column. The yellow text above the key is used since you are in the “2nd” keyboard options as selected in step 2.
4. The display should show “END” or “BGN” to indicate which mode you are currently in. If this is the mode you desire, press and release the “CE/C” key on the lower left corner of the key pad to cancel the toggle process.
5. If you want to change from “End” to “Beginning” or from “Beginning” to “End,” press and release the “2nd” key once, from this intermediate position.
6. Then press and release the “SET” key once. This key is in the second column of the first row. The display will change from “END” to “BGN” or from “BGN” to “END.”
7. Press and release the “C/CE” key to return to the normal operations of the BA II Plus.

Clue: While the BA II Plus is in the “Annuity Due” mode – “BGN” indicating that the annuity payment is due at the beginning of the period there will be displayed near the top and towards the right side of the display. If the BA II Plus is in the “END” there will be no additional display items as this is the default mode.

Days Between Dates with the BA II Plus

The Texas Instrument BA II Plus will calculate the days between dates. A very nice function for accounts receivable and accounts payable aging as well as determining issues such as interest payments made or received every 30 days. To determine the days between the invoice date of January 24, 2012, and the date of March 15, 2012:

1. Turn the BA II Plus on by pressing and releasing the On/Off button on the upper right corner of the key pad.
2. Press and release the yellow “2nd” key once. This key is in the first column of the second row.
3. Press and release the “DATE” key, this text is shown above the “1” key on the key pad. The yellow text above the key is used since you are in the “2nd” keyboard options as selected in step 2.
4. The display should show “DT1=” for Date 1. To enter the date of January 24, 2012, enter “01.2408” and press and release the “ENTER” in the second column of the first row. The display should show “DT1= 1 - 24 - 2012”.
5. Use the up or down arrows in the third and fourth columns of row one to display the “DT2=” screen. This screen may contain a date from previous work or a default date. Enter March 15,
2012, as “03.1508” and press and release the “ENTER” key. The display should show “DT2= 3 - 15 – 2012”.

6. Use the up and down arrows in the third and fourth columns of row one to display the “DBD=” screen. This screen may show a value from a previous computation. Press the “CPT” button in the first column of the first row. The BA II Plus should display “DBD= 51.000”, days between dates is 51.

**Hint:** Each time a new date is entered the “CPT” process must be run again to generate the correct number of days between dates.

You can also calculate the date a note, such as a 120-day note, issued January 24, 2012, is due. To do this:

1. Turn the BA II Plus on by pressing and releasing the On/Off button on the upper right corner of the key pad.
2. Press and release the yellow “2nd” key once. This key is in the first column of the second row.
3. Press and release the “DATE” key, this text is shown above the “1” key on the key pad. The yellow text above the key is used since you are in the “2nd” keyboard options as selected in step 2.
4. The display should show “DT1=” for Date 1. To enter the date of January 24, 2012, enter “01.2408” and press and release the “ENTER” in the second column of the first row. The display should show “DT1= 1 - 24 - 2012”.
5. Use the up or down arrows in the third and fourth columns of row one to display the “DBD=” screen. This screen may contain a value from previous work or a default value. Enter “120” and then press and release the “ENTER” key. The display should show “DBD= 120”.
6. Use the up and down arrows in the third and fourth columns of row one to display the “DT2=” screen. This screen may show a date from a previous computation or a default date. Press the “CPT” button in the first column of the first row. The BA II Plus should display “DT2= 5 – 23 – 2012”. The date a 120-day note issued on January 24, 2012, would be due.

**Tip:** Entering the “DBD” (Days between dates) value as a negative will generate a valid response for a earlier date. If you wanted a 180-day note payable on June 30, 2012, enter “DT1” as “06.3008” and “DBD” as “-180” and then compute “DT2” to determine that the note should be issued January 02, 2012, displayed as “Mon = 1-02-2012”.

**Storing Values in the BA II Plus**

A major asset of a professional calculator like the BA II Plus is the ability to store data. In the example you are issuing 10 year bonds. The bonds carry a face interest rate of 8% while the market is 7%. Interest is paid semi-annually. The issue consists of 1,500 bonds with face values of $1,000 each. Your challenge is to identify the present value of the interest payments, the present value of the bonds, and the present value of the bond issue. The “Store” and “Recall” capability are major tools in this task.

First, determine the face value of the bonds – 1,500 bonds × $1,000 = $1,500,000 and use the keystrokes “STO” (Store) near the bottom of the calculator in the first column, followed by pressing and releasing the “1” key. This will store $1,500,000 into the Storage Register 1.

Now you will address the present value of the bonds.

While the $1,500,000 is still in the display, press and release the “FV” (Future value) key to record this value into that field.

Type in “0” (zero) and press and release the “PMT” (Payment) button. It is recommended that you develop a discipline of entering values in all the TVM (Time value of money) fields from left to right or right to left to ensure previous values do not enter your current calculation. This field will remain at “0” for this calculation.
Type in “0” (zero) and press and release the “PV” button. It is recommended that you develop a
discipline of entering values in all the TVM (Time value of money) fields from left to right or right to left
to ensure previous values do not enter your current calculation. This will be your solve value in a couple
of steps.

Type in the market interest rate as a whole number – “7” then press and release the ÷ (division) key,
enter “2” and press and release the equal sign to properly state the annual (stated) interest rate a period
of interest rate of 3 ½%. Press and release the “I/Y” (Interest) key to enter the value into the interest field.

Type in “10”, the life of the bonds in years, then press and release the “×” (Multiply) key in the right
most column of the calculator followed “2”, the number of interest periods per year by the “=” (Equal)
sign. The display should read “20”. Press and release the “N” (Period) key to enter this value into the
“Number of periods” or “life” register.

Now press and release the “CPT” (Compute) key in the upper, left corner of the calculator followed
by the “PV”(Present value) key in the center of the TVM row. The BA II Plus should respond with “PV=
-753,848.8266”. This is the present value of the bonds.

Press and release the “STO” button in the first column near the left, bottom corner followed by the
“2”. You have now stored that value into the second storage register.

To solve the present value of the interest payments, enter “0” (zero) into the BA II Plus and press and
release the “FV” (Future value) key.

Press and release the “RCL” (Recall) key, near the left bottom corner of the key pad, followed by the
“1” key. The value stored in the first memory register, “1,500,000” should appear in the display.

Press and release the “×” (Multiply) key followed by the “(“ (Open parenthesis) then press and
release the “8”, the face interest rate, press and release the “%” (Percentage) key, followed by the ÷
(Division) followed by “2” and then the “)” parenthesis. The display will show “0.04”. This is the period
interest rate of the face or stated interest rate (8% / 2). Since you already have “1,500,000” and “×”
hovering in cyberspace from the earlier step, press “=” (Equal) and the BA II Plus should respond with
60,000.00. This is your period interest payment in cash.

Press and release the “STO” (Store) key and then the “3” key to place this value in the third storage
register.

The $60,000.0000 value should still be in the display. Press and release the “PMT” (Payment) key.

Press and release the “CPT” key followed by the “PV” (Present value) key and the BA II Plus should
display “PV= -852,744.1981”, the present value of the interest payments.

The “N” (Periods) and “I/Y” fields were entered in your first calculation for the present value of the
bonds and you have not changed them in this short period of time so reentry was not necessary.

Press and release the “STO” (Store) key followed by the “4” to store this value in the fourth memory
register.

The present value of the bonds is the sum of: “CE/C” to clear the display and working register to
preclude bring in an unintended value, “RCL” “2”, and “-753,848.8266” should appear. Press and release
the “+” (Plus) key followed by “RCL” (Recall) and then the “4” key and the display should read “-
852,744.1981”.

Press the “=” (Equal) sign to display the sum of these two numbers – “-1,606,593.025”. Since your
display was set to four significant digits but the BA II Plus needed one of those places to display a whole
number it took it. This value is the present value of the bonds.

While the “-1,606,593.025” is in the display, press and release the “STO” (Store) button followed by
the “5” to store this value.
To determine the discount, recall the value in memory register 1 by “RCL” “1” and ADD these numbers as one is a positive value while the other is a negative value, the premium of “$106,593.0248” on this bond issue. Store this value in memory register by pressing “STO” followed by “6”.

Now, the bond issue is stored in “1”, the present value of the bonds is stored in “2”, the cash interest payments are stored in “3”, the present value of the interest payments is stored in “4”, the present value of the bond issue is stored in “5”, and the premium is stored in “6”.

The memory registers can be “overwritten” or “rewritten” by simply “STO” and the specific registry number. All the memory registers can be cleared at one time by the keystrokes “2ND” then “MEM” (the text above the “0” key), the “2ND” again followed by the “CE/C” key. The valid registers are from “0” (zero) through “9” (nine).

**Balloon Payments with the BA II Plus**

The Texas Instruments BA II Plus respects cash and value inflows and outflows. If the present value (PV) (or principal) entered is positive indicating cash inflows or value inflows to you, then the payment (PMT) or future value (FV) will be an outflow or a negative value. However, for most uses you realize that you are getting a loan or making a loan and enter the present value (PV) as positive to save keystrokes and simply read “−691.3918” as “$691.39” as your payment or cash outflow. However, assume that in this loan example, you are buying a $35,000 vehicle, the loan term is 60 months, the interest is 6.9% annually, and you are going to make a balloon payment of $5,000 at the end of the loan with and payments are made monthly. “N” or number of periods is (5 years × 12 months) 60, “I/Y” or interest is 6.9 /12 months or 0.5750, “PV” or present value is 35000, and “PMT” or payment is 0 as a matter of discipline. Now cash flow representation is important. Since the balloon payment is cash flow out and the principal is cash flow in, if the principal is positive, then the balloon payment or “FV” – future value, must be negative. If you had entered the 35000 as a negative number representing cash flow or value flow out, then the balloon payment entered in “FV” must be positive. When 5000 is entered into the BA II Plus you will need to press the “+/−” key near the bottom right corner of the key pad to convert the positive value to negative -5000. Now press and release the “FV” key to enter the negative 5000 into that field. Now press “CPT” the key in the first column of the first row and then the “PMT” or payment key. The BA II Plus should return -621.13716. Without the balloon payment your payment was $691.3918, with the balloon payment your payment is only $621.3716. Had the balloon payment been put in as a positive number matching the “PV” or present value field, the payment would be -761.4121 or $761.4121. Which fails a basic logic evaluation of lower your payment level by the balloon payment.

**Time Value of Money with the BA II Plus**

The Texas Instrument BA II Plus utilizes the same field identities as the accounting and financial professionals in the calculation of the time values of money. On the third row of keys of the BA II Plus from left to right (column 1 through column 5) you are presented with:

“N” for the number of periods for the event. If you set your BA II Plus up as earlier discussed with “1” in the “P/Y” and “C/Y” parameters, this value is easy to determine. If the loan is for 5 years and payments as well as interest is compounded monthly, enter the value of 5 into the BA II Plus then press the “×” (times) key in the right column of the BA II Plus, then press “12” followed by the “=” (equal sign). The display will now indicate “60.000” representing the periods of the loan, in this example, months. Now press and release the “N” or number of periods key in the first column of the second row.

“I/Y” is interest per year and, if the BA II Plus has been set up as previously discussed, this is now interest per period. Since it is interest per period and the interest rate is provided as annually, enter the interest rate of 6.9 and DO NOT PRESS THE “6” KEY. Now divide this value by the same factor as you multiplied the term by – 12. So press and release the “÷” (divide) key followed by the “=” (equal
sign). The display should show 0.5750. Press and release the “I/Y” key to enter the value into the “I” or interest field.

“PV” is the present value field. For this example you will remain with the basic loan and conform to discipline. Since the cash flow or value is in, it will be positive, so enter 35000 into the BA II Plus and press and release the “PV” key in the third column of row three.

“PMT” is the payment field. Since you are trying to solve for payment and want to ensure every field’s value, enter “0” (zero) into the BA II Plus and press the “PMT” key.

“FV” is the future value field. For this example you will retain your balloon payment issue. Since the “PV” or present or principal value is positive, this must be negative indicating that you are making the payment, representing cash flows out, at the end of the loan. Enter 5000 into the BA II Plus then press and release the “+/−” key near the bottom right corner of the BA II Plus. The display changes to -5,000. Press and release the “FV” future value key in the fifth column of the third row.

Now solve for “PMT” or payment by pressing the “CPT” (Compute) button in the upper left corner of the BA II Plus followed by pressing and releasing the “PMT” (payment) key and the BA II Plus should respond with -621.3716 indicating our payment is $621.3716.

Present Value of a $1 with the BA II Plus
You need the present value of $1 with 15 periods at 15% interest and no payments, the fields would be:

N = 15
I/Y = 15
PV = 0 as a matter of discipline to ensure the values in the BA II Plus.
PMT = 0 as a matter of discipline to ensure the values in the BA II Plus.
FV = 1
Then “CPT” and “PV.” The response should be -0.1229 which can be checked with printed present value table for validity.

To find the present value of $150 with 15 periods at 15% interest and no payments, the fields would be:

N = 15
I/Y = 15
PV = 0 as a matter of discipline to ensure the values in the BA II Plus.
PMT = 0 as a matter of discipline to ensure the values in the BA II Plus.
FV = 150
Then “CPT” and “PV.” The response should be -18.4342 which can be checked with printed present value table for validity by multiplying $150 × 0.1229 = $18.4350 and the difference is a rounding factor.

Future Value of a $1 with the BA II Plus
You need the future value of $1 with 15 periods at 15% interest and no payments, the fields would be:

N = 15
I/Y = 15
PV = 1
PMT = 0 as a matter of discipline to ensure the values in the BA II Plus.
FV = 0 as a matter of discipline to ensure the values in the BA II Plus.
Then “CPT” and “FV.” The response should be -8.1371 which can be checked with printed future value table for validity.

To find the future value of $150 with 15 periods at 15% interest and no payments, the fields would be:

N = 15
I/Y = 15
PV = 150
PMT = 0 as a matter of discipline to ensure the values in the BA II Plus.
FV = 0 as a matter of discipline to ensure the values in the BA II Plus.

Then “CPT” and “FV.” The response should be -1,220.5592 which can be checked with printed future value table for validity by multiplying $150 \times 8.1371 = 1,220.5650 and the difference is a rounding factor.

**Present Value of an Annuity of a $1 with the BA II Plus**

You need the present value of an annuity of $1 with 15 periods at 15% interest and no future value. The payments are to be made at the end of the period. The fields would be:

- N = 15
- I/Y = 15
- PV = 0 as a matter of discipline to ensure the values in the BA II Plus.
- PMT = 1
- FV = 0 as a matter of discipline to ensure the values in the BA II Plus.

Then “CPT” and “PV.” The response should be -5.8474 which can be checked with printed present value of an annuity table for validity.

To find the present value of an annuity of $150 with 15 periods at 15% interest and no future value. The payments are to be made at the end of the period. The fields would be:

- N = 15
- I/Y = 15
- PV = 0 as a matter of discipline to ensure the values in the BA II Plus.
- PMT = 150
- FV = 0 as a matter of discipline to ensure the values in the BA II Plus.

Then “CPT” and “PV.” The response should be -877.1055 which can be checked with printed present value of an annuity table for validity by multiplying $150 \times 5.8474 = 877.1100 and the difference is a rounding factor.

For the present value of an annuity due, change the BA II Plus into “BGN” or “Beginning” mode (due) by utilizing the keystrokes:

1. Press and release the yellow “2nd” key once. This key is in the first column of the second row.
2. Press and release the “BGN” key, this text is shown above the “PMT” key on the third row in the fourth column. The yellow text above the key is used since you are in the “2nd” keyboard options as selected in step 2.
3. The display should show “END” or “BGN” to indicate which mode you are currently in. If this is the mode you desire, press and release the “CE/C” key on the lower left corner of the key pad to cancel the toggle process.
4. If you want to change from “End” to “Beginning,” press and release the “2nd” key once, from this intermediate position.
5. Then press and release the “SET” key once. This key is in the second column of the first row. The display will change from “END” to “BGN.”
6. Press and release the “C/CE” key to return to the normal operations of the BA II Plus.
7. You will have a “BGN” text string in the upper right area of the display while in this mode. Recomputing the example as an annuity due should result in a value -1,008.6713.

The steps of 1 through 6 are “toggles.” Accomplishing them again should result in a “BGN” in step 2 and “END” in step 5.
Future Value of an Annuity of a $1 with the BA II Plus

You need the future value of an annuity of $1 with 15 periods at 15% interest and payments made at the end of the periods – ordinary annuity, the fields would be:

- \( N = 15 \)
- \( I/Y = 15 \)
- \( PV = 0 \) as a matter of discipline to ensure the values in the BA II Plus.
- \( PMT = 1 \)
- \( FV = 0 \)

Then “CPT” and “FV.” The response should be -47.5804 which can be checked with printed future value of an annuity table for validity.

To find the future value of an annuity of $150 with 15 periods at 15% interest and payments are made at the end of the periods, the fields would be:

- \( N = 15 \)
- \( I/Y = 15 \)
- \( PV = 0 \) as a matter of discipline to ensure the values in the BA II Plus.
- \( PMT = 150 \)
- \( FV = 0 \)

Then “CPT” and “FV.” The response should be -7,137.0616 which can be checked with printed future value of an annuity table for validity by multiplying $150 × 47.5804 = 7,137.0600 and the difference is a rounding factor.

For the future value of an annuity due, change the BA II Plus into “BGN” or “Beginning” mode (due) by utilizing the keystrokes:

1. Press and release the yellow “2nd” key once. This key is in the first column of the second row.
2. Press and release the “BGN” key, this text is shown above the “PMT” key on the third row in the fourth column. The yellow text above the key is used since you are in the “2nd” keyboard options as selected in step 2.
3. The display should show “END” or “BGN” to indicate which mode you are currently in. If this is the mode you desire, press and release the “CE/C” key on the lower left corner of the key pad to cancel the toggle process.
4. If you want to change from “End” to “Beginning,” press and release the “2nd” key once, from this intermediate position.
5. Then press and release the “SET” key once. This key is in the second column of the first row. The display will change from “END” to “BGN.”
6. Press and release the “C/CE” key to return to the normal operations of the BA II Plus.
7. You will have a “BGN” text string in the upper right area of the display while in this mode. Recomputing the example as an annuity due should result in a value -8,207.6209.

The steps of 1 through 6 are “toggles.” Accomplishing them again should result in a “BGN” in step 2 and “END” in step 5.

Other BA II Plus Functions

There are other BA II Plus functions explained in the Texas Instrument BA II Plus manuals and documents. Some of these include the determination of the present value of a bond issue through a single math function, net present value, internal rate of return, depreciation functions, and breakeven points.
Chapter 19

HEWLETT–PACKARD

HP–12C

Chapter Outline

Hewlett-Packard HP-12C Basics
Days between Dates with the HP-12C
Storing Values in the HP-12C
Balloon Payments with the HP-12C
Time Value of Money with the HP-12C
Present Value of a $1 with the HP-12C

Hewlett-Packard HP-12C Basics

Hewlett-Packard produces the HP-12C Programmable Financial Calculator, a calculator for the professional accountant, financial analysts, and business users. This calculator uses “RPN” or “Reverse Polish Notation” logic. With this logic as an operating system to add 2 and 2 together and get the result of 4, the keystrokes are:

“2” – The display shows “2”.
“Enter” – The display shows 2.0000. (If the display is set to 4 significant digits.)
“2” – The display shows “2”.
“Plus” – The display shows 4.000. (If the display is set to 4 significant digits.)

This is slightly different than the

“2” – The display shows “2”.
“+” – The display shows 2.0000. (If the display is set to 4 significant digits.)
“2” – The display shows “2”.
“=” – The display shows 4.000. (If the display is set to 4 significant digits.)

of calculators like the BA II Plus of Texas Instruments. When mastered, the HP-12C can greatly assist you in your academic endeavors, accounting, financial, and business career. The HP-12C has an extensive manual and many features, only a few will be addressed here. The same basic features will be addressed for the Texas Instrument BA II Plus (Business Analyst II Plus) in other chapters.

**Hint:** There is no “=” (equal sign) on the HP-12C calculator.

First, the HP-12C default for significant digits displayed is four shown as “0.0000”. In most academic, accounting, financial, and business situations four or five significant digits are appropriate. And, when the requirement is less, the few extra digits displayed can easily be ignored. They will also be hidden if the HP-12C needs more display room for whole numbers. To set or change the number of decimal places displayed in the HP-12C’s display follow these steps:
1. Turn the HP-12C on by pressing and releasing the black “ON” button on the lower left corner of the key pad. This is a “toggle” switch, pressing it while the HP-12C is on will turn the calculator off.

2. Press and release the yellow “F” (Function) key once. This key is just to the right of the “ON” on the bottom row.

3. Press and release any of the numerical numbers from “0” through “9”. The display changes to the requested display immediately. Any values current in the display are redisplayed in the new format.

4. Now test the calculator, if you chose “4” as the significant digits, dividing 0.025 by 30 is actually 0.000833333…. This is done by the keystrokes “0.025”, “ENTER,” “30”, “÷” and the display should show “0.0008” when the HP-12C is asked for this calculation while set to four significant digits. The trailing 3s round down and therefore, “off” the display. This complete value to some significant number of digits is still held in memory, without rounding, for future calculations. Multiply the display by 100,000 through the keystrokes “100000” and then “X” (Multiply) and the results should be “83.3333” – demonstrating that the non-displayed values are not lost.

5. Now divide 0.025 by 26 with the keystrokes “0.025”, “ENTER,” “26”, “÷” and the display should show “0.0010” when the HP-12C is asked for this calculation while set to four significant digits. The HP-12C should return “0.0010” while the actual value is 0.00096154… and it has been rounded up to 0.0010. Multiply the display by 100,000 through the keystrokes “100000” and then “X” (Multiply) and the result should be 96.1538 – again demonstrating that the non-displayed values are not lost.

Second, the HP-12C gives you a quick way to support the time value of money calculations in numerous periodicities as well as annual statements and monthly interest and payments. No adjustments or setting need be made. These will be discussed in detail later.

**Tip:** When using the time value of money function on the calculator develop the habit of entering values in all “fields” from left to right or right to left even if that value is “0” (zero). This should preclude any old values from entering the equation unexpectedly.

Enter the following data through the keystrokes – enter “60” in the “n” field of the time value of money register of the HP-12C by typing in “60” into the display and pressing and releasing the “n” key in the upper left corner of the HP-12C. Pressing the “ENTER” key is not required since you will not be using it for a “keyboard” operation. Type in “6.9” and press and release the “ENTER” key, the type in “12” followed by the “÷” (Division) key. The display should read “0.5750”. Press and release the “i” (Interest) key to record this value as the period interest. Type in “35000” and press the “PV” (Present value) key to enter the loan value into the present value field. Type in “0” and press and release the “PMT” (Payment) field. As a matter of discipline, entering a value, even “0” in the fields or register from left to right or from left to right will preclude an unintended value from entering the calculation. Type in “0” and press and release the “FV” (Future value) field. Now press the “PMT” key and the HP-12C will calculate the payment for the loan as “-691.3918”.

The HP-12C will respect the presentation of cash flow and value flow within the time value of money (TVM) calculations. If the “PV” (Present value or principal value) is entered as a positive number indicating cash flows in or value flows in, the “PMT” (Payment) and / or “FV” (Future value” will be negative indicating cash flows out or value flows out. If “PMT” (Payment) is entered as a positive value indicating cash flows in or value flows in, then computed “PV” and / or “FV” (Future value) will be negative indicating cash or value flows in the opposite direction - out. If you wanted true discipline, you can enter the present value as positive since it was value inflow to you and cash outflow in payments will be negative. However, if you were the used car salesman and wanted discipline, in the data enter, type in “35000” and then press the “CHS” (Change sign) key in the fifth column of the first row. This will
convert a positive display to a negative value (or a negative value to a positive value). Rerun the calculation simply by placing a “-35000” (negative) into the present value field and recompute the payment. This time the HP-12C should show “691.3918”, a positive value indicating cash flows or value flows in since the present value is negative, representing cash flows or value flows out.

Annuities can be paid at the beginning or the end of the payment period. To make this change there are two buttons on the HP-12C. The “Beginning” button labeled “BEG” in blue font on the slanted face of the “7” and the “End” button labeled “END” in blue font on the slant face of the “8”. To change to “Annuity Due” or “Beginning,” press and release the blue “g” key in the lower left corner of the HP-12C and then press the “BEG” (Beginning / 7) key since you are in the “Blue text options” after pressing and releasing the blue “g” key. At this time the HP-12C will display “BEGIN” in the center, bottom of its display. To enter an “Ordinary Annuity” where payments are made at the end of the period, press and release the blue “g” key in the lower left corner of the HP-12C and then press the “END” (Ending / 8) key since you are in the “Blue text options” after pressing and releasing the blue “g” key. At this time the HP-12C display of “BEGIN” in the center, bottom of its display will disappear indicating that it is in the default mode of “Ordinary Annuity.”

**Clue:** While the HP-12C is in the “Annuity Due” mode – “BEGIN” indicating that the annuity payment is due at the beginning of the period there will be displayed in the center, bottom of the display. If the HP-12C is in the “END” there will be no additional display items as this is the default mode.

**Days Between Dates with the HP-12C**

The Hewlett-Packard HP-12C will calculate the days between dates. A very nice function for accounts receivable and accounts payable aging as well as determining issues such as interest payments made or received every 30 days. To determine the days between the invoice date of January 24, 2012, and the date of March 15, 2012:

1. Turn the HP-12C on by pressing and releasing the “ON” button on the bottom left corner of the key pad.
2. Press the blue “g” key in the third column of the bottom row followed by the “M.DY” (“5” / “M.DY”) key, in the eighth column of the second row from the top. This sets the HP-12C to a date format of “01.242012” for January 24, 2012. Your instruction manual has other date formats available.
3. Type in the first date, January 24, 2012, as “01.242012” and press “Enter.”
4. Type in the second date of March 15, 2012, as “03.152012.”
5. Press and release the blue “g” key followed by the “▲DYS” (EEX / ▲DYS) in the sixth column of the second row from the top. This key reads as “Delta in days” with “▲” being an engineering symbol for “delta” or “Degree of change.” The “▲DYS” is in blue font on the slant face of the key since you are in the “g” (blue) key board options. The HP-12C should respond with “51” days between these two dates.

You can also calculate the date a note, such as a 120-day note, issued January 24, 2012, is due. To do this:

1. Turn the HP-12C on by pressing and releasing the “ON” button on the lower left corner of the key pad.
2. Press the “g” (blue) key in the third column of the bottom row followed by the “M.DY” (“5” / “M.DY”) key, in the eighth column of the second row from the top. This sets the HP-12C to a date format of “01.242012” for January 24, 2012. Your instruction manual has other date formats available.
3. Type in January 24, 2012, as “01.242012” and press “Enter.”
4. Type in “120” into the HP-12C. Do not hit the “ENTER” key.
5. Press the “g” (blue) key in the third column of the bottom row followed by the “DATE” (“CHS” / “DATE”) key, in the sixth column of the top row. The HP-12C should respond with “5,23,2012”.
3” indicating the note will be due on May 23, 2012, which is a Wednesday as indicated by the trailing “3”.

**Tip:** Entering the days between dates value as a negative will generate a valid response for a earlier date. If you wanted a 180-day note payable on June 30, 2012, enter “06.302012” and press “ENTER.” Then enter “120” and press the “CHS” (change sign) key in the sixth column of the top row. The display will show “-120”. Press the blue “g” key followed by the “Date” key (“CHS” / “DATE”) again. The HP-12C will respond with “3,02,2012 5” indicating that the note should be issued Friday, March 2, 2012.

**Storing Values in the HP-12C**

A major asset of a professional calculator like the HP-12C is the ability to store data. In the example you are issuing 10 year bonds. The bonds carry a face interest rate of 8% while the market is 7%. Interest is paid semi-annually. The issue consists of 1,500 bonds with face values of $1,000 each. Your challenge is to identify the present value of the interest payments, the present value of the bonds, and the present value of the bond issue. The “Store” and “Recall” capability are major tools in this task.

First, determine the face value of the bonds – 1,500 bonds × $1,000 = $1,500,000 by typing in “1500” and pressing and releasing the “Enter” key. Then type in “1000” and press and release the “×” (multiply) key. The display will show “1,500,000”. Now use the keystrokes “STO” (Store) near the bottom of the calculator in the fourth column, followed by pressing and releasing the “1” key. This will store $1,500,000 into the Storage Register 1.

Now you will address the present value of the bonds.

While the $1,500,000 is still in the display, press and release the “FV” (Future value) key to record this value into that field.

Type in “0” (zero) and press and release the “PMT” (Payment) button. It is recommended that you develop a discipline of entering values in all the TVM (Time value of money) fields from left to right or right to left to ensure previous values do not enter your current calculation. This field will remain at “0” for this calculation.

Type in “0” (zero) and press and release the “PV” button. It is recommended that you develop a discipline of entering values in all the TVM (Time value of money) fields from left to right or right to left to ensure previous values do not enter your current calculation. This will be your “solve” value in a couple of steps.

Type in the market interest rate as a whole number – “7” then press and release “ENTER” key, enter “2” followed by the ÷ (division) key. The display will properly state the annual (stated) interest rate a period of interest rate of 3 ½%. Press and release the “i” (Interest) key to enter the value into the interest field.

Type in “10”, the life of the bonds in years, then press and release the “ENTER” key followed by “2” and the “×” (Multiply) key in the right most column of the calculator. The display should read “20”. Press and release the “n” (Period) key to enter this value into the “Number of periods” or “life” register.

Now press and release the “PV” (Present value) key in the third column of the top row. The HP-12C should respond with “-753,848.8266”. This is the present value of the bonds.

Press and release the “STO” button in the fourth column of the bottom row followed by the “2”. You have now stored that value into the second storage register.

To solve the present value of the interest payments, enter “0” (zero) into the HP-12C and press and release the “FV” (Future value) key.
Press and release the “RCL” (Recall) key, in the fourth column of the bottom row of the key pad, followed by the “1” key. The value stored in the first memory register, “1,500,000” should appear in the display.

Press and release the “ENTER” key then enter “8” and press and release the “%” for the face interest rate in the fifth column of the second row from the top. The display should show “120,000.0000”. Now enter “0.5” indicating semi-annual interest payments. Press and release the “×” (multiply) key on the right side of the HP-12C. The display should show the cash interest payments of “60,000.0000”.

Press and release the “STO” (Store) key and then the “3” key to place this value in the third storage register.

The “60,000.0000” value should still be in the display. Press and release the “PMT” (Payment) key.

Press and release the “PV” (Present value) key and the HP-12C should display “-852,744.1981”, the present value of the interest payments.

The “N” (Periods) and “I/Y” fields were entered in your first calculation for the present value of the bonds and you have not changed them in this short period of time so reentry was not necessary.

Press and release the “STO” (Store) key followed by the “4” to store this value in the fourth memory register.

The present value of the bonds is the sum of: “RCL” “2”, “ENTER,” and “-753,848.8266” should appear. Press and release the “RCL” (Recall) key followed by pressing and releasing the “4” key and the display should read “-852,744.1981”.

Press the “+” (Plus) sign to display the sum of these two numbers – “-1,606,593.025”. Since your display was set to four significant digits but the HP-12C needed one of those places to display a whole number it took it away. This value is the present value of the bonds.

While the “-1,606,593.025” is in the display, press and release the “STO” (Store) button followed by the “5” to store this value.

To determine the premium or discount, recall the value in memory register 1 by “RCL” “1” and ADD these numbers as one is a positive value while the other is a negative value, the premium of “-106,593.025” on this bond issue. Store this value in memory register by pressing “STO” followed by “6”.

Now, the bond issue is stored in “1”, the present value of the bonds is stored in “2”, the cash interest payments are stored in “3”, the present value of the interest payments is stored in “4”, the present value of the bond issue is stored in “5”, and the premium is stored in “6”.

The memory registers can be “overwritten” or “rewritten” by simply “STO” and the specific registry number. All the memory registers can be cleared at one time by the keystrokes the yellow “f” key followed by the “Clear – Reg” key which is in the fifth column and the third row for the top which has white text of “CLX and orange/yellow text above it labeled “REG” which is under the “Gang title” of “Clear.” The valid registers are from “0” (zero) through “9” (nine).

**Balloon Payments with the HP-12C**

The Hewlett-Packard HP-12C (HP-12C) respects cash and value inflows and outflows. If the present value (PV) (or principal) entered is positive indicating cash inflows or value inflows to you, then the payment (PMT) or future value (FV) will be an outflow or a negative value. However, for most uses you realize that you are getting a loan or making a loan and enter the present value (PV) as positive to save keystrokes and simply read “-691.3918” as “$691.39” as your payment or cash outflow. However, assume that in this loan example, you are buying a $35,000 vehicle, the loan term is 60 months, the interest is 6.9% annually, and you are going to make a balloon payment of $5,000 at the end of the loan with and payments are made monthly. “N” or number of periods is (5 years × 12 months) “60”, “i” or interest is
“6.9 ENTER 12 ÷” or “0.5750”, “PV” or present value is “35000”, and “PMT” or payment is 0 as a matter of discipline. Now cash flow representation is important. Since the balloon payment is cash flow out and the principal is cash flow in, if the principal is positive, then the balloon payment or “FV” – future value, must be negative. If you had entered the 35000 as a negative number representing cash flow or value flow out, then the balloon payment entered in “FV” must be positive. When “5000” is entered into the HP-12C you will need to press the “CHS” key in the sixth column of the top row of the key pad to convert the positive value to negative “-5000”. Now press and release the “FV” key to enter the negative “5000” into that field. Now press “PMT” (Payment) the key in the fourth column of the top row. The HP-12C should return -621.13716. Without the balloon payment your payment was $691.3918, with the balloon payment your payment is only $621.3716. Had the balloon payment been put in as a positive number matching the “PV” or present value field, the payment would be -761.4121 or $761.4121. Which fails a basic logic evaluation of lower your payment level by the balloon payment.

**Time Value of Money with the HP-12C**

The Hewlett-Packard HP-12C (HP-12C) utilizes the same field identities as the accounting and financial professionals in the calculation of the time values of money. On the top row of keys of the HP-12C from left to right (column 1 through column 5) you are presented with:

“n” for the number of periods for the event. There is a way to turn years into months with the HP-12C. In the loan example the term is 5 years. Enter “5” into the HP-12C, then press the blue “g” key followed by the “12×”, which is the “n” key in the upper left corner of the key pad. By pressing the blue “g” key first you enter a secondary key pad which states “Take the input value and multiply it by 12” when you press the “n” key. The display will show “60”, the result of 5 years multiplied by 12 months per year. No additional settings or actions are required to take advantage of this function. If you press “RCL” (Recall) in the bottom row of the key pad followed by the “n” key you will see the value of “60”.

“i” is for interest for the event. The HP-12C is expecting interest in whole values so 6.9% is entered as “6.9”. If this is an annual interest rate and interest is compounded monthly you can enter the “6.9” followed by blue “g” key followed by the “12÷”, which is the “i” key in the second column of the upper row of the key pad. By pressing the blue “g” key first you enter a secondary key pad which states “Take the input value and divide it by 12” when you press the “i” key. The display will show “0.5750”, the result of 6.9(%) divided by 12 months per year. No additional settings or actions are required to take advantage of this function.

“PV” is the present value field. For this example you will remain with the basic loan and conform to discipline. Since the cash flow or value is in, it will be positive, so enter 35000 into the HP-12C and press and release the “PV” key in the third column of the top row.

“PMT” is the payment field. Since you are trying to solve for payment and want to ensure every field’s value, enter “0” (zero) into the HP-12C and press the “PMT” key.

“FV” is the future value field. For this example you will retain your balloon payment issue. Since the “PV” or present or principal value is positive, this must be negative indicating that you are making the payment, representing cash flows out, at the end of the loan. Enter 5000 into the HP-12C then press and release the “CHS” (Change sign) key in the sixth column of the top row of the HP-12C. The display changes to -5,000. Press and release the “FV” future value key in the fifth column of the top row.

Now solve for “PMT” or payment by pressing the “PMT” (Payment) button in the fourth column of the top row of the HP-12C. The HP-12C should respond with -621.3716 indicating our payment is $621.3716.
Present Value of a $1 with the HP-12C

You need the present value of $1 with 15 periods at 15% interest and no payments, the fields would be:

\[ \begin{align*}
  n &= 15 \\
  i &= 15 \\
  PV &= 0 \text{ as a matter of discipline to ensure the values in the HP-12C.} \\
  PMT &= 0 \text{ as a matter of discipline to ensure the values in the HP-12C.} \\
  FV &= 1 \\
\end{align*} \]

When “PV” (Present value) is pressed and released the HP-12C should respond with 0.1229 which can be checked with printed present value table for validity.

To find the present value of $150 with 15 periods at 15% interest and no payments, the fields would be:

\[ \begin{align*}
  n &= 15 \\
  i &= 15 \\
  PV &= 0 \text{ as a matter of discipline to ensure the values in the HP-12C.} \\
  PMT &= 0 \text{ as a matter of discipline to ensure the values in the HP-12C.} \\
  FV &= 150 \\
\end{align*} \]

When “PV” (Present value) is pressed and released the HP-12C should respond with -18.4342 which can be checked with printed present value table for validity by multiplying $150 \times 0.1229 = $18.4350 and the difference is a rounding factor.

Future Value Of A $1 With The HP-12C

You need the future value of $1 with 15 periods at 15% interest and no payments, the fields would be:

\[ \begin{align*}
  n &= 15 \\
  i &= 15 \\
  PV &= 1 \\
  PMT &= 0 \text{ as a matter of discipline to ensure the values in the HP-12C.} \\
  FV &= 0 \text{ as a matter of discipline to ensure the values in the HP-12C.} \\
\end{align*} \]

When “FV” is pressed and released. The response should be -8.1371 which can be checked with printed future value table for validity.

To find the future value of $150 with 15 periods at 15% interest and no payments, the fields would be:

\[ \begin{align*}
  n &= 15 \\
  i &= 15 \\
  PV &= 150 \\
  PMT &= 0 \text{ as a matter of discipline to ensure the values in the HP-12C.} \\
  FV &= 0 \text{ as a matter of discipline to ensure the values in the HP-12C.} \\
\end{align*} \]

When “FV” (Future value) is pressed and released the HP-12C response should be -1,220.5592 which can be checked with printed future value table for validity by multiplying $150 \times 8.1371 = $1,220.5650 and the difference is a rounding factor.
Present Value of an Annuity of a $1 with the HP-12C

You need the present value of an annuity of $1 with 15 periods at 15% interest and no future value. The payments are to be made at the end of the period. The fields would be:

\[
\begin{align*}
n & = 15 \\
i & = 15 \\
PV & = 0 \text{ as a matter of discipline to ensure the values in the HP-12C.} \\
PMT & = 1 \\
FV & = 0 \text{ as a matter of discipline to ensure the values in the HP-12C.}
\end{align*}
\]

When “PV” is pressed and released the response should be -5.8474 which can be checked with printed present value of an annuity table for validity.

To find the present value of an annuity of $150 with 15 periods at 15% interest and no future value. The payments are to me made at the end of the period. The fields would be:

\[
\begin{align*}
n & = 15 \\
i & = 15 \\
PV & = 0 \text{ as a matter of discipline to ensure the values in the HP-12C.} \\
PMT & = 150 \\
FV & = 0 \text{ as a matter of discipline to ensure the values in the HP-12C.}
\end{align*}
\]

When “PV” is pressed and released the HP-12C should respond with -877.1055 which can be checked with printed present value of an annuity table for validity by multiplying $150 \times 5.8474 = 877.1100$ and the difference is a rounding factor.

For the present value of an annuity due, change the HP-12C into “BEGIN” or “Beginning” mode (due) by utilizing the keystrokes:

1. Press and release the blue “g” key once. This key is in the third column of the bottom row.
2. Press and release the blue font “BEG” (7 / BEG) key, this text is shown below the “7” on the slant face in the top row of the key pad, the seventh column. The blue text on the slant face of the key is used since you are in the “blue” or “g” keyboard options.
3. The display should show “BEGIN in the bottom, center of the display.

Recomputing the example as an annuity due by pressing the “PV” (Present value) key should result in a value -1,008.6713.

To change to “ordinary annuity” or an annuity paying at the end of the period:

1. Press and release the blue “g” key once. This key is in the third column of the bottom row.
2. Press and release the blue font “END” (8 / END) key, this text is shown below the “8” on the slant face in the top row of the key pad in the eighth column. The blue text on the slant face of the key is used since you are in the “blue” or “g” keyboard options.
3. The display of “BEGIN in the bottom, center of the display will disappear as this is the default mode.
Future Value of an Annuity of a $1 with the HP-12C

You need the future value of an annuity of $1 with 15 periods at 15% interest and payments at the end of the periods – ordinary annuity, the fields would be:

\[\begin{align*}
n &= 15 \\
i &= 15 \\
PV &= 0 \text{ as a matter of discipline to ensure the values in the HP-12C.} \\
PMT &= 1 \\
FV &= 0 \text{ as a matter of discipline to ensure the values in the HP-12C.}
\end{align*}\]

When “FV” (Future value) key in the fifth column of the top row is pressed and released the HP-12C response should be \(-47.5804\) which can be checked with printed future value of an annuity table for validity.

To find the future value of an annuity of $150 with 15 periods at 15% interest and payments made at the end of the periods, the fields would be:

\[\begin{align*}
n &= 15 \\
i &= 15 \\
PV &= 0 \text{ as a matter of discipline to ensure the values in the HP-12C.} \\
PMT &= 150 \\
FV &= 0
\end{align*}\]

Then press and release the “FV” (Future value) key. The response should be \(-7,137.0616\) which can be checked with printed future value of an annuity table for validity by multiplying $150 \times 47.5804 = 7,137.0616 and the difference is a rounding factor.

For the present value of an annuity due, change the HP-12C into “BEGIN” or “Beginning” mode (due) by utilizing the keystrokes:

1. Press and release the blue “g” key once. This key is in the third column of the bottom row.
2. Press and release the blue font “BEG” (7 / BEG) key, this text is shown below the “7” on the slant face in the top row of the key pad, the seventh column. The blue text on the slant face of the key is used since you are in the “blue” or “g” keyboard options.

Recomputing the example as an annuity due by pressing and releasing the “FV” (Future value) key. The HP-12C should respond with a value of \(-8,207.6209\).

To change to “ordinary annuity” or an annuity paying at the end of the period:

1. Press and release the blue “g” key once. This key is in the third column of the bottom row.
2. Press and release the blue font “END” (8 / END) key, this text is shown below the “8” on the slant face in the top row of the key pad in the eighth column. The blue text on the slant face of the key is used since you are in the “blue” or “g” keyboard options.
3. The display of “BEGIN in the bottom, center of the display will disappear as this is the default mode.

Other HP-12C Functions

There are other HP-12C functions explained in the Hewlett-Packard HP-12C manuals and documents. Some of these include the determination of the present value of a bond issue through a single math function, net present value, internal rate of return, and depreciation functions.
Index, Page b

Conditional Formatting ................................................................. 83
Convert .......................................................................................... 120
COPY, CUT, PASTE, CLEAR, AND DELETE, Chapter 5 .................. 36
Copying a Formula ........................................................................ 38
Copying and Pasting ..................................................................... 36
Copying the Data Files to Personally Transportable Media .......... 3
Copying the Data Files to the Hard Drive .................................... 2
CountIf ......................................................................................... 75
Cumulative Payment to Interest .................................................. 116
Cumulative Payment to Principal ............................................... 116
CUSTOMIZING EXCEL, Chapter 7 ............................................. 49
Cut Command ............................................................................. 41

D

Days Between Dates with the BA II Plus ....................................... 136
Days Between Dates with the HP-12C .......................................... 145
Declining-Balance Depreciation .................................................. 108
Delete and Delete ........................................................................ 41
Demo Worksheet .......................................................................... 17
Depreciation .............................................................................. 107
DEPRECIATION, Chapter 14 ...................................................... 106
DISPLAY, Chapter 11 ................................................................. 81
Displaying Zero Values ............................................................... 84
Drawing on Worksheets ............................................................... 60
Drop-Down Menu ........................................................................ 20

E

Embedded Formulas ..................................................................... 122
Excel Basics ................................................................................ 12
Excel Defaults ............................................................................ 49
Excel Tables into Word ............................................................... 132
Excel Workbook / File Naming Recommendations ...................... 51
Excel Worksheets ........................................................................ 18

F

File Extensions within Excel ......................................................... 24
File Shortcuts .............................................................................. 4
Find ............................................................................................. 71
Find and Replace .......................................................................... 45
Formatting Cells .......................................................................... 92
Formatting within a Cell .............................................................. 96
Formula Auditing ........................................................................ 91
Formula Bar ................................................................................ 23
Freeze Panes .............................................................................. 81, 82
Future Value ............................................................................... 118
Future Value of a $1 with the BA II Plus ..................................... 140
Future Value Of A $1 With The HP-12C .................................... 149
Future Value of an Annuity of a $1 with the BA II Plus ............... 142
Future Value of an Annuity of a $1 with the HP-12C ................. 151
Index, Page c

<table>
<thead>
<tr>
<th>G</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Go To</td>
<td>44</td>
</tr>
<tr>
<td>Gridlines on the Screen</td>
<td>85</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>H</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Help</td>
<td>21</td>
</tr>
<tr>
<td>Hewlett-Packard HP-12C Basics</td>
<td>143</td>
</tr>
<tr>
<td>HEWLETT-PACKARD HP-12C, Chapter 19</td>
<td>143</td>
</tr>
<tr>
<td>Hidden</td>
<td>86</td>
</tr>
<tr>
<td>Hiding Columns and Rows</td>
<td>85</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>I</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>If Statement</td>
<td>99</td>
</tr>
<tr>
<td>Indent within a Cell</td>
<td>88</td>
</tr>
<tr>
<td>Installing Microsoft Office</td>
<td>9</td>
</tr>
<tr>
<td>INSTALLING, FINDING, AND SHORTCUTS TO MICROSOFT OFFICE, Chapter 2</td>
<td>6</td>
</tr>
<tr>
<td>Interest Payment</td>
<td>115</td>
</tr>
<tr>
<td>Intermediate Formulas</td>
<td>123</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>18</td>
</tr>
<tr>
<td>INVENTORY, Chapter 10</td>
<td>71</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>K</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Keystrokes and Shortcuts</td>
<td>125</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>L</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Linking Worksheets and Workbooks</td>
<td>126</td>
</tr>
<tr>
<td>Loan Payments</td>
<td>112</td>
</tr>
<tr>
<td>LOANS AND TIME VALUE OF MONEY, Chapter 15</td>
<td>111</td>
</tr>
<tr>
<td>LOCATIONS AND LOCATING, Chapter 6</td>
<td>44</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>M</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Macros</td>
<td>62</td>
</tr>
<tr>
<td>Macros on Objects</td>
<td>63</td>
</tr>
<tr>
<td>Master Sort Column</td>
<td>74</td>
</tr>
<tr>
<td>Mathematical Order of Operation</td>
<td>31</td>
</tr>
<tr>
<td>Merge Cells</td>
<td>95</td>
</tr>
<tr>
<td>Microsoft Windows Versions</td>
<td>1</td>
</tr>
<tr>
<td>MICROSOFT WORD, Chapter 17</td>
<td>129</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>N</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Named Ranges</td>
<td>47</td>
</tr>
<tr>
<td>Nested Parenthesis</td>
<td>31</td>
</tr>
<tr>
<td>New Workbook</td>
<td>21</td>
</tr>
<tr>
<td>NOTE TO THE INSTRUCTOR</td>
<td>vii</td>
</tr>
<tr>
<td>Null Value</td>
<td>97</td>
</tr>
</tbody>
</table>
### Index

#### O
- Opening Elements of Microsoft Office .................................................................................................................. 10
- Opening Excel ............................................................................................................................................................ 13
- Opening Excel Files ................................................................................................................................................... 14
- Or .............................................................................................................................................................................. 98
- Other BA II Plus Functions ....................................................................................................................................... 142
- Other HP-12C Functions .......................................................................................................................................... 151

#### P
- Page Break Preview .................................................................................................................................................... 66
- Page Setup ................................................................................................................................................................ 65
- Paste Special ............................................................................................................................................................ 104
- Payment to Principal ................................................................................................................................................ 114
- Pivot Tables ............................................................................................................................................................ 56
- Pop-up Menus .......................................................................................................................................................... 19
- Present Value ........................................................................................................................................................... 117
- Present Value of a $1 with the BA II Plus ................................................................................................................ 140
- Present Value of a $1 with the HP-12C .................................................................................................................... 149
- Present Value of an Annuity of a $1 with the BA II Plus .......................................................................................... 141
- Present Value of an Annuity of a $1 with the HP-12C ............................................................................................ 150
- PRESENTATION, Chapter 8 ....................................................................................................................................... 52
- Print Area .................................................................................................................................................................. 67
- Print Preview ............................................................................................................................................................. 69
- Printing ....................................................................................................................................................................... 70
- PRINTING ISSUES, Chapter 9 .................................................................................................................................. 65
- Protection ...................................................................................................................................................................... 58
- Purchasing Microsoft Office ..................................................................................................................................... 9

#### R
- Read Only Files and Templates .................................................................................................................................. 59
- Recently Used File List .............................................................................................................................................. 32
- Renaming Files within Windows .................................................................................................................................. 3
- Row and Column Headers ......................................................................................................................................... 23

#### S
- Saving Excel Files ....................................................................................................................................................... 22
- Search within Windows ............................................................................................................................................... 3
- Sizing Workbook Presentations .................................................................................................................................. 25
- Solver .......................................................................................................................................................................... 96
- SOME BASICS OF WINDOWS 7, Chapter 1 ................................................................................................................... 1
- Sort ............................................................................................................................................................................. 73
- Storing Values in the BA II Plus .................................................................................................................................. 137
- Storing Values in the HP-12C .................................................................................................................................... 146
- Straight-Line Depreciation .......................................................................................................................................... 107
- Subtotal ..................................................................................................................................................................... 75
- Sum Formula .............................................................................................................................................................. 29
- SumIf ........................................................................................................................................................................ 74
- Sum-of-Years'-Digits Depreciation ............................................................................................................................ 110
# Index

<table>
<thead>
<tr>
<th>Term</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terms and Conventions of this Text</td>
<td>6</td>
</tr>
<tr>
<td>Texas Instrument BA II Plus Basics</td>
<td>134</td>
</tr>
<tr>
<td>TEXAS INSTRUMENTS BA II PLUS, Chapter 18</td>
<td>134</td>
</tr>
<tr>
<td>Text to Columns</td>
<td>103</td>
</tr>
<tr>
<td>TEXT, Chapter 13</td>
<td>101</td>
</tr>
<tr>
<td>The Acknowledgement of Copyrights, Patents, and Trademarks</td>
<td>vi</td>
</tr>
<tr>
<td>The Differences between Versions of Microsoft Office</td>
<td>8</td>
</tr>
<tr>
<td>The Exercise and Problem Templates</td>
<td>16</td>
</tr>
<tr>
<td>Time Value of Money with the BA II Plus</td>
<td>139</td>
</tr>
<tr>
<td>Time Value of Money with the HP-12C</td>
<td>148</td>
</tr>
<tr>
<td>Today and Now</td>
<td>105</td>
</tr>
<tr>
<td>Truncate</td>
<td>88</td>
</tr>
<tr>
<td>Undo and Redo</td>
<td>33</td>
</tr>
<tr>
<td>Units-of-Activity Depreciation</td>
<td>110</td>
</tr>
<tr>
<td>Variable Declining Balance Depreciation</td>
<td>109</td>
</tr>
<tr>
<td>Vlookup</td>
<td>79</td>
</tr>
<tr>
<td>Windows Explorer</td>
<td>1</td>
</tr>
<tr>
<td>Word File Storage</td>
<td>129</td>
</tr>
<tr>
<td>Word Table Formulas</td>
<td>131</td>
</tr>
<tr>
<td>Word Tables</td>
<td>130</td>
</tr>
<tr>
<td>Workbooks and Worksheets within Excel</td>
<td>13</td>
</tr>
<tr>
<td>Workspaces</td>
<td>89</td>
</tr>
</tbody>
</table>