ASA Research

Excel for Advanced Users

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ASA RESEARCH

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2010 Excel Advanced
Course Information

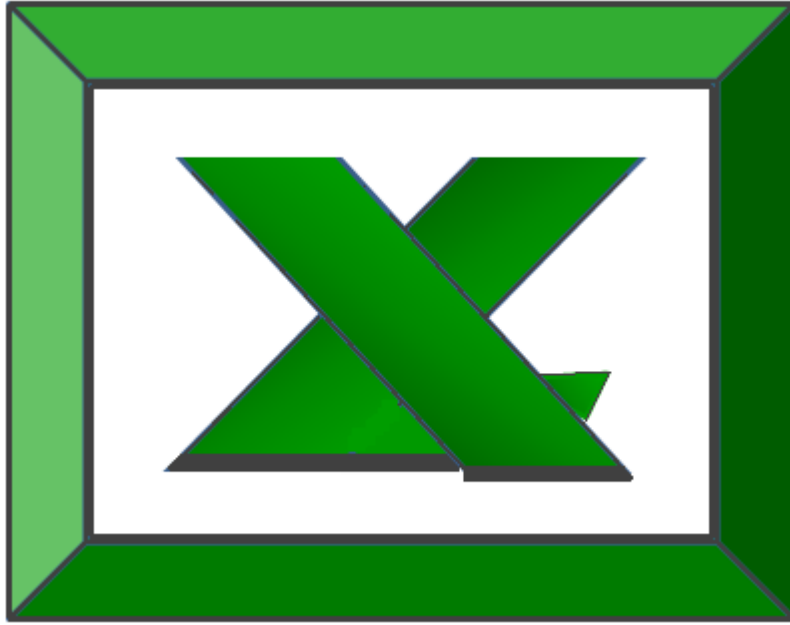| Learning Objectives	To increase the productivity of accountants and CPAs using Excel by introducing them to advanced capabilities within Excel
Course Level	Advanced
Pre-Requisites	Good Familiarity with Microsoft Excel
Advanced Preparation	None
Presentation Method	Live lecture using full color projection systems and live Internet access with follow up course materials
Recommended CPE Credit	8 hours
Handouts	Templates, checklists, web examples, manual
Instructors	J. Carlton Collins, CPA
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Chapter 1

Excel Advanced Concepts

1. **E-Mail Merge from Excel**
   a. Demonstrate

2. **Validation**
   a. Drop Down List
   b. Dates, Whole Numbers, Decimals
   c. Comments
   Also:
   a. Color of Data Input Cells
   b. =TODAY
   c. =VLOOKUP
   d. Macro & Macro Buttons

3. **Macros**
   a. Create "Page Setup" Macro
      a. Simply turn on macro recording, press keys, turn off macro recording
      b. No Spaces allowed in macro name
      c. Assign macro to icon or object for easy access
   b. Record in workbook vs. personal macro workbook
   c. Absolute vs. relative reference
   d. Create an "Erase" Macro
   e. Create a "Print" Macro
   f. Create Macro Buttons
   g. Show Developer Tab
   h. Introduction to VBA (Not too deep)
   i. Insert VBA elements into Excel – Combo Box
   j. Displays the Macro dialog box - ALT+F8
   k. Displays the Visual Basic Editor - ALT+F11

4. **Hyperlinks**
   a. Text
   b. Objects
   c. Text Box
   d. Icons
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   f. To E-mail Addresses
   g. To Bookmarks
   h. To Other Files

5. **Administrative Page**
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6. **Protection**
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    b. Hidden Cells
    c. Protect Sheet (Review Ribbon)
    d. Protect Sheet Options

7. **Encryption (Password Protection)**
    a. Save As, Tools, General Options (In Excel 2003)
    b. 40 Bit vs 128 Bit (in 2003 Only)
    c. Explaining Bits and Encryption

8. **Formula Auditing**
    a. CTRL + ~
    b. Formula Auditing Tool Bar
    c. Precedents & D
    d. Dependents
    e. Links to other worksheets or workbooks

9. **Gantt Chart**
    a. Start by creating a stacked bar chart
    b. Remove the Data Series by right mouse clicking and choosing Select Data Source
    c. Add a new Data Source Named Starting Date, and point to the range of start dates for the values
    d. Add another new data source named Duration (Days), and point to the range of duration days for the values
    e. Add Category Axis Labels and point to the Task names in Column A
    f. Remove legend by selecting legend and pressing the Delete key
    g. Click on the beginning series and set the Fill and Borders to None
    h. Right mouse click on the task labels, choose format Axis, and check the Categories in Reverse Order box (if needed)
    i. In two blank cells, write a formula referencing the start and end dates, convert these dates to numbers with formatting
    j. Use the resulting numbers to set the scale of the Gantt Chart (perhaps use a slightly larger range of dates)
    k. Right mouse click on the date range, set the minimum and maximums to fixed using the numbers acquired in the above step
    l. Format the date range to show a short date
    m. Format the remaining data bars to display a 3-D bevel
    n. For added touch, search Google images for a nice picture of a house, save it to your hard drive.
    o. Set the background plot area to picture, and wash out the picture enough so that the chart is still readable.
    p. Add a title or text boxes as needed to complete the description of the Gantt Chart

10. Web Queries
   a. Stock Portfolio Example
   b. Link to Ticker Symbols
   c. Link Results to Portfolio
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   e. Refresh All

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      c. Presentation Quality Output

   b. Demonstrate:
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      b. Push Pins
      c. Data Bar Formatting
      d. Traffic Light Formatting
      e. Picture Support
      f. Chart Improvements
      g. Animate Excel Charts in PPT by Series
      h. Smart Art
      i. New Headers & Footers Controls
      j. Contextual Menus
      k. Quick Access Tool Bar
      l. PDF versus XPS formats

m. Watch Window

15. Set up Options
   a.   Always show full menus
   b.   Uncheck move on enter
   c.   Turn on transition keys so home key takes you home

16. Fill in Missing Data
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   c. QuickBooks Example

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   b.   Simple Example – Wave Sound
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   b.   Copy paste Link
   c.   Copy paste Link as Picture
   d.   Copy paste as Object

19. SUMIF

20. VLOOKUP Example

21. Loan Amortization Schedule example

22. Consolidate Similar Budgets Example
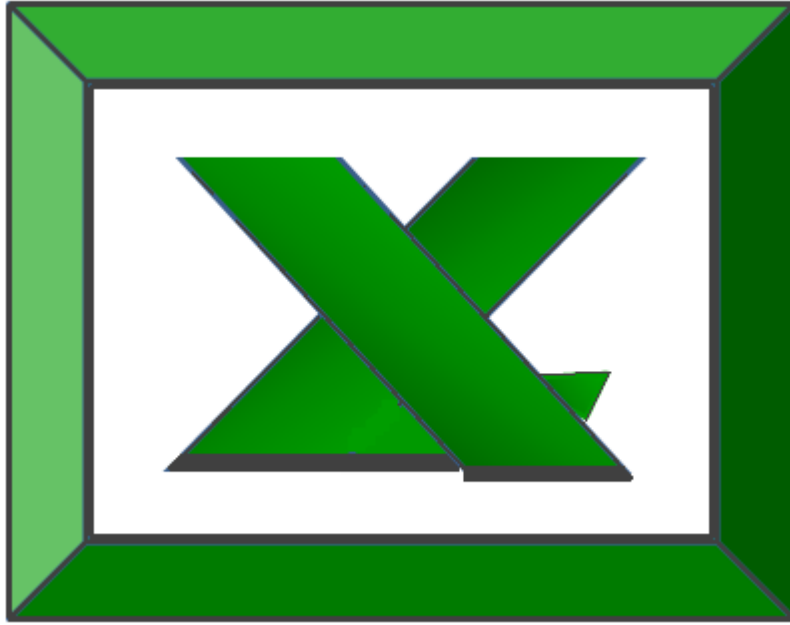
23. Consolidate Dis -Similar Budgets Example

24. Scenario Manager

25. Solver

26. Get Excel 2007 for $299 - Action Pack

27. Combo Charts

Chapter 2
Excel & The Internet
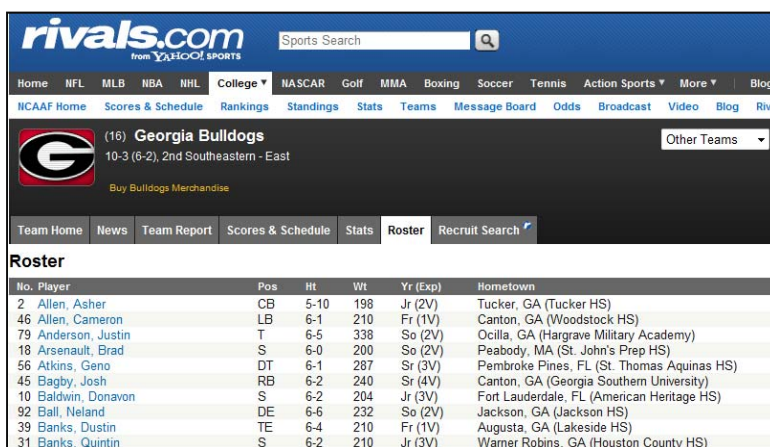
EXCEL AND THE INTERNET

Listed below are 9 good ways in which Excel and the Internet can work together, as follows:

1. Copy/Paste Internet data into Excel (Simple I know, but there are a few tricks).
2. E-Mail part of an Excel file across the Internet.
3. E-Mail the entire Excel file across the Internet.
4. Save an Excel File to the Internet (A good way to share a large Excel file).
5. Publish part of an Excel file as an web page.
6. Publish an entire Excel file as a web page.
7. Publish an entire Excel file as a web page with Auto-republishing
8. Web Queries - Linking Internet Data to Excel.
9. Embedded Hyperlinks (to web pages, e-mail addresses)

These bullet points are discussed in more detail below.

Copy/Paste Internet Data into Excel – As an exercise, search the web for your favorite Football team roster on rivals.com. Copy and paste the schedule into Excel. Now tell me how many players came from each state and what the average weight is for each position. Simple huh? Here are five pointers to keep in mind:

- Selecting internet data from the bottom right to the upper left is usually easier than the other way around.
- Making columns wider before pasting Internet data into Excel keeps the row heights from taking off.
- Eliminating hyperlinks in data is usually faster if you copy and paste-special as values to another blank column.
- Often you must parse Internet data before you can manipulate it. Do this using the =Left, =Find, =MID, and =RIGHT functions.
- Once parsed, turn on auto filters and apply the subtotaling command to yield the results you seek.

E-Mail part of an Excel file across the Internet - Excel provides the ability to e-mail a single worksheet within a workbook as an e-mail. This feature is found in the "File, Send To" menu of excel 2003 and earlier, and is a non-ribbon tool which you must add to the Quick Access Tool bar in Excel 2007 and later. Here's what the tool looks like in all editions of Excel.
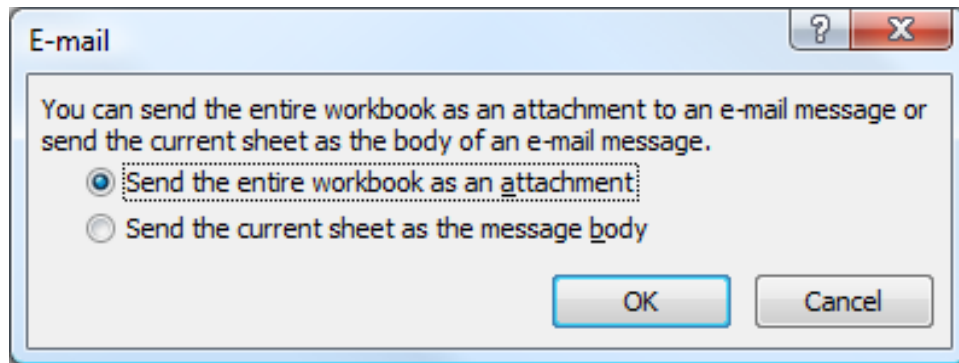
E-Mail the entire Excel file across the Internet - Of course this same tool mentioned above can be used to e-mail the entire Excel file as well. The difference is that with this option, the Excel workbook arrives at the recipient as a complete standalone excel file which the recipient can open. When a worksheet is sent in this manner, it arrives as a table in the body of the e-mail – there are no formulas, just numbers.

Save an Excel File to the Internet - Another option is to simply save a password-protected Excel file to a web server. This is accomplished using the Save as function, and specifying the server where the file is to be saved. Of course you will valid user name and password to complete the transaction as show below. The primary advantage to this method is that it allows you to share a large Excel file that is too big to be sent via e-mail (most e-mail services prohibit attachments greater than 10 MBs. This approach also allows you to share your Excel file with others, or even with yourself if you plan to work on the file further from your home computer.
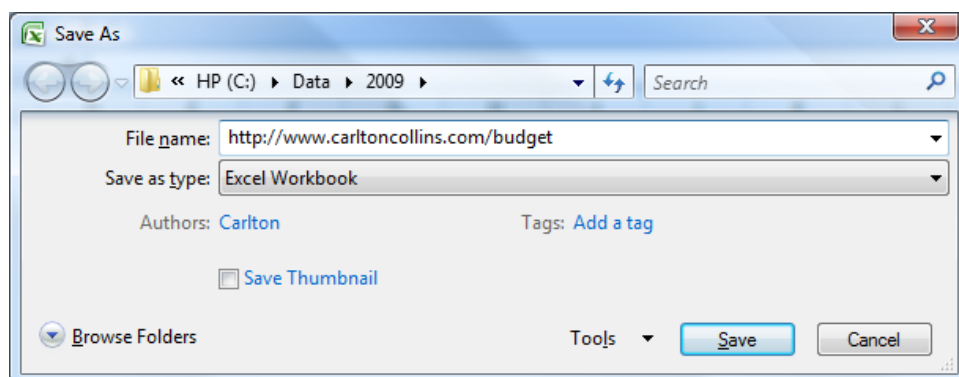
Publish Part of an Excel file as an Web Page – Excel enables you to publish a selection of cells as a web page in an HTML format. To do this, simply change the "Save As Type" to "Web Page" as shown in the screen below.
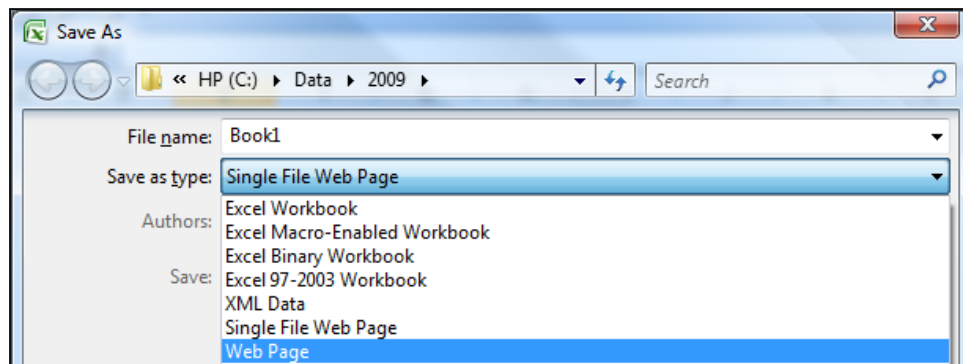
Of course to accomplish this task, you will need access to web site via user name and password.

Publish an entire Excel file as a Web Page – Excel can also automatically convert your entire workbook to an HTML page format and publish it to the web – saving you a large amount of time in the process.

Publish an entire Excel file as a web page with Auto-republishing – An interesting feature is the Auto-Republish feature that automatically updates your web based Excel data whenever it changes in your Excel workbook. To enable this feature, simple check the "AutoRepublish every time this workbook is saved" checkbox as shown below.
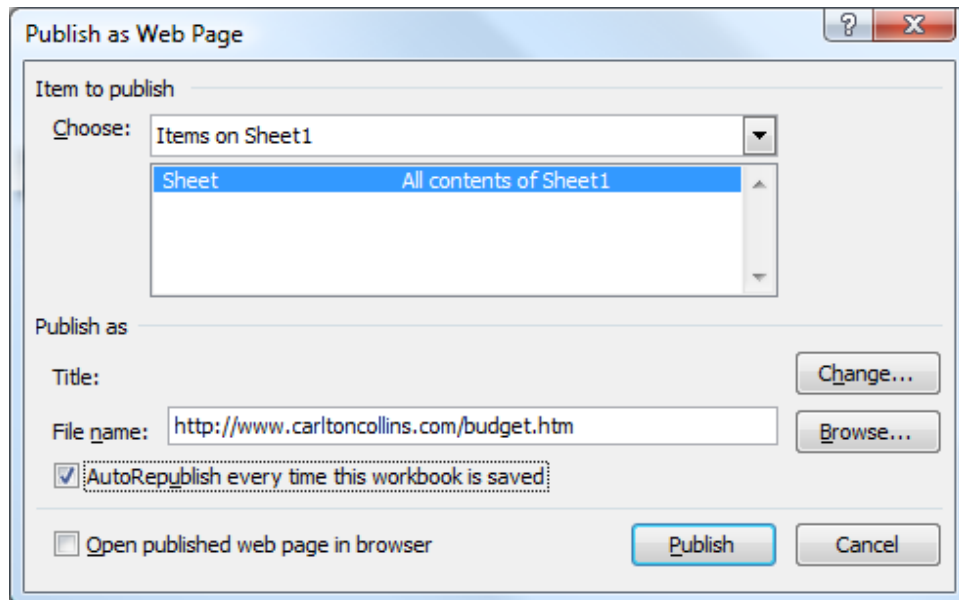
Special Note re: Password protecting Data on the Internet - When publishing Excel data as a web page, there is no Excel option for password protecting the data, but you can achieve the same results by saving the publishing the data to a password protected folder on your web server. To do this, use a web publishing tool (such as Dreamweaver or Expression Web) to open your web server. Create a new folder and convert it to a sub web. Now you can use the tools

options to apply permissions to that folder. (Caveat – only UNIX based web servers allow you to apply these type of permissions, Windows based web servers do not).

Web Queries - Excel includes pre-designed "queries" that can import commonly used data in 10 seconds. For example, you could use a web query to create a stock portfolio. All you need is a connection to the Internet and of course, some stock ticker symbols. In Excel 2003 select "Data, Import External Data, Import Data" and walk through the web query wizard for importing stock quotes. In Excel 2007 and later use the Data Ribbon, Existing Connections, Stock Quotes option. In seconds, Excel will retrieve 20 minute delayed stock prices from the web (during the hours when the stock market is open) and display a grid of complete up-to-date stick price information that is synchronized to the stock market's changing stock prices. With each click of the "Refresh" button, the stock price information in Excel is updated - this sure beats picking numbers out of the newspaper.

				Last	Previous Close	High	Low	Volume	Change	% Change	52 Wk High	52 Wk Low
1	Friday, April 24, 2009											
2	11:34:42 AM											
3	**Stock Quotes Provided by MSN Money**											
4	Click here to visit MSN Money											
6	Microsoft Corp	Chart	News	20.29	18.92	20.45	19.5	66,077,415	1.37	7.24%	32.1	14.87
7	Apple Inc	Chart	News	124.32	125.4	125.14	123.73	6,275,076	-1.08	-0.86%	192.24	78.2
8	Coca-Cola Co	Chart	News	42.87	42.92	43.09	42.71	3,205,193	-0.05	-0.12%	61	37.44
9	United Parcel Service Inc	Chart	News	53.48	53.33	54.04	52.53	2,533,150	0.15	0.28%	74.14	37.99
10	International Business Machines Corp	Chart	News	100.33	101.42	101.97	100.09	2,665,080	-1.09	-1.07%	130.93	69.5
11	Wal-Mart Stores Inc	Chart	News	48.73	48.86	49.56	48.51	8,042,577	-0.13	-0.27%	63.85	46.25

Completing the Stock Portfolio – Next link the grid data to another worksheet, and insert new columns containing the number of shares owned, as wells as an additional column to computer the total value based on shares owned, as shown below.

		Last	Shares Owned	Current Value	Previous Close	High	Low	Volume	Change	% Change
1	Friday, April 24, 2009									
2	11:40:17 AM									
3	**Stock Quotes Provided by MSN Money**									
4										
6	Microsoft Corp	20.29	13,500	273,915	18.92	20.45	19.5	66077415	1.37	0.0724
7	Apple Inc	124.32	2,400	298,368	125.4	125.14	123.73	6275076	-1.08	-0.0086
8	Coca-Cola Co	42.87	12,000	514,440	42.92	43.09	42.71	3205193	-0.05	-0.0012
9	United Parcel Service Inc	53.48	1,780	95,194	53.33	54.04	52.53	2533150	0.15	0.0028
10	International Business Machines	100.33	2,800	280,924	101.42	101.97	100.09	2665080	-1.09	-0.0107
11	Wal-Mart Stores Inc	48.73	8,300	404,459	48.86	49.56	48.51	8042577	-0.13	-0.0027
12				1,867,300						

Refreshing the Stock Prices - Once you have created your portfolio, simply click the Refresh Data button on the "External Data" Toolbar in Excel 2003 or on the "Data Ribbon" in Excel 2007 shown below to update the current value of your Portfolio.

Query Parameters - There are numerous options to help you extract exactly the data you want they way you want it. The "Web Query Parameters Box", "Web Query Options box" and "External Data Properties Box" provide numerous options for controlling your web query.

Query Any Web Page – You can query any web page on the web using the new web Query Option. Allow me to demonstrate a simple example.

Embedded Hyperlinks – Another way to use Excel with the Internet is to inset hyperlinks to web pages or e-mail addresses. Notice in cell C7 that I have inserted multiple e-mail addresses – yes this works just fine.

Microsoft Excel History

Microsoft began selling a spreadsheet application called Multiplan in 1982 for CP/M systems like the Osboune computer. However, on the MS-DOS platform Lotus 1-2-3 was the market leader. Microsoft released Excel for the Mac in 1985, and Excel for Windows version in November, 1987. Lotus was slow to release a Windows version of 1-2-3 and by 1988 Excel was outselling 1-2-3. Later IBM purchased Lotus Development Corporation and is typical with software owned by IBM, the product's presence diminished in the marketplace. Officially the current version for the Windows platform is Excel 12, also called Microsoft Office Excel 2007. The current version for the Mac OS X platform is Microsoft Excel 2008.
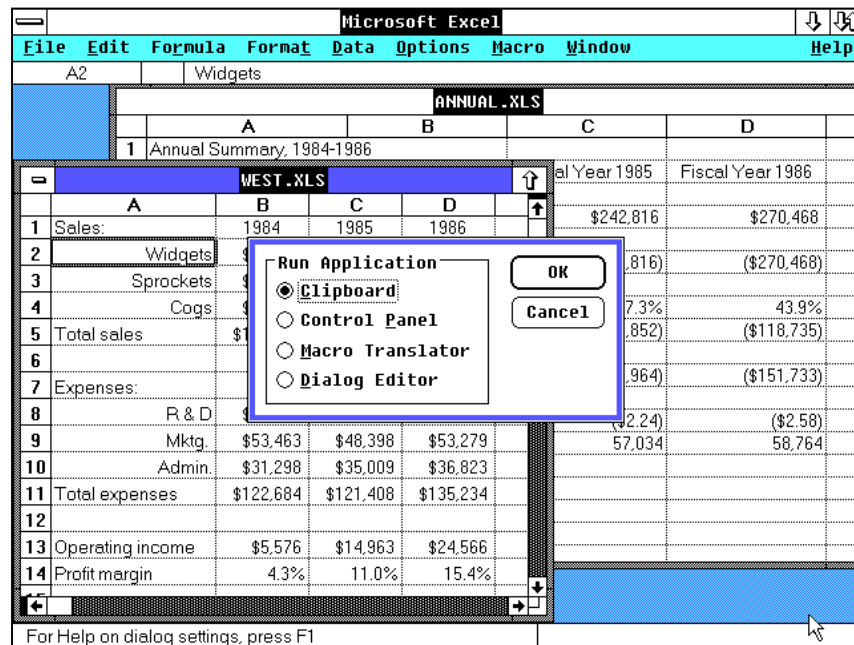
Microsoft Excel 2.1 included a runtime version of Windows 2.1

A Few Comments about Excel:

1. **Trademark Dispute -** In 1993, another company that was already selling a software package named "Excel" in the finance industry Excel became filed a trademark lawsuit. Eventually, this forced Microsoft to refer to the program as "Microsoft Excel". Later Microsoft purchased the trademark rights.

2. **Formatting -** Excel was the first electronic spreadsheet that allowed the user to define the appearance of spreadsheets (fonts, character attributes and cell appearance).

3. **Recomputation -** It also introduced intelligent cell recomputation, where only cells dependent on the cell being modified are updated (previous spreadsheet programs recomputed everything all the time or waited for a specific user command).

4. **VBA -** Since 1993, Excel has included Visual Basic for Applications (VBA), a programming language based on Visual Basic which adds the ability to automate tasks in Excel and to provide user defined functions (UDF) for use in worksheets. VBA allows the creation of forms and in-worksheet controls to communicate with the user. The language supports use (but not creation) of ActiveX (COM) DLL's; later versions add support for class modules allowing the use of basic object-oriented programming techniques.

File Formats - Until 2007 Microsoft Excel used a proprietary binary file format called Binary Interchange File Format (BIFF) as its primary format. Excel 2007 uses Office Open XML as its primary file format, an XML-based format that followed after a previous XML-based format called "XML Spreadsheet" ("XMLSS"), first introduced in Excel 2002. The latter format is not able to encode VBA macros. Although supporting and encouraging the use of new XML-based formats as replacements, Excel 2007 remained backwards-compatible with the traditional, binary formats. In addition, most versions of Microsoft Excel can read CSV, DBF, SYLK, DIF, and other legacy formats. Support for some older file formats were removed in Excel 2007. The file formats were mainly from DOS based programs.

5. **Binary -** Microsoft made the specification of the Excel binary format specification available on request, but since February 2008 programmers can freely download the .XLS format specification and implement it under the Open Specification Promise patent licensing.[

Standard file-extensions:

Format	Extension	Description
Spreadsheet	.xls	Main spreadsheet format which holds data in worksheets, charts, and macros
Add-in (VBA)	.xla	Adds custom functionality; written in VBA
Toolbar	.xlb	
Chart	.xlc	
Dialog	.xld	
Archive	.xlk	
Add-in (DLL)	.xll	Adds custom functionality; written in C++/C, Visual Basic, Fortran, etc. and compiled in to a special dynamic-link library
Macro	.xlm	
Template	.xlt	
Module	.xlv	
Workspace	.xlw	Arrangement of the windows of multiple Workbooks

6. **Office Open XML** - Microsoft Excel 2007, along with the other products in the Microsoft Office 2007 suite, introduces a host of new file formats. These form part of the Office Open XML (OOXML) specification.

New Excel 2007 formats

Format	Extension	Description
Excel Workbook	.xlsx	The default Excel 2007 workbook format. In reality a ZIP compressed archive with a directory structure of XML text documents. Functions as the primary replacement for the former binary .xls format, although it does not support Excel macros for security reasons.
Excel Macro-enabled Workbook	.xlsm	As Excel Workbook, but with macro support.
Excel Binary Workbook	.xlsb	As Excel Macro-enabled Workbook, but storing information in binary form rather than XML documents for opening and saving especially large documents.
Excel Macro-enabled Template	.xltm	A template document that forms a basis for actual workbooks, with macro support. The replacement for the old .xlt format.
Excel Add-in	.xlam	Excel add-in to add extra functionality and tools. Inherent macro support due to the file purpose.

Software Errors - Criticisms of spreadsheets in general also apply to Excel. See Spreadsheet shortcomings. Errors specific to Excel include accuracy, date problems and the Excel 2007 display error.

7. **Accuracy** - Due to Excel's foundation on floating point calculations, the statistical accuracy of Excel has been criticized as lacking certain statistical tools.

8. **Date Problems** - Excel incorrectly treats 1900 as a leap year. The bug originated from Lotus 1-2-3, and was purposely implemented in Excel for the purpose of backward compatibility. This legacy has later been carried over into Office Open XML file format.[citation needed] Excel also supports the second date format based on year 1904 epoch. The Excel DATE() function causes problems with a year value prior to 1900.
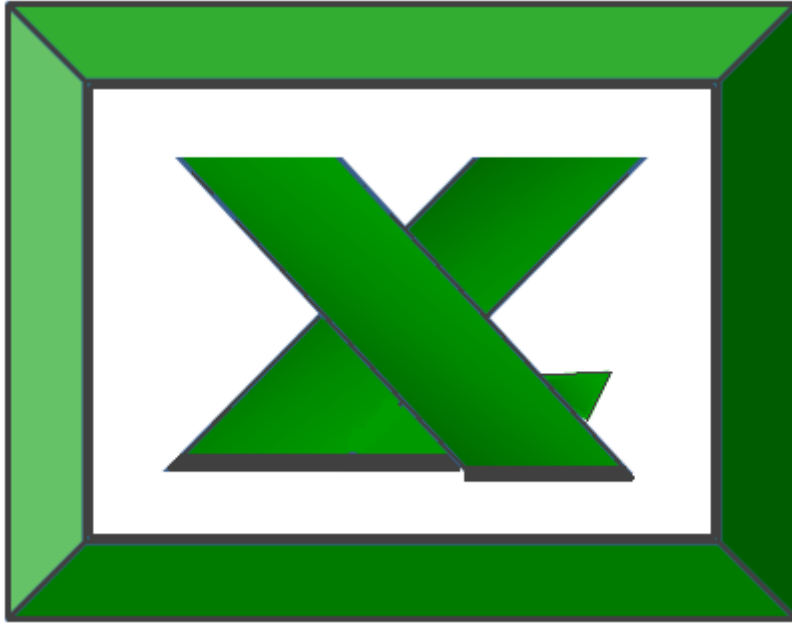
Chapter 3

Functions

Introduction to Excel Functions

Excel Functions are preprogrammed commands that make the task of writing complex formulas easier. There are a total of 333 functions in Excel. These functions are separated into 11 categories as follows:

1. Database Functions (12)
2. Date and Time Functions (20)
3. Engineering Functions (39)
4. Financial Functions (53)
5. Information Functions (17)
6. Logical Functions (6)
7. Lookup and Reference Functions (18)
8. Math and Trigonometry Functions (59)
9. Statistical Functions (80)
10. Text Functions (27)
11. External Functions (2)

Some Excel functions are more powerful than others and some are more relevant to the CPA than others. For example, most CPAs will find the IF, SUM, COUNT, SUBTOTAL, TEXT, and VLOOKUP are very relevant to the CPA while other engineering and trigonometry functions such as LOG, PI, RADIENS, DELTA, TAN, COMPLEX, and HAX2DEC are typically less relevant to CPAs. It has been my experience that the following 67 functions are most relevant to the CPA; therefore CPAs wishing to increase their command of Excel functions should concentrate on these functions first.

Carlton's List of The Top 67 Functions Most Relevant to CPAs
Sorted By Carlton's Opinion of the Most Useful

1. IF	2. SUM	3. SUMIF	4. COUNT	5. COUNTA
6. AVERAGE	7. COUNTBLANK	8. COUNTIF	9. VALUE	10. TEXT
11. VLOOKUP	12. HLOOKUP	13. LOOKUP	14. TRIM	15. PROPER
16. LOWER	17. LEFT, LEFTB	18. MID, MIDB	19. RIGHT,	20. FIND, FINDB
21. REPLACE	22. CONCATENATE	23. CLEAN	24. UPPER	25. LEN, LENB
26. SUBSTITUTE	27. NOW	28. TODAY	29. MONTH	30. DATE
31. DAY	32. YEAR	33. WEEKDAY	34. ROUND	35. ROUNDDOWN
36. ROUNDUP	37. MAX	38. MIN	39. MEDIAN	40. MODE
41. PERCENTILE	42. PERCENTRANK	43. PMT	44. NPV	45. DSUM
46. DCOUNT	47. DCOUNTA	48. AND	49. OR	50. CHOOSE
51. TIME	52. FV	53. IRR	54. YIELD	55. CELL
56. ERROR.TYPE	57. INFO	58. ISBLANK	59. ISNA	60. GETPIVOTDATA
61. HYPERLINK	62. TRANSPOSE	63. ABS	64. RAND	65. RANDBETWEEN
66. CONFIDENCE	67. REPT			

Following is a list of all Excel functions, organized by category, including a description of each function.

	Database Functions	
	Function	**Description**
1	DAVERAGE	Returns the average of selected database entries
2	DCOUNT	Counts the cells that contain numbers in a database
3	DCOUNTA	Counts nonblank cells in a database
4	DGET	Extracts from a database a single record that matches the specified criteria
5	DMAX	Returns the maximum value from selected database entries
6	DMIN	Returns the minimum value from selected database entries
7	DPRODUCT	Multiplies the values in a particular field of records that match the criteria in a database
8	DSTDEV	Estimates the standard deviation based on a sample of selected database entries
9	DSTDEVP	Calculates the standard deviation based on the entire population of selected database entries
10	DSUM	Adds the numbers in the field column of records in the database that match the criteria
11	DVAR	Estimates variance based on a sample from selected database entries
12	DVARP	Calculates variance based on the entire population of selected database entries
	Date and Time Functions	
	Function	**Description**
13	DATE	Returns the serial number of a particular date
14	DATEVALUE	Converts a date in the form of text to a serial number
15	DAY	Converts a serial number to a day of the month
16	DAYS360	Calculates the number of days between two dates based on a 360-day year
17	EDATE	Returns the serial number of the date that is the indicated number of months

		before or after the start date
18	EOMONTH	Returns the serial number of the last day of the month before or after a specified number of months
19	HOUR	Converts a serial number to an hour
20	MINUTE	Converts a serial number to a minute
21	MONTH	Converts a serial number to a month
22	NETWORKDAYS	Returns the number of whole workdays between two dates
23	NOW	Returns the serial number of the current date and time
24	SECOND	Converts a serial number to a second
25	TIME	Returns the serial number of a particular time
26	TIMEVALUE	Converts a time in the form of text to a serial number
27	TODAY	Returns the serial number of today's date
28	WEEKDAY	Converts a serial number to a day of the week
29	WEEKNUM	Converts a serial number to a number representing where the week falls numerically with a year
30	WORKDAY	Returns the serial number of the date before or after a specified number of workdays
31	YEAR	Converts a serial number to a year
32	YEARFRAC	Returns the year fraction representing the number of whole days between start_date and end_date

Engineering Functions

	Function	Description
33	BESSELI	Returns the modified Bessel Function In(x)
34	BESSELJ	Returns the Bessel Function Jn(x)
35	BESSELK	Returns the modified Bessel Function Kn(x)

36	BESSELY	Returns the Bessel Function Yn(x)
37	BIN2DEC	Converts a binary number to decimal
38	BIN2HEX	Converts a binary number to hexadecimal
39	BIN2OCT	Converts a binary number to octal
40	COMPLEX	Converts real and imaginary coefficients into a complex number
41	CONVERT	Converts a number from one measurement system to another
42	DEC2BIN	Converts a decimal number to binary
43	DEC2HEX	Converts a decimal number to hexadecimal
44	DEC2OCT	Converts a decimal number to octal
45	DELTA	Tests whether two values are equal
46	ERF	Returns the error Function
47	ERFC	Returns the complementary error Function
48	GESTEP	Tests whether a number is greater than a threshold value
49	HEX2BIN	Converts a hexadecimal number to binary
50	HEX2DEC	Converts a hexadecimal number to decimal
51	HEX2OCT	Converts a hexadecimal number to octal
52	IMABS	Returns the absolute value (modulus) of a complex number
53	IMAGINARY	Returns the imaginary coefficient of a complex number
54	IMARGUMENT	Returns the argument theta, an angle expressed in radians
55	IMCONJUGATE	Returns the complex conjugate of a complex number
56	IMCOS	Returns the cosine of a complex number
57	IMDIV	Returns the quotient of two complex numbers
58	IMEXP	Returns the exponential of a complex number
59	IMLN	Returns the natural logarithm of a complex number

60	IMLOG10	Returns the base-10 logarithm of a complex number
61	IMLOG2	Returns the base-2 logarithm of a complex number
62	IMPOWER	Returns a complex number raised to an integer power
63	IMPRODUCT	Returns the product of from 2 to 29 complex numbers
64	IMREAL	Returns the real coefficient of a complex number
65	IMSIN	Returns the sine of a complex number
66	IMSQRT	Returns the square root of a complex number
67	IMSUB	Returns the difference between two complex numbers
68	IMSUM	Returns the sum of complex numbers
69	OCT2BIN	Converts an octal number to binary
70	OCT2DEC	Converts an octal number to decimal
71	OCT2HEX	Converts an octal number to hexadecimal

Financial Functions

	Function	Description
72	ACCRINT	Returns the accrued interest for a security that pays periodic interest
73	ACCRINTM	Returns the accrued interest for a security that pays interest at maturity
74	AMORDEGRC	Returns the depreciation for each accounting period by using a depreciation coefficient
75	AMORLINC	Returns the depreciation for each accounting period
76	COUPDAYBS	Returns the number of days from the beginning of the coupon period to the settlement date
77	COUPDAYS	Returns the number of days in the coupon period that contains the settlement date
78	COUPDAYSNC	Returns the number of days from the settlement date to the next coupon date

79	COUPNCD	Returns the next coupon date after the settlement date
80	COUPNUM	Returns the number of coupons payable between the settlement date and maturity date
81	COUPPCD	Returns the previous coupon date before the settlement date
82	CUMIPMT	Returns the cumulative interest paid between two periods
83	CUMPRINC	Returns the cumulative principal paid on a loan between two periods
84	DB	Returns the depreciation of an asset for a specified period by using the fixed-declining balance method
85	DDB	Returns the depreciation of an asset for a specified period by using the double-declining balance method or some other method that you specify
86	DISC	Returns the discount rate for a security
87	DOLLARDE	Converts a dollar price, expressed as a fraction, into a dollar price, expressed as a decimal number
88	DOLLARFR	Converts a dollar price, expressed as a decimal number, into a dollar price, expressed as a fraction
89	DURATION	Returns the annual duration of a security with periodic interest payments
90	EFFECT	Returns the effective annual interest rate
91	FV	Returns the future value of an investment
92	FVSCHEDULE	Returns the future value of an initial principal after applying a series of compound interest rates
93	INTRATE	Returns the interest rate for a fully invested security
94	IPMT	Returns the interest payment for an investment for a given period
95	IRR	Returns the internal rate of return for a series of cash flows
96	ISPMT	Calculates the interest paid during a specific period of an investment
97	MDURATION	Returns the Macauley modified duration for a security with an assumed par value of $100
98	MIRR	Returns the internal rate of return where positive and negative cash flows are financed at different rates

99	NOMINAL	Returns the annual nominal interest rate
100	NPER	Returns the number of periods for an investment
101	NPV	Returns the net present value of an investment based on a series of periodic cash flows and a discount rate
102	ODDFPRICE	Returns the price per $100 face value of a security with an odd first period
103	ODDFYIELD	Returns the yield of a security with an odd first period
104	ODDLPRICE	Returns the price per $100 face value of a security with an odd last period
105	ODDLYIELD	Returns the yield of a security with an odd last period
106	PMT	Returns the periodic payment for an annuity
107	PPMT	Returns the payment on the principal for an investment for a given period
108	PRICE	Returns the price per $100 face value of a security that pays periodic interest
109	PRICEDISC	Returns the price per $100 face value of a discounted security
110	PRICEMAT	Returns the price per $100 face value of a security that pays interest at maturity
111	PV	Returns the present value of an investment
112	RATE	Returns the interest rate per period of an annuity
113	RECEIVED	Returns the amount received at maturity for a fully invested security
114	SLN	Returns the straight-line depreciation of an asset for one period
115	SYD	Returns the sum-of-years' digits depreciation of an asset for a specified period
116	TBILLEQ	Returns the bond-equivalent yield for a Treasury bill
117	TBILLPRICE	Returns the price per $100 face value for a Treasury bill
118	TBILLYIELD	Returns the yield for a Treasury bill
119	VDB	Returns the depreciation of an asset for a specified or partial period by using a declining balance method
120	XIRR	Returns the internal rate of return for a schedule of cash flows that is not

		necessarily periodic
121	XNPV	Returns the net present value for a schedule of cash flows that is not necessarily periodic
122	YIELD	Returns the yield on a security that pays periodic interest
123	YIELDDISC	Returns the annual yield for a discounted security; for example, a Treasury bill
124	YIELDMAT	Returns the annual yield of a security that pays interest at maturity

Information Functions

	Function	Description
125	CELL	Returns information about the formatting, location, or contents of a cell
126	ERROR.TYPE	Returns a number corresponding to an error type
127	INFO	Returns information about the current operating environment
128	ISBLANK	Returns TRUE if the value is blank
129	ISERR	Returns TRUE if the value is any error value except #N/A
130	ISERROR	Returns TRUE if the value is any error value
131	ISEVEN	Returns TRUE if the number is even
132	ISLOGICAL	Returns TRUE if the value is a logical value
133	ISNA	Returns TRUE if the value is the #N/A error value
134	ISNONTEXT	Returns TRUE if the value is not text
135	ISNUMBER	Returns TRUE if the value is a number
136	ISODD	Returns TRUE if the number is odd
137	ISREF	Returns TRUE if the value is a reference
138	ISTEXT	Returns TRUE if the value is text
139	N	Returns a value converted to a number
140	NA	Returns the error value #N/A

141	TYPE	Returns a number indicating the data type of a value
17		

Logical Functions

	Function	Description
142	AND	Returns TRUE if all of its arguments are TRUE
143	FALSE	Returns the logical value FALSE
144	IF	Specifies a logical test to perform
145	NOT	Reverses the logic of its argument
146	OR	Returns TRUE if any argument is TRUE
147	TRUE	Returns the logical value TRUE

Lookup and Reference Functions

	Function	Description
148	ADDRESS	Returns a reference as text to a single cell in a worksheet
149	AREAS	Returns the number of areas in a reference
150	CHOOSE	Chooses a value from a list of values
151	COLUMN	Returns the column number of a reference
152	COLUMNS	Returns the number of columns in a reference
153	GETPIVOTDATA	Returns data stored in a PivotTable
154	HLOOKUP	Looks in the top row of an array and returns the value of the indicated cell
155	HYPERLINK	Creates a shortcut or jump that opens a document stored on a network server, an intranet, or the Internet
156	INDEX	Uses an index to choose a value from a reference or array
157	INDIRECT	Returns a reference indicated by a text value
158	LOOKUP	Looks up values in a vector or array

159	MATCH	Looks up values in a reference or array
160	OFFSET	Returns a reference offset from a given reference
161	ROW	Returns the row number of a reference
162	ROWS	Returns the number of rows in a reference
163	RTD	Retrieves real-time data from a program that supports COM automation (Automation: A way to work with an application's objects from another application or development tool. Formerly called OLE Automation, Automation is an industry standard and a feature of the Component Object Model (COM).)
164	TRANSPOSE	Returns the transpose of an array
165	VLOOKUP	Looks in the first column of an array and moves across the row to return the value of a cell

Math and Trigonometry Functions

	Function	Description
166	ABS	Returns the absolute value of a number
167	ACOS	Returns the arccosine of a number
168	ACOSH	Returns the inverse hyperbolic cosine of a number
169	ASIN	Returns the arcsine of a number
170	ASINH	Returns the inverse hyperbolic sine of a number
171	ATAN	Returns the arctangent of a number
172	ATAN2	Returns the arctangent from x- and y-coordinates
173	ATANH	Returns the inverse hyperbolic tangent of a number
174	CEILING	Rounds a number to the nearest integer or to the nearest multiple of significance
175	COMBIN	Returns the number of combinations for a given number of objects
176	COS	Returns the cosine of a number

177	COSH	Returns the hyperbolic cosine of a number
178	DEGREES	Converts radians to degrees
179	EVEN	Rounds a number up to the nearest even integer
180	EXP	Returns e raised to the power of a given number
181	FACT	Returns the factorial of a number
182	FACTDOUBLE	Returns the double factorial of a number
183	FLOOR	Rounds a number down, toward zero
184	GCD	Returns the greatest common divisor
185	INT	Rounds a number down to the nearest integer
186	LCM	Returns the least common multiple
187	LN	Returns the natural logarithm of a number
188	LOG	Returns the logarithm of a number to a specified base
189	LOG10	Returns the base-10 logarithm of a number
190	MDETERM	Returns the matrix determinant of an array
191	MINVERSE	Returns the matrix inverse of an array
192	MMULT	Returns the matrix product of two arrays
193	MOD	Returns the remainder from division
194	MROUND	Returns a number rounded to the desired multiple
195	MULTINOMIAL	Returns the multinomial of a set of numbers
196	ODD	Rounds a number up to the nearest odd integer
197	PI	Returns the value of pi
198	POWER	Returns the result of a number raised to a power
199	PRODUCT	Multiplies its arguments
200	QUOTIENT	Returns the integer portion of a division

201	RADIANS	Converts degrees to radians
202	RAND	Returns a random number between 0 and 1
203	RANDBETWEEN	Returns a random number between the numbers you specify
204	ROMAN	Converts an arabic numeral to roman, as text
205	ROUND	Rounds a number to a specified number of digits
206	ROUNDDOWN	Rounds a number down, toward zero
207	ROUNDUP	Rounds a number up, away from zero
208	SERIESSUM	Returns the sum of a power series based on the formula
209	SIGN	Returns the sign of a number
210	SIN	Returns the sine of the given angle
211	SINH	Returns the hyperbolic sine of a number
212	SQRT	Returns a positive square root
213	SQRTPI	Returns the square root of (number * pi)
214	SUBTOTAL	Returns a subtotal in a list or database
215	SUM	Adds its arguments
216	SUMIF	Adds the cells specified by a given criteria
217	SUMPRODUCT	Returns the sum of the products of corresponding array components
218	SUMSQ	Returns the sum of the squares of the arguments
219	SUMX2MY2	Returns the sum of the difference of squares of corresponding values in two arrays
220	SUMX2PY2	Returns the sum of the sum of squares of corresponding values in two arrays
221	SUMXMY2	Returns the sum of squares of differences of corresponding values in two arrays
222	TAN	Returns the tangent of a number
223	TANH	Returns the hyperbolic tangent of a number

224	TRUNC	Truncates a number to an integer
	Statistical Functions	
	Function	Description
225	AVEDEV	Returns the average of the absolute deviations of data points from their mean
226	AVERAGE	Returns the average of its arguments
227	AVERAGEA	Returns the average of its arguments, including numbers, text, and logical values
228	BETADIST	Returns the beta cumulative distribution Function
229	BETAINV	Returns the inverse of the cumulative distribution Function for a specified beta distribution
230	BINOMDIST	Returns the individual term binomial distribution probability
231	CHIDIST	Returns the one-tailed probability of the chi-squared distribution
232	CHIINV	Returns the inverse of the one-tailed probability of the chi-squared distribution
233	CHITEST	Returns the test for independence
234	CONFIDENCE	Returns the confidence interval for a population mean
235	CORREL	Returns the correlation coefficient between two data sets
236	COUNT	Counts how many numbers are in the list of arguments
237	COUNTA	Counts how many values are in the list of arguments
238	COUNTBLANK	Counts the number of blank cells within a range
239	COUNTIF	Counts the number of nonblank cells within a range that meet the given criteria
240	COVAR	Returns covariance, the average of the products of paired deviations
241	CRITBINOM	Returns the smallest value for which the cumulative binomial distribution is less than or equal to a criterion value

242	DEVSQ	Returns the sum of squares of deviations
243	EXPONDIST	Returns the exponential distribution
244	FDIST	Returns the F probability distribution
245	FINV	Returns the inverse of the F probability distribution
246	FISHER	Returns the Fisher transformation
247	FISHERINV	Returns the inverse of the Fisher transformation
248	FORECAST	Returns a value along a linear trend
249	FREQUENCY	Returns a frequency distribution as a vertical array
250	FTEST	Returns the result of an F-test
251	GAMMADIST	Returns the gamma distribution
252	GAMMAINV	Returns the inverse of the gamma cumulative distribution
253	GAMMALN	Returns the natural logarithm of the gamma Function, Γ(x)
254	GEOMEAN	Returns the geometric mean
255	GROWTH	Returns values along an exponential trend
256	HARMEAN	Returns the harmonic mean
257	HYPGEOMDIST	Returns the hypergeometric distribution
258	INTERCEPT	Returns the intercept of the linear regression line
259	KURT	Returns the kurtosis of a data set
260	LARGE	Returns the k-th largest value in a data set
261	LINEST	Returns the parameters of a linear trend
262	LOGEST	Returns the parameters of an exponential trend
263	LOGINV	Returns the inverse of the lognormal distribution
264	LOGNORMDIST	Returns the cumulative lognormal distribution
265	MAX	Returns the maximum value in a list of arguments

266	MAXA	Returns the maximum value in a list of arguments, including numbers, text, and logical values
267	MEDIAN	Returns the median of the given numbers
268	MIN	Returns the minimum value in a list of arguments
269	MINA	Returns the smallest value in a list of arguments, including numbers, text, and logical values
270	MODE	Returns the most common value in a data set
271	NEGBINOMDIST	Returns the negative binomial distribution
272	NORMDIST	Returns the normal cumulative distribution
273	NORMINV	Returns the inverse of the normal cumulative distribution
274	NORMSDIST	Returns the standard normal cumulative distribution
275	NORMSINV	Returns the inverse of the standard normal cumulative distribution
276	PEARSON	Returns the Pearson product moment correlation coefficient
277	PERCENTILE	Returns the k-th percentile of values in a range
278	PERCENTRANK	Returns the percentage rank of a value in a data set
279	PERMUT	Returns the number of permutations for a given number of objects
280	POISSON	Returns the Poisson distribution
281	PROB	Returns the probability that values in a range are between two limits
282	QUARTILE	Returns the quartile of a data set
283	RANK	Returns the rank of a number in a list of numbers
284	RSQ	Returns the square of the Pearson product moment correlation coefficient
285	SKEW	Returns the skewness of a distribution
286	SLOPE	Returns the slope of the linear regression line
287	SMALL	Returns the k-th smallest value in a data set
288	STANDARDIZE	Returns a normalized value

289	STDEV	Estimates standard deviation based on a sample
290	STDEVA	Estimates standard deviation based on a sample, including numbers, text, and logical values
291	STDEVP	Calculates standard deviation based on the entire population
292	STDEVPA	Calculates standard deviation based on the entire population, including numbers, text, and logical values
293	STEYX	Returns the standard error of the predicted y-value for each x in the regression
294	TDIST	Returns the Student's t-distribution
295	TINV	Returns the inverse of the Student's t-distribution
296	TREND	Returns values along a linear trend
297	TRIMMEAN	Returns the mean of the interior of a data set
298	TTEST	Returns the probability associated with a Student's t-test
299	VAR	Estimates variance based on a sample
300	VARA	Estimates variance based on a sample, including numbers, text, and logical values
301	VARP	Calculates variance based on the entire population
302	VARPA	Calculates variance based on the entire population, including numbers, text, and logical values
303	WEIBULL	Returns the Weibull distribution
304	ZTEST	Returns the one-tailed probability-value of a z-test
	Text Functions	
	Function	Description
305	ASC	Changes full-width (double-byte) English letters or katakana within a character string to half-width (single-byte) characters
306	BAHTTEXT	Converts a number to text, using the ß (baht) currency format

307	CHAR	Returns the character specified by the code number
308	CLEAN	Removes all nonprintable characters from text
309	CODE	Returns a numeric code for the first character in a text string
310	CONCATENATE	Joins several text items into one text item
311	DOLLAR	Converts a number to text, using the $ (dollar) currency format
312	EXACT	Checks to see if two text values are identical
313	FIND, FINDB	Finds one text value within another (case-sensitive)
314	FIXED	Formats a number as text with a fixed number of decimals
315	JIS	Changes half-width (single-byte) English letters or katakana within a character string to full-width (double-byte) characters
316	LEFT, LEFTB	Returns the leftmost characters from a text value
317	LEN, LENB	Returns the number of characters in a text string
318	LOWER	Converts text to lowercase
319	MID, MIDB	Returns a specific number of characters from a text string starting at the position you specify
320	PHONETIC	Extracts the phonetic (furigana) characters from a text string
321	PROPER	Capitalizes the first letter in each word of a text value
322	REPLACE, REPLACEB	Replaces characters within text
323	REPT	Repeats text a given number of times
324	RIGHT, RIGHTB	Returns the rightmost characters from a text value
325	SEARCH, SEARCHB	Finds one text value within another (not case-sensitive)
326	SUBSTITUTE	Substitutes new text for old text in a text string
327	T	Converts its arguments to text
328	TEXT	Formats a number and converts it to text

329	TRIM	Removes spaces from text
330	UPPER	Converts text to uppercase
331	VALUE	Converts a text argument to a number
	External Functions	
	Function	Description
332	EUROCONVERT	Converts a number to euros, converts a number from euros to a euro member currency, or converts a number from one euro member currency to another by using the euro as an intermediary (triangulation)
333	SQL.REQUEST	Connects with an external data source and runs a query from a worksheet, then returns the result as an array without the need for macro programming
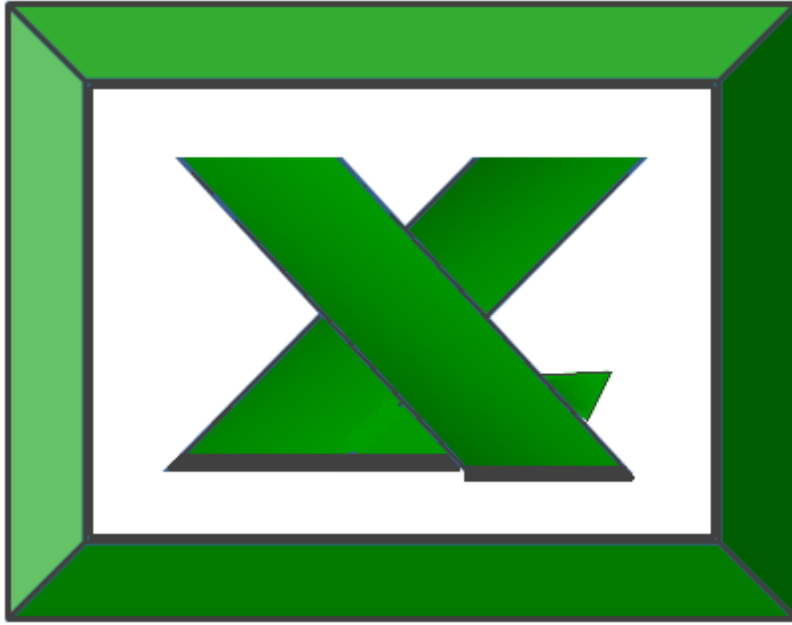
Chapter 4

The =IF Function

=IF

The "IF" function is the most powerful of all functions – not just in Excel, but in any programming language. Commonly referred to as "Conditional Programming", it is the IF function that enables us to introduce logical thinking into any program. This function is also referred to as the "If-Then-Else" command, "conditional expressions", or "Propositional Logic". The following Wikis explains this concept in more detail:

http://en.wikipedia.org/wiki/Conditional_(programming).
http://en.wikipedia.org/wiki/Logical_conditional#Conditional_statements

The clever CPA can use the IF Function to build elaborate Excel templates and financial models containing an almost unlimited amount of sophisticated programming. Presented below are several examples to help you better understand the application of this powerful tool.

Simple IF - The IF function returns one value if a condition you specify evaluates to TRUE, and another value if that condition evaluates to FALSE. Presented below is a simple example:

D4		f_x	=IF(C4>B4,"Over Budget","")		
	A	B	C	D	E	F
1	Simple IF Example					
2						
3		Budget	Actual			
4	Travel Expense	2,300.00	2,492.43	Over Budget		

Simple IF with Calculation – Presented below is an example that is a little more complex:

D18		f_x	=IF(C18>B18,"Over Budget by $"&C18-B18,"")				
	A	B	C	D	E	F	G	H
15	A Little More Complex IF Example							
16								
17		Budget	Actual					
18	Travel Expense	2,300.00	2,492.43	Over Budget by $192.43				
19								

Simple IF – Larger Example - Presented below is yet another IF example on a little larger scale – this example shows how one might apply the IF function to evaluate budget versus actual comparisons.

	D13	▼	f_x	=IF(C13>B13,"Over Budget by \$"&C13-B13,"")		
	A	B	C	D	E	F
11	**IF Example - A Slightly Larger Example:**					
12		**Budget**	**Actual**			
13	AUTOMOBILE EXPENSE	2,139.55	2,674.44	Over Budget by \$534.89		
14	BANK SERVICE CHARGES	37.34	48.54	Over Budget by \$11.2		
15	CONFERENCE REGISTRATION FEES	750.00	500.00			
16	CONTRACT LABOR	26,654.80	34,651.24	Over Budget by \$7996.44		
17	CONTRIBUTIONS	1,282.53	1,603.16	Over Budget by \$320.63		
18	DUES AND SUBSCRIPTIONS	6,051.13	7,866.47	Over Budget by \$1815.34		
19	EQUIPMENT PURCHASE	1,235.87	1,544.84	Over Budget by \$308.97		
20	EQUIPMENT RENTAL	124.50	85.03			
21	HARDWARE PURCHASE	3,950.05	4,937.56	Over Budget by \$987.51		
22	INSURANCE	11,697.00	15,206.10	Over Budget by \$3509.1		
23	MARKETING GIVEAWAYS	1,876.70	1,481.09			
24	MEMBERSHIPS	90.00	117.00	Over Budget by \$27		
25	MISCELLANEOUS	21,010.25	26,262.81	Over Budget by \$5252.56		
26	OFFICE SUPPLIES	6,861.83	8,920.38	Over Budget by \$2058.55		
27	ONLINE COMPUTER SERVICES	5,789.74	7,237.18	Over Budget by \$1447.44		
28	OUTSIDE SERVICES	4,563.21	508.95			
29	PARTNER SALARY DRAW	172,000.00	215,000.00	Over Budget by \$43000		
30	PAYROLL EXPENSES	564.67	655.43	Over Budget by \$90.76		

Simple IF with Drop Down - In the following example, the IF function is checking to see if they have signed up for insurance. If they have, the deduction amount is entered.

	D9	▼	f_x	=IF(C9="Yes",235,0)
	A	B	C	D
5	**Name**	**Hire Date**	**Insurance?**	**Deduction**
6	Wells, Diane	3/1/2008	Yes	235.00
7	Thomas, Doug	11/1/2005	No	0.00
8	Singh, Lisa	6/1/2003	No	0.00
9	Smith, John	2/1/2007	Yes	235.00
10	Simpleton, Fred	2/22/2006		0.00
11	Norris, Carnie	4/7/2002		0.00
12	Hall, Nancy	8/2/2005		0.00

Simple IF with Calculation - The next IF function example is determining each employees earned vacation days. If they have worked for more than a year, they have earned 5 vacation days plus one day for each additional full year.

	D8		f_x	=IF(C8>1,INT(C8)+4,0)	
	A	**B**	**C**	**D**	
6	8/8/2009				
7		Hire Date	Years Employed	Vacation Days Earned	
8	Garcia, Jorge	3/1/2008	1.44	5.00	
9	Jones, Joe	11/1/2005	3.77	7.00	
10	Singh, Lisa	6/1/2003	6.19	10.00	
11	Smith, John	2/1/2009	0.51	0.00	
12					

Nested IF Functions - In this sample, there are four possibilities for bonuses.

	D6		f_x	=IF(C6="B. Basic Bonus",$I$5,IF(C6="C. High perfpormance Bonus",$I$6,IF(C6="D. Super Bonus",$I$7,$I$4)))						
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
4	8/8/2009							A. No Bonus	-	
5	**Employee**	**Hire date**	**Bonus Level**	**Deduction**				B. Basic Bonus	1,500	
6	Garcia, Jorge	3/1/2008	B. Basic Bonus	1,500.00				C. High Performance Bonus	2,500	
7	Jones, Joe	11/1/2005	C. High Performance Bonus	0.00				D. Super Bonus	4,000	
8	Singh, Lisa	6/1/2003	D. Super Bonus	4,000.00						
9	Smith, John	2/1/2007	A. No Bonus	0.00						
10	Wells, Diane	3/1/2008	B. Basic Bonus	1,500.00						
11	Thomas, Doug	11/1/2005	C. High Performance Bonus	0.00						
12	Simpleton, Fred	2/22/2006	A. No Bonus	0.00						
13	Norris, Carnie	4/7/2002	D. Super Bonus	4,000.00						
14	Hall, Nancy	8/2/2005	A. No Bonus	0.00						

IF Function with Logical OR Argument - Teams A and C meet on Tuesday, Teams B and D meet on Thursday. We want to list the meeting days in column D.

	D7		f_x	=IF(OR(C7="A",C7="C"),"Tuesday","Thursday")	
	A	**B**	**C**	**D**	**E**
5	8/8/2009				
6	**Employee**	**Hire date**	**Team**	**Meeting Day**	
7	Garcia, Jorge	3/1/2008	A	Tuesday	
8	Jones, Joe	11/1/2005	B	Thursday	
9	Singh, Lisa	6/1/2003	C	Tuesday	
10	Smith, John	2/1/2007	D	Thursday	
11	Wells, Diane	3/1/2008	A	Tuesday	
12	Thomas, Doug	11/1/2005	B	Thursday	
13	Simpleton, Fred	2/22/2006	C	Tuesday	
14	Norris, Carnie	4/7/2002	D	Thursday	
15	Hall, Nancy	8/2/2005	A	Tuesday	
16					

More Complex IF Function Example - The following IF example shows a more complex application in which the user selects a taxpayer status from a drop down list, which then retrieves the correct tax base, threshold, and incremental tax rates to be used in calculating tax.

This example illustrates how a CPA might prepare an income statement template that calculates the appropriate amount of taxes as net income and the taxpayer status changes. Essentially the template calculates the correct tax given all four possible taxpayer statuses, and the IF statements are used to select the correct answers based on the taxpayer status selected.

Keep in mind that despite the many accolades mentioned above, the IF Function is not always the best solution. For example, the VLOOKUP would be a better and easier function to use to extract data from a list as shown in the nested IF Function a few examples above. Many Excel Functions also provide built-in "IF-Then-Else" functionality.

Key Pointers for Using the IF Function:

1. **Nesting** – You can embed up to 8 nested IF functions in a single formula in Excel 2003, and up to 64 IF nested functions in Excel 2007.
2. **AND, OR** – You can use the AND and/or OR operator to add more conditions to an IF Function.
3. **Variations of IF** - Excel offers several variations of the IF function as follows: COUNTIF, COUNTIFS, SUMIF, SUMIFS.
4. **Evaluating an IF Error** – Since the IF statement provides only a true or false result, there is no way to evaluate an IF Function to ERROR. If you receive an error, you wrote the formula wrong.
5. **The Null Set** - The Double Quotes is the Null Set, or absence of a value. For example, when testing for a Zero balance or testing for a blank cell, the following IF functions would apply:
   a. =IF(A1=0,"ZERO","")
   b. =IF(A1="","Blank","")
   (Excel also provides an ISBLANK Function that would also work.)
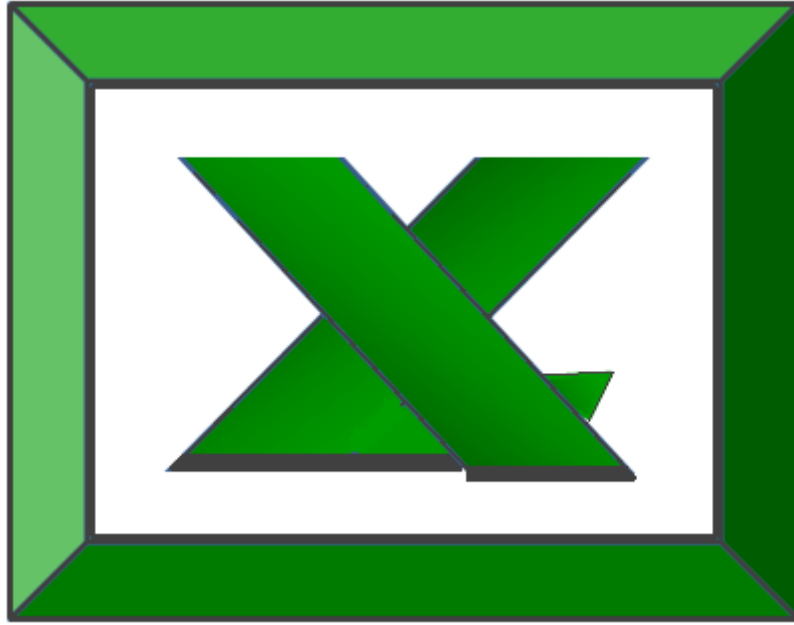
Chapter 5

Using Functions To Crunch & Clean Data

Cleaning Data Using Functions

CPAs often receive or retrieve data from many sources in a wide variety of formats such as Text or CSV formats. You don't always have control over the format and type of data that you import from an external data source, such as a database, text file, or a Web page. Before you can analyze the data, you often need to clean it up. Fortunately, Office Excel has many features to help you get data in the precise format that you want. Sometimes, the task is straightforward and there is a specific feature that does the job for you.

For example, you can easily use Spell Checker to clean up misspelled words in columns that contain comments or descriptions. Or, if you want to remove duplicate rows, you can quickly do this by using the **Remove Duplicates** dialog box. At other times, you may need to manipulate one or more columns by using a formula to convert the imported values into new values.

For example, if you want to remove trailing spaces, you can create a new column to clean the data by using a formula, filling down the new column, converting that new column's formulas to values, and then removing the original column. Excel provides many functions to help you clean your data as follows:

1. Import
2. Text to Columns
3. Remove Duplicates
4. Find & Replace
5. Spell Check
6. =UPPER
7. =LOWER
8. =PROPER
9. =FIND
10. =SEARCH
11. =LEN
12. =SUBSTITUTE
13. =REPLACE
14. =LEFT
15. =MID
16. =RIGHT
17. =VALUE
18. =CONCATENATE
19. =TEXT
20. =TRIM
21. =CLEAN
22. =FIXED
23. =DOLLAR
24. =CODE
25. Macros

1. **Importing Data into Excel –** Of course excel opens up excel files, but what happens when you attempt to open data that is not contained in an Excel format? The answer is that Excel automatically imports that data on the fly and displays a Import Wizard to help you complete the process. The Text Import Wizard examines the text file that you are importing and helps you import the data the way that you want. To start the Text Import Wizard, on the Data tab, in the Get External Data group, click From Text. Then, in the Import Text File dialog box, double-click the text file that you want to import. The following dialog box will be displayed:
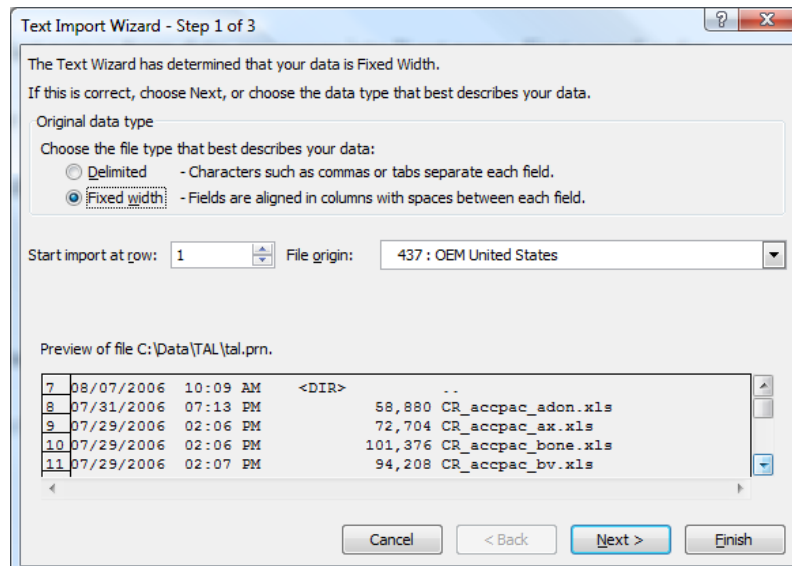
If items in the text file are separated by tabs, colons, semicolons, spaces, or other characters, select Delimited. If all of the items in each column are the same length, select Fixed width. In step 3, click the Advanced button to specify that one or more numeric values may contain a trailing minus sign. Also click the desired data format for each column to be imported.
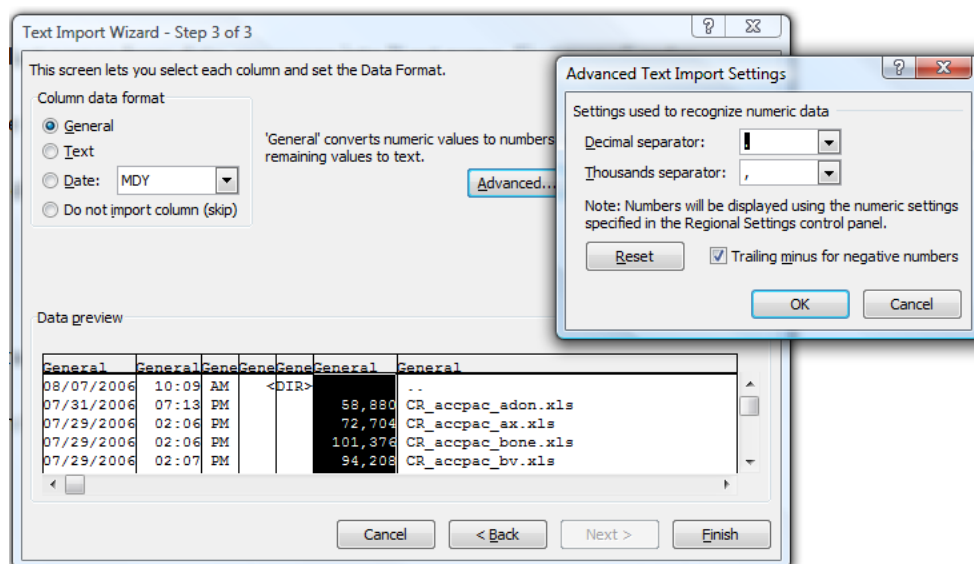
2. **Text to Columns** – The Text to Columns command located on the Data Ribbon works exactly the same way as described above – the user simply launches it to convert data within an existing worksheet.

3. **Removing Duplicate Rows -** Duplicate rows are a common problem when you import data. You can identify and remove duplicate rows by using the Data, Advanced Filter, Unique Records Only tool as show in the screen below.
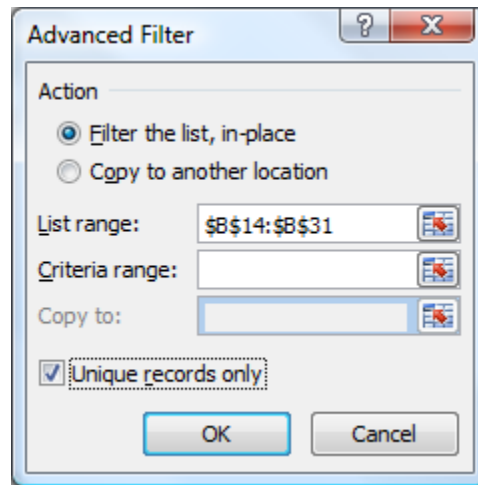
4. **Find and Replace Text –** This tool can be used to identify and remove leading string, such as a label followed by a colon and space, or a suffix, such as a parenthetic phrase at the end of the string that is obsolete or unnecessary. You can do this by finding instances of that text and then replacing it with no text or other text.
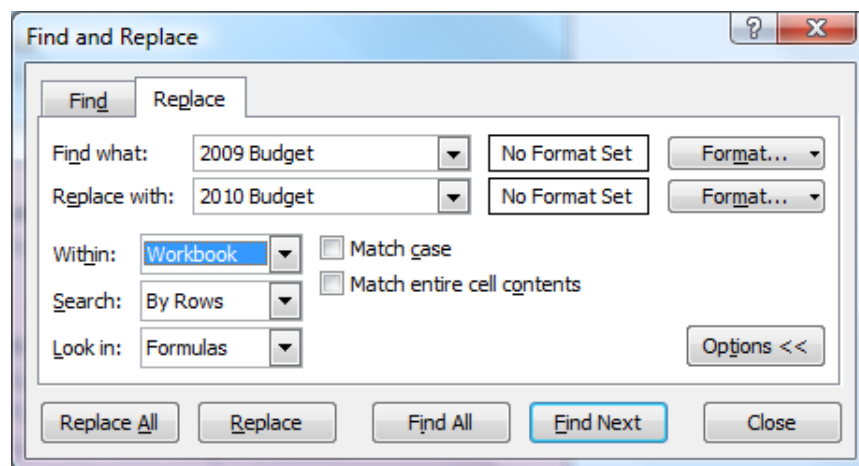
Noteworthy Find and Replace Points:

1. You can search and replace for an entire worksheet, or the entire workbook.
2. You can find and replace formats with new formats.
3. There is a cell chooser option that makes it easier to find and replace formats.

4. If you highlight a range of cells, then search and replace only searches and replaces within that range of cells.
5. You can replace all at once or one at a time.
6. You could also find and replace references in a formula.

5. **Spell Check -** You can use a spell checker to not only find misspelled words, but to find values that are not used consistently, such as product or company names, by adding those values to a custom dictionary. The spell check function also checks your grammar as well.
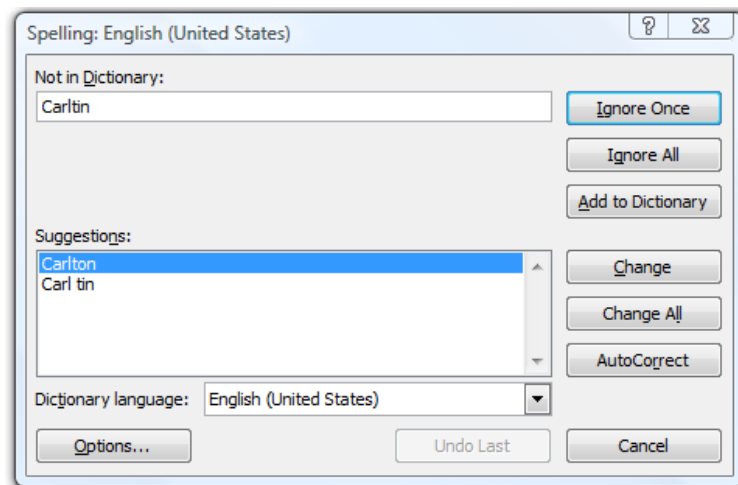
Changing The Case Of Text – You can use one or more of the three Case functions to convert text to lowercase letters, such as e-mail addresses, uppercase letters, such as product codes, or proper case, such as names or book titles.

6. **= UPPER** - Converts text to uppercase letters.

7. **=LOWER** - Converts all uppercase letters in a text string to lowercase letters.

8. **=PROPER** - Capitalizes the first letter in a text string and any other letters in text that follow any character other than a letter. Converts all other letters to lowercase letters.

A15			f_x	=PROPER(A13)	
	A	B	C	D	
13	KEITH BELL	118 BELVEDERE LANE	PEACHTREE CITY, GA 30269	770-632-9875	
14					
15	Keith Bell	118 Belvedere Lane	Peachtree City, Ga 30269	770-632-9875	

Merging And Splitting Columns - A common task after importing data from an external data source is to either merge two or more columns into one, or split one column into two or more columns. For example, you may want to split a column that contains a full name into a first and last name. Or, you may want to split a column that contains an address field into separate street, city, region, and postal code columns. The reverse may also be true. Presented below are functions that to help you accomplish these tasks:

9. **=FIND** – Use Returns the starting position of a character, string of characters or word with a cell. Find is case sensitive.

I3			f_x	=FIND("(",A3)					
	A	B	C	D	E	F	G	H	I
3	Alan Akers,316 Wild Heron Road,St. Simons Island, GA 31522,(912) 638-5009,alan@akers.com								60

10. **=SEARCH** – Returns the starting position of a character, string of characters or word with a cell. Search is not case sensitive.

I3			f_x	=SEARCH("(",A3)					
	A	B	C	D	E	F	G	H	I
3	Alan Akers,316 Wild Heron Road,St. Simons Island, GA 31522,(912) 638-5009,alan@akers.com								60

11. **=LEN** – Displays the length or number of characters in a cell.

B3			f_x	=LEN(A3)	
	A				B
3	Alan Akers,(912) 638-5009,alan@Yahoo.com, alan@Gmail.com,AlanAkers@SSI.com				74

12. **=SUBSTITUTE** – Replaces a character or characters with a character or characters that you specify.

A8			f_x	=SUBSTITUTE(A6,"AOL","America Online")
	A			
6	Teresa Baldwin, (912) 265-2616, Teresa@AOL.com			
7				
8	Teresa Baldwin, (912) 265-2616, Teresa@America Online.com			

13. **=REPLACE** - Replaces a character or characters with a character or characters that you specify.

A8			f_x	=REPLACE(A6,40,3,"America Online")
	A			
6	Teresa Baldwin, (912) 265-2616, Teresa@AOL.com			
7				
8	Teresa Baldwin, (912) 265-2616, Teresa@America Online.com			

14. **=LEFT** – Extracts the specified number of characters from a cell, starting from the left.

H4	▾ ⊙	f_x	=LEFT(G4,7)

	G	H
4	Memphis, TN (Briarcrest Christina HS)	Memphis

15. =MID – Extracts the specified number of characters from a cell, starting from somewhere in the middle of the cell.

H4	▾ ⊙	f_x	=MID(G4,10,2)

	G	H
4	Memphis, TN (Briarcrest Christina HS)	TN

16. =RIGHT – Extracts the specified number of characters from a cell, starting from the right.

F4	▾ ⊙	f_x	=RIGHT(G4,3)

	F	G	H
4	268	6-5/268	Memphis, TN (Briarcrest Christina HS)

17. =Value – Converts text to values so the data can be added, subtracted, multiplied, divided or referenced in a function.

F4	▾ ⊙	f_x	=VALUE(RIGHT(G4,3))

	D	E	F	G	H
4	Fr.	HS	268	6-5/268	Memphis, TN (Briarcrest Christina HS)

18. =CONCATENATE - Joins two or more text strings into one text string.

D5	▾ ⊙	f_x	

	A	B	C	D
3	**Collins**	**Carlton**	**Carlton Collins**	

Variations of these functions that are used when working with foreign languages:

=FINDB – Use this when working with foreign characters like these (京 "," 東 京 都)
=SEARCHB – Use this when working with foreign characters like these (京 "," 東 京 都)
=REPLACEB – Use this when working with foreign characters like these (京 "," 東 京 都)
=LEFTB – Use this when working with foreign characters like these (京 "," 東 京 都)
=RIGHTB – Use this when working with foreign characters like these (京 "," 東 京 都)
=LENB – Use this when working with foreign characters like these (京 "," 東 京 都)
=MIDB – Use this when working with foreign characters like these (京 "," 東 京 都)

Cleaning Text – (Removing Spaces And Nonprinting Characters From Text) - Sometimes text values contain leading, trailing, or multiple embedded space characters (Unicode character set values 32 and 160), or nonprinting characters (Unicode character set values 0 to 31, 127, 129, 141, 143, 144, and 157). These characters can sometimes cause unexpected results when you sort, filter, or search. For example, in the external data source, users may make typographical errors by inadvertently adding extra space characters, or imported text data from external sources may contain nonprinting characters that are

embedded in the text. Because these characters are not easily noticed, the unexpected results may be difficult to understand. Following is a list of functions you can use to remove these unwanted characters:

19. =TEXT - Converts a value to text in a specific number format.

	A10	▾	f_x	=A5&" sold "&TEXT(B5, "$0.00")&" worth of units."
	A		B	
5	Carlton Collins		$ 2,800.00	Mo
6	Mickey Mouse		40%	
7				
8	**Examples**			
9	Carlton Collins2800			Simple com
10	Carlton Collins sold $2800.00			Combines c

20. =TRIM - Removes the 7-bit ASCII space character (value 32) from text.

	C4	▾	f_x	=TRIM(B4)
	B			C
4	American Institute of Certified Public Accountants			American Institute of Certified Public Accountants

21. =CLEAN - Removes the first 32 nonprinting characters in the 7-bit ASCII code (values 0 through 31) from text.

	D4	▾	f_x	=CLEAN(B4)	
	A	B		C	D
4		•Accounts Receivable•			Accounts Receivable

22. =FIXED - Rounds a number to the specified number of decimals, formats the number in decimal format by using a period and commas, and returns the result.

	B15	▾	f_x	=FIXED(B13,2)	
	A		B	C	D
13	Insurance		11,826.9537	15,375.0398	19,218.7997
14					
15			11,826.95	15,375.04	19,218.80

23. =DOLLAR - Converts a number to text format and applies a currency symbol.

	B15	▾	f_x	=DOLLAR(B13,2)	
	A		B	C	D
13	Insurance		11,826.9537	15,375.0398	19,218.7997
14					
15			$11,826.95	$15,375.04	$19,218.80

24. =CODE - Returns a numeric code for the first character in a text string.

Fixing Dates and Times - There are many different date formats, and these varied formats may be confused with numbered part codes or other strings that contain slash marks or hyphens, dates and times often need to be converted and reformatted. Presented below is a list of functions that help you accomplish this task.

25. **=DATE** - Returns the sequential serial number that represents a particular date. If the cell format was General before the function was entered, the result is formatted as a date.

	A	B	C	D	E	F
	A7		fx	=DATE(A4,B4,C4)		
3	Year	Month	Day	Data		
4	2008	1	1	20081125		
5						
6	Examples:					
7		1/1/2008		Serial date for the date derived by using cells A2, B2, and C2 as t		

26. **=DATEVALUE** - Converts a date represented by text to a serial number.

	A	B	C	D	E
	C4		fx	=DATEVALUE(A4)	
4	1/1/2008		39448		

27. **=TIME** - Returns the decimal number for a particular time. If the cell format was General before the function was entered, the result is formatted as a date.

28. **=TIMEVALUE** - Returns the decimal number of the time represented by a text string. The decimal number is a value ranging from 0 (zero) to 0.99999999, representing the times from 0:00:00 (12:00:00 AM) to 23:59:59 (11:59:59 P.M.).

Transforming And Rearranging Columns And Rows - Most of the analysis and formatting features in Office Excel assume that the data exists in a single, flat two-dimensional table. Sometimes you may want to make the rows become columns, and the columns become rows. At other times, data is not even structured in a tabular format, and you need a way to transform the data from a nontabular to a tabular format. The following function can help you achieve this goal:

29. **=TRANSPOSE** - Returns a vertical range of cells as a horizontal range, or vice versa.

SUM | =TRANSPOSE(A2:FC18)

=Transpose (You must select a range, Press F2, and then press CTRL+SHFT+ENTER)

Name	My Area is:	Public Practice	Industry	Government	Education	Other 1:	I am a CPA	My Position is:	Owner or Partner	Manager	Supervisor	Senior or staff	Administrative	Other 2	My Experience is:	0-5 years	6-10 years	11-20 years	21 - 30 Years	More than 30 years
Heydon		1								1									1	
Forsberg			1				1				1							1		
Morris		1					1	1										1		
Olson			1				1	1											1	
Morlock		1					1	1											1	
Sheehan		1					1	1										1		
Adank						1	1					1							1	
Hage		1					1													1
Bartholomay			1							1								1		
Myers			1							1										1
Dickson		1									1							1		
Hillstrom		1										1					1			
Marshman		1					1				1						1			
Stroud		1					1	1										1		
Chilcote		1					1					1					1			
DeMars		1										1					1			

=TRANSPOSE(A2:FC18)

30. Data Fill In Trick – A clever trick for filling in missing data can be accomplished using the GOTO, Special, Blanks command. Here is how it works. This trick works well when you have a large volume of data but descriptions are not provided for every row, as shown in the example below:

	A	B	C	D	E	F	G	H
26	Georgia	Atlanta	Apartment	Ginger	432,900	367,965	64,935	24.7%
27			Apartment	Kathy	1,205,988	1,073,329	132,659	43.2%
28			Apartment	Ginger	96,768	70,641	26,127	53.3%
29			Apartment	Kathy	328,563	305,564	22,999	39.8%
30			Duplex	Steve	57,888	55,572	2,316	31.5%
31			Duplex	Steve	79,114	64,873	14,240	27.6%
32			Duplex	Steve	57,888	55,572	2,316	18.7%
33			Duplex	Steve	79,114	64,873	14,240	54.4%
34			Townhome	Steve	39,600	38,016	1,584	56.4%
35			Townhome	Steve	51,480	58,172	(6,692)	26.5%
36			Triplex	Ginger	181,988	205,646	(23,658)	43.2%
37			Triplex	Steve	71,676	70,959	717	53.3%
38			Triplex	Ginger	121,198	112,714	8,484	15.4%
39		Macon	Apartment	Ginger	128,563	119,564	8,999	15.4%
40			Apartment	Steve	296,700	216,591	80,109	23.3%
41			Apartment	Ginger	128,563	119,564	8,999	13.4%
42			Duplex	Steve	76,219	60,213	16,006	26.5%
43			Duplex	Steve	75,254	58,698	16,556	35.6%
44			Townhome	Steve	52,800	46,992	5,808	18.7%
45		Savannah	Apartment	Ginger	76,032	75,272	760	65.0%
46	Texas	Dallas	Apartment	Fred	432,900	367,965	64,935	24.7%
47			Apartment	Martha	1,205,988	1,073,329	132,659	43.2%
48			Apartment	Kathy	328,563	305,564	22,999	39.8%
			Duplex	Steve	57,888	55,572	2,316	31.5%

Start by entering a simple formula referencing the data label in the above cell, just like this:

SUM | =A4

	A	B	C	D	E	F
3	State	City	Type	Manager	Revenue	Expenses
4	Florida	Daytona	Duplex	Steve	75,254	58,698
5	=A4		Duplex	Steve	77,184	87,218

a. Next copy that formula...
b. Highlight the entire range containing data labels in columns A and B. columns...
c. Press the F5 key to launch the GoTo dialog box...
d. Select the Options Box...
e. Click on the "Blanks" radio button...
f. Press Enter...
g. Paste.

	A	B	C	D	E
4	Florida	Daytona	Duplex	Steve	75,254
5	Florida				
6					
7					
8					
9					
10					
11					
12					
13					
14		Tampa			
15					
16					
17					
18					
19					
20					
21			Triplex	Ginger	91,224
22			Triplex	Ginger	91,224
23			Triplex	Ginger	110,772
24			Triplex	Ginger	71,676
25			Triplex	Ginger	110,772
26	Georgia	Atlanta	Apartment	Ginger	432,900

Go To Special — Select:
- Comments
- Constants
- Formulas
  - ☑ Numbers
  - ☑ Text
  - ☑ Logicals
  - ☑ Errors
- ● Blanks
- Current region
- Current array
- Objects
- Row differences
- Column differences
- Precedents
- Dependents
  - ● Direct only
  - All levels
- Last cell
- Visible cells only
- Conditional formats
- Data validation
  - ● All
  - Same

[OK] [Cancel]

This action will cause all data labels to repeat in the empty cells beneath. Next:

h. Copy columns A & B...
i. Paste Special as values to convert the formulas to text based data labels...
j. You are now ready to sort, filter, subtotal and pivot your data.

Fetching Data - Occasionally, database administrators use Office Excel to find and correct matching errors when two or more tables are joined. This might involve reconciling two tables from different worksheets, for example, to see all records in both tables or to compare tables and find rows that don't match.

31. =VLOOKUP - Searches for a value in the first column of a table array and returns a value in the same row from another column in the table array. For example, consider the example below which uses a =VLOOKUP function to calculate the appropriate amount of tax due based on the IRS rate schedule.

F15   fx   =VLOOKUP(F13,B4:F10,1)

A	B	C	D	E	F	G	H	I	J
=VLOOKUP							**Income Statement - Schedule C**		
									2009
Schedule Y-1 — Married Filing Jointly or Qualifying							Revenue		
If Taxable Income	But Not Over--	The Tax Is:		Base Tax	Tax Rate		Sales		$2,300,322
$0	$14,600	over $0		-	10%		Cost of Goods Sold		1,546,577
$14,600	$59,400	15% of the amount		1,460.00	15%		Gross Margin		$ 753,745
$59,400	$119,950	the amount over		8,180.00	25%				
$119,950	$182,800	28% of the amount		23,317.50	28%		Expenses:		
$182,800	$326,450	33% of the amount		40,915.50	33%		Rent		$ 86,230
$326,450	no limit	35% of the amount		88,320.00	35%		Salaries		326,300
							Supplies		12,988
							Insurance		36,788
Taxable Income (from profit & loss statement on Sheet 2)					224,209		Travel		67,230
							Total Expenses		$ 529,536
Taxable Income Threshold Amount (from Column 1 Above)					182,800.00				
							Net Income Before Taxes		$ 224,209
Tax Rate (from Column 5 Above)					33%				
							Taxes		$ 54,580
Base Tax Amount (from Column 4 Above)					40,915.50				
							Net Income After Taxes		$ 169,629
Total Amount of Taxes Due					54,580.47				

As the Income statement shown in the shaded area is updated , the resulting taxable income amount is referenced in Cell F13. Next, 3 VLOOKUP functions pull the appropriate rate, base and threshold information from the rate schedule to be used in calculating income tax. Once calculated, the resulting tax is referenced back to the income statement for the purposes of computing Net income After taxes.

Key points to Consider when Using VLOOKUP:

    a. If you are looking up based on text, the first column containing lookup values must be sorted alphabetically in descending order – else it will not work properly.

    b. If you are looking up based on text, you must have an exact match between the lookup value and the table array value.

    c. If you are looking up based on values, the first column containing lookup values must be sorted numerically in descending order – else it will not work properly.

    d. If you are looking up based on values, then Excel will choose the closest value without going over. For example, if the lookup value is 198,000 and the table array contains values of 100,000 and 200,000, the n excel will choose 100,000 because 200,000 goes over or exceeds 198,000. (It might be helpful to think back to the old Bob barker game show the Price is Right.)

32. **=HLOOKUP** - Searches for a value in the top row of a table or an array of values, and then returns a value in the same column from a row you specify in the table or array.

33. **=INDEX** - Returns a value or the reference to a value from within a table or range. There are two forms of the INDEX function: the array form and the reference form.

34. **=MATCH** - Returns the relative position of an item in an array that matches a specified value in a specified order. Use MATCH instead of one of the LOOKUP functions when you need the position of an item in a range instead of the item itself.

35. **=OFFSET** - Returns a reference to a range that is a specified number of rows and columns from a cell or range of cells. The reference that is returned can be a single cell or a range of cells. You can specify the number of rows and the number of columns to be returned.

36. **Data Cleaning with Macros** - To periodically clean the same data source, consider recording a macro or writing code to automate the entire process. There are also a number of external add-ins written by third-party vendors, listed in the Third-party providers section, that you can consider using if you don't have the time or resources to automate the process on your own.

37. **RAND( ), RANDBETWEEN( ), ROUND( )** – In Excel 2003, RANDBETWEEN is not in the standard EXCEL installation but if the analysis tool pack is installed and the add-in activated it is an extremely useful function.

	A	B	C	D	E	F	G	H
1	**Selecting Invoice Numbers**							
2								
3	First Invoice Number		1000					
4	Last Invoice Number		9999					
5								
6	Simple Randon Number Example:							
8		1		2		3		
9		=RAND()		=B8*1000		=ROUND(D8,0)		
10		0.637495984		637.496		637		
11								
12	Complex Randon Number Example:							
14		1		2		3		
15		=RANDBETWEEN(C2,C3)		=B8*1000		=ROUND(D8,0)		
16		9174		9174000		9174000		

38. Informational Functions

CELL(**info_type**,reference) - Info_type   is a text value that specifies what type of cell information you want. The following list shows the possible values of info_type and the corresponding results.

Info_type	Returns
"address"	Reference of the first cell in reference, as text.
"col"	Column number of the cell in reference.
"color"	1 if the cell is formatted in color for negative values; otherwise returns 0 (zero).
"contents"	Value of the upper-left cell in reference; not a formula.
"filename"	Filename (including full path) of the file that contains reference, as text. Returns empty text ("") if the worksheet that contains reference has not yet been saved.
"format"	Text value corresponding to the number format of the cell. The text values for the various formats are shown in the following table. Returns "-" at the end of the text value if the cell is formatted in color for negative values. Returns "()" at the end of the text value if the cell is formatted with parentheses for positive or all values.
"parentheses"	1 if the cell is formatted with parentheses for positive or all values; otherwise returns 0.
"prefix"	Text value corresponding to the "label prefix" of the cell. Returns single quotation mark (') if the cell contains left-aligned text, double quotation mark (") if the cell contains right-aligned text, caret (^) if the cell contains centered text, backslash (\) if the cell contains fill-aligned text, and empty text ("") if the cell contains anything else.
"protect"	0 if the cell is not locked, and 1 if the cell is locked.
"row"	Row number of the cell in reference.
"type"	Text value corresponding to the type of data in the cell. Returns "b" for blank if the cell is empty, "l" for label if the cell contains a text constant, and "v" for value if the cell contains anything else.

"width" Column width of the cell rounded off to an integer. Each unit of column width is equal to the width of one character in the default font size.

Reference the cell that you want information about. If omitted, information specified in info_type is returned for the last cell that was changed. The following list describes the text values CELL returns when info_type is "format", and reference is a cell formatted with a built-in number format.

If the Microsoft Excel format is	CELL returns
General	"G"
0	"F0"
#,##0	",0"
0.00	"F2"
#,##0.00	",2"
$#,##0_);($#,##0)	"C0"
$#,##0_);[Red]($#,##0)	"C0-"
$#,##0.00_);($#,##0.00)	"C2"
$#,##0.00_);[Red]($#,##0.00)	"C2-"
0%	"P0"
0.00%	"P2"
0.00E+00	"S2"
# ?/? or # ??/??	"G"
m/d/yy or m/d/yy h:mm or mm/dd/yy	"D4"
d-mmm-yy or dd-mmm-yy	"D1"
d-mmm or dd-mmm	"D2"
mmm-yy	"D3"
mm/dd	"D5"
h:mm AM/PM	"D7"
h:mm:ss AM/PM	"D6"
h:mm	"D9"
h:mm:ss	"D8"

If the info_type argument in the CELL formula is "format", and if the cell is formatted later with a custom format, then you must recalculate the worksheet to update the CELL formula.

Examples of Cell Information

44	2	=CELL("col",B5)
	G	=CELL("format",B5)
	8	=CELL("width",B6)
	$B$5	=CELL("address",B5)

Third-Party Solutions – In case Excels built in functions are not sufficient to meet your needs, following is a partial list of third-party providers that have products that are used to clean data in a variety of ways.

Provider	Product
Add-in Express Ltd.	Advanced Find & Replace, Merge Cells Wizard
Add-Ins.com	Duplicate Finder
AddinTools	AddinTools Assist
CDX	Zip Stream
Click 2 Convert	Converts PDF to Excel formats
DigDB	Add-ins for Excel®
JKP Application Development	Flexfind for Excel
J-Walk & Associates, Inc.	Power Utility Pak Version 7
Office Assistance LLC	Similar Data Finder for Excel®
PATools	PATools Advanced Find Replace
PDF2XL	Converts PDF files to Excel Formats
Spinnaker Software Solutions	Spinnaker DB tools for Excel
Vonnix	Excel Power Expander 4.6
WinPure	ListCleaner Lite
ListCleaner Pro	
Clean and Match 2007	
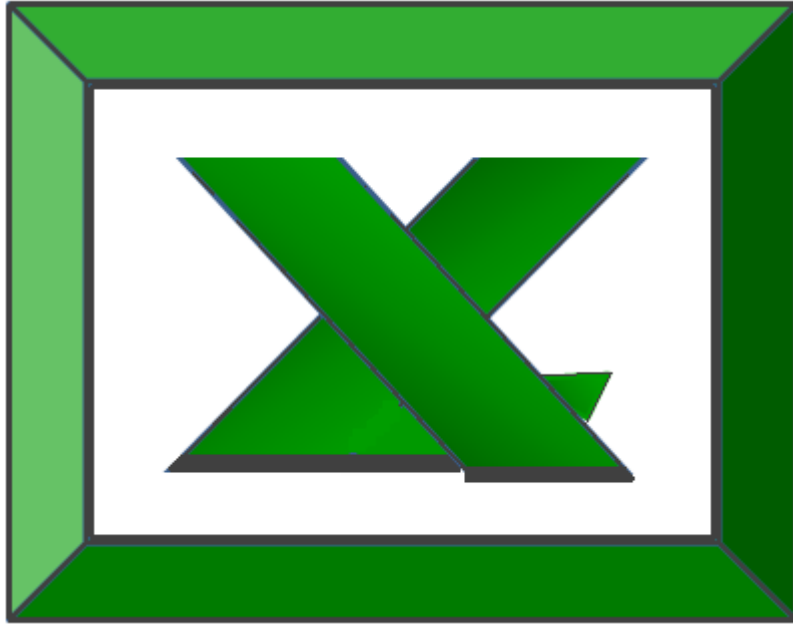
Chapter 6
Data Commands

The Data Menu - Perhaps the parts of Excel that are of most value to CPAs, but least used by CPAs are the Data commands found under the Data menu in Excel 2003 and earlier, and on the data Ribbon in Excel 2007. These commands are shown below, and we will concentrate the next hour to studying these commands.
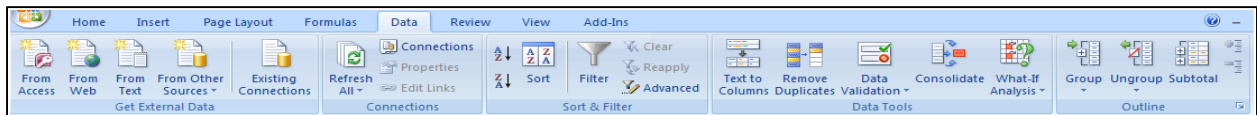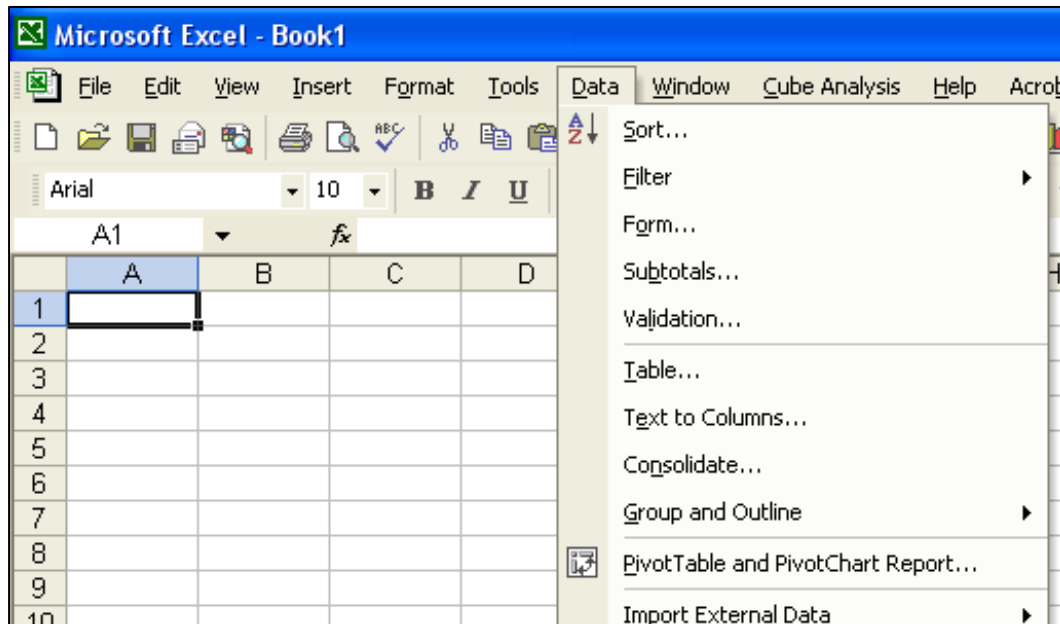
Data Sort - The Sort tool does exactly what it implies – it sorts and data. Key sorting points are as follows:

1. **Contiguous Data** - The "A to Z" sorting tool can sort large matrix of data automatically as long as the data is contiguous. In other words, your data should contain no blank columns, no blank rows, and the columns must all be labeled. Only then will Excel always correctly select the entire matrix for sorting.

2. **A to Z Button** - Simply place the cursor in the desired column for sorted, and press the A to Z or Z to A button as the case may be. Excel will automatically sort all continuous columns that have headings and all contiguous rows from the top row under the heading labels down to the last row in the selected column that contains data. *(Note - If you accidently select 2 cells instead of just one, your results will not be correct.)*

3. **Sort by 64 Columns** - The "Sort" tool is dramatically enhanced in Excel 2007 as it now provides the ability to sort by up to 64 columns, instead of just 3 columns. Presented below is a dialog box which shows this expanded functionality.
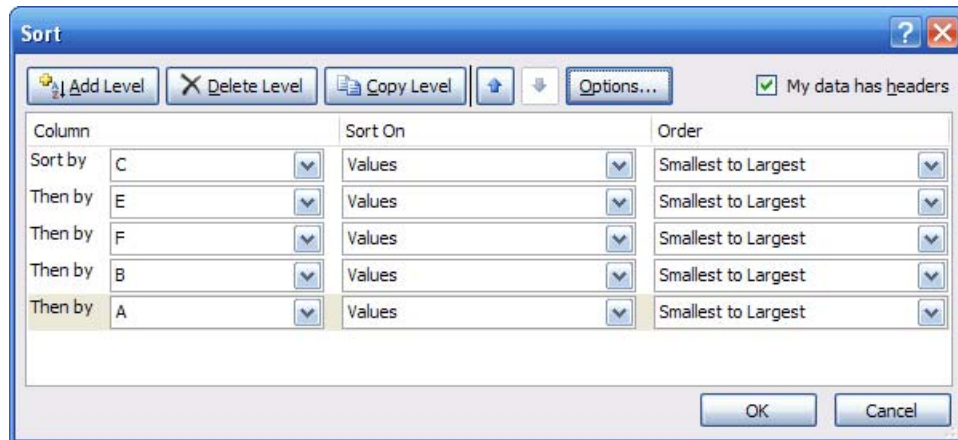
4. **Sort Left to Right** – Excel has always provided the ability to sort left to right. To do so, select the options box in the Sort Dialog box and click the check box labeled "Sort left to Right" as shown below.
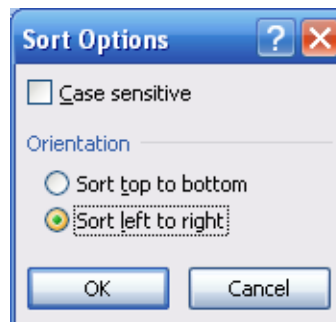
5. **Sort by Color** – Excel 2007 now provides the ability to sort by font color or by cell color, or both. This is handy in many ways. Sometimes CPAs use color to tag or mark certain cells - and later find it useful to be able to sort by those markings. In other situations CPAs use conditional formatting to apply color to cells using a wide variety of rules. Thereafter Excel can sort the data based on the resulting colors. The sort-by-color options are shown below.
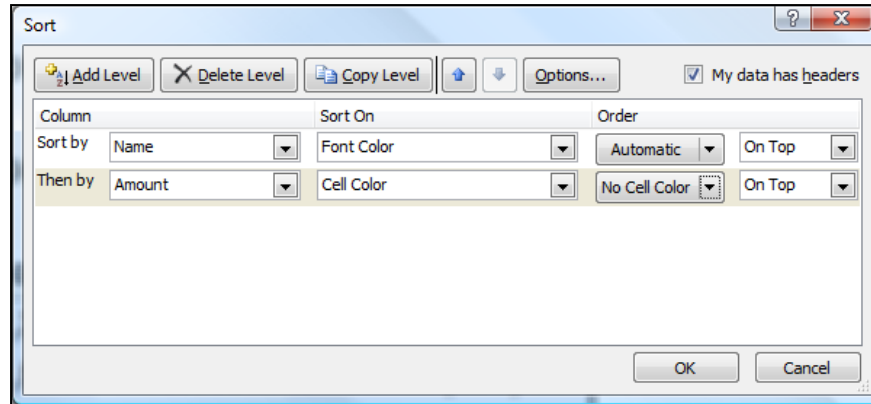
To be accurate, it was possible to sort by color in Excel 2003. To accomplish this task, you needed to use the =CELL function in order to identify information about a given cell such as the cell color or font color. Thereafter, the results of that function could be used to sort rows – which effectively means that you can sort by color in Excel 2003 – but it takes a bit more effort.

6. **Sort By Custom List** – Another sorting capability in Excel is the ability to sort by Custom List. For example, assume a CPA firm has ten partners, and the Managing partner prefers to be shown at the top of the list, and the remaining Partners based on seniority. In this case, you could create a Custom List in the excel Options dialog box listing the partners in the desired order, and then sort future reports based on that order.

Perhaps a better example use of this feature would be to create a non-alphabetic custom list of your chart of accounts, and then sort transactions to produce a general ledger in chart of account order – even if your preferred chart of accounts is not alphabetical. the partner seniority does not match the alphabetic names, nor any

Filtering Data - Using AutoFilter to filter data allows you to view a subset of your data in a range of cells or table. Once you have filtered the data, you can apply additional filters to further refine your data view. When you are done, you can clear a filter to once again redisplay all of the data. To use this tool, start with any list of data and turn on the AutoFilter tool. Then position your cursor in the column you want to filter and use the drop down arrows to apply your filters as shown in the screen below.

	A	B	C	D	E	F	G	H	I	J
4										
5			Carlton's Rental Properties							
6			2009 Analysis							
8	State	City	Type	Manager	Revenue	Expenses	Profit	Vacancy Rate		
9	Sort A to Z		Apartment	Kathy	1,205,988	1,073,329	132,659	43.2%		
10	Sort Z to A		Apartment	Ginger	432,900	367,965	64,935	24.7%		
11	Sort by Color		Apartment	Kathy	328,563	305,564	22,999	39.8%		
12	Clear Filter From "City"		Apartment	Steve	296,700	216,591	80,109	23.3%		
13	Filter by Color		Triplex	Ginger	181,988	205,646	(23,658)	43.2%		
14	Text Filters		Apartment	Ginger	217,504	184,878	32,626	53.3%		
15	☑ (Select All)		Triplex	Ginger	91,224	127,714	(36,490)	24.7%		
16	☑ Atlanta ☑ Daytona		Triplex	Ginger	110,772	125,172	(14,400)	23.3%		
17	☑ Macon ☑ Savannah		Triplex	Ginger	110,772	125,172	(14,400)	31.8%		
18	☑ Tampa		Apartment	Ginger	128,563	119,564	8,999	39.8%		
19			Apartment	Ginger	128,563	119,564	8,999	15.4%		
20			Apartment	Ginger	128,563	119,564	8,999	13.4%		
21	OK	Cancel	Triplex	Ginger	121,198	112,714	8,484	45.0%		
22			Triplex	Ginger	121,198	112,714	8,484	23.3%		
23	Georgia	Atlanta	Triplex	Ginger	121,198	112,714	8,484	15.4%		
24	Florida	Daytona	Triplex	Ginger	110,772	94,156	16,616	39.8%		
25	Florida	Daytona	Duplex	Steve	77,184	87,218	(10,034)	56.4%		

Data Menu / Sort / **Filter** / Form / Subtotals / Validate / Table / Text to Columns

Once the filters are applied, you will see a subset your data. For example, the screen presented below shows filtered data for only Macon and Savannah properties.

	A	B	C	D	E	F	G	H	I
4									
5			Carlton's Rental Properties						
6			2009 Analysis						
8	State	City	Type	Manager	Revenue	Expenses	Profit	Vacancy Rate
12	Georgia	Macon	Apartment	Steve	296,700	216,591	80,109	23.3%
19	Georgia	Macon	Apartment	Ginger	128,563	119,564	8,999	15.4%
20	Georgia	Macon	Apartment	Ginger	128,563	119,564	8,999	13.4%
26	Georgia	Savannah	Apartment	Ginger	76,032	75,272	760	65.0%
36	Georgia	Macon	Duplex	Steve	76,219	60,213	16,006	26.5%
39	Georgia	Macon	Duplex	Steve	75,254	58,698	16,556	35.6%
43	Georgia	Macon	Townhome	Steve	52,800	46,992	5,808	18.7%

As filters are applied, a small funnel appears in the drop down arrow button to indicate that a filter has been applied. You can apply filters for multiple columns simultaneously.

Key Points Concerning The AutoFilter Command:

1. **Contiguous Data** – The AutoFilter tools works best when you are working with data that is contiguous. In other words, your data should contain no blank columns, no blank rows, and the columns must all be labeled.

2. **Filter by Multiple Columns** - You can filter by more than one column.

3. **Removing Filters** – In Excel 2003 and earlier, a faster way to remove multiple filters is to turn off filtering and then turn filtering back on. In Excel 2007 you can simple click the Clear button in the Sort and Filter Group as shown below.
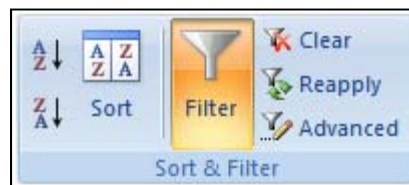
4. **Filters are Additive** - Each additional filter is based on the current filter and further reduces the subset of data.

5. **Three Types of Filters** – You can filter based on list values, by formats, or by criteria. Each of these filter types is mutually exclusive for each range of cells or column table. For example, you can filter by cell color or by a list of numbers, but not by both; you can filter by icon or by a custom filter, but not by both.
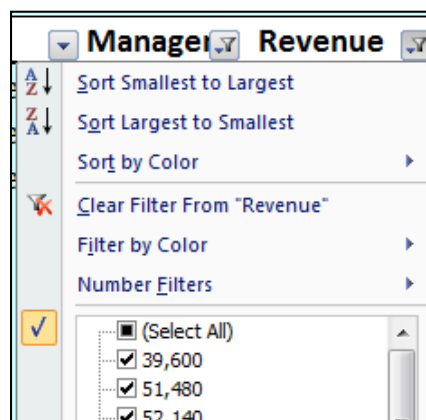
6. **Filters Enabled** - A drop-down arrow ⏷ means that filtering is enabled but not applied.

7. **Filter Applied** - A Filter button 🔽 means that a filter is applied.

8. **Filter Spanning** - The commands under the All Dates in the Period menu, such as January or Quarter 2, filter by the period no matter what the year. This can be useful, for example, to compare sales by a period across several years.

9. **This Year vs. Year-to-Date** Filtering - This Year and Year-to-Date are different in the way that future dates are handled. This Year can return dates in the future for the current year, whereas Year to Date only returns dates up to and including the current date.

10. **Filtering Dates** - All date filters are based on the Gregorian calendar as decreed by Pope Gregory XIII, after whom the calendar was named, on 24 February 1582. The Gregorian calendar modifies the Julian calendar's regular four-year cycle of leap years as follows: Every year that is exactly divisible by four is a leap year, except for years that are exactly divisible by 100; the centurial years that are exactly divisible by 400 are still leap years. For example, the year 1900 is not a leap year; the year 2000 is a leap year.

11. **Filtering By Days of Week -** If you want to filter by days of the week, simply format the cells to show the day of the week.

12. **Top & Bottom Filtering** - On the Data tab, in the Sort & Filter group, click Filter. Point to Number Filters and then select Top 10. To filter by number, click Items. To filter by percentage, click Percent. Note - Top and bottom values are based on the original range of cells or table column and not the filtered subset of data.

13. **Above & Below Average Filtering** - On the Data tab, in the Sort & Filter group, click Filter. Point to Filter by Numbers that are Above/Below Average. Note – These values
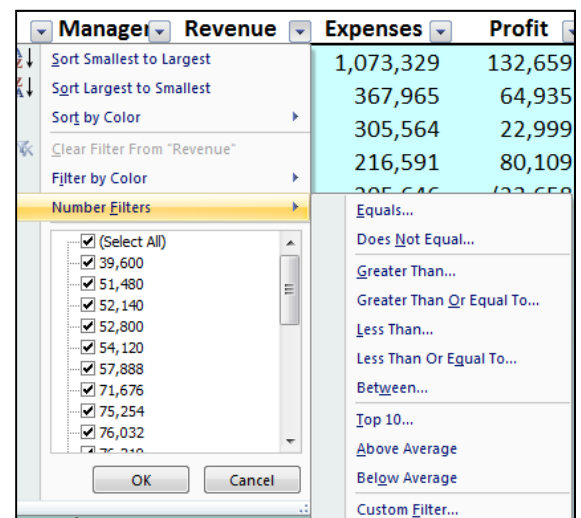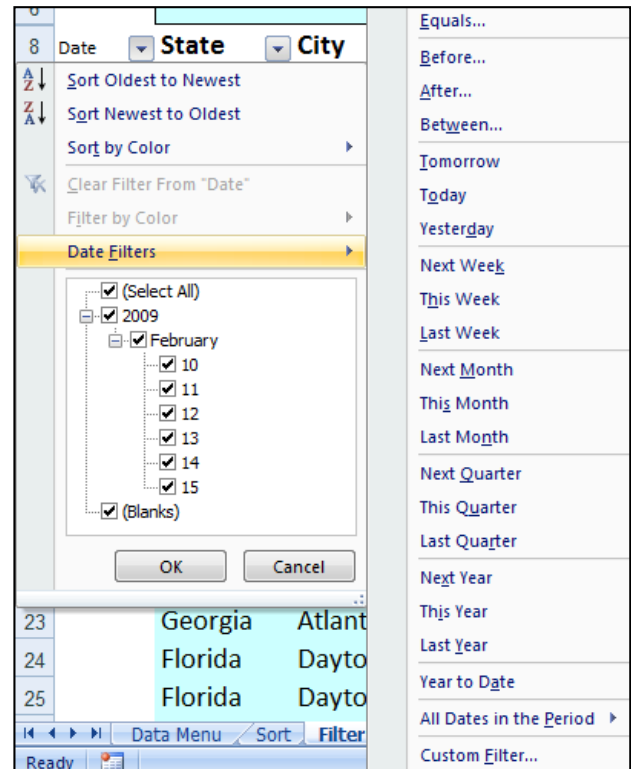
are based on the original range of cells or table column and not the filtered subset of data.

14. **Filtering Out Blanks** - To filter for blanks, in the AutoFilter menu at the top of the list of values, clear (Select All), and then at the bottom of the list of values, select (Blanks).

15. **Filtering By Color** - Select Filter by Color, and then depending on the type of format, select Filter by Cell Color, Filter by Font Color, or Filter by Cell Icon.

16. **Filter by Selection** - To filter by text, number, or date or time, click Filter by Selected Cell's Value and then: To filter by cell color, click Filter by Selected Cell's Color. To filter by font color, click Filter by Selected Cell's Font Color. To filter by icon, click Filter by Selected Cell's Icon.

17. **Refreshing Filters** - To reapply a filter after the data changes, click a cell in the range or table, and then on the Data tab, in the Sort & Filter group, click Reapply.

Data Form – Excel's 2003 Data Form tool makes Excel look more and behave more like a database, such as Microsoft Access. (The Form button has not been included on the Office Fluent user interface Ribbon, but you can still use it in Office Excel 2007 by adding the Form button to the Quick Access Toolbar.)

A data form provides a convenient means to enter or display one complete row of information in a range or table without scrolling horizontally. You may find that using a data form can make data entry easier than moving from column to column when you

have more columns of data than can be viewed on the screen. Use a data form when a simple form of text boxes that list the column headings as labels is sufficient and you don't need sophisticated or custom form features, such as a list box or spin button.

Key Points using data Form:

1. **You cannot print a data form.**

2. **Because a data form is a modal dialog box, you cannot use either the Excel Print command or Print button until you close the data form.**

3. **You might consider using the Windows Print Screen key to make an image of the form, and then paste it into Microsoft Word for printing.**

Data Subtotals – Excel provides an automatic subtotaling which will automatically calculate and insert subtotals and grand totals in your list or table. Once inserted, Excel recalculates subtotal and grand total values automatically as you enter and edit the detail data. The Subtotal command also outlines the list so that you can display and hide the detail rows for each subtotal. Examples of a the Subtotal dialog box and a resulting subtotaled table are shown below.

			Carlton's Rental Properties					
	5		**Carlton's Rental Properties**					
	6		**2009 Analysis**					
							Vacancy	**Police**
	8	**Type**	**Manager**	**Revenue**	**Expenses**	**Profit**	**Rate**	**Visits**
+	22		Billy Total	1,938,977	1,640,126	298,851		75
+	40		Ginger Total	2,340,914	2,211,002	129,912		78
+	54		Jacob Total	3,128,030	2,763,405	364,625		79
+	57		Kathy Total	1,534,551	1,378,893	155,658		13
+	81		Steve Total	1,679,088	1,439,202	239,886		117
−	82		Grand Total	10,621,561	9,432,628	1,188,932		362

Key points to Consider When Using Subtotaling are as follows:

1. **Contiguous Data** – The Subtotal tools works best when you are working with data that is contiguous. In other words, your data should contain no blank columns, no blank rows, and the columns must all be labeled.

2. **Sort Before Your Subtotal** - You must sort the data by the column you wish to Subtotal by, else you will receive erroneous results.

3. **Other Mathematical Applications** - The Subtotal tool not only calculates subtotals, but it can also calculate minimums, maximums, averages, standard deviations, and other functions.

4. **Subtotals in 2007 Tables** – Excel 2007 deploys Subtotaling a little differently in that the Subtotal tool appears at the bottom of each column in each table, as shown in the screen below.

5. **Automatic Outlining** - Subtotaling automatically inserts Outlines, which is really cool. You can then condense and expand the data in total and by subtotal. Some CPAs also like to copy and paste the condensed subtotal information to another location but find that this process copies and pastes all of the data. There are

two ways to achieve a clean copy and paste without grabbing all the hidden data as follows:

a. **CTRL key** – Hold the Control Key down while you individually click on each subtotal row. This will enable you to copy and paste just the subtotal data. This approach can be problematic because if you mis-click, you have to start over.

b. **Select Visible Cells** – A better approach is to use the Select Visible Cells tool. This tool will select on the data you can see, after which the copy and paste routine will yield the desired results. This option is better because it is faster and less error prone.

Data Validation

Data Validation can be used to limit the data that can be entered into a cell. For example, you might want the user to enter only values between 1% and 99%. You might also use this tool to enable data input to a drop down list. This has two advantages in that it can be faster and more accurate. Start with the dialog box below to create your drop down list functionality.
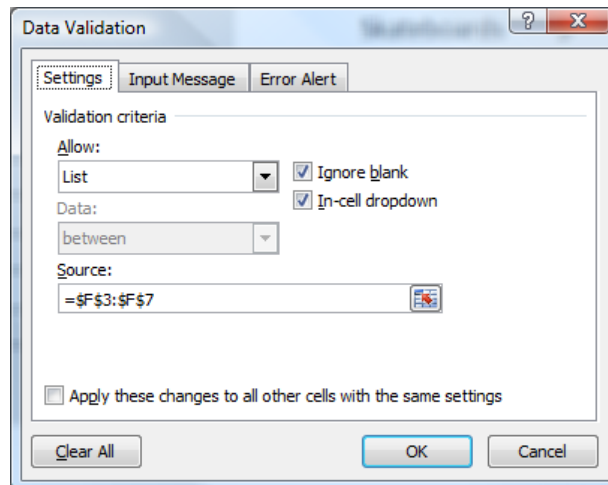
After making all the necessary selections in the validation list dialog box, your worksheet will behave as shown below.

You can also provide messages to define what input you expect for the cell, and instructions to help users correct any errors. For example, in a marketing workbook, you can set up a cell to allow only account numbers that are exactly three characters long. When users select the cell, you can show them a message such as this one:

If users ignore this message and type invalid data in the cell, such as a two-digit or five-digit number, you can show them an actual error message. In a more advanced scenario, you might use data validation to calculate the maximum allowed value in a cell based on a value elsewhere in the workbook. In the following example, the user has typed $4,000 in cell E7, which exceeds the maximum limit specified for commissions and bonuses.

If the payroll budget were to increase or decrease, the allowed maximum in E7 would automatically increase or decrease with it.

PivotTables

The PivotTable report tool provides an interactive way to summarize large amounts of data. Use should use the PivotTable tools to crunch and analyze numerical data PivotTable reports are particularly useful in the following situations:

a. Rearranging rows to columns or columns to rows (or "pivoting") to see different summaries of the source data.
b. Filtering, sorting, grouping, and conditionally formatting your data.
c. Preparing concise, attractive, and annotated online or printed reports
d. Querying large amounts of data.
e. Subtotaling and aggregating numeric data.
f. Summarizing data by categories and subcategories
g. Creating custom calculations and formulas.
h. Expanding and collapsing levels of data.
i. Drilling down to details from the summary data

In essence, PivotTables present multidimensional data views to the user – this process is often referred to as "modeling", "data-cube analysis", or "OLAP data cubes". To re-arrange the PivotTable data, just drag and drop column and row headings to move data around. PivotTables are a great data analysis tool for management.

If you have never used a PivotTable before, initially the concept can be difficult to grasp. The best way to understand a PivotTable is to create a blank Pivot Table and then drag

and drop field names onto that blank table. This way you will see the resulting pivot table magically appear and it will help you better understand the important relationship between the pivot pallet and the field name list.

Let's create a simple PivotTable. Start with an Excel worksheet data that contains several columns of data – the data must include column and row headings and it helps if the data is contiguous. Place your cursor anywhere in the data and select PivotTable from the Data menu in Excel 2003 and click Finish; or from the insert Ribbon in Excel 2007. This process is shown below: Let's start with a page of data summarizing the results of tax season as all of the time sheet entries have been entered onto a single worksheet as shown below.

	A	B	C	D	E	F	G	H	I	J
3	Staff	Month	Work	Partner	Client	Type	Hours	Billings	Budget	Under/Over
4	Abby	January	1040	Coleman	Lisa Sullivan	Individual	19.0	1,425	1,311	114
5	Bill	March	1065	Coleman	Sam's Services	Corporate	22.0	1,650	1,848	(198)
6	Brenda	April	Financial Planning	Smith	Betty Harrington	Individual	10.2	1,020	1,377	(357)
7	Jennifer	March	1065	Coleman	Lisa Sullivan	Individual	18.4	630	706	(76)
8	Jennifer	January	1120	Coleman	Sam's Services	Corporate	32.0	2,400	2,208	192
9	Jennifer	March	1040	Coleman	Tony Davis	Individual	2.6	195	218	(23)
10	Jesseca	March	1040	Coleman	Betty Harrington	Individual	19.0	1,900	2,128	(228)
11	Jesseca	March	1120	Coleman	Course Concrete	Corporate	17.0	1,700	1,904	(204)
12	John	March	1040	Coleman	Mindy Simmon	Individual	16.0	1,600	1,792	(192)
13	Jesseca	January	1040	Coleman	Molly Francis	Individual	3.5	350	322	28
14	Jesseca	January	1040	Coleman	Robert Kennedy	Individual	3.7	370	340	30
15	Jesseca	March	1040	Coleman	Robert Kennedy	Individual	8.4	840	941	(101)
16	Jesseca	March	1040	Coleman	Tommy Pruitt	Individual	8.0	800	896	(96)
17	Jesseca	January	1040	Coleman	Tommy Pruitt	Individual	6.0	600	552	48
18	John	March	1120	Coleman	Camera Shot	Corporate	2.0	150	168	(18)
19	Kathleen	April	1040	Coleman	Robert Kennedy	Individual	2.0	200	270	(70)
20	Keith	February	1040	Coleman	Mindy Simmon	Individual	32.0	3,200	3,168	32
21	Martha	February	1120	Coleman	Course Concrete	Corporate	8.0	800	792	8
22	Martha	April	Fidiciary	Coleman	Molly Francis	Individual	6.0	600	810	(210)
23	Martin	April	Fidiciary	Coleman	Boris Tellman	Individual	6.0	750	1,013	(263)
24	Martin	February	1040	Coleman	Boris Tellman	Individual	3.5	438	433	4
25	Martin	February	1040	Coleman	Charlie Sullivan	Individual	2.0	250	248	3

Place your cursor anywhere in the data and select PivotTable from the Insert Ribbon as shown below:
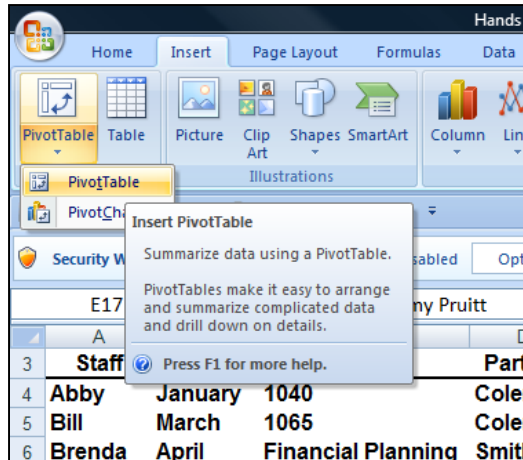
For learning purposes let's right mouse click on the pivot table and select PivotTable Options, Display, Classic PivotTable Layout. Your screen will now appear as follows:
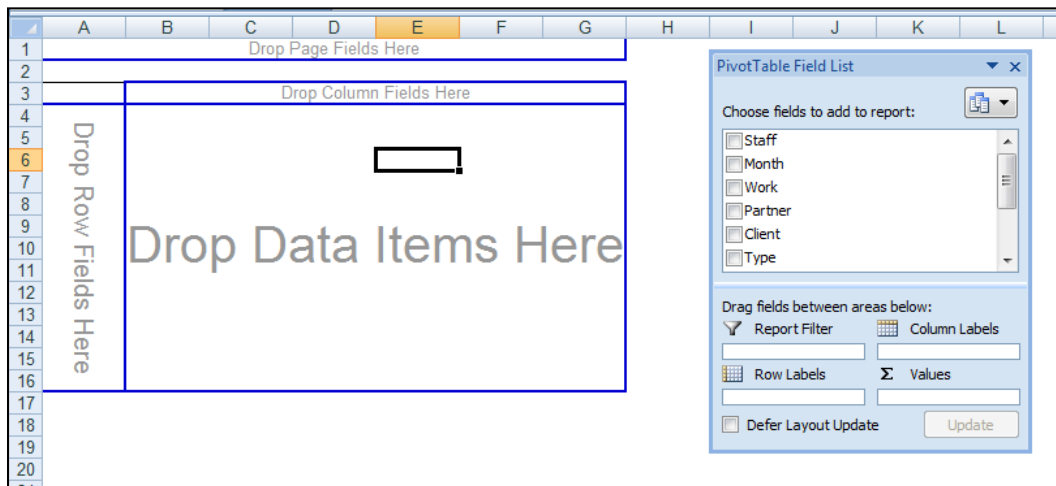
I like for CPAs to learn how to use Pivot Tables in this view because it visually helps them understand the all important relationship better the blank pivot palette and the PivotTable field List, both elements of which are shown in the screen above.

To proceed, simply drag and drop field names shown on the right onto the blank Pivot palette shown on the left. With each drop, your report grows larger. As an alternative you could use the check boxes next to field names – this functionality is new in Excel 2007. After added some data to your blank Pivot Palette, your data will look something like this:

	A	B	C	D	E	F	G	H	I	J
1			Drop Page Fields Here							
2						PivotTable Field List			▼ ×	
3	Sum of Billings	Partner ▼				Choose fields to add to report:				
4	Staff ▼	Coleman	Johnson	Smith	Grand Total					
5	Abby	1,425		2,535	3,960	☐ Work				
6	Bill	1,650	2,100	278	4,028	☑ **Partner**				
7	Brenda		860	1,020	1,880	☐ Client				
8	Jennifer	3,225	263	563	4,050	☐ Type				
9	Jesseca	6,560	9,190	6,110	21,860	☐ Hours				
10	John	1,750		2,888	4,638	☑ **Billings**				
11	Kathleen	200	1,440		1,640	☐ Budget				
12	Keith	3,200	2,570		5,770					
13	Kevin		1,400	2,240	3,640	Drag fields between areas below:				
14	Martha	1,400		1,640	3,040	▼ Report Filter		Column Labels		
15	Martin	10,463	9,550	9,313	29,325			Partner ▼		
16	nancy	4,150	290		4,440					
17	Phil	4,928	2,018	10,650	17,595					
18	Sam	218	1,215	1,350	2,783	Row Labels		Σ Values		
19	Sandra	14,163	7,175	8,550	29,888	Staff ▼		Sum of Billings ▼		
20	Steve	2,600	600	450	3,650					
21	Grand Total	55,930	38,670	47,585	142,185					
22						☐ Defer Layout Update		Update		
23										
24										
25										
26										

Next format and filter the Pivot Report. Very quickly your report comes together as shown below. Notice the filter button has been applied and a Pivot table style has also been applied for appearance.

	A	B	C	D	E
1					
2					
3	**Sum of Billings**	**Partner** ▼			
4	**Staff** ▼	**Coleman**	**Johnson**	**Smith**	**Grand Total**
5	Brenda		860	1,020	1,880
6	Jennifer	3,225	263	563	4,050
7	Jesseca	6,560	9,190	6,110	21,860
8	John	1,750		2,888	4,638
9	**Grand Total**	**11,535**	**10,313**	**10,580**	**32,428**

Double clicking on any number in a pivot report will automatically produce a new worksheet complete with all supporting detail that comprises the summary number.

There are a multitude of PivotTable options that can be applied to alter the appearance or behavior of your Pivot table.

Key Points Concerning Pivot Tables are as Follows:

a. You can create as many Pivot Reports as you want from your initial raw data page. Your raw data remains unchanged as new Pivot tables are created.

b. As your raw data changes, your pivot tables are updated each time you press the refresh button. Or if you prefer you can set your PivotTables to update themselves at regularly scheduled intervals – say every ten minutes.

c. A key to understanding PivotTables is understanding the relationship between the Blank Pivot palette and the PivotTable Field list. As data is selected in the list, it appears on the Pivot table Report.

d. You can alter the PivotTable simple by dragging and dropping the field names in different locations on the Pivot palette, or in different locations in the PivotTable Field list Box.

e. PivotTables can be pivoted.

f. PivotTables can be sorted by any Column. (Or by any row when sorting left to right)

g. PivotTables can be Filtered.

h. PivotTables can be Drilled.

i. PivotTables can be copied and pasted.

j. PivotTables can be formatted using PivotTable Styles, as shown below.
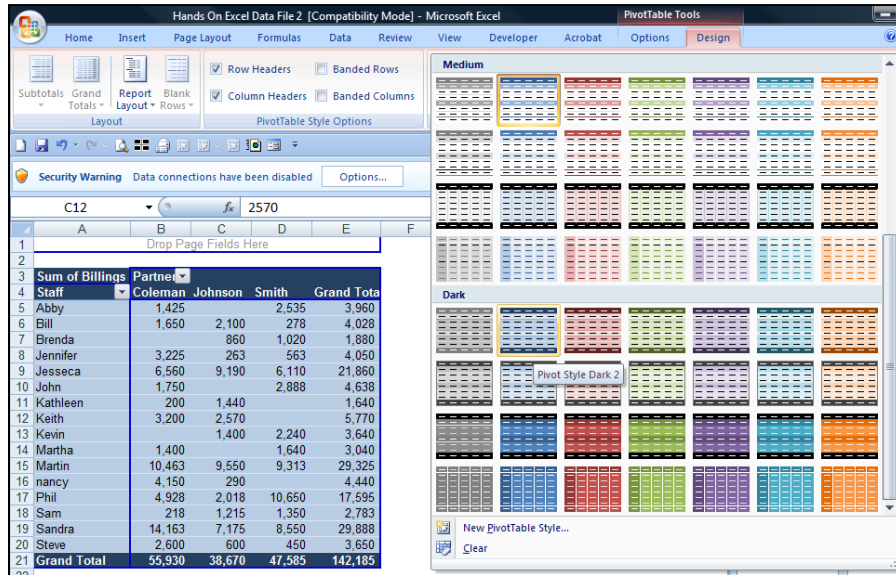
k. Subtotals and grand totals can be displayed or suppressed at the users desire.

l. PivotTable Data can be shown as numbers or percentages at the users desire.

m. PivotTable can not only be summed, it can be averaged, minimized, maximized, counted, etc.

n. Blank rows can be displayed or suppressed at the users desire.

o. A new feature called "Compact Form" organized multiple column labels into a neatly organized outline which is easier to read.

p. PivotTables can query data directly from any ODBC compliant database. The PivotTable tool for accomplishing this task is not included in the ribbon – you will find it by Customizing the Quick Access Tool Bar and searching the "Commands Not Shown in the Ribbon" tab to find the PivotTable and PivotChart Wizard Option.

q. Many accounting systems can push data out of the accounting system into an Excel PivotTable format – this is commonly referred to as an OLAP Data Cube. OLAP data Cube is just a fancy word for PivotTable – and there is no difference.

r. PivotTables can automatically combine data from multiple data sources. The PivotTable tool for accomplishing this task is not included in the ribbon – you will find it by Customizing the Quick Access Tool Bar and searching the "*Commands Not Shown in the Ribbon*" tab to find the PivotTable and PivotChart Wizard Option.
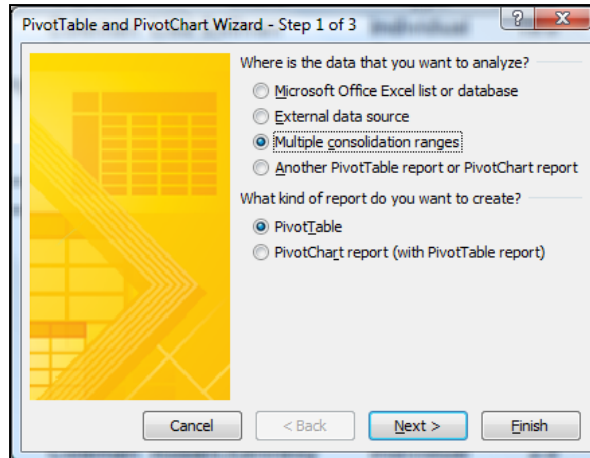
s. Excel also provides a PivotChart function which works similarly to PivotTables. Presented below is an example PivotChart.
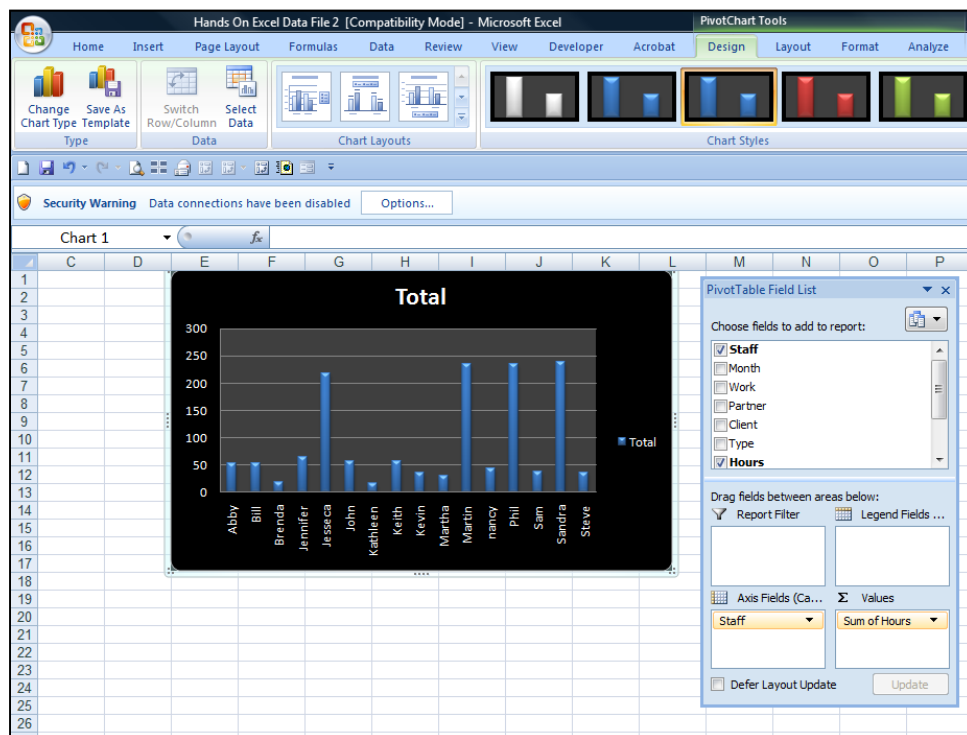
Excel 2003 PivotTables work very similarly as shown below. Excel creates a blank PivotTable, and the user must drag and drop the various fields from the PivotTable Field List onto the appropriate column, row, or data section. As you drag and drop these items, the resulting report is displayed on the fly. Here is the blank Pivot Palette view.
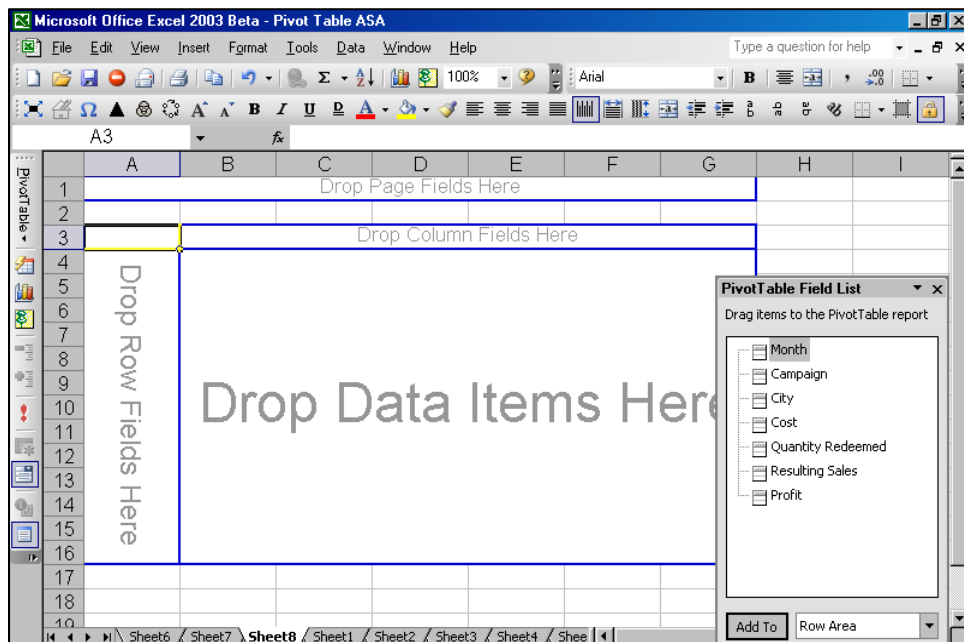
Now drag and drop field names from the Pivot Table field list onto the Pivot pallet. This action will automatically create Pivot Table reports – and they will change each time you drop additional field names, or move field names around. Presented below are but a few examples of hundreds of possible reports that could be viewed with this data through the PivotTable format.

This report shown above shows the total resulting sales for each marketing campaign for each of the 4 months marketing campaigns were conducted.

In this screen we see the same information is shown as a percentage of the total. A few observations include the fact that overall Radio Spots are the most profitable type of campaign, but only in April and July. In January and October, local ads and direct mail, respectively, produce better results. Further, April campaigns had the best response overall.

Sum of Resulting Sales	City			
Campaign	Atlanta	Columbus	New York	Grand Total
Coupon	6.25%	16.22%	3.73%	26.19%
Direct Mail	7.49%	3.21%	11.82%	22.52%
Local Ads	3.00%	1.27%	19.63%	23.90%
Radio Spot	3.25%	6.99%	17.15%	27.39%
Grand Total	19.99%	27.68%	52.33%	100.00%

Further analysis in the screen above tells us that our results vary widely from one city to the next. In New York, coupons were least effective, but coupons were most effective in Columbus. Pivot charts based on PivotTable data can be modified by pivoting and/or narrowing the data. They can also be published on the Internet (or on an Intranet) as interactive Web pages. This allows users to "play" with the data. The chart below provides a visual look at the data shown above.
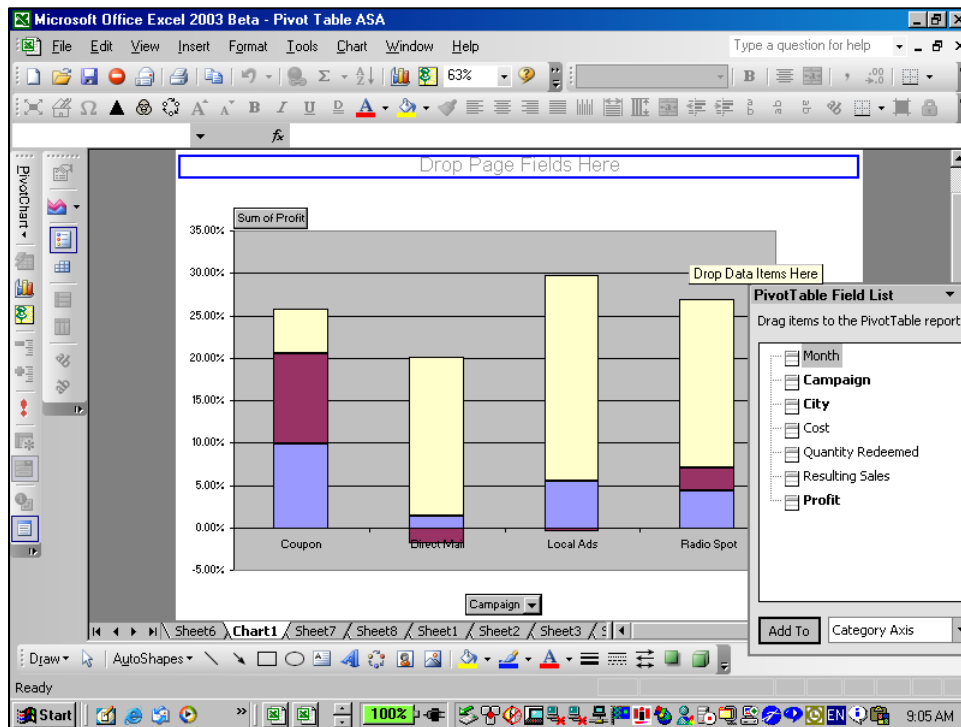
Filtering Pivot Tables - If you take a close look at your resulting pivot tables, you will notice that Excel automatically inserts a filter button on each field list as shown by the drop down arrows in the screen below:
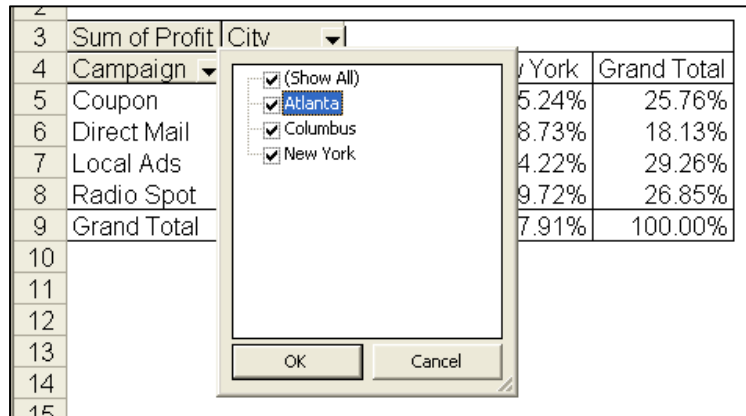
This drop down filter list makes it easy to refine your report to include just the data you want.

Drilling Pivot Tables - Another nice feature in pivot tables is that they are automatically drillable. Simply double click on any number in a pivot report top have Excel automatically insert a new sheet and produce the detailed report underlying the number you clicked on. An example of this is shown below:
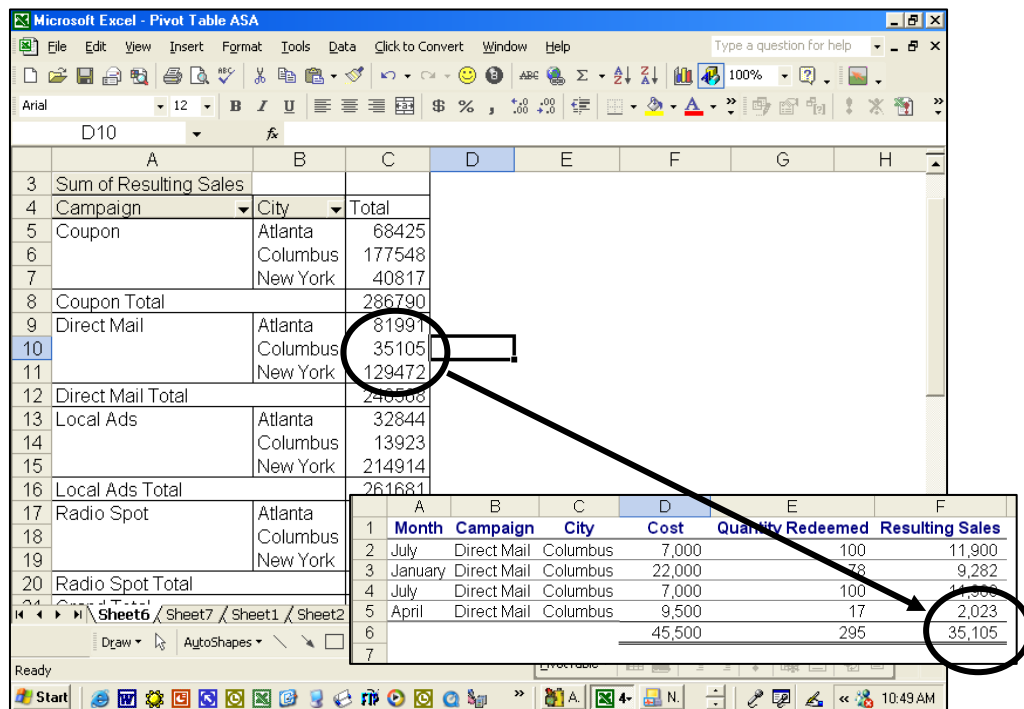
Pivot Table Options - By right mouse clicking on your pivot table you will reveal several option settings boxes as shown below. For example, these options boxes control the types of subtotals produced in your pivot reports. Excel also offers a pivot table options box as well as a layout wizard that makes producing pivot tables a little easier.
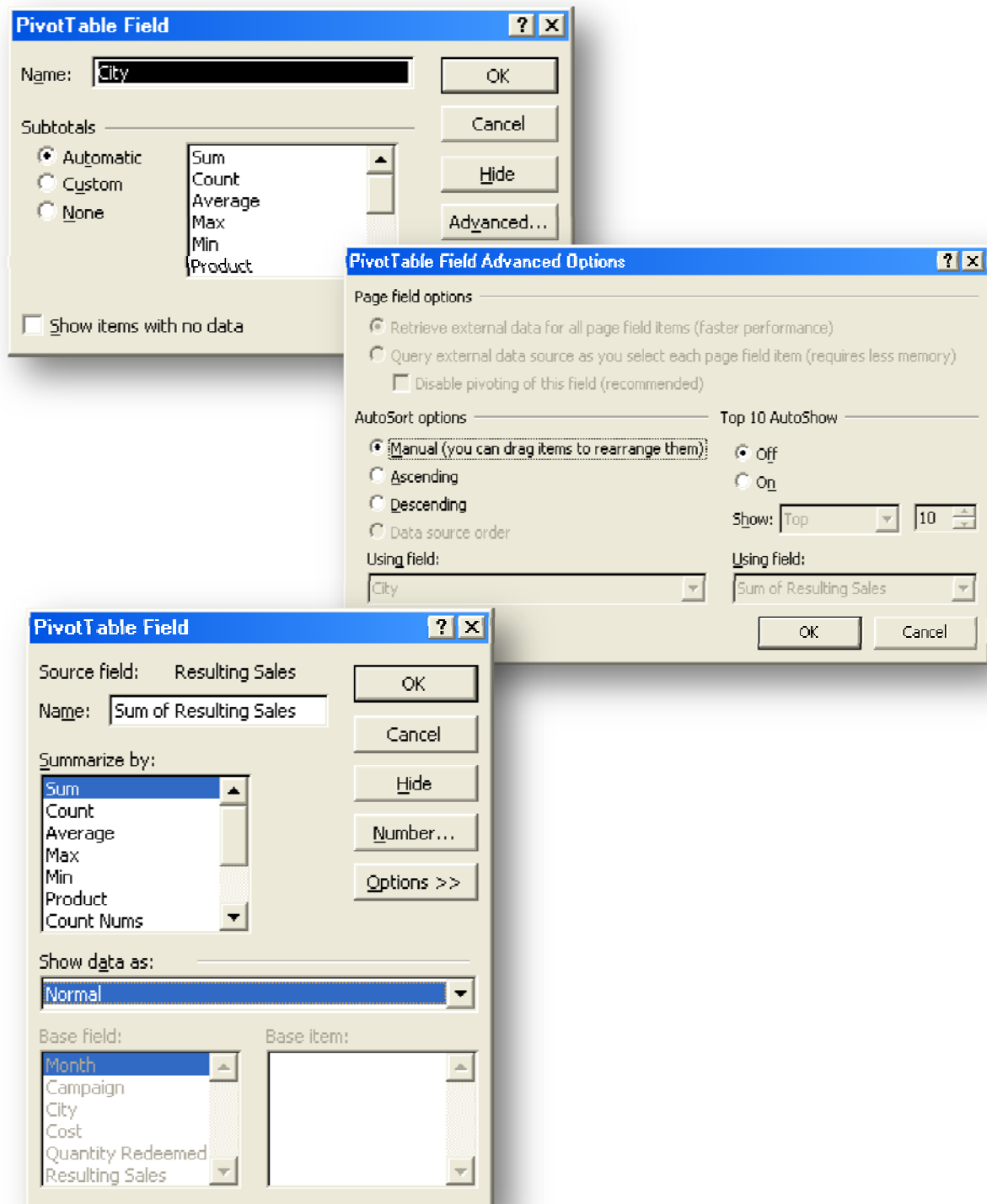
Data Table ("What-if Analysis")
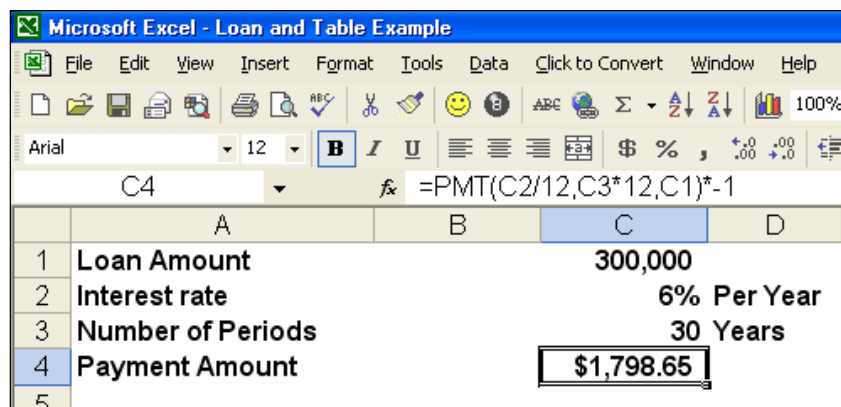
Data tables are part of a suite of commands that are called what-if analysis tools. When you use data tables, you are doing "what-if analysis". What-if analysis is the process of changing the values in cells to see how those changes will affect the outcome of formulas on the worksheet. For example, you can use a data table to vary the interest rate and term length that are used in a loan to determine possible monthly payment amounts.

Three categories of What-if Analysis Tools - There are three kinds of what-if analysis tools in Excel:

1. Data Tables
2. Goal Seek
3. Scenarios

A data table cannot accommodate more than two variables. If you want to analyze more than two variables, you should instead use scenarios. Although it is limited to only one or two variables (one for the row input cell and one for the column input cell), a data table can include as many different variable values as you want. A scenario can have a maximum of 32 different values, but you can create as many scenarios as you want.

Loan Analysis - In this exercise, we start by creating a simple Payment function to calculate the payment amount of a loan given a loan amount, interest rate and number of periods.

The next step is to create a "Two-Way Data Table" displaying the resulting payment amount given a variety of lengths of the loan. This process is started by creating a list of the alternative loan amounts, as shown below in B8, B9, B10, etc. Cell C7 must reference the results you want to be displayed in the table.

	C7	▼	fx	=C4	
	A	B	C	D	
1	Loan Amount		300,000		
2	Interest rate		6%	Per Year	
3	Number of Periods		30	Years	
4	Payment Amount		$1,798.65		
5					
6					
7			$ 1,799		
8		1			
9		2			
10		3			
11		4			
12		5			
13		6			
14		7			

The next step is to highlight the data table range and use the Data Table command under the Data menu (as shown below) to generate the desired table.

Table

Row input cell:

Column input cell: $C$3

OK   Cancel

This process will generate the following table:

	A	B	C	D
1	Loan Amount		300,000	
2	Interest rate		6%	Per Year
3	Number of Periods		30	Years
4	Payment Amount		$1,798.65	
5				
6				
7			$ 1,799	
8		1	$ 25,820	
9		2	$ 13,296	
10		3	$ 9,127	
11		4	$ 7,046	
12		5	$ 5,800	
13		6	$ 4,972	

This table tells us that the same loan amount will require a monthly payment of $3,331 to pay the loan off in just 10 years, and a monthly payment of $5,800 to repay the loan in just 5 years.

The next step in this exercise is to generate a line chart based on the data table we just created. This line chart will provide some interesting observations regarding the benefits and detriments of paying off loans over longer periods.
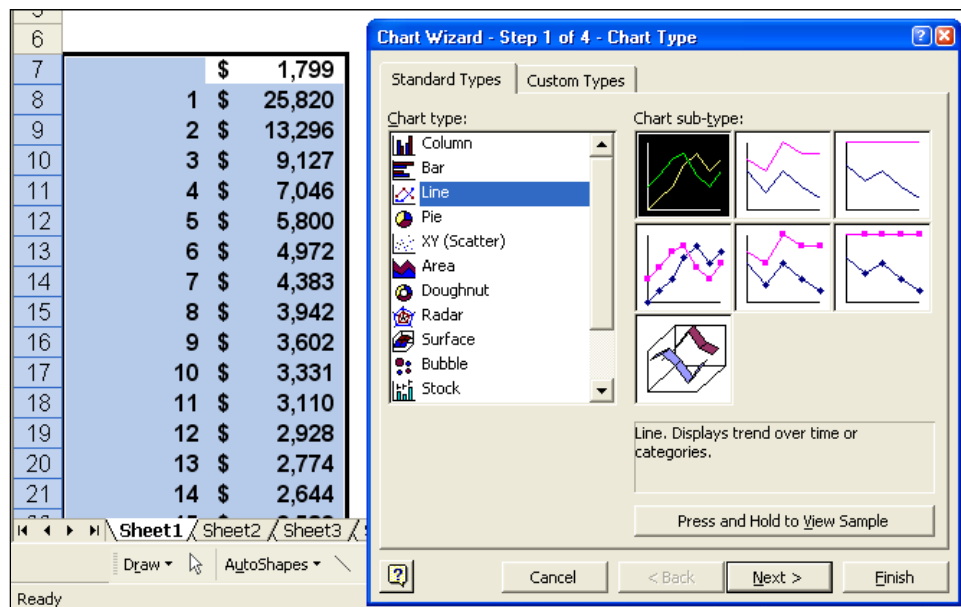
The resulting chart is shown as follows:
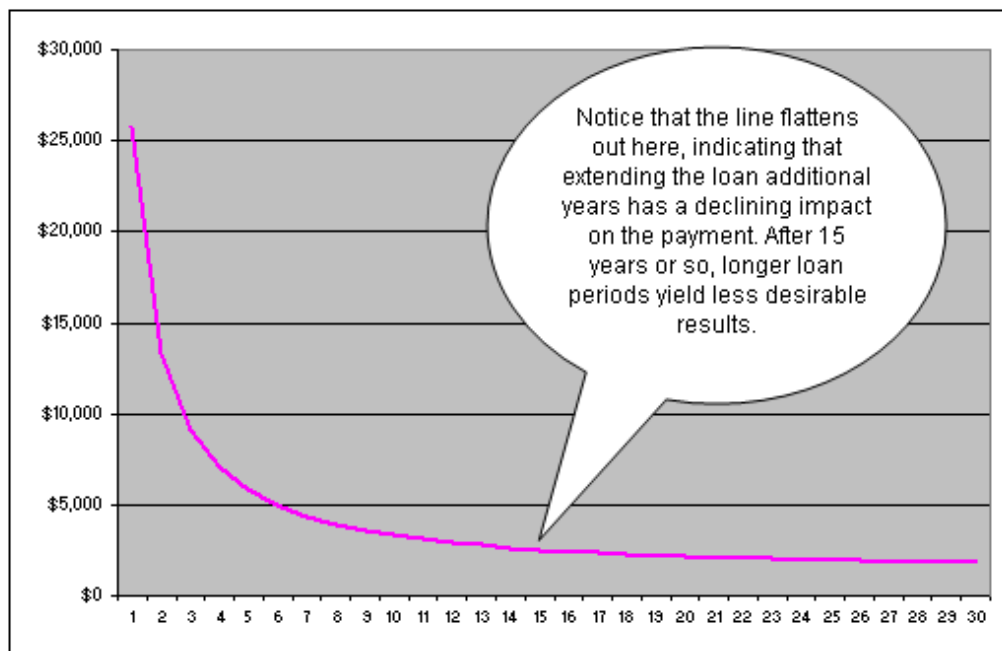
Based on this, no one should ever obtain a fair market loan for more than 15 years, the reduction in payments simply aren't worth the additional length of the loan. This same basic behavior is seen whether the interest rate is 1% or 100%. The only time you might be justified in obtaining a loan loner than 15 years might be when you are extended a favorable interest – this better than a fair market interest rate.

Goal Seek

If you know the result that you want from a formula, but are not sure what input value the formula needs to get that result, use the Goal Seek feature. For example, suppose that you need to borrow some money. You know how much money you want, how long you want to take to pay off the loan, and how much you can afford to pay each month. You can use Goal Seek to determine what interest rate you will need to secure in order to meet your loan goal. Goal Seek works only with one variable input value. If you want to accept more than one input value; for example, both the loan amount and the monthly payment amount for a loan, you use the Solver add-in discussed at the end of this manual.

Scenarios

Scenario Manager allows you to create and save multiple "what if" scenarios (such as best case, most likely, and worst cases scenarios). You can also create a summary table of the scenario results in seconds. It is particularly useful for worksheets such as budgets in which users have often saved multiple copies of

the same worksheet to accomplish the same objective. An example is shown below. In this example, a tire company has prepared a revenue budget for the coming year, and has created three alternative scenarios to generate the revenues that will result given a variety of mark up assumptions – in this case 100%, 110% and 120% markups.

Tire Sales

Brand	Cost	Markup	Sales Price	Projected Units Sold	Projected Sales
Michelin Tires	$ 45.78	110%	$ 96.14	2600	$ 249,959
Cooper Tires	$ 33.90	90%	$ 64.41	3550	$ 228,656
Firestone Tires	$ 38.70	92%	$ 74.30	900	$ 66,874
Continental Tires	$ 41.98	98%	$ 83.12	4590	$ 381,523
College Logo Tires	$ 39.65	120%	$ 87.23	1450	$ 126,484
Re-Treads	$ 36.50	85%	$ 67.53	2800	$ 189,070
					$ 1,242,564

Labor Installing Tires

Brand	Sales Price for 4 Tires	Projected Sets Installed	Projected Sales
Michelin Tires	$ 52.88	650	$ 34,369
Cooper Tires	$ 35.43	888	$ 31,440
Firestone Tires	$ 40.87	225	$ 9,195
Continental Tires	$ 45.72	1,148	$ 52,459
College Logo Tires	$ 47.98	363	$ 17,391
Re-Treads	$ 37.14	700	$ 25,997
			$ 170,853
Total Projected Revenue for 2007			$ 1,413,417

Scenario Manager

Scenarios:
110% Markup
100% Markup
120% Markup

[Show] [Close] [Add...] [Delete] [Edit...] [Merge...] [Summary...]

Changing cells:
$D$7:$D$12

Comment:
Created by Carlton Collins on 9/2/2005

Pressing the summary button in the scenario manager dialog box will create the following Pivot Table of possible alternative results. Here we see detailed revenue projections for all tires and labor fees given all three possible scenarios of 100%, 110%, and 120% markup.

		$D$7:$D$12		
4	Result Cells	100% Markup	110% Markup	120% Markup
5	$G$7	$ 238,056	$ 249,959	$ 261,862
6	$G$8	$ 240,690	$ 252,725	$ 264,759
7	$G$9	$ 69,660	$ 73,143	$ 76,626
8	$G$10	$ 385,376	$ 404,645	$ 423,914
9	$G$11	$ 114,985	$ 120,734	$ 126,484
10	$G$12	$ 189,070	$ 189,070	$ 189,070
11	$G$13	$ 1,237,837	$ 1,290,276	$ 1,342,714
12	$G$18	$ 32,733	$ 34,369	$ 36,006
13	$G$19	$ 33,095	$ 34,750	$ 36,404
14	$G$20	$ 9,578	$ 10,057	$ 10,536
15	$G$21	$ 52,989	$ 55,639	$ 58,288
16	$G$22	$ 15,810	$ 16,601	$ 17,391
17	$G$23	$ 25,997	$ 25,997	$ 25,997
18	$G$24	$ 170,203	$ 177,413	$ 184,623
19	$G$25			
20	$G$26	$ 1,408,040	$ 1,467,689	$ 1,527,337

With a few simple copy paste commands, the newly created data can be positioned and formatted next to the original projections as shown in the screen below.

Tire Sales

Brand	Cost	Markup	Sales Price	Projected Units Sold	Projected Sales	100% Markup	110% Markup	120% Markup
Michelin Tires	$ 45.78	110%	$ 96.14	2,600	$ 249,959	$ 238,056	$ 249,959	$ 261,862
Cooper Tires	$ 33.90	110%	$ 71.19	3,550	$ 252,725	$ 240,690	$ 252,725	$ 264,759
Firestone Tires	$ 38.70	110%	$ 81.27	900	$ 73,143	$ 69,660	$ 73,143	$ 76,626
Continental Tires	$ 41.98	110%	$ 88.16	4,590	$ 404,645	$ 385,376	$ 404,645	$ 423,914
College Logo Tires	$ 39.65	110%	$ 83.27	1,450	$ 120,734	$ 114,985	$ 120,734	$ 126,484
Re-Treads	$ 36.50	85%	$ 67.53	2,800	$ 189,070	$ 189,070	$ 189,070	$ 189,070
					$ 1,290,276	$ 1,237,837	$ 1,290,276	$ 1,342,714

Labor Installing Tires

Brand	Sales Price for 4 Tires			Projected Sets Installed	Projected Sales	100% Markup	110% Markup	120% Markup
Michelin Tires	$ 52.88			650	$ 34,369	$ 32,733	$ 34,369	$ 36,006
Cooper Tires	$ 39.15			888	$ 34,750	$ 33,095	$ 34,750	$ 36,404
Firestone Tires	$ 44.70			225	$ 10,057	$ 9,578	$ 10,057	$ 10,536
Continental Tires	$ 48.49			1,148	$ 55,639	$ 52,989	$ 55,639	$ 58,288
College Logo Tires	$ 45.80			363	$ 16,601	$ 15,810	$ 16,601	$ 17,391
Re-Treads	$ 37.14			700	$ 25,997	$ 25,997	$ 25,997	$ 25,997
					$ 177,413	$ 170,203	$ 177,413	$ 184,623
Total Projected Revenue for 2007					$ 1,467,689	$ 1,408,040	$ 1,467,689	$ 1,527,337

Of course the scenarios above could have been created easily using simple formulas instead of using the scenario manager tool as described above. This underscores that best purpose of scenario manager which is to keep track of older and changing data through time, rather than producing what-if scenarios. For example, a complex projection containing scenarios based on original assumptions, revised assumptions, and final assumptions will allow management to go back and review the assumptions used throughout the project, and see how those assumptions changed as project planning progressed.

Data - Text to Columns

As discussed earlier in this manual, often CPAs receive data from their clients or IT departments that is in text form. When this happens, Excel can split the contents of one or more cells in a column and distribute those contents as individual parts across other cells in adjacent columns. For example, the worksheet below contains a column of full names and amounts that you want to split into separate columns. The Text to Columns Wizard parses the data automatically into separate

Select the cell, range (range: Two or more cells on a sheet. The cells in a range can be adjacent or nonadjacent.), or entire column that contains the text values that you want to split. Note   A range that you want to split can include any number of rows, but it can include no more than one column. You also should keep enough blank columns to the right of the selected column to prevent existing data in adjacent
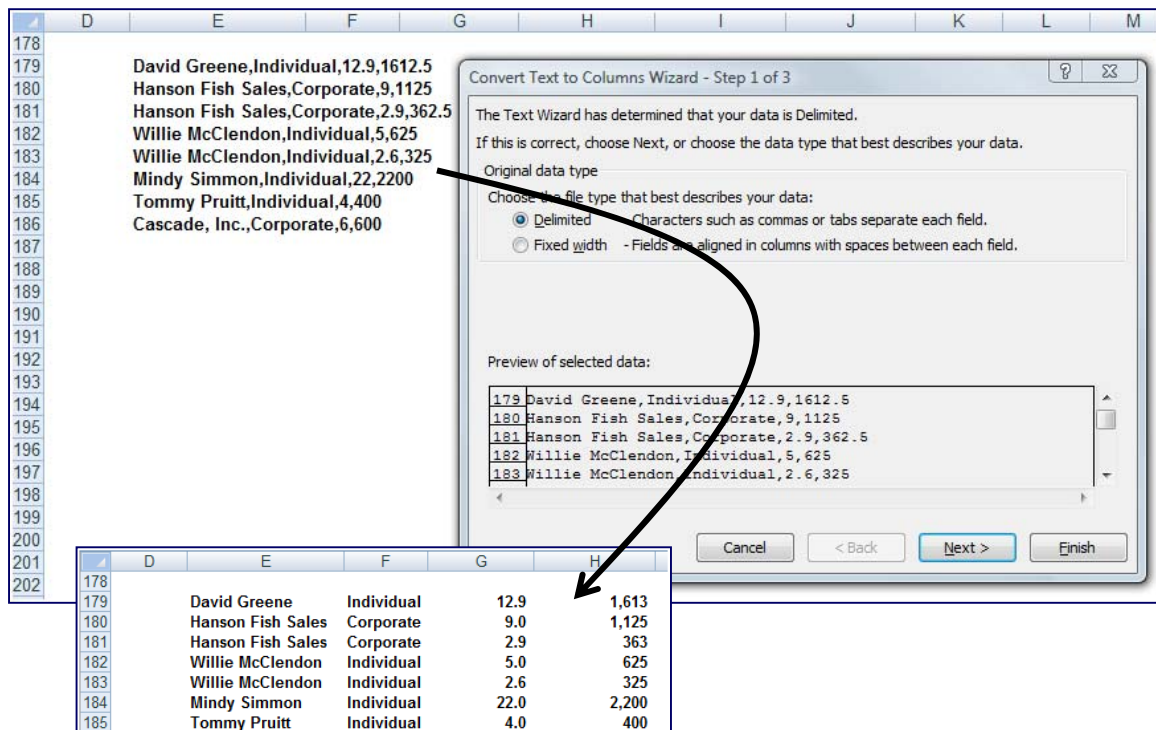
Data Consolidate

Excel can combine, summarize, and report consolidated results from separate worksheets. The underlying worksheets can be in the same workbook or in other separate workbooks. There are two different sitautions as follows:

1. **You Are Consolidating Similar Data** – Such as departmental budgets where every worksheet contains the exact same labels in the exact same cells. In this case, you can write a "Spearing Formula" which can consolidate the necessary information easily.

2. **You Are Consolidating Dis-Similar Data** – The various worksheets contain different row and column descriptions located in different locations on the worksheets. In this case you should use the Data Consolidate command.

For example, assume that you have received budgets from multiple departments, and you want to combine them together. In this case, Excel will do the work for you. You can use a consolidation to roll up these figures into a corporate budget worksheet, as shown below.

PaperCut
Budget
For the Calendar Year ending December 31, 2008
March 2, 2009 11:33
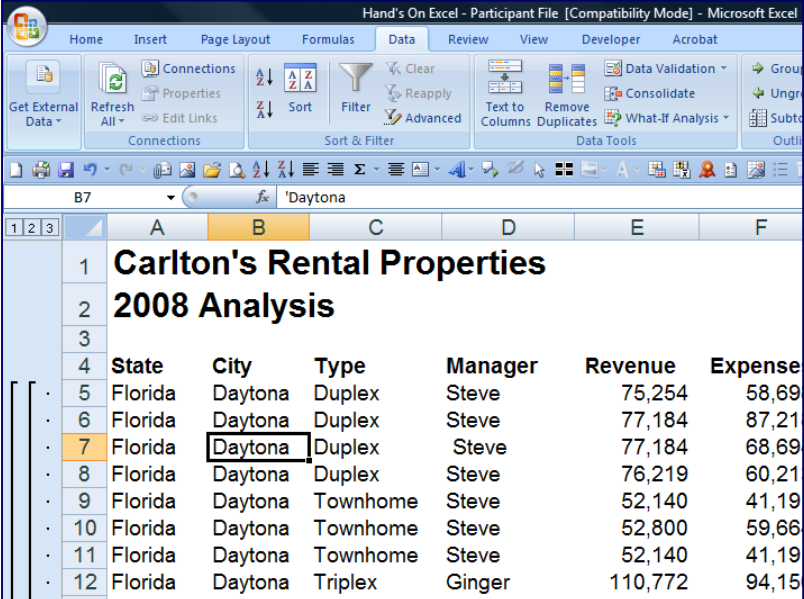
Account #	Description	Location	Department	Amount	Jan	Feb	Mar	Ap
6000	Revenue	Atlanta	Sales	(7,303,453.44)	(608,621.12)	(608,621.12)	(608,621.12)	(608,
6150	Returns & Allowances	Atlanta	Sales	12,545.52	1,045.46	1,045.46	1,045.46	1,
7000	Cost of Goods Sold	Atlanta	Sales	1,100,753.52	91,729.46	91,729.46	91,729.46	91,
7097	Inventory Adjustments	Atlanta	Sales	140,242.68	11,686.89	11,686.89	11,686.89	11,

PaperCut
Budget
For the Calendar Year ending December 31, 2008
March 2, 2009 11:33

Account #	Description	Location	Department	Amount	Jan	Feb	Mar	Ap
6000	Revenue	Atlanta	Admin	$ -	$ -	$ -	$ -	$
6150	Returns & Allowances	Atlanta	Admin	-	-	-	-	
7000	Cost of Goods Sold	Atlanta	Admin	-	-	-	-	
7097	Inventory Adjustments	Atlanta	Admin	-	-	-	-	
7098	Purchases Discounts	Atlanta	Admin	-	-	-	-	
7100	Freight	Atlanta	Admin	-	-	-	-	
7210	Payroll Expense	Atlanta	Admin	301,788.00	25,149.00	25,149.00	25,149.00	25,
7211	Employee Expenses	Atlanta	Admin	55,303.56	4,608.63	4,608.63	4,608.63	4,
7213	Payroll Tax Expense	Atlanta	Admin	71,752.80	5,979.40	5,979.40	5,979.40	5,
7215	Workers' Compensation	Atlanta	Admin	68,920.80	5,743.40	5,743.40	5,743.40	5,
7260	Uniform Allowance	Atlanta	Admin	23,561.28	1,963.44	1,963.44	1,963.44	1,
7300	Office Expenses	Atlanta	Admin	30,837.60	2,569.80	2,569.80	2,569.80	2,
7310	Administrative	Atlanta	Admin	21,018.96	1,751.58	1,751.58	1,751.58	1,
7320	Insurance	Atlanta	Admin	41,442.60	3,453.55	3,453.55	3,453.55	3,
7330	Legal and Accounting	Atlanta	Admin	4,796.28	399.69	399.69	399.69	

Sum of Total	Column Labels									
	Atlanta			Atlanta Total	Boston				Boston T
Row Labels	Admin	Sales	Service	Support		Admin	Sales	Service	Support	
6000 Revenue	-	(7,303,500)	(4,057,500)	(2,164,000)	(13,525,000)	-	(5,026,200)	(3,742,900)	(1,924,900)	(10,694
6150 Returns & Allowances	-	12,500	9,300	4,800	26,600	-	15,900	8,200	3,300	27
7000 Cost of Goods Sold	-	1,100,800	106,600	265,100	1,472,700	-	992,000	96,200	238,900	1,327
7097 Inventory Adjustments	-	140,200	8,900	28,400	177,500	-	94,800	7,300	22,400	124
7098 Purchases Discounts	-	45,500	4,200	8,100	57,800	-	33,800	3,100	6,000	42
7100 Freight	-	100,800	9,500	5,200	115,500	-	97,400	9,100	3,300	109
7210 Payroll Expense	301,800	1,297,700	995,900	422,500	3,017,900	296,900	1,123,000	851,900	309,800	2,581
7211 Employee Expenses	55,300	170,200	148,900	51,000	425,400	47,600	168,600	106,300	44,000	366
7213 Payroll Tax Expense	71,800	271,400	205,900	74,900	624,000	79,000	206,700	212,800	109,400	607
7215 Workers' Compensation	68,900	183,000	166,400	57,000	475,300	51,600	158,500	103,300	42,700	356
7260 Uniform Allowance	23,600	106,000	77,800	28,300	235,700	25,400	60,400	57,800	31,500	175
7300 Office Expenses	30,800	132,600	101,800	43,200	308,400	36,100	105,600	91,700	44,500	277
7310 Administrative	21,000	75,900	53,000	32,900	182,800	17, 800	75,900	19,000	135
7320 Insurance	41,400	121,500	82,900	40,000	285,800	23, 100	32,100	200
7330 Legal and Accounting	4,800	18,100	12,100	6,700	41,700	4, 100	4,700	33
7340 Office Supplies	4,800	11,500	11,000	6,000	33,300	3, 900	3,800	27
7350 Telephone	6,300	29,100	19,000	8,900	63,300	8,700	23,100	21,000	7,200	60
7360 Utilities	87,300	237,900	180,700	96,400	602,300	60,100	159,600	136,800	58,100	414
7500 Sales Expenses	14,300	89,000	4,600	2,500	110,400	9,200	78,000	3,300	1,800	92
7510 Advertising	56,300	155,900	142,900	78,000	433,100	41,800	132,000	96,600	51,500	321
7515 Bad Debt	3,000	10,100	7,000	3,300	23,400	2,300	7,500	5,200	2,400	17
7520 Dues and Subscriptions	900	3,200	2,100	1,000	7,200	500	2,100	1,400	900	5
7530 Entertainment	22,800	80,500	50,800	21,000	175,100	13,100	60,300	39,400	18,400	131
7550 Travel	33,400	156,800	96,800	46,700	333,700	34,200	140,300	112,900	54,800	342

Sum of Total
Value: 36,100
Row: 7300 Office Expenses
Column: Boston - Admin

Bos_Ser / Bos_Sup / Bos_Adm / Consolidated / Sheet4 / Rounded

Data Grouping & Outlining

If you have a list of data that you want to group and summarize, you can create an outline of up to eight levels, one for each group. Each inner level, represented by a higher number in the outline symbols displays detail data for the preceding outer level, represented by a lower number in the outline symbols. Use an outline to quickly display summary rows or columns, or to reveal the detail data for each group. You can create an outline of rows (as shown in the example below), an outline of columns, or an outline of both rows and columns.

Web Queries

Excel includes pre-designed "queries" that can import commonly used data in 10 seconds. For example, you could use a web query to create a stock portfolio. All you need is a connection to the Internet and of course, some stock ticker symbols. In Excel 2003 select "Data, Import External Data, Import Data" and walk through the web query wizard for importing stock quotes. In Excel 2007 and later use the Data Ribbon, Existing Connections, Stock Quotes option. In seconds, Excel will retrieve 20 minute delayed stock prices from the web (during the hours when the stock market is open) and display a grid of complete up-to-date stick price information that is synchronized to the stock market's changing stock prices. With each

click of the "Refresh" button, the stock price information in Excel is updated - this sure beats picking numbers out of the newspaper.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1		Friday, April 24, 2009											
2		11:34:42 AM											
3		Stock Quotes Provided by MSN Money											
4		Click here to visit MSN Money											
5					Last	Previous Close	High	Low	Volume	Change	% Change	52 Wk High	52 Wk Low
6		Microsoft Corp	Chart	News	20.29	18.92	20.45	19.5	66,077,415	1.37	7.24%	32.1	14.87
7		Apple Inc	Chart	News	124.32	125.4	125.14	123.73	6,275,076	-1.08	-0.86%	192.24	78.2
8		Coca-Cola Co	Chart	News	42.87	42.92	43.09	42.71	3,205,193	-0.05	-0.12%	61	37.44
9		United Parcel Service Inc	Chart	News	53.48	53.33	54.04	52.53	2,533,150	0.15	0.28%	74.14	37.99
10		International Business Machines Corp	Chart	News	100.33	101.42	101.97	100.09	2,665,080	-1.09	-1.07%	130.93	69.5
11		Wal-Mart Stores Inc	Chart	News	48.73	48.86	49.56	48.51	8,042,577	-0.13	-0.27%	63.85	46.25

Completing the Stock Portfolio – Next link the grid data to another worksheet, and insert new columns containing the number of shares owned, as wells as an additional column to computer the total value based on shares owned, as shown below.

	A	B	C	D	E	F	G	H	I	J	K	L
1		Friday, April 24, 2009										
2		11:40:17 AM										
3		Stock Quotes Provided by MSN Money										
4												
5			Last	Shares Owned	Current Value		Previous Close	High	Low	Volume	Change	% Change
6		Microsoft Corp	20.29	13,500	273,915		18.92	20.45	19.5	66077415	1.37	0.0724
7		Apple Inc	124.32	2,400	298,368		125.4	125.14	123.73	6275076	-1.08	-0.0086
8		Coca-Cola Co	42.87	12,000	514,440		42.92	43.09	42.71	3205193	-0.05	-0.0012
9		United Parcel Service Inc	53.48	1,780	95,194		53.33	54.04	52.53	2533150	0.15	0.0028
10		International Business Machines	100.33	2,800	280,924		101.42	101.97	100.09	2665080	-1.09	-0.0107
11		Wal-Mart Stores Inc	48.73	8,300	404,459		48.86	49.56	48.51	8042577	-0.13	-0.0027
12					1,867,300							

Refreshing the Stock Prices - Once you have created your portfolio, simply click the Refresh Data button on the "External Data" Toolbar in Excel 2003 or on the "Data Ribbon" in Excel 2007 shown below to update the current value of your Portfolio.

Query Parameters - There are numerous options to help you extract exactly the data you want they way you want it. The "Web Query Parameters Box", "Web Query Options box" and "External Data Properties Box" provide numerous options for controlling your web query.

Database Queries

Microsoft Excel can also query and retrieve data you want from an external data source. For example, you can retrieve Microsoft Excel data about a specific product by region. You can create a simple query by using the Query Wizard, or you can create a more complex query by using the advanced features of Microsoft Query.

To use Microsoft Query to retrieve external data, you must:

1. **Have access to an external data source -** If the data is not on your local computer, you may need to see the administrator of the external database for a password, user permission, or other information about how to connect to the database.

2. **Install Microsoft Query -** If Microsoft Query is not available, you might need to install it.

3. **Specify a source to retrieve data from, and then start using Microsoft Query** -   For example, if you want to insert database information, display the Database toolbar, click Insert Database, click Get Data, and then click MS Query.

For example, suppose we have some data in our accounting system – Sage MAS 200 ERP that we would like to analyze in Excel. We can use the Database Query Wizard to build a query that will extract the data we need and place it in an Excel spreadsheet.
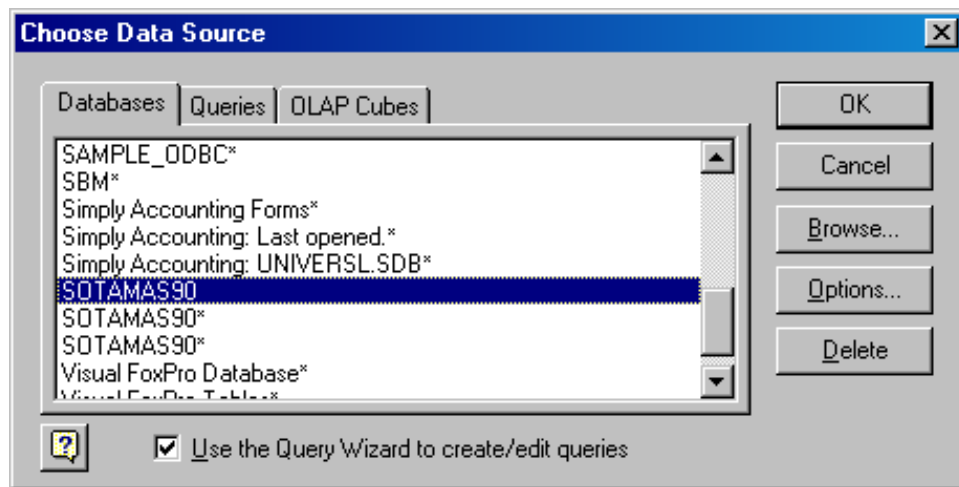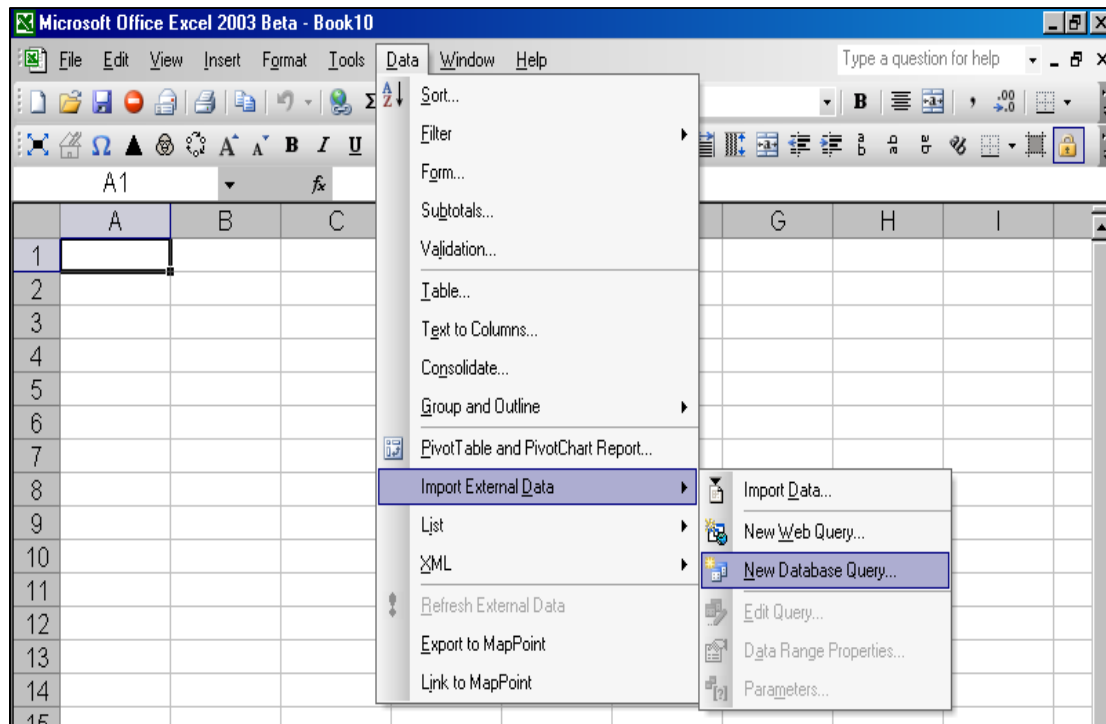
The first step is to select the type of database you want to query and to select the specific database.
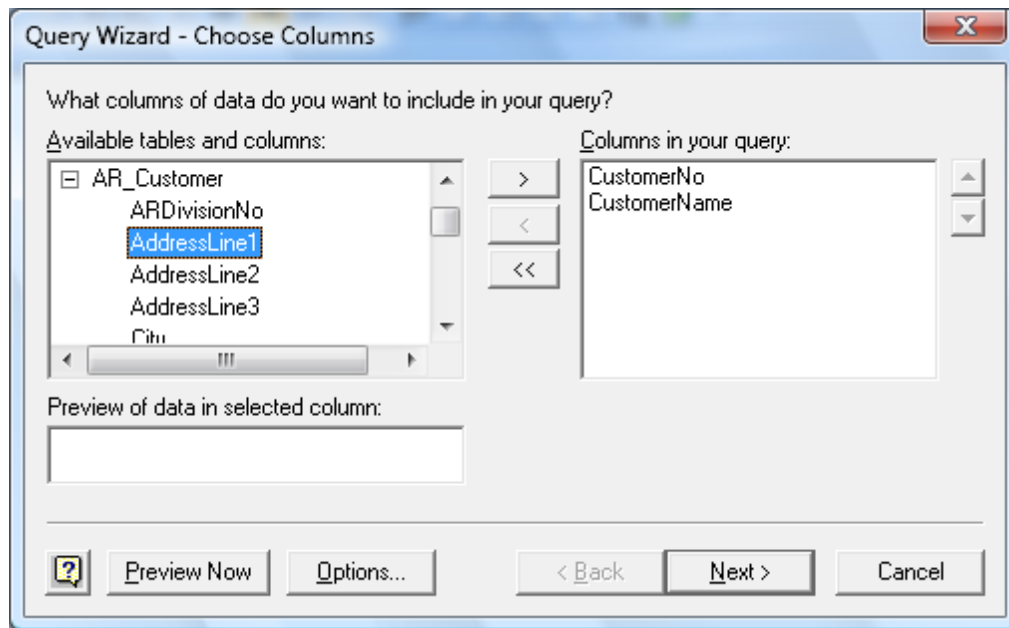
Upon the selection of the desired database a list of tables will be presented. Choose the desired tables, and select the desired data fields to be imported. You will then have the option to filter and sort the data before it is imported. Finally you will be given the option to save the query so that you can run it at a later date without having to start from scratch. Excel will then return a table full of the data you requested as shown in the screen below.

Microsoft Excel - Book1

File Edit View Insert Format Tools Data Window Help

Arial   10   **B** *I* U

A1

	A	B	C	D	E	F	G
1	**CustomerNo**	**CustomerName**	**State**	**CurrentBalance**	**AvgDaysOverDue**		
2	ABF	American Business Futures	WI	5732.36	0		
3	AVNET	Avnet Processing Corp	WI	7377.37	52		
4	BRESLIN	Breslin Parts Supply	WI	11828.26	0		
5	HILLSB	Hillsboro Service Center	WI	2902.86	0		
6	RSSUPPL	R & S Supply Corp.	WI	7086.74	0		
7	SHEPARD	Shepard Motorworks	WI	513339.95	0		
8	ALLENAP	Allen's Appliance Repair	CA	645.51	0		
9	AMERCON	American Concrete Service	CA	13743.8	57		
10	ATOZ	A To Z Carpet Supply	CA	8732.4	37		
11	AUTOCR	Autocraft Accessories	CA	23954.02	0		
12	BAYPYRO	Bay Pyrotronics Corp.	CA	16644.94	106		
13	CAPRI	Capri Sailing Ships	CA	56169.33	31		
14	CUSTOM	Custom Craft Products	CA	19446.43	0		
15	GREALAR	Greater Alarm Company	CA	825.5	0		
16	JELLCO	Jellco Packing	CA	5055.91	0		
17	ORANGE	Orange Door & Window Co.	CA	263.37	0		
18							
19							
20							

Chapter 7

MACROS

Automating Your Key Strokes

Macros

Macros offer a powerful and flexible way to extend the features of Excel. They allow the automation of repetitive tasks such as printing, formatting, configuring, or otherwise manipulating data in Excel. In its' simplest form, a macro is a recording of your keystrokes. While macros represent one of the stronger features found in Excel, they are rather easy to create and use. There are six major points that I like to make about macros as follows.

1. **Record, Use Excel, Stop Recording** – To create a macro, simply turn on the macro recorder, use Excel as you normally do, then turn off the recorder. Presto – you have created a macro. While the process is simple from the user's point of view, underneath the covers Excel creates a Visual Basic subroutine using sophisticated Visual Basic programming commands.

2. **Macro Location** – Macros can be stored in either of two locations, as follows:

   a. The workbook you are using, or
   b. Your Personal Macro Workbook (which by default is hidden from view)

   If your macro applies to all workbooks, then store it in the Personal Macro Workbook so it will always be available in all of your Excel workbooks; otherwise store it in your current workbook. A macro stored in your current workbook will be embedded and included in the workbook, even if you e-mail the workbook to another user.

3. **Assign your Macro to an Icon, Text or a Button** – To make it easy to run your macro, you should assign it to a toolbar icon so it will always be available no matter which workbooks you have open. If the macro applies only to your current workbook, then assign it to Text or a macro Button so it will be quickly available in your current workbook.

4. **Absolute versus Relative Macros** – An "Absolute" macro will always affect the same cells each time whereas a "Relative" macro will affect those cells relative to where your cursor is positioned when you invoke the macro. It is crucial that you understand the difference.

5. **Editing Macros** – Once created, you can view and/or edit your macro using the View Macros option. This will open the macro subroutine in a Visual basic programming window and provide you with a plethora of VB tools.

6. **Advanced Visual Basic Programming** – For the truly ambitious CPA, in the Visual Basic Programming window, you have the necessary tools you need to build very sophisticated macros with dialog boxes, drop down menu options, check boxes, radio buttons – the whole works. I invite you to knock yourself out. To see all of this power, turn on the "Developer Tab" in "Excel Options" (see below).

Presented below are more detailed comments and step-by-step instructions for creating and invoking macros, followed by some example macros.

1. **Creating a Macro -** To create a macro, click "Record Macro" in the "Code Group" on the Developer Tab.

    a. **Assign a Name -** In the "Macro Name" box, enter a name for the macro.

        i. The first character of the macro name must be a letter.
        ii. Subsequent characters can be letters, numbers, or underscore characters.
        iii. Spaces cannot be used in a macro name (an underscore character is often used as a word separator.
        iv. If you use a macro name that is also a cell reference, you may get an error message that the macro name is not valid.

    b. **Assign a CTRL Combination (*optional*)** – You can assign a CTRL combination <u>shortcut key</u> to run the macro by typing any lowercase letter or uppercase letter that you want to use in the Shortcut key box.

        i. The shortcut key will override any equivalent default Excel shortcut key while the workbook that contains the macro is open.

    c. **Macro Location -** In the **"**Store Macro In" list, select the workbook where you want to store the macro.

        i. As mentioned above, if you want a macro to be available whenever you use Excel, select "**Personal Macro Workbook"**. When you select **Personal Macro Workbook**, Excel creates a hidden personal macro workbook (Personal.xlsb) if it does not already exist, and saves the macro in this workbook.
        ii. In Windows Vista, this workbook is saved in the C:\Users*user name*\AppData\Local\Microsoft\Excel\XLStart folder.
        iii. In Microsoft Windows XP, this workbook is saved in the C:\Documents and Settings*user name*\Application Data\Microsoft\Excel\XLStart folder.
        iv. Workbooks in the XLStart folder are opened automatically whenever Excel starts.
        v. If you want a macro in the personal macro workbook to be run automatically in another workbook, you must also save that workbook in the XLStart folder so that both workbooks are opened when Excel starts.

    d. **Macro Description -** In the **Description** box, type a description of the macro.

    e. **Start Recording -** Click **OK** to start recording.

    f. **Start Typing -** Perform the actions that you want to record.

    g. **Stop Recording** – When you are done click "Stop Recording" in the "Code Group" On the "Developer Tab".

        i. You can also click **Stop Recording** on the left side of the status bar.

h. **Assign a macro to an object, graphic, or control** - On a worksheet, right-click the object, graphic, or control to which you want to assign an existing macro, and then click Assign Macro. In the Macro name box, click the macro that you want to assign.

2. **Menu Navigation Not Recorded** - When you record a macro, the macro recorder records all the steps required to complete the actions that you want your macro to perform. Navigation on the Ribbon is not included in the recorded steps, only the commands that are executed are recorded in the macro.

3. **Turn On The Developer Tab** - Turn on the Developer tab by clicking the Microsoft Office Start Button, and then click Excel Options. In the Popular category, under Top options for working with Excel, select the Show Developer tab in the Ribbon check box, and then click OK.
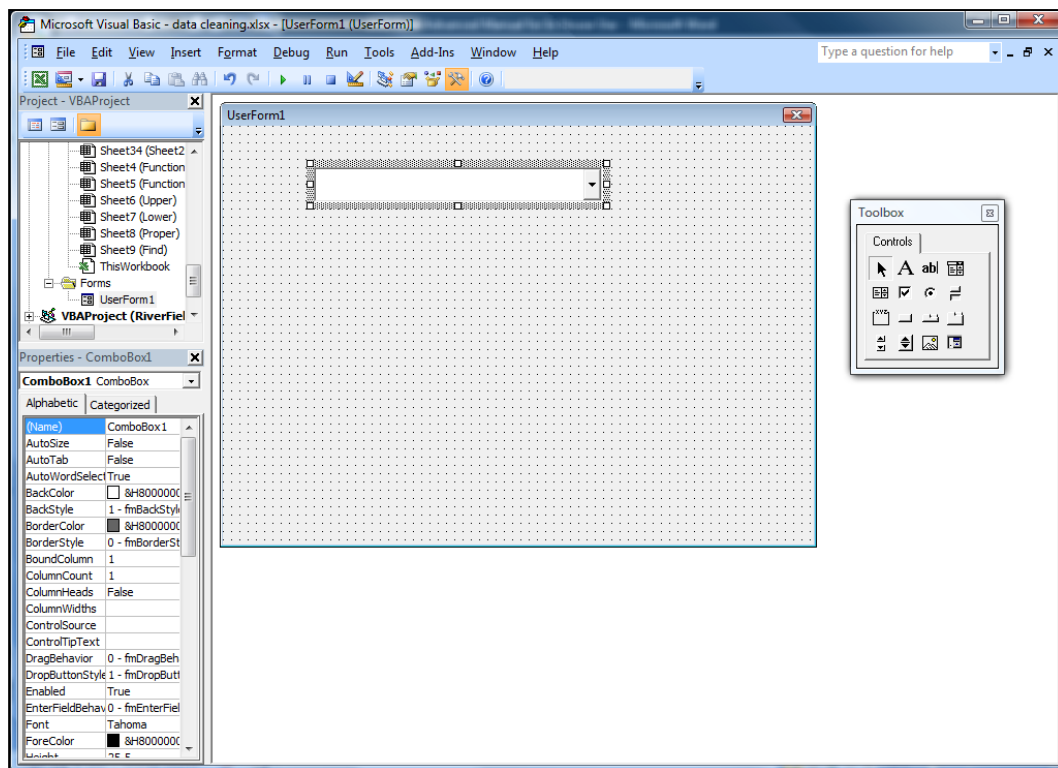
4. **Enable Macros –** If the macro functions are disabled, you can enable them by selecting Macro Security in the Code group on the Developer tab as shown below.
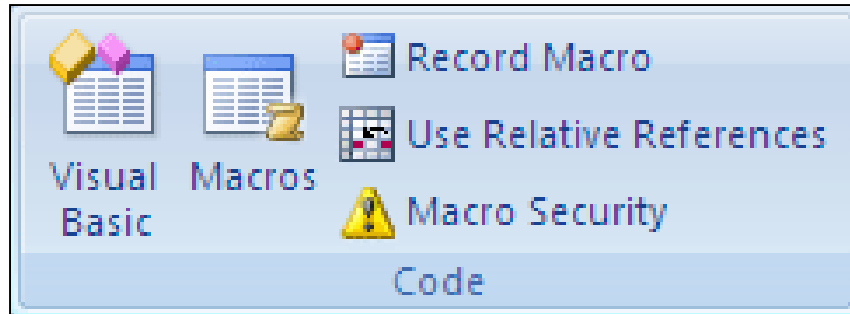
Under Macro Settings, click Enable all macros (not recommended, potentially dangerous code can run), and then click OK.

5. **Example Macros**

    a. **Page Setup Macro –** Start recording a new macro called page setup. Select all of the worksheets and then choose Page Setup and customize the header and footers to include page numbers, date and time stamps, file locations, tab names, etc. Assign the macro to an Icon on your toolbar or Quick Access Bar and insetting headers and footers will be a breeze for the rest of your life.

    b. **Print Macros –** Do you have a template that you print frequently from? If so, insert several macro buttons to print each report, a group of reports, and even multiple reports and reporting will be snap in the future.

    c. **Delete Data Macro –** Do you have a template that you use often that contains a lot of variables? If so, create a macro that visits each cell and erases that data, resetting the worksheet for use in a new set of criteria. Assign the macro to a macro button and you will never again have old assumptions mixed in with your newer template.
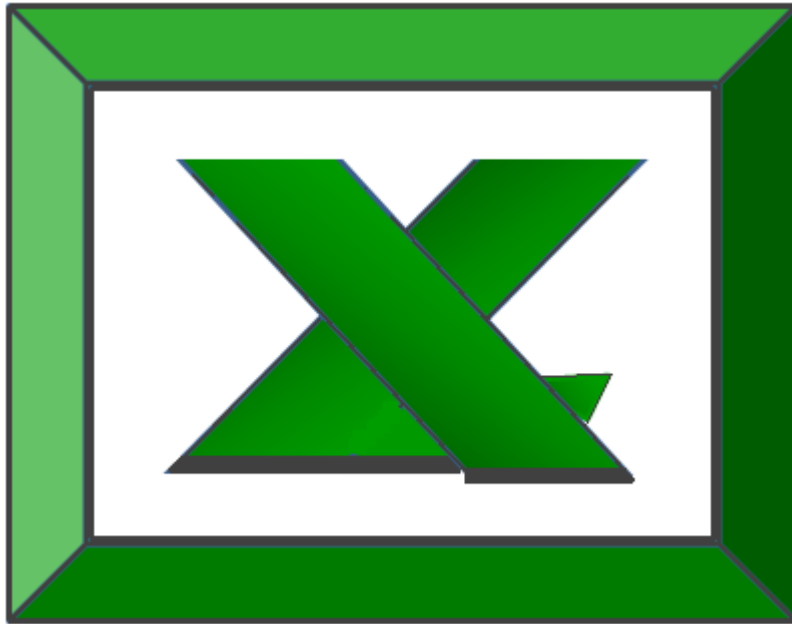
Chapter 8
Solver

Solver

Solver is one of the more powerful features in Excel because it can solve for optimum results in complex worksheets while obeying stated constraints. With Solver, you can find an optimal value for a formula by manipulating a group of cells that are related, either directly or indirectly, to the formula in the target cell. Solver adjusts the values in the adjustable cells to produce the result you specify from the target cell formula. You can apply constraints to restrict the values Solver can use in the model, and the constraints can refer to other cells that affect the target cell formula.

In the portfolio example shown below, the user wishes to determine how much money to invest in various investments in order to maximize the return on those investments. Of course the maximum results can be achieved by simply place in all monies in the investment that yields the highest results, however this approach violates the "don't put all of your eggs in one basket rule". In this case the user wants to diversify their funds across many types of investments. Therefore constraints are established such as no more than 35% of funds can be invested in blue chip stocks and the checking accounting must contain at least $100,000.

A portfolio is shown below and some constraints have been included in lust form. These constraints will need to be stated in terms of formulas in the solver manager dialog box.

	Annual Earnings Rate	Annual Growth Rate	Amount of Investment	Percentage Investment	Annual Earnings Rate	Annual Growth Rate	Projected Total
Blue Chip Stocks	6.00%	1.00%	300,000	16.7%	18,000	3,000	321,000
Growth Stocks	0.00%	12.00%	300,000	16.7%	-	36,000	336,000
Speculation Stocks	0.00%	12.00%	300,000	16.7%	-	36,000	336,000
Checking Account	2.20%	0.00%	300,000	16.7%	6,600	-	306,600
Real Estate	-4.00%	12.00%	300,000	16.7%	(12,000)	36,000	324,000
Mutual Fund	5.00%	0.00%	300,000	16.7%	15,000	-	315,000
			1,800,000	100.0%	27,600	111,000	1,938,600

Objective is to Diversify Investments

Checking Account must have at least $100,000
Checking Account shoul be no more than $150,000
Speculaton stocks must be no more than 10% of portfolio
Blue chips must be at least 25% of portfolio
Mutual funds must be no more than 10% of portfoio
Real Estate must be at least 25%
Blue chips can be no more than 35%

The key to making solver work is the solver Parameters dialog box shown below.
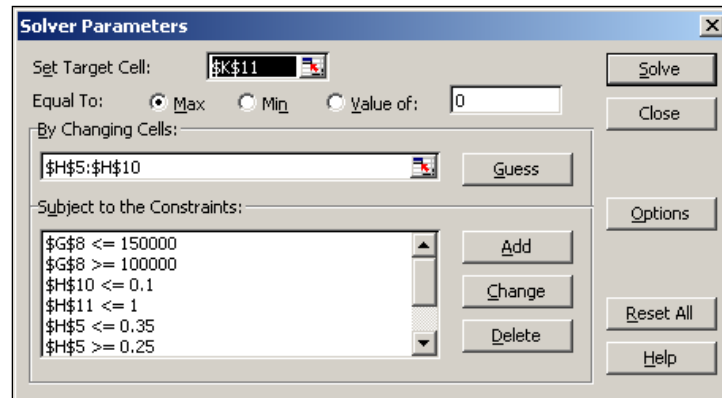
The target cell is set to refer to the total portfolio value at the end of the year because this is the value that we want to maximize. The changing cells are set to reference the percentages of each investment. Finally the various constraints are expressed as formulas as shown in the lower left hand corner of the dialog box. Once solver has been run once, the solver formulas stick to the worksheet and the results are changed and updated as the various assumptions in the worksheet are changed and updated. For example, you may later determine that the growth rate for real estate is a different amount. Inputting that new amount in the worksheet will cause Excel to automatically adjust all variables to produce the optimum investment mix that maximizes earnings without violating any stated constraints.
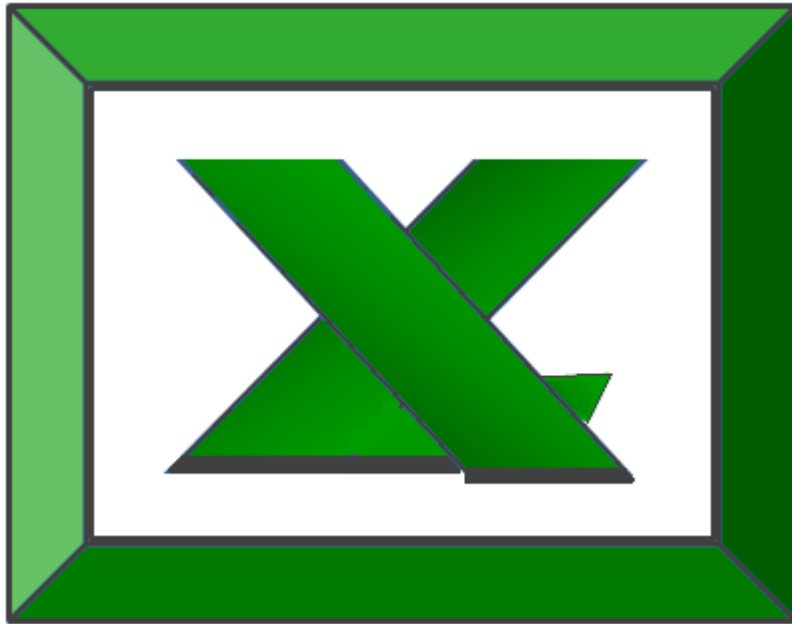
Chapter 9

EXAMPLE
Case Studies

Trick Excel into Creating a Gantt Chart

Let's start by tricking Excel into creating a Gantt Chart. Of course Excel does not do Gantt charts, so we will apply clever tricks to achieve the desired affects. It's really not that hard and it works just as well in Excel 2003 as it does in Excel 2007. Start by preparing a simple list of tasks including start dates, duration of each task, and end dates (formulas in Excel can calculate the end dates). An example is shown below:

	A	B	C	D
1	Trick Excel into Creating a Gantt Chart			
2				
3				
4	Tasks	Start Date	Duration (Days)	End Date
5	Land Preparation	9/4/2008	8	9/12/2008
6	Foundation	9/12/2008	4	9/16/2008
7	Framing	9/16/2008	5	9/21/2008
8	Doors and Windows	9/19/2008	4	9/23/2008
9	Plumbing	9/23/2008	2	9/25/2008
10	Electrical	9/23/2008	3	9/26/2008
11	Sheet Rock	9/26/2008	12	10/8/2008
12	Finish Work	10/8/2008	7	10/15/2008
13	Painting	10/10/2008	9	10/19/2008

1. Start by creating a stacked bar chart
2. Remove the Data Series by right mouse clicking and choosing Select Data Source
3. Add a new Data Source Named Starting Date, and point to the range of start dates for the values
4. Add another new data source named Duration (Days), and point to the range of duration days for the values
5. Add Category Axis Labels and point to the Task names in Column A
6. Remove legend by selecting legend and pressing the Delete key
7. Click on the beginning series and set the Fill and Borders to None
8. Right mouse click on the task labels, choose format Axis, and check the Categories in Reverse Order box (if needed)
9. In two blank cells, write a formula referencing the start and end dates, convert these dates to numbers with formatting
10. Use the resulting numbers to set the scale of the Gantt Chart (perhaps use a slightly larger range of dates)
11. Right mouse click on the date range, set the minimum and maximums to fixed using the numbers acquired in the above step
12. Format the date range to show a short date
13. Format the remaining data bars to display a 3-D bevel
14. For added touch, search Google images for a nice picture of a house, save it to your hard drive.
15. Set the background plot area to picture, and wash out the picture enough so that the chart is still readable.
16. Add a title or text boxes as needed to complete the description of the Gantt Chart

The resulting Gantt chart is shown below. At this point, changing any of the start dates or duration dates will automatically update the Gantt chart.

	A	B	C	D	E	F	G	H

(Gantt chart image showing Carlton Collins Contractors Gantt Chart for Building a Home, with rows 32-54, tasks: Painting, Finish Work, Sheet Rock, Electrical, Plumbing, Doors and Windows, Framing, Foundation, Land Preparation, dates 8/30/08, 9/9/08, 9/19/08, 9/29/08, 10/9/08, 10/19/08)
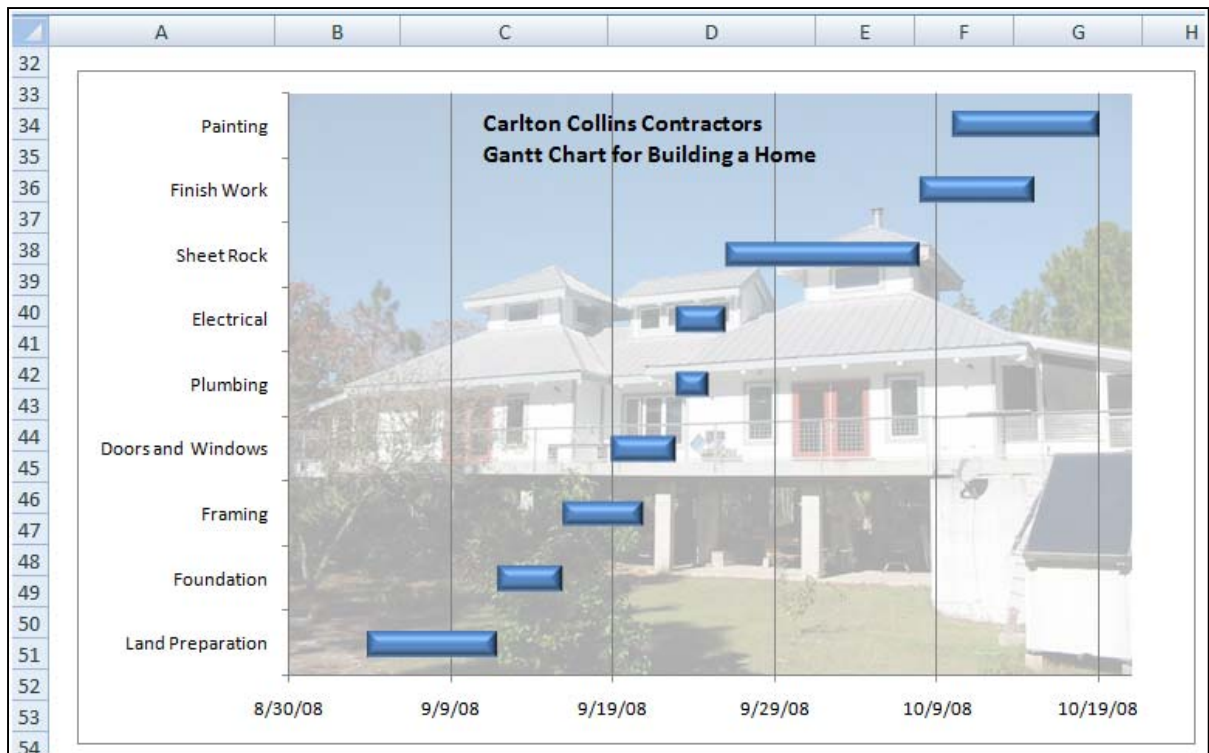
Combination Chart

A combination chart is used to show one chart on top of another chart, using the same scale by percentage. This allows the reader to better study the data to determine whether relationships, if any, exist between the two sets of data. For example, consider the simple study hours and resulting grade information shown to the right for a new college student – we will call him Austin.

We have compiled a worksheet showing the number of hours in which Austin studied each week, and the average scores he achieved on his homework, quizzes, test and exams.

1. Start by creating a line chart from your entire data range
2. Rescale the top line by right clicking and change the series option to use a secondary axis
3. Note the ranges on each side of the chart
4. Next right mouse click one of the lines and choose Change Series Chart type, and choose a column chart format
5. Now apply a chart format and study your date for any useful relationships

	A	B	C
1	**Combination Charts**		
2			
3	**Week**	**Hours of Study**	**Avg Grades for the Week**
4	Week 1	22	92
5	Week 2	20	88
6	Week 3	17.5	76
7	Week 4	14	65
8	Week 5	24	90
9	Week 6	30	98
10	Week 7	20	87
11	Week 8	12	67
12	Week 9	8.5	69
13	Week 10	12	72
14	Week 11	19.5	85
15	Week 12	14	81
16	Week 13	17	83
17	Week 14	22	89
18	Week 15	24	94
19	Week 16	26	97
20	Week 17	16	90
21	Week 18	20	92
22	Week 19	14	83
23	Week 20	32	99
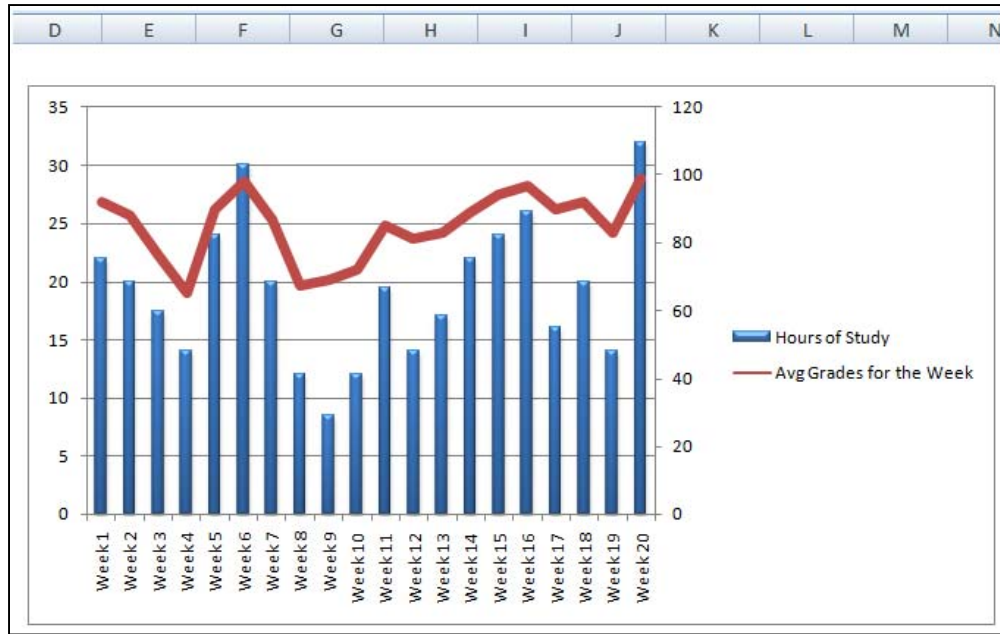
As we can see by the resulting combination chart, approximately 26 hours of study are required each week in order to achieve an average grade of 90 or above, and approximately 20 to 22 hours of study are required each week to achieve a B average above 80. In our next case study we might want to analyze whether the amount of money his parents send to him each week affects the number of hours of study he puts forth each week.

Creating an Organization Chart

Next we will create an organizational chart using the SmartArt capabilities in Excel 2007. Excel 2003 offers a similar tool, but not as pretty. Start by choosing SmartArt and point to the desired chart format.
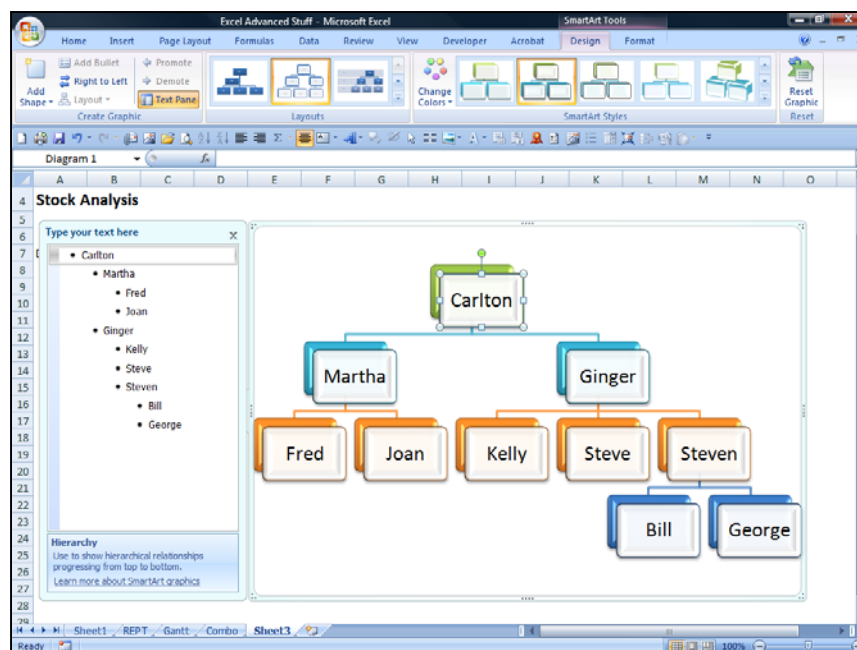
Portfolio Case Study

The Situation - Your individual client (Mr. Slade) has been very successful in his business dealings, and has accumulated $1 million in cash and investments. Previously Mr. Slade has invested these funds rather haphazardly, in a potpourri of investments without much strategy or thought. Presented below is a summary of his funds as they are currently invested:

Cash	275,000
Speculative Stocks	400,000
Mutual Funds	325,000

In speaking with Mr. Slade, with your help he determines that he would like to spread his investments around in a variety of investments in an effort to diversify his portfolio. Together, you come up with the following criteria for Mr. Slade's investment strategy:

1. Mr. Slade wants to spread his investments around, including blue chip stocks, growth stocks, speculation stocks, cash, real estate and mutual funds.
2. Mr. Slade needs between $100,000 and $150,000 in liquid cash.
3. Mr. Slade wants to carry about 25% to 35% of the portfolio in blue chip stocks.
4. Mr. Slade would like to no more than 20% of the portfolio invested in speculative stocks.
5. Mr. Slade wants no more than 20% of his investments in mutual funds.

The next step in this process is to estimate the expected return on investment (ROI) for each of investments. Some of these numbers are easy to come by and some are a little more difficult. For example, it is known that the checking account pays 2.2% interest, and of course there is no growth. Mr. Slade's speculative stock investments have grown

at an average of 12%, with no dividend payments while his mutual funds have grown 7% per year. A little research reveals that blue chip stocks grow on average 6.0% per year, and pay about 4% in dividends annually, and growth stocks grow at about 8% per year. The real estate market has shown steady growth of 12% per year, but there is an annual cost of about 3.5% for taxes, insurance and maintenance.

Mr. Slade wants you to help him figure out which portfolio mix maximizes his earnings, while obeying his stated constraints. Thereafter, Mr. Slade wants you to set up a organized approach for tracking these investments in the future.

The Big Picture - Your Goals Are:

1. Install the Solver tool in Excel.

2. Use Solver to calculate the best mix of investments that also obeys Mr. Slade's stated investment goals and criteria.

3. Set up an Excel worksheet that organizes and tracks these investments.

4. Create web queries that will import stock prices and mutual fund information directly into Excel.

This Case Study Covers the following Excel Features and Concepts:

1. Add-ins
2. Solver Overview
3. Solver Worksheet
4. Solver Constraints
5. Solver Targets
6. Solver Reporting
7. Portfolio Design
8. Web Queries

9. Web Query Parameters
10. Editing Web Queries
11. Refreshing Web Queries
12. Subtotaling
13. Outlining
14. Tables
15. PivotTables
16. Format Gallery

Steps:

1. To use the Solver Add-in, you need to load it first. To do this, Click the Microsoft Office Button, and then click Excel Options. Click Add-Ins, and then in the Manage box, select Excel Add-ins. Click Go. In the Add-Ins available box, select the Solver Add-in check box, and then click OK. After you load the Solver Add-in, the Solver command is available in the Analysis group on the Data tab.
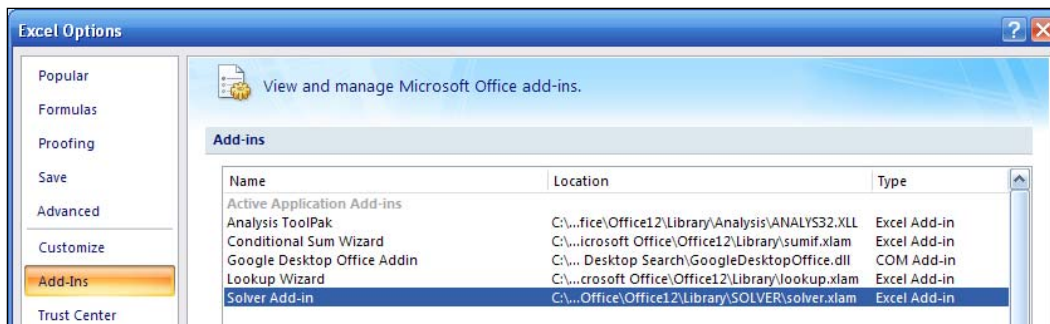
2. Set up the "Investment Mix" worksheet, starting with the row and column labels shown below.

3. Enter the percentage returns for each investment, including earnings and growth rate. Note that the earnings rate for real estate is a negative number because the owner must pay money annually for taxes, insurance and maintenance.

		Annual Earnings Rate	Annual Growth Rate	Amount of Investment	Percentage Investment	Annual Earnings Rate	Annual Growth Rate	Projected Total
1	Portfolio Case Study - Using Solver							
2								
3								
4								
5	Blue Chip Stocks	4%	6%					
6	Growth Stocks	0%	8%					
7	Speculation Stocks	0%	12%					
8	Checking Account	2.20%	0					
9	Real Estate	-3.50%	12%					
10	Mutual Fund	0	7%					
11								

4. Enter an amount of funds for each investment, the total of which sums to the $1 million that Mr. Slade owns. **It does not matter which amounts you enter here**; these are the amounts that will eventually be adjusted by Solver. (For example, you could enter $1 for the first five investments and $999,995 for the last investment if you wanted to.)

		Annual Earnings Rate	Annual Growth Rate	Amount of Investment	Percentage Investment	Annual Earnings Rate	Annual Growth Rate	Projected Total
5	Blue Chip Stocks	4%	6%	150000				
6	Growth Stocks	0%	8%	150000				
7	Speculation Stocks	0%	12%	150000				
8	Checking Account	2.20%	0	150000				
9	Real Estate	-3.50%	12%	150000				
10	Mutual Fund	0	7%	250000				
11				1000000				

5. Enter formulas to calculate the percentage of each investment as a percentage to the total investments. This is best accomplished by typing in the top formula, applying absolute references to the denominator, and double clicking the fill handle to copy the formula down.

		Annual Earnings Rate	Annual Growth Rate	Amount of Investment	Percentage Investment	Annual Earnings Rate	Annual Growth Rate	Projected Total
5	Blue Chip Stocks	4%	6%	150000	15%			
6	Growth Stocks	0%	8%	150000	15%			
7	Speculation Stocks	0%	12%	150000	15%			
8	Checking Account	2.20%	0	150000	15%			
9	Real Estate	-3.50%	12%	150000	15%			
10	Mutual Fund	0	7%	250000	25%			
11				1000000	100%			

6. Enter the remaining formulas to complete the schedule. These formulas are straight forward and they are best accomplished by typing the formula once, applying the proper absolute column reference to the "Amount of Investment" cell reference, and then copying this formula down and across. The final column simply sums the earnings and growth to derive a total return on investment.

		Annual Earnings Rate	Annual Growth Rate	Amount of Investment	Percentage Investment	Annual Earnings Rate	Annual Growth Rate	Projected Total
5	Blue Chip Stocks	4%	6%	150,000	15%	6,000	9,000	15,000
6	Growth Stocks	0%	8%	150,000	15%	-	12,000	12,000
7	Speculation Stocks	0%	12%	150,000	15%	-	18,000	18,000
8	Checking Account	2.20%	0	150,000	15%	3,300	-	3,300
9	Real Estate	-3.50%	12%	150,000	15%	(5,250)	18,000	12,750
10	Mutual Fund	0	7%	250,000	25%	-	17,500	17,500
11				1,000,000	100%	4,050	74,500	78,550

7. Presented below is an auditing view of this schedule with all data and formulas displayed so that you can check your work. This computation represents the Solver Problem which Solver with solve.

	Annual Earnings Rate	Annual Growth Rate	Amount of Investment	Percentage Investment	Annual Earnings Rate	Annual Growth Rate	Projected Total
Blue Chip Stocks	0.04	0.06	150000	=F5/$F$11	=D5*$F5	=E5*$F5	=I5+H5
Growth Stocks	0	0.08	150000	=F6/$F$11	=D6*$F6	=E6*$F6	=I6+H6
Speculation Stocks	0	0.12	150000	=F7/$F$11	=D7*$F7	=E7*$F7	=I7+H7
Checking Account	0.022	0	150000	=F8/$F$11	=D8*$F8	=E8*$F8	=I8+H8
Real Estate	-0.035	0.12	150000	=F9/$F$11	=D9*$F9	=E9*$F9	=I9+H9
Mutual Fund	0	0.07	250000	=F10/$F$11	=D10*$F10	=E10*$F10	=I10+H10
			=SUM(F5:F10)	=F11/$F$11	=SUM(H5:H10)	=SUM(I5:I10)	=SUM(J5:J10)

8. Now that your investment schedule is complete, you are ready to use solver to determine the optimum investment mix that yields the top return, yet obeys Mr. Slade's stated investment objectives. Launch the Solver tool from the Data menu's Analysis chunk.
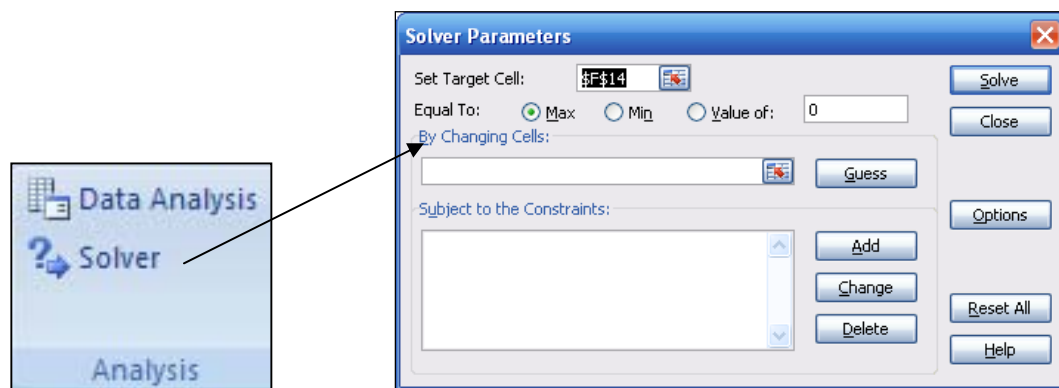
9. Enter the Constraints into the solver Parameters dialog box one at a time. For example, the amount of cash is to be at least $100,000 and at most $150,000. These constraints are expressed as $F$8 >= 100000 and $F$8 <= 150000.
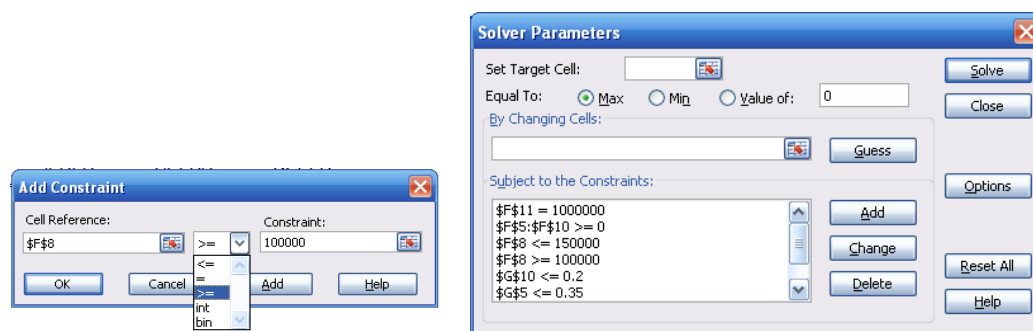
Further, in order to make solver work, you must add two additional constraints as follows. A constraint that tells solver the total amount of available funds must also be added by instructing Solver that total funds are $1,000,000. Another constraint that indicates that no investment shall be less than $0.00 must also be added, otherwise solver will try to maximize earnings by suggesting negative
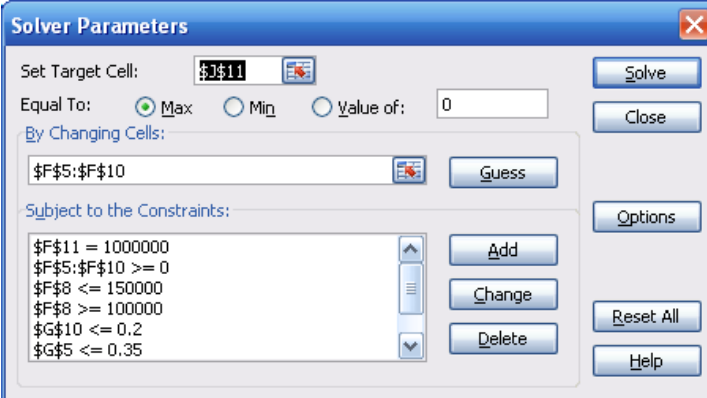
investment amounts. (Sure, this sounds crazy, but Solver is not a thinking intelligent being, its just a calculation.)

10. Complete the Solver by referencing the cells to be changed and the cell to be maximized in the solution. The cells to be changed are the 6 cells containing the amounts to be invested in each type of investment, as shown in the dotted line box below.

Annual Growth Rate	Amount of Investment	Percentage Investment	Annual Earnings Rate	Annual Growth Rate	Projected Total
6%	150,000	15%	6,000	9,000	15,000
8%	150,000	15%	-	12,000	12,000
12%	150,000	15%	-	18,000	18,000
0	150,000	15%	3,300	-	3,300
12%	150,000	15%	(5,250)	18,000	12,750
7%	250,000	25%	-	17,500	17,500
	1,000,000	100%	4,050	74,500	78,550

Solver Parameters

$F$5:$F$10

11. The cell to be maximized is the total amount of return on investment, or the total of the "Projected Total" column.

Solver Parameters

Set Target Cell: $J$11

Equal To: ⊙ Max   ○ Min   ○ Value of: 0

By Changing Cells:

$F$5:$F$10   Guess

Subject to the Constraints: Options

$F$11 = 1000000
$F$5:$F$10 >= 0   Add
$F$8 <= 150000
$F$8 >= 100000   Change
$G$10 <= 0.2
$G$5 <= 0.35   Delete

Solve
Close
Reset All
Help

Solver is Ready to Run

12. With all constraints, changing cells, and maximized cell properly referenced, you are now ready to produce the solution by pressing the Solve button. This action will adjust the portfolio mix schedule to provide those top results which obey the stated investment objectives.

	Annual Earnings Rate	Annual Growth Rate	Amount of Investment	Percentage Investment	Annual Earnings Rate	Annual Growth Rate	Projected Total
5 Blue Chip Stocks	4%	6%	350,000	35%	14,000	21,000	35,000
6 Growth Stocks	0%	8%	0	0%	-	0	0
7 Speculation Stocks	0%	12%	200,000	20%	-	24,000	24,000
8 Checking Account	2.20%	0	100,000	10%	2,200	-	2,200
9 Real Estate	-3.50%	12%	350,000	35%	(12,250)	42,000	29,750
10 Mutual Fund	0	7%	(0)	0%	-	(0)	(0)
11			1,000,000	100%	3,950	87,000	90,950

Solver Results

Solver found a solution. All constraints and optimality conditions are satisfied.

Reports
Answer
Sensitivity
Limits

◉ Keep Solver Solution
○ Restore Original Values

[OK]   [Cancel]   [Save Scenario...]   [Help]

As you can see by the serene above, solver has adjusted the portfolio investment mix to show that total earnings of $90,950 can be achieved by maximizing the investments in blue chip stocks, avoiding growth stocks, placing the minimum amount of $100,000 in checking, etc. After producing this report, Mr. Slade may decide that additional constraints are needed, and if so, the numbers can be massaged accordingly.

13. Solver now offers a variety of options for reporting the results. The report can be saved as a scenario. Thereafter, Solver will produce various reports to help you understand the results. The first of these reports is the Answers Report shown to the right.

1 Microsoft Excel 12.0 Answer Report
2 Worksheet: [Case Study - Portfolio.xlsx]Sheet1
3 Report Created: 2/12/2007 11:46:06 AM

6 Target Cell (Max)

Cell	Name	Original Value	Final Value
$J$11	Projected Total	78,550	90,950

11 Adjustable Cells

Cell	Name	Original Value	Final Value
$F$5	Blue Chip Stocks Amount of Investment	150,000	350,000
$F$6	Growth Stocks Amount of Investment	150,000	0
$F$7	Speculation Stocks Amount of Investmer	150,000	200,000
$F$8	Checking Account Amount of Investment	150,000	100,000
$F$9	Real Estate Amount of Investment	150,000	350,000
$F$10	Mutual Fund Amount of Investment	250,000	(0)

21 Constraints

Cell	Name	Cell Value	Formula	Status	Slack
$G$5	Blue Chip Stocks Percentage Investment	35%	$G$5<=0.35	Binding	0
$G$5	Blue Chip Stocks Percentage Investment	35%	$G$5>=0.25	Not Binding	10%
$F$11	Amount of Investment	1,000,000	$F$11=1000000	Not Binding	0
$G$10	Mutual Fund Percentage Investment	0%	$G$10<=0.2	Not Binding	0.2
$G$7	Speculation Stocks Percentage Investme	20%	$G$7<=0.2	Binding	0
$F$8	Checking Account Amount of Investment	100,000	$F$8<=150000	Not Binding	50000
$F$8	Checking Account Amount of Investment	100,000	$F$8>=100000	Binding	-
$F$5	Blue Chip Stocks Amount of Investment	350,000	$F$5>=0	Not Binding	350,000
$F$6	Growth Stocks Amount of Investment	0	$F$6>=0	Binding	-
$F$7	Speculation Stocks Amount of Investmer	200,000	$F$7>=0	Not Binding	200,000
$F$8	Checking Account Amount of Investment	100,000	$F$8>=0	Not Binding	100,000
$F$9	Real Estate Amount of Investment	350,000	$F$9>=0	Not Binding	350,000
$F$10	Mutual Fund Amount of Investment	(0)	$F$10>=0	Binding	-

Answer Report 1 / Sensitivity Report 1 / Limits Report 1 / Sheet1 / Sheet2 / Sheet

Ready

14. The Sensitivity and Limit Reports provide details into how the final answers were derived.

		Final	Reduced
Microsoft Excel 12.0 Sensitivity Report			
Worksheet: [Case Study - Portfolio.xlsx]Sheet1			
Report Created: 2/12/2007 11:46:06 AM			

Adjustable Cells

Cell	Name	Final Value	Reduced Gradient
$F$5	Blue Chip Stocks Amount of Investment	350,000	-
$F$6	Growth Stocks Amount of Investment	0	(0)
$F$7	Speculation Stocks Amount of Investment	200,000	-
$F$8	Checking Account Amount of Investment	100,000	(0)
$F$9	Real Estate Amount of Investment	350,000	-
$F$10	Mutual Fund Amount of Investment	(0)	(0)

Constraints

Cell	Name	Final Value	Lagrange Multiplier
$G$5	Blue Chip Stocks Percentage Investment	35%	1500001%
$G$5	Blue Chip Stocks Percentage Investment	35%	0%
$F$11	Amount of Investment	1,000,000	0
$G$10	Mutual Fund Percentage Investment	0%	0%
$G$7	Speculation Stocks Percentage Investment	20%	3500000%

Microsoft Excel 12.0 Limits Report
Worksheet: [Case Study - Portfolio.xlsx]Limits Report 1
Report Created: 2/12/2007 11:46:07 AM

Cell	Target Name	Value
$J$11	Projected Total	90,950

Cell	Adjustable Name	Value	Lower Limit	Target Result	Upper Limit	Target Result
$F$5	Blue Chip Stocks Amount of Investment	350,000	350,000	90,950	350,000	90,950
$F$6	Growth Stocks Amount of Investment	0	0	90,950	0	90,950
$F$7	Speculation Stocks Amount of Investment	200,000	200,000	90,950	200,000	90,950
$F$8	Checking Account Amount of Investment	100,000	100,000	90,950	100,000	90,950
$F$9	Real Estate Amount of Investment	350,000	350,000	90,950	350,000	90,950
$F$10	Mutual Fund Amount of Investment	(0)	-	90,950	-	90,950

15. Now that the Portfolio Investment Mix and Solver worksheets have both been created, they can be rerun as frequently as desired in just a few seconds. For example, assume that the checking account interest rate changes, blue chip returns fall, and Mr. Slade's objectives change. This is no problem as you can open the worksheets and make these adjustments in only a few seconds. Specifically, assume that Mr. Slade decides that at least 10% of the investments should be invested in Mutual funds. Simply add this new constraint to Solver and recomputed the results.

	Annual Earnings Rate	Annual Growth Rate	Amount of Investment	Percentage Investment	Annual Earnings Rate	Annual Growth Rate	Projected Total
Blue Chip Stocks	4%	6%	350,000	35%	14,000	21,000	35,000
Growth Stocks	0%	8%	0	0%	-	0	0
Speculation Stocks	0%	12%	200,000	20%	-	24,000	24,000
Checking Account	2.20%	0	100,000	10%	2,200	-	2,200
Real Estate	-3.50%	12%	250,000	25%	(8,750)	30,000	21,250
Mutual Fund	0	7%	100,000	10%	-	7,000	7,000
			1,000,000	100%	7,450	82,000	89,450

As market conditions change, the Investment Mix Schedule assumptions can be updated and Solver can be re-run to produce new results. Thereafter, Mr. Slade needs only to track investments and move them around as the amounts grow to match his desired investment goals.

16. The next step is to assist Mr. Slade in selecting investments from each category, and then creating a worksheet to track those investments. While the selection of each individual investment is complex, strategic and personal (and hence beyond

the scope of this case study), let us assume that Mr. Slade has decided upon the following specific investments:

Category	Symbol	Company Name	Intial Amount
Blue Chip Stocks	MSFT	Microsoft	50,000
Blue Chip Stocks	T	AT&T Inc.	50,000
Blue Chip Stocks	DOW	Dow Chemical	50,000
Blue Chip Stocks	DD	Du Pont	50,000
Blue Chip Stocks	UPS	UPS	50,000
Blue Chip Stocks	XOM	Exon Mobil	50,000
Blue Chip Stocks	KO	Coca Cola	50,000
Speculation Stocks	GOOG	Google	50,000
Speculation Stocks	ORCL	Oracle	50,000
Speculation Stocks	IN	Intermec	50,000
Speculation Stocks	MRK	Merck	50,000
Checking Account			100,000
Real Estate		Undeveloped Land	70,000
		Townhome	180,000
Mutual Fund	FFIDX	Fidelity Fund	50,000
Mutual Fund	EDSIX	Evergreen Disciplined Value Fund	25,000
Mutual Fund	AFATX	Afba 5Star Science & Technology	25,000
			1,000,000

17. Set up an initial Portfolio that list these investments and the initial amounts that Mr. Slade has decided to place in each investment. Include a column for share price and the total number of shares as shown below.

18. On a separate sheet, insert a Web Query to retrieve these stock and mutual fund prices using the ticker symbols provided. To do this, select "Existing Connections

from the Data Ribbon's "Get External Data" Chunk, and select "Stock Quotes". Enter the ticker symbols in the "Enter Parameter Value" dialog box shown below. Be sure to check the checkbox titled "Use this value/reference for future refreshes".
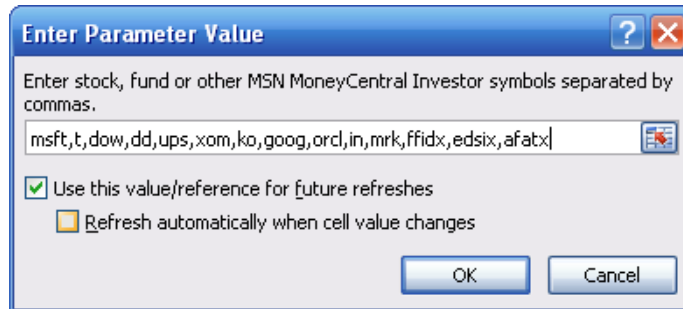
19. This action will cause Excel to reach out to a stock portfolio database on the Internet and create the following summary report:

20. Return to the Portfolio and insert formulas to pull stock price data from the web query into the Portfolio as shown below.

	Category	Symbol	Company Name	Intial Amount	Share Price	Shares
16	Category	Symbol	Company Name	Intial Amount	Share Price	Shares
17	Blue Chip Stocks	MSFT	Microsoft	50,000	=Sheet3!D4	
18	Blue Chip Stocks	T	AT&T Inc.	50,000	37.01	
19	Blue Chip Stocks	DOW	Dow Chemical	50,000	42.14	
20	Blue Chip Stocks	DD	Du Pont	50,000	51.12	
21	Blue Chip Stocks	UPS	UPS	50,000	73.95	
22	Blue Chip Stocks	XOM	Exon Mobil	50,000	74.86	
23	Blue Chip Stocks	KO	Coca Cola	50,000	48.18	
24						
25	Speculation Stocks	GOOG	Google	50,000	456.27	
26	Speculation Stocks	ORCL	Oracle	50,000	16.62	
27	Speculation Stocks	IN	Intermec	50,000	24.56	
28	Speculation Stocks	MRK	Merck	50,000	43.95	

21. Add formulas in the shares column by dividing the amount of each investment by the share price in order to determine the appropriate number of shares of each investment Mr. Slade should purchase to meet his investment goals. Be sure to use the round function and round to the nearest tenth.

	Category	Symbol	Company Name	Intial Amount	Share Price	Shares
16	Category	Symbol	Company Name	Intial Amount	Share Price	Shares
17	Blue Chip Stocks	MSFT	Microsoft	50,000	28.95	=ROUND(F17
18	Blue Chip Stocks	T	AT&T Inc.	50,000	37.01	1,350
19	Blue Chip Stocks	DOW	Dow Chemical	50,000	42.14	1,190
20	Blue Chip Stocks	DD	Du Pont	50,000	51.12	980
21	Blue Chip Stocks	UPS	UPS	50,000	73.95	680
22	Blue Chip Stocks	XOM	Exon Mobil	50,000	74.86	670
23	Blue Chip Stocks	KO	Coca Cola	50,000	48.18	1,040
24						
25	Speculation Stocks	GOOG	Google	50,000	456.27	110
26	Speculation Stocks	ORCL	Oracle	50,000	16.62	3,010
27	Speculation Stocks	IN	Intermec	50,000	24.56	2,040
28	Speculation Stocks	MRK	Merck	50,000	43.95	1,140

22. Once Mr. Slade has made all of the necessary investments, recreate the portfolio on a new sheet, and make the necessary adjustments to reflect the actual results of these transactions. Due to the requirements of purchasing bocks of shares, Mr. Slade will not be able to purchase the exact number of shares indicated above at the exact same price indicated above. Therefore there will be slight discrepancies. Once those transactions are completed, Mr. Slade will need a worksheet that documents the beginning point in which Mr. Slade begins to track his investments. For example, the resulting Portfolio might look like this:

	A	B	C	D	E	F	G
1	Category		Symbol	Company Name	Shares	Share Price	Shares
2	Blue Chip Stocks		MSFT	Microsoft	1750	28.95	50,663
3	Blue Chip Stocks		T	AT&T Inc.	1300	37.01	48,113
4	Blue Chip Stocks		DOW	Dow Chemical	1200	42.14	50,568
5	Blue Chip Stocks		DD	Du Pont	1000	51.12	51,120
6	Blue Chip Stocks		UPS	UPS	700	73.95	51,765
7	Blue Chip Stocks		XOM	Exon Mobil	600	74.86	44,916
8	Blue Chip Stocks		KO	Coca Cola	1000	48.18	48,180
9	Speculation Stocks		GOOG	Google	100	456.27	45,627
10	Speculation Stocks		ORCL	Oracle	3000	16.62	49,860
11	Speculation Stocks		IN	Intermec	2000	24.56	49,120
12	Speculation Stocks		MRK	Merck	1100	43.95	48,345
13	Checking Account			Wachovia			109,621
14	Real Estate			Undeveloped Land - Houston			70,000
15	Real Estate			Townhome - Destin, FL			180,000
16	Mutual Fund		FFIDX	Fidelity Fund	1400	36.65	51,310
17	Mutual Fund		EDSIX	Evergreen Disciplined Value Fund	1400	18.19	25,466
18	Mutual Fund		AFATX	Afba 5Star Science & Technology	1800	14.07	25,326
19							
20							1,000,000

23. Once created, the portfolio can be updated at any time by pressing the "Refresh Data" button. As an example, just moments after completing this portfolio, Mr. Slade's investments had grown by $1,651, as shown below. Of course changes in the real estate holdings and checking account balance will need to be input manually on a periodic basis such as every 6 months or each year.

24. Next, practice converting this data to both a table, and a PivotTable. Therefore select the top cell referencing the share price, and press F2 and then F$ to toggle on the absolute references. Use the down arrow and repeat this until all share formulas have an absolute reference. Copy the Portfolio to a new sheet, and again to yet another new sheet.

25. Select one of the portfolio examples and apply Subtotals to the Portfolio using the "Subtotal" tool from the Data Ribbon's "Outline" Chunk. This action will automatically subtotal the Portfolio by category as shown below.

	A	B	C	D	E	F	G
1	Category	Symbol	Company Name	Shares	Share Price	Total	
2	Blue Chip Stocks	MSFT	Microsoft	1750	28.93	50,628	
3	Blue Chip Stocks	T	AT&T Inc.	1300	36.96	48,048	
4	Blue Chip Stocks	DOW	Dow Chemical	1200	42.18	50,616	
5	Blue Chip Stocks	DD	Du Pont	1000	51.02	51,020	
6	Blue Chip Stocks	UPS	UPS	700	74	51,800	
7	Blue Chip Stocks	XOM	Exon Mobil	600	74.74	44,844	
8	Blue Chip Stocks	KO	Coca Cola	1000	48.19	48,190	
9	**Blue Chip Stocks Total**					345,146	
10	Speculation Stocks	GOOG	Google	100	475	47,500	
11	Speculation Stocks	ORCL	Oracle	3000	16.59	49,770	
12	Speculation Stocks	IN	Intermec	2000	24.6	49,200	
13	Speculation Stocks	MRK	Merck	1100	43.92	48,312	
14	**Speculation Stocks Total**					194,782	
15	Checking Account		Wachovia			109,621	
16	**Checking Account Total**					109,621	
17	Real Estate		Undeveloped Land - Houston			70,000	
18	Real Estate		Townhome - Destin, FL			180,000	
19	**Real Estate Total**					250,000	
20	Mutual Fund	FFIDX	Fidelity Fund	1400	36.65	51,310	
21	Mutual Fund	EDSIX	Evergreen Disciplined Value Fund	1400	18.19	25,466	

26. Convert the portfolio to a table using the "Table" tool from the Insert Ribbon's "Tables" Chunk. This will automatically apply formatting and drop down filters to the Portfolio. Yu change the formatting using the gallery or by applying new formats to individual rows or columns.

	A	B	C	D	E	F	G
1	Category	Symbol	Company Name	Shares	Share Price	Total	
2	Blue Chip Stocks	MSFT	Microsoft	1750	28.93	50,628	
3	Blue Chip Stocks	T	AT&T Inc.	1300	36.96	48,048	
4	Blue Chip Stocks	DOW	Dow Chemical	1200	42.18	50,616	
5	Blue Chip Stocks	DD	Du Pont	1000	51.02	51,020	
6	Blue Chip Stocks	UPS	UPS	700	74	51,800	
7	Blue Chip Stocks	XOM	Exon Mobil	600	74.74	44,844	
8	Blue Chip Stocks	KO	Coca Cola	1000	48.19	48,190	
9	**Blue Chip Stocks Total**					345,146	
10	Speculation Stocks	GOOG	Google	100	475	47,500	
11	Speculation Stocks	ORCL	Oracle	3000	16.59	49,770	
12	Speculation Stocks	IN	Intermec	2000	24.6	49,200	
13	Speculation Stocks	MRK	Merck	1100	43.92	48,312	
14	**Speculation Stocks Total**					194,782	
15	Checking Account		Wachovia			109,621	
16	**Checking Account Total**					109,621	
17	Real Estate		Undeveloped Land - Houston			70,000	
18	Real Estate		Townhome - Destin, FL			180,000	
19	**Real Estate Total**					250,000	
20	Mutual Fund	FFIDX	Fidelity Fund	1400	36.65	51,310	
21	Mutual Fund	EDSIX	Evergreen Disciplined Value Fund	1400	18.19	25,466	

27. Next click the "Outline" selection number 2 to display the collapsed version of the data, displaying subtotals and grand totals only.

		A	B	C	D	E	F
	1	Category	Symbol	Company Name	Shares	Share Price	Total
+	9	Blue Chip Stocks Total					345,146
+	14	Speculation Stocks Total					194,782
+	16	Checking Account Total					109,621
+	19	Real Estate Total					250,000
+	23	Mutual Fund Total					102,102
−	24	Total					-
	25	Grand Total					1,001,651

28. Now select the second copy of the Portfolio, and with your cursor positioned on any cell in the table, select the "PivotTable" tool from the Insert Ribbon's PivotTable Chunk. This action will produce a new Sheet with a Blank Pivot Pallet displayed as shown below.
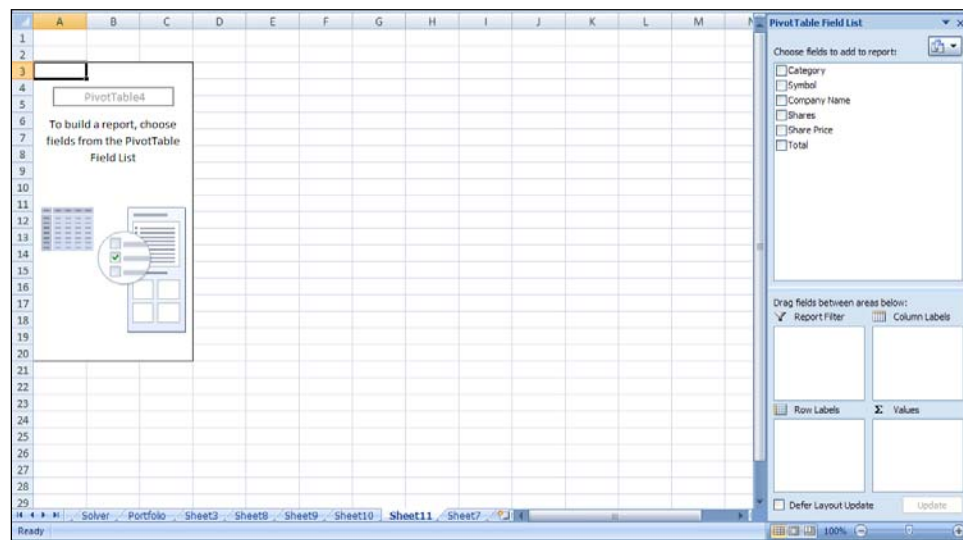
29. In the Pivot Table Field List dialog box, check the "Category", "Company Name" and "Total" column. Next drag the Category field from the Row Labels box and drop it in the Column labels box. The resulting pivot report should appear as follows:
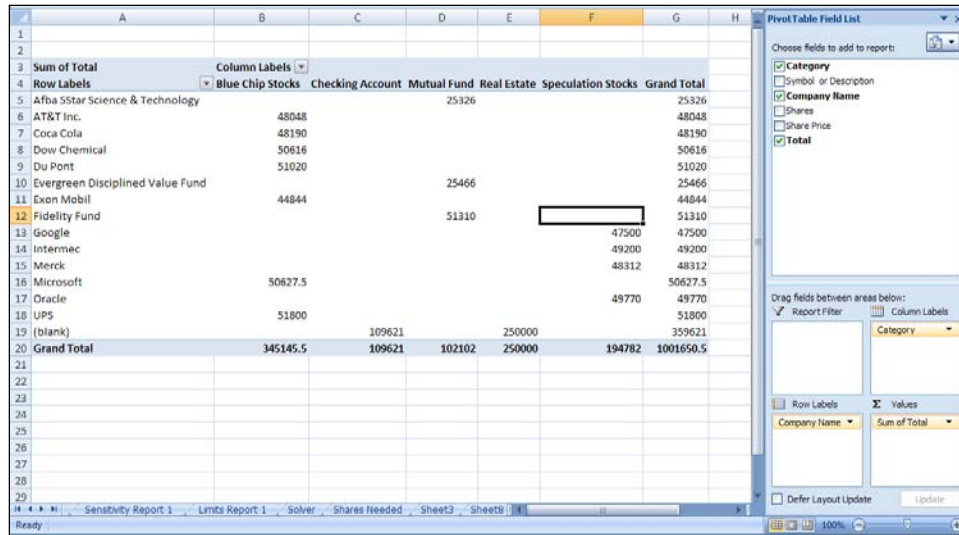
30. Finish by formatting the table with a "Dark" design from the "Format as Table" tool on the Home Ribbon's Styles chunk. Also apply comma formatting.

Sum of Total	Column Labels					
Row Labels	Blue Chip Stocks	Checking Account	Mutual Fund	Real Estate	Speculation Stocks	Grand Total
Afba 5Star Science & Technology			25,326			25,326
AT&T Inc.	48,048					48,048
Coca Cola	48,190					48,190
Dow Chemical	50,616					50,616
Du Pont	51,020					51,020
Evergreen Disciplined Value Fund			25,466			25,466
Exon Mobil	44,844					44,844
Fidelity Fund			51,310			51,310
Google					47,500	47,500
Intermec					49,200	49,200
Merck					48,312	48,312
Microsoft	50,628					50,628
Oracle					49,770	49,770
UPS	51,800					51,800
(blank)		109,621		250,000		359,621
Grand Total	345,146	109,621	102,102	250,000	194,782	1,001,651

In conclusion, you have assisted Mr. Slade in planning an investment strategy which diversifies his holdings, yet maximizes earnings. Additionally, you have created a worksheet that tracks these investments. As all of the factors change, Mr. Slade can easily determine which monies, if any, need to be moved around to maintain his desired diversity. For example, assume that Mr. Slade makes an additional $200,000 in 2007, and his checking account increases accordingly. He need only insert the new checking account balance into solver, along with any other known adjustments such as changes in earnings, and rerun solver to obtain a new mix, which can be compared to the current investment mix to determine which investments need to be adjusted.
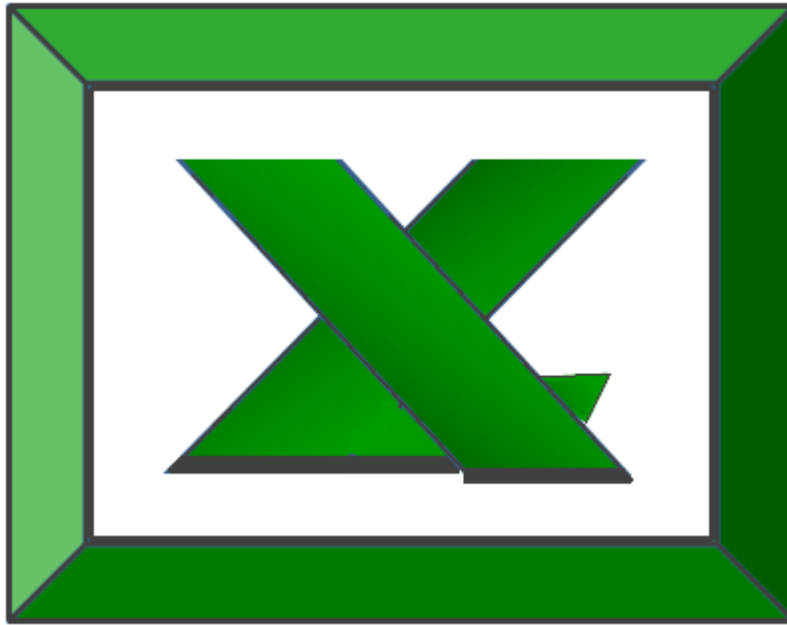
Chapter 10

Excel Advanced
Digging Deeper into Excel's Fundamentals

Excel Functions

Functions are basically prewritten formulas, but you must follow the proper syntax to use them. There are a total of 348 Functions built into Excel, categorized as follows:

	Function Categories	Number of Functions Per Category	Carlton's List of Best Functions for CPAs
1	Add-in	5	1
2	Cube	7	4
3	Database	12	7
4	Date and time	20	8
5	Engineering	39	0
6	Financial	53	8
7	Information	7	3
8	IS	11	2
9	Logical	7	6
10	Lookup/Reference	17	7
11	Math/Trig	60	8
12	Statistical	83	8
13	Text	27	15
	Total Functions	348	77

Many of these functions represent powerful tools for the CPA while others represent tools that have limited CPA application. For example most CPAs have little applications for CPAs for trigonometry functions that calculate logarithms, seines, or cosines, and perhaps even less opportunities to use engineering functions such as gammas, hypergeometric distribution, or coefficients of complex numbers. Based on my years of using Excel in a CPA environment, I find that the following 77 functions are most applicable to CPAs:

Add-in:	
=GETPIVOTDATA	Returns data stored in a PivotTable report
Database:	
=DCOUNT	Counts the cells that contain numbers in a database
=DCOUNTA	Counts nonblank cells in a database
=DGET	Extracts a single database record that matches the specified criteria
=DSUM	Adds numbers in the database that match the criteria
Date and time:	
=DATE	Returns the serial number of a particular date
=DATEVALUE	Converts a date in the form of text to a serial number
=DAY	Converts a serial number to a day of the month
=TODAY	Returns the serial number of today's date

=WEEKDAY	Converts a serial number to a day of the week	
=WEEKNUM	Converts a serial number to week number 1 thru 52	
=YEAR	Converts a serial number to a year	

Financial:

=FV	Returns the future value of an investment
=INTRATE	Returns the interest rate for a fully invested security
=IPMT	Returns the interest payment for an investment for a given period
=IRR	Returns the internal rate of return for a series of cash flows
=NPV	Returns the net present value of an investment based on a series of periodic cash flows and a discount rate
=PMT	Returns the periodic payment for an annuity
=PV	Returns the present value of an investment
=RATE	Returns the interest rate per period of an annuity

Information:

=CELL	Returns information about the formatting, location, or contents of a cell
=INFO	Returns information about the current operating environment

IS :

=ISBLANK	Returns TRUE if the value is blank
=ISERR	Returns TRUE if the value is any error value except #N/A

Logical:

=AND	Returns TRUE if all of its arguments are TRUE
=FALSE	Returns the logical value FALSE
=IF	Specifies a logical test to perform
=IFERROR	Returns a value you specify if error; otherwise, returns the result
=NOT	Reverses the logic of its argument
=OR	Returns TRUE if any argument is TRUE

Lookup/Reference

=ADDRESS	Returns a reference as text to a single cell in a worksheet
=CHOOSE	Chooses a value from a list of values
=HLOOKUP	Looks in the top row of an array and returns the value of the indicated cell
=HYPERLINK	Creates link to open a document stored on your computer or the Internet
=LOOKUP	Looks up values in a vector or array
=TRANSPOSE	Returns the transpose of an array
=VLOOKUP	Looks in the first column of an array and moves across the row to return the value of a cell

Math/Trigonometry

=RAND	Returns a random number between 0 and 1
=RANDBETWEEN	Returns a random number between the numbers you specify
=ROUND	Rounds a number to a specified number of digits
=ROUNDDOWN	Rounds a number down, toward zero
=ROUNDUP	Rounds a number up, away from zero
=SUBTOTAL	Returns a subtotal in a list or database
=SUM	Adds its arguments

=SUMIF	Adds the cells specified by a given criteria	

Text:

=CLEAN	Removes all nonprintable characters from text
=CONCATENATE	Joins several text items into one text item
=FIND,	Finds one text value within another (case-sensitive)
=LEFT,	Returns the leftmost characters from a text value
=LEN,	Returns the number of characters in a text string
=LOWER	Converts text to lowercase
=MID,	Returns specific characters from a text string starting where you specify
=PROPER	Capitalizes the first letter in each word of a text value
=REPLACE,	Replaces characters within text
=RIGHT,	Returns the rightmost characters from a text value
=SUBSTITUTE	Substitutes new text for old text in a text string
=TEXT	Formats a number and converts it to text
=TRIM	Removes spaces from text
=UPPER	Converts text to uppercase
=VALUE	Converts a text argument to a number

Statistical:

=AVERAGE	Returns the average of its arguments
=COUNT	Counts how many numbers are in the list of arguments
=COUNTA	Counts how many values are in the list of arguments
=COUNTBLANK	Counts the number of blank cells within a range
=COUNTIF	Counts the number of cells within a range that meet the given criteria
=MAX	Returns the maximum value in a list of arguments
=MEDIAN	Returns the median of the given numbers
=MIN	Returns the minimum value in a list of arguments

Functions can save time and promote accuracy. Best of all, they eliminate the need for CPAs to create complex formulas because these functions do most of the work for you. To fully utilize functions in Excel, a user should study the various functions listed above and be aware of the following facets regarding functions:

1. The Insert Function Tool
2. Formula AutoComplete, Syntax Reminder, Insert Function options
3. Insert Function – Help
4. The AutoSum Function Tool
5. Demonstration of the following selected functions:

Financial	Logical	Text	Date/Time	Lookup	Math	More
=PMT	=IF	=LEFT	=TODAY	=VLOOKUP	=ROUND	=COUNT
	=AND	=MID	=NOW	=HLOOKUP	=SUBTOTAL	=CELL
	=OR	=RIGHT	=MONTH	=CHOOSE	=SUMIF	=INFO
		=FIND	=YEAR		=RAND	
		=LEN	=DAY		=RANDBETWEEN	
		=SUBSTITUTE	=WEEKDAY			
		=CONCANTENATE				
		=VALUE				

Download an example Excel worksheet from the web which demonstrates each of these function concepts at the following web site address:

www.exceladvisor.net/functions.htm

Formatting:

Formulas and Functions represent the power Excel has to offer, but your final product must be neat, readable, and well-organized. Excel's built-in formatting tools are designed to help you produce financial reports and data that are of presentation quality. The key formatting concepts that CPA's should be aware of are as follows:

1. Number Formats – Controlling commas, decimals, currency symbols, and negatives.
2. Date Formats – Controlling days, months, years, seconds, hours and minute.
3. Alignment - Left, Middle, Right, Top, Middle, & Bottom.
4. Alignment – Text Wrapping.
5. Alignment – Text Orientation.
6. Alignment – Text Shrink to Fit.
7. Alignment – Text Direction.
8. Fonts - Font Size, Bold, Italics, Color.
9. Fonts – Strikethroughs, Superscripts & Subscripts.
10. Fonts – In-Cell Formatting Character-by-Character.
11. Fonts – Underlines & Double Underlines.
12. Cells – Borders, Colors & Line Styles.
13. Cells – Fill Colors & Fill Effects.
14. Cells – Merging Cells.
15. Cells - Fill Color, Pattern, Effect.
16. Conditional Formatting – Highlighting with Colors.
17. Conditional Formatting – Top & Bottom Formatting.
18. Conditional Formatting – Data Bars.
19. Conditional Formatting – Traffic Lights.
20. Column Width and Row Height – Changing one row or column.
21. Column Width and Row Height – Changing multiple rows or columns.
22. Column Width and Row Height – Auto adjusting row height and columns widths.
23. Styles – Using Excel's Default Styles.
24. Styles – Creating Custom Styles.
25. Tables – Table Formatting.

Download an example Excel worksheet from the web which demonstrates each of these formatting concepts at the following web site address:

www.exceladvisor.net/formetting.htm
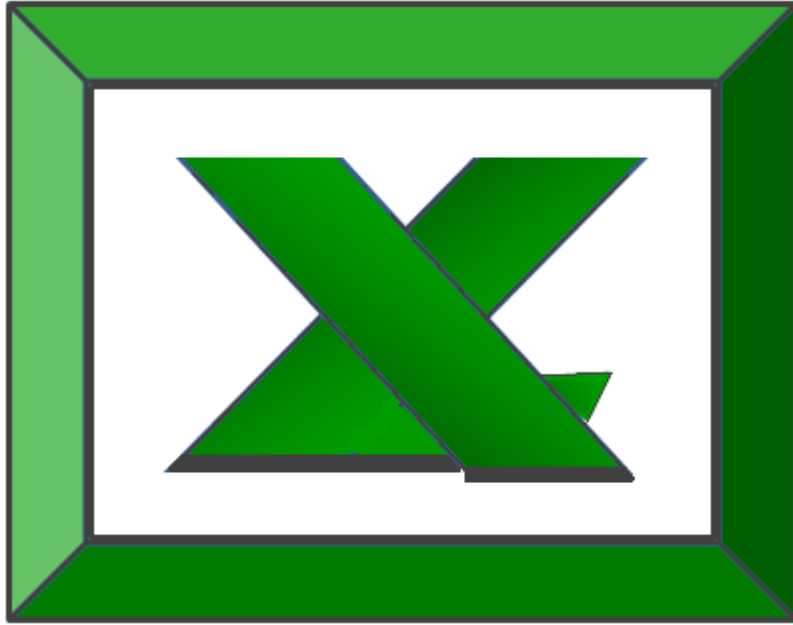
Microsoft Excel XML Chapter 11

Overview of XML in Excel ▾ Hide All

Microsoft Office Excel makes it easy to import Extensible Markup Language (XML) (Extensible Markup Language (XML): A condensed form of Standard Generalized Markup Language (SGML) that enables developers to create customized tags that offer flexibility in organizing and presenting information.) data that is created from other databases and applications, to map XML elements from an XML schema (XML Schema: A formal specification, written in XML, that defines the structure of an XML document, including element names and rich data types, which elements can appear in combination, and which attributes are available for each element.) to worksheet cells, and to export revised XML data for interaction with other databases and applications. Think of these XML features as turning Office Excel into an XML data file generator with a familiar user interface.

1. Why use XML in Excel?
   a. XML data and schema files
   b. Key XML and Excel scenarios
2. The basic process of using XML data in Excel
   a. Working with XML maps
   b. Using the XML Source task pane
   c. Element types and their icons
   d. Working with single-mapped cells
   e. Working with repeating cells in XML tables
   f. XML map security considerations
   g. Importing XML data
   h. Working with an inferred schema
   i. Exporting XML data
3. Using the Excel macro-enabled Office XML Format file
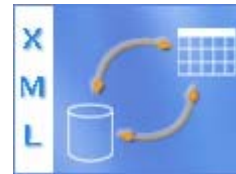
Why use XML in Excel?

XML is a technology that is designed for managing and sharing structured data in a human-readable text file. XML follows industry-standard guidelines and can be processed by a variety of databases and applications. Using XML, application designers can create their own customized tags, data structures, and schemas. In short, XML greatly eases the definition, transmission, validation, and interpretation of data between databases, applications, and organizations.

XML data and schema files
Excel works primarily with two types of XML files:
XML data files (.xml), which contain the custom tags and structured data.
Schema files (.xsd), which contain schema tags that enforce rules, such as data type and validation.
 Note The XML standard also defines Extensible Stylesheet Language Transformation (XSLT) (XSL Transformation (XSLT): A file that is used to transform XML documents into other types of documents, such as HTML or XML. It is designed for use as part of XSL.) (.xslt) files, which are used to apply styles and transform XML data into different presentation formats. You can apply these transforms before you import XML files into Excel and after you export XML files from Excel. If XSLT files are linked to XML data files that you import into Excel, you do have the

option to apply or not apply the formatting before the data is added to the worksheet, but only when you open an XML file by using the **Open** command on the **Microsoft Office Button** .

Key XML and Excel scenarios

By using XML and Excel, you can manage workbooks and data in ways that were previously impossible or very difficult. By using XML maps, you can easily add, identify, and extract specific pieces of business data from Excel documents. For example, an invoice that contains the name and address of a customer or a report that contains last quarter's financial results are no longer just static reports. You can easily import this information from databases and applications, revise it, and export it to the same or other databases and applications. The following are key scenarios that the XML features are designed to address:

1. Extend the functionality of existing Excel templates by mapping XML elements onto existing cells. This makes it easier to get XML data into and out of your templates without having to redesign them.
2. Use XML data as input to your existing calculation models by mapping XML elements onto existing worksheets.
3. Import XML data files into a new workbook.
4. Import XML data from a Web service into your Excel worksheet.
5. Export data in mapped cells to XML data files independent from other data in the workbook.

The basic process of using XML data in Excel

The following diagram shows how the different files and operations work together when you use XML with Excel. Essentially, there are five phases to the process:

1. Adding an XML schema file (.xsd) to a workbook
2. Mapping XML schema elements to individual cells or XML tables
3. Importing an XML data file (.xml) and binding the XML elements to mapped cells
4. Entering data, moving mapped cells, and leveraging Excel functionality, while preserving XML structure and definitions
5. Exporting revised data from mapped cells to an XML data file
6.

Working with XML maps

You can create or open a workbook in Excel, attach an XML schema file (.xsd) to the workbook, and then use the **XML Source** task pane to map XML elements of the schema to individual cells or tables. After you map the XML elements to your worksheet, you can import and export XML data into and out of the mapped cells. When you add an XML schema file (.xsd) to your workbook, you create an XML map. In general, XML maps are used to create mapped cells and to manage the relationship between mapped cells and individual elements in the XML schema. In addition, these XML maps are used to bind the contents of mapped cells to elements in the schema when you import or export XML data files (.xml).

There are two kinds of mapped cells that you can create: single-mapped cells and repeating cells (which appear as XML tables). To make designing your worksheet more flexible, you can drag the mapped cells anywhere on a worksheet and into any order — even one different from the XML schema. You can also choose which elements to map and not map.

The following rules about using XML maps are important to know:

1. A workbook can contain one or more XML maps.
2. You can only map one element to one location in a workbook at a time.
3. Each XML map is an independent entity, even if multiple XML maps in the same workbook refer to the same schema.
4. An XML map can only contain one root element. If you add a schema that defines more than one root element, you are prompted to choose the root element to use for the new XML map.

Using the XML Source task pane

You use the **XML Source** task pane to manage XML maps. To open it, on the **Developer** tab, in the **XML** group, click **Source**. The following diagram shows the main features of this task pane.
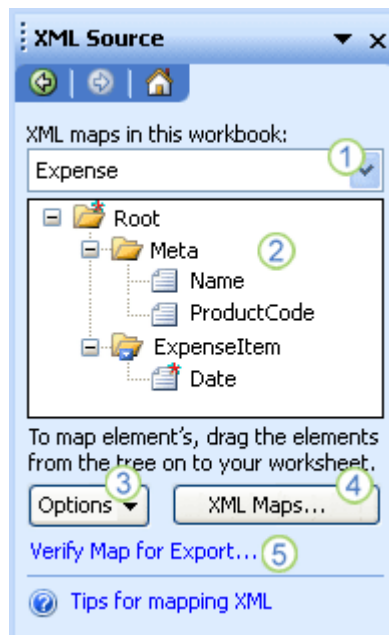
1. Lists XML maps that were added to the workbook
2. Displays a hierarchical list of XML elements in the currently listed XML map
3. Sets options when working with the **XML Source** task pane and the XML data, such as how to preview the data and control headings
4. Opens the **XML Maps** dialog box, which you can use to add, delete, or rename XML maps
5. Verifies whether you can export XML data through the current XML map

Element types and their icons

The following table summarizes each type of XML element that Excel can work with and the icon that is used to represent each type of element.

Element type	Icon
Parent element	
Required parent element	
Repeating parent element	
Required repeating parent element	
Child element	
Required child element	
Repeating child element	
Required repeating child element	
Attribute	
Required attribute	
Simple content in a complex structure	
Required simple content in a complex structure	

Working with single-mapped cells

A single-mapped cell is a cell that has been mapped to a nonrepeating XML element. You create a single-mapped cell by dragging a nonrepeating XML element from the **XML Source** task pane onto a single cell in your worksheet. When you drag a nonrepeating XML element onto the worksheet, you can use a smart tag to choose to include the XML element name as a heading above or just to the left of the single-mapped cell, or you can use an existing cell value as a heading. You can also use a formula in a single-mapped cell, if the cell is mapped to an XML element with an XML Schema Definition (XSD) data type that Excel interprets as a number, date, or time.

Working with repeating cells in XML tables

XML tables are similar in appearance and functionality to Excel tables. An XML table is an Excel table that has been mapped to one or more XML repeating elements. Each column in the XML table represents an XML element. An XML table is created when you:

1. Use the **Import** command (in the **XML** group on the **Developer** tab) to import an XML data file.
2. Use the **Open** command (on the **Microsoft Office Button**) to open an XML data file — and then select **As an XML table** in the **Open XML** dialog box.
3. Use the **From XML Data Import** command (from the **From Other Sources** command button, in the **Get External Data** group, on the **Data** tab) to import an XML data file — and then select **XML table in existing worksheet** or **New worksheet** in the **Import Data** dialog box.
4. Drag one or more repeating elements from the **XML Source** task pane to a worksheet.
5. When you create an XML table, the XML element names are automatically used as column headings. You can change these to any column headings that you want. However, the original XML element names are always used when you export data from the mapped cells.

Two options under the **Options** button in the **XML Source** task pane are useful when you work with XML tables:

1. **Automatically Merge Elements When Mapping** When selected, Excel creates one XML table from multiple fields as they are dropped onto the worksheet. This option works as long as the multiple fields are dropped on the same row, one adjacent to the other. When this option is cleared, each element appears as its own XML table.
2. **My Data Has Headings** When selected, existing heading data is used as column headings for repeating elements that you map to your worksheet. When this option is cleared, the XML element names are used as column headings.

Using XML tables, you can easily import, export, sort, filter, and print data based on an XML data source. However, XML tables do have some limitations regarding how they can be arranged on the worksheet.

XML tables are row-based, meaning that they grow from the header row down. You cannot add new entries above existing rows. You cannot transpose an XML table so that new entries will be added to the right. You can use formulas in columns that are mapped to XML elements with an XML Schema Definition (XSD) data type that Excel interprets as a number, date, or time. Just as in an Excel table, formulas in an XML table are filled down the column when new rows are added to the table.

XML map security considerations
An XML map and its data source information are saved with the Excel workbook, not a specific worksheet. A malicious user can view this map information by using a Microsoft Visual Basic for Applications (VBA) macro. Furthermore, if you save your workbook as a macro-enabled Excel Open XML Format File, this map information can be viewed through Microsoft Notepad or through another text-editing program.

If you want to keep using the map information but remove the potentially sensitive data source information, you can delete the data source definition of the XML schema from the workbook,

but still export the XML data, by clearing the **Save data source definition in workbook** check box in the **XML Map Properties** dialog box, which is available from the **Map Properties** command in the **XML** group on the **Developer** tab.

If you delete a worksheet before you delete a map, the map information about the data sources, and possibly other sensitive information, is still saved in the workbook. If you are updating the workbook to remove sensitive information, make sure that you delete the XML map before you delete the worksheet, so that the map information is permanently removed from the workbook.

Importing XML data
You can import XML data into an existing XML map in your workbook. When you import data, you bind the data from the file to an XML map that is stored in your workbook. This means that each data element in the XML data file has a corresponding element, in the XML schema, that you mapped from an XML Schema file or inferred schema. Each XML map can only have one XML data binding, and an XML data binding is bound to all of the mappings that were created from a single XML map. You can display the **XML Map Properties** dialog box (Click **Map Properties** in the **XML** group on the **Developer** tab.), which has three options, all selected by default, that you can set or clear to control the behavior of an XML data binding:

1. **Validate data against schema for import and export** Specifies whether Excel validates data against the XML map when importing data. Click this option when you want to ensure that the XML data that you import conforms to the XML schema.
2. **Overwrite existing data with new data** Specifies whether data is overwritten when you import data. Click this option when you want to replace the current data with new data, for example, when up-to-date data is contained in the new XML data file.
3. **Append new data to existing XML tables** Specifies whether the contents of the data source are appended to the existing data on the worksheet. Click this option, for example, when you are consolidating data from several similar XML data files into an XML table, or you do not want to overwrite the contents of a cell that contains a function.

When you import XML data, you may want to overwrite some mapped cells but not others. For example, some mapped cells may contain formulas and you don't want to overwrite the formula when you import an XML file. There are two approaches that you can take:

1. Unmap the elements that you don't want overwritten, before you import the XML data. After you import the XML data, you can remap the XML element to the cells containing the formulas, so that you can export the results of the formulas to the XML data file.
2. Create two XML maps from the same XML schema. Use one XML map for importing the XML data. In this "Import" XML map, don't map elements to the cells that contain formulas or other data that you don't want overwritten. Use another XML map for exporting the data. In this "Export" XML map, map the elements that you want to export to an XML file.

The ability to import XML data from a Web service by using a Data Retrieval Service Connection (.uxdc) file to connect to a data source is no longer supported in Microsoft Office Excel 2007

through the user interface. If you open a workbook that was created in Office Excel 2003, you can still view the data, but you cannot edit or refresh the source data.

Working with an inferred schema

If you import XML data without first adding a corresponding XML schema to create an XML map, Excel tries to infer a schema for you based on the tags that are defined in the XML data file. The inferred schema is stored with the workbook, and the inferred schema allows you to work with XML data if an XML schema file isn't associated with the workbook. When you work with imported XML data that has an inferred schema, you can also customize the **XML Source** task pane. Select the **Preview Data in Task Pane** option from the **Options** button to display the first row of data as sample data in the element list, if you imported XML data associated with the XML map in the current session of Excel.

You cannot export the Excel inferred schema as a separate XML schema data file (.xsd). Although there are XML schema editors and other methods for creating an XML schema file, you may not have convenient access to them or know how to use them. As an alternative, you can use the Excel 2003 XML Tools Add-in Version 1.1, which can create a schema file from an XML map. For more information, see Using the Excel 2003 XML Tools Add-in Version 1.1.

Exporting XML data

You export XML data by exporting the contents of mapped cells on the worksheet. When you export data, Excel applies the following rules to determine what data to save and how to save it:

1. Empty items are not created when blank cells exist for an optional element, but empty items are created when blank cells exist for a required element.
2. Unicode Transformation Format-8 (UTF-8) encoding is used to write the data.
3. All namespaces are defined in the Root XML element.
4. Excel overwrites existing namespace prefixes. The default namespace is assigned a prefix of ns0. Successive namespaces are designated ns1, ns2 to ns*<count>* where *<count>* is the number of namespaces written to the XML file.
5. Comment nodes are not preserved.
6. You can display the **XML Map Properties** dialog box (Click **Map Properties** in the **XML** group on the **Developer** tab.) and then use the **Validate data against schema for import and export** option (active by default) to specify whether Excel validates data against the XML map when exporting data. Click this option when you want to ensure that the XML data you export conforms to the XML schema.

Using the Excel Macro-enabled Office XML Format File

You can save an Excel workbook in a variety of file formats, including the Excel macro-enabled Office XML Format File (.xlsm). Excel has a defined XML schema that defines the contents of an Excel workbook, including XML tags that store all workbook information, such as data and properties, and define the overall structure of the workbook. Custom applications can use this Excel macro-enabled Office XML Format File. For example, developers may want to create a custom application to search for data in multiple workbooks that are saved in the this format and create a reporting system based on the data found.
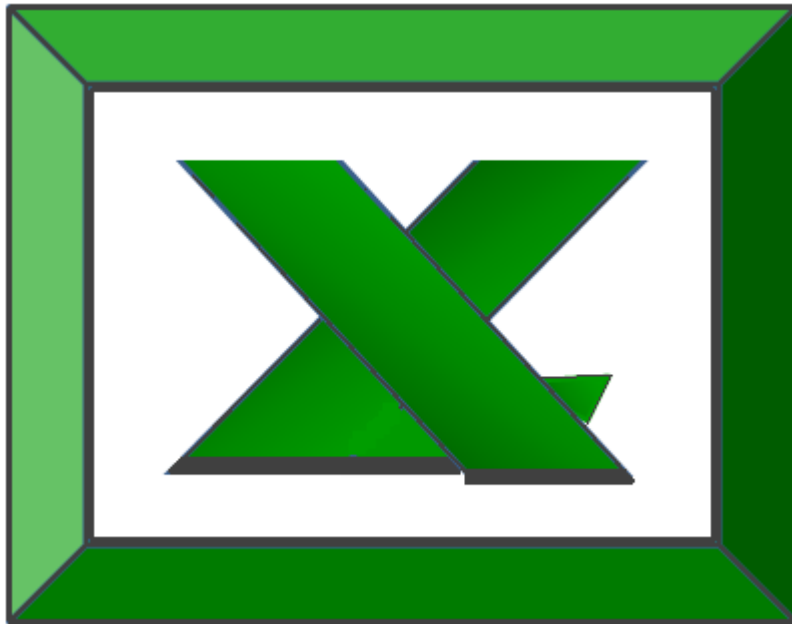
Chapter 12

Using Microsoft Excel with Your Accounting System

Featuring Examples using Dynamics GP

Chapter Contents and learning Points

Using Excel with Your Accounting System

The primary goal of an accounting system is to produce financial statements and reports to help company officials manage the business. Unfortunately many accounting systems fall short of providing the financial information needed to accomplish this goal. In this situation, Microsoft excel can often fill this void. Microsoft Excel can be used to analyze and manipulate data from your accounting system in many different ways. This chapter explores a multitude of ways in which this can be accomplished providing real-to-life examples as follows:

1. Exporting financial reports to Microsoft Excel.
2. Preparing financial projections in Microsoft Excel using linear regression analysis.
3. Pivoting accounting system data in Microsoft Excel.
4. Producing visual charts and graphs using accounting data in Microsoft Excel.
5. Exporting accounting system transaction data to Microsoft Excel.
6. Exporting accounting system master file data to Microsoft Excel.
7. Performing Ratio Analysis using Microsoft Excel.
8. Generating OLAP data cubes.
9. Hot linking data from your accounting to Excel using ODBC integration.
10. Preparing accounting system budgets in Microsoft Excel.
11. Adjusting and managing inventory prices using Microsoft Excel.
12. Importing accounting transactions from Microsoft Excel.
13. Maintaining master file data using Microsoft Excel.
14. Using Excel to mail merge contact information and data from your accounting system.

Accounting System Used in Demonstrations

For purposes of demonstrating these concepts, we will use the Microsoft Dynamics GP accounting system.

Executive Summary of Dynamics GP

1. **Top Rated -** Dynamics GP is regarded as one of the world's top solutions.

2. **Complete** - More than just an accounting system, Dynamics GP is a complete business Management System which includes many integrated solutions within the following categories:

Financial Management	Business Intelligence and Reporting	Human Resource Management
Project Management	Customer Relationship Management	Manufacturing
Supply Chain Management	Collaborative Workspace	Configuration and Development

3. **Modules -** Dynamics GP has more than 50 modules and 200 add-in solutions.

4. **Customers -** More than 100,000 companies in more than 50 countries use the Microsoft Dynamics solutions.

5. **Partners -** There are more than 5,200 Partners selling and supporting Microsoft Dynamics solutions in the US, and more than 9,900 world-wide.
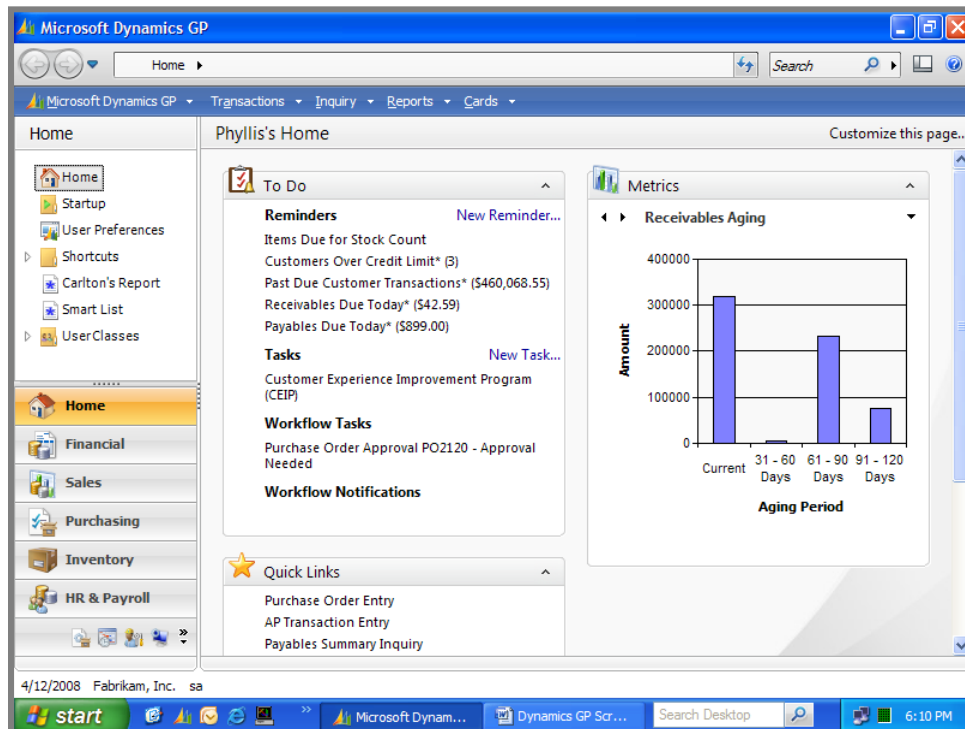
6. **Familiar Design -** Microsoft Dynamics solutions use a menu design and interface that is similar to that found in Microsoft Office Suite of products – which means you are probably already familiar with the Dynamics products.

7. **Role Based Menus -** Dynamics GP uses a "Role-based User Interface" which is tailored for each user - depending on what role you play in an organization. This means that the accounting system provides menus and options that most relevant to you.

8. **Migration Path from QuickBooks and Peachtree** – Microsoft provides an upgrade path for QuickBooks and Peachtree users which offer the following benefits:

   a) *Dynamics GP provides with more than twice as many features compared to QuickBooks Enterprise or Peachtree Quantum.*
   b) *Dynamics.GP can handle millions of transactions without slowing down whereas QuickBooks' and Peachtree database performance can decline dramatically.*
   c) *Dynamics GP provides stronger financial reporting with scheduled reports which can be delivered via e-mail to predetermined recipients.*
   d) *Dynamics GP offers a data conversion capability in which QuickBooks or Peachtree data is automatically converted for use in Dynamics GP.*
   e) *Dynamics.GP offers "Business-Ready" pricing which allows QuickBooks or Peachtree users to migrate to Dynamics.GP for about the same cost as migrating to QuickBooks Enterprise or Peachtree Quantum. (Dynamics GP is priced per user beginning at $2,150. QuickBooks Enterprise and Peachtree Quantum are priced from $3,000 to $9,500).*
   f) *To help QuickBooks and Peachtree users feel right at home, Dynamic GP includes data entry screens that look and feel similar to the screens you are already used to. For example, following are the check writing screens for both QuickBooks and Microsoft Dynamics GP.*
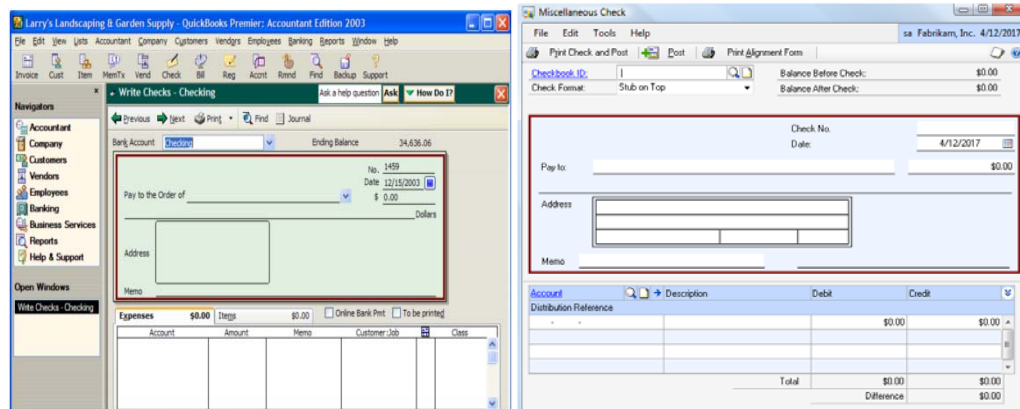
For more information visit: www.asmartmove.com

Exporting Financial Reports to Microsoft Excel

Most accounting systems provide the ability to export financial statements to Microsoft Excel for a wide variety of reasons including:

1. What-if analysis.
2. Data analysis.
3. Charting.
4. Consolidating data from other reports.
5. Consolidating data from other accounting systems.
6. Budget Preparation.
7. Simply to better format the report before printing.

These examples are discussed in more detail below:

What-if Analysis

Excel is a great tool for using "what-if" analysis to study the potential impact of changing variables. There are a wide variety of methods and tools for preparing a "What-if" analysis in Excel. To start the process, we export our financial reports from Dynamics GP into Excel. As with most top accounting systems, Dynamics GP provides an Excel (and Word) export button at the top of all financial statements and reports to make it easy to send reports and data to Excel.
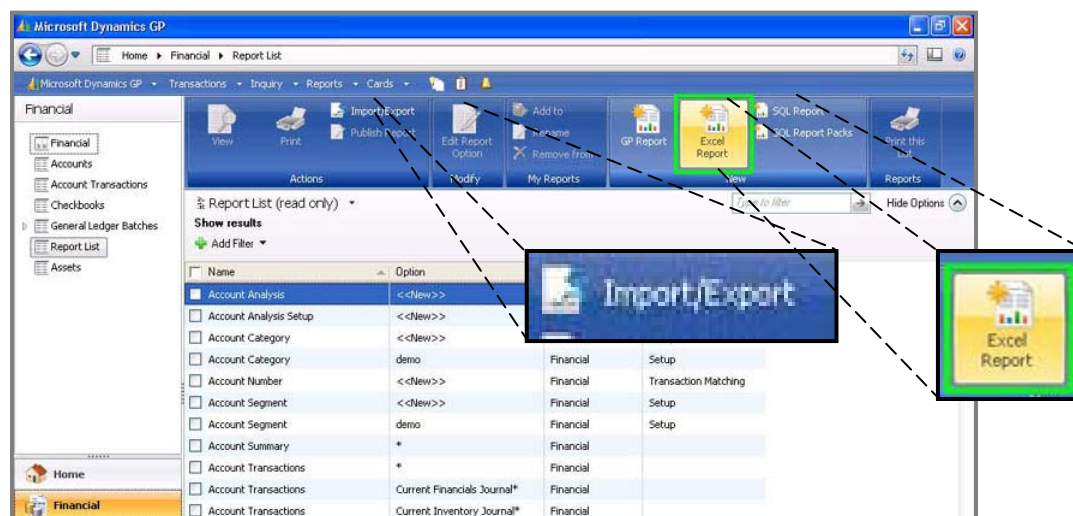
The Financial Reports List in Dynamics GP includes more than 1,950 standard reports as well as "Import/Export" and "Excel Report" buttons to instantly send those reports to Microsoft Excel.

Once the report is in Excel, simply plug new numbers or write simple formulas to increase or decrease financial statement line items. Better yet, use Excel's What-if Analysis tools located on the data menu to manipulate the data. For example, you might

use the "Goal Seek" tool to determine the necessary gross profit margin for producing a $1,000,000 profit. You might use the "Data Table" tool to produce a table of resulting gross profit and net income amounts based on a variety of changing gross profit percentages. As you create new financial reports, you can save each new result using the "Scenario Manager" tool for later retrieval and comparison.
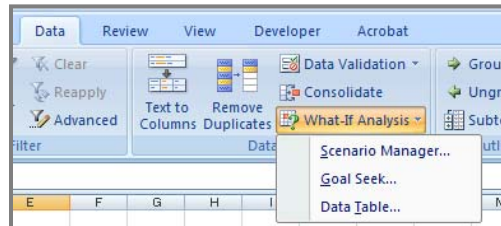
Excel's "What-if" Analysis tools help you analyze the affect
of changing assumptions and variables, and capture those results.

Data Analysis

"Data analysis" differs from "what-if" analysis in that you are seeking to better under your data, rather than speculating on the results of different data. Excel has many tools designed to help users analyze data as shown in the following example. In this example we will export data from Dynamics GP using the built in Smart List tool and analyze the data in a variety of ways in Excel.

The Dynamics GP SmartList tool provides a window into all of the data contained in Dynamics GP. There
are several hundred standard lists, and additional lists can be custom created.

The Dynamics GP SmartList provides a unique approach to accessing data – it's sort of like holding up a pair of binoculars and looking directly into the database tables within Dynamics GP. Use the Change Column Display dialog box to indicate which data fields are to appear in the report. Once you have modified the report to your satisfaction, you can create a "Favorites" link to that report so that you don't have to recreate that same report from scratch again in the future.
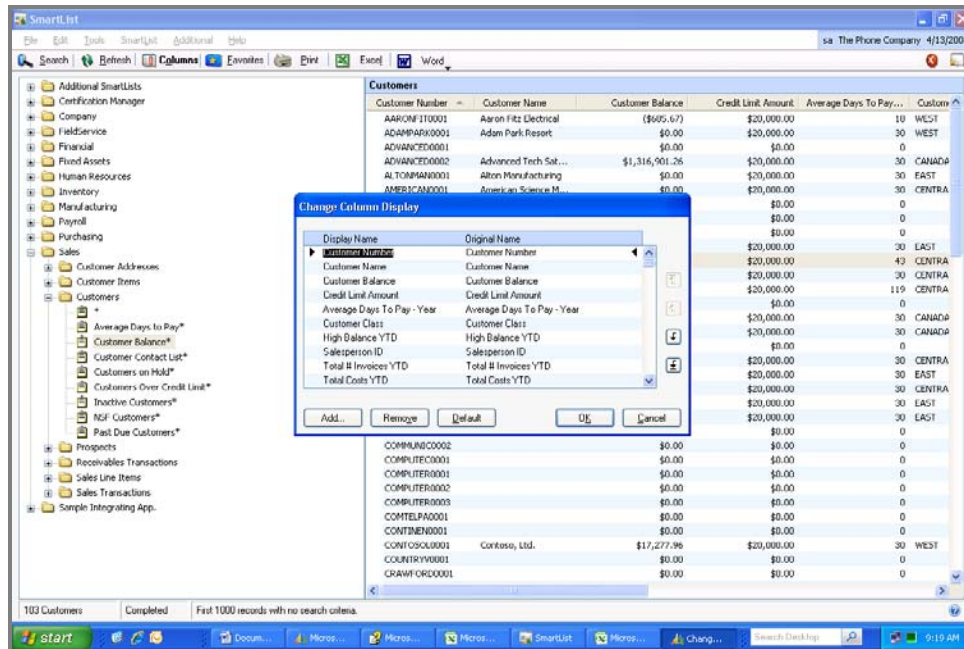
The Dynamics GP SmartList provides access to all data in the Dynamics GP database tables. As shown above, additional fields can be added to the reports, and filters can be applied to produce specific results.

Additional SmartList features allow you to link to Microsoft Dynamics GP data from Office applications, using smart tags to speed access to customer, vendor, inventory, general ledger account, and employee information. For example, using the SmartList Builder, you can link data from Microsoft Dynamic GP to create a customized list of the information you want to review and analyze; then easily export inquiries to Word or Microsoft Office Excel for use in mass mailings or further analysis. You can view a complete listing of all standard SmartList reports here:
http://www.microsoft.com/dynamics/gp/using/defaultsmartlistfavorites.mspx.

Simply click the Excel export tool located at the top of the SmartList to send the data to Excel.
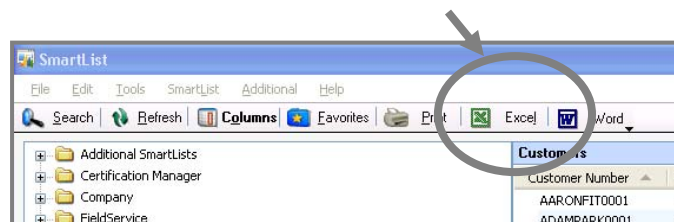
The resulting data is exported to Excel as shown below. The Dynamcis GP SmartList export works well with Excel 2007 or previous versions of Excel if that is what is loaded on your computer.

Customer data exported from Dynamics GP to Excel using the SmartList tool

In Excel additional formulas can be added easily for data analysis purposes. For example in the screen below two columns have been added to calculate the profit and profit percentages.

Formulas are added to data exported from Dynamics GP to calculate profit and profit percentages.

Notice also that "IF" functions have been inserted into the profit percentage formulas to prevent "Divide by Zero" errors from being displayed where line items are empty. The next step is to dress up the appearance of the data by wrapping and centering the titles and adjusting the column widths so more data fits on the visible screen. Bolded fonts

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have also been applied and the zoom has been increased to increase the readability of the data.

Customer information displayed in Excel after enhancing the appearance of the data.

The next step in analyzing this data might be to apply the Excel AutoFilter tool located on the data menu. The filter tool enables you to instantly condense your data based on the contents of any column.

Excel's AutoFilter tool is used to display information for the "EAST" region of the country only.

You should always use the Subtotaling tool in conjunction with the AutoFilter tool so that filtered data will automatically display subtotals. To use the subtotaling tool, first sort the data by the column you are interested in using to group your data. In this

example we have presorted the data by the column labeled Salesperson ID. Next turn on the subtotaling tool (which is located on the Data Ribbon) and indicate the columns you want summed. For example, in the screen below you can see subtotals for both Wright and Sandra. Now when you filter data, your filtered results will be automatically summed as well.

Excel's Subtotaling Tool is used to create automatic subtotals which also respond to data filtering.

If desired, you could also use Excel 2007's new Table tool to convert the data range to an "Excel Table". This task is performed by selecting "Insert Table" from the Data Ribbon. Thereafter Excel will display a multitude of tools such as gallery formatting, banded rows, outlining, etc.

The Table Tools in Excel 2007 make it easier to format and manage large blocks of data.

Perhaps the best way to analyze accounting system data in Excel is to use PivotTables to create views of your data that can be easily pivoted, drilled, and filtered. To create a PivotTable simply place your cursor in any cell within the transaction data exported from Dynamics GP, and select "Insert PivotTable" from the Data Ribbon. This process will generate a blank Pivot Palette like the one shown below.
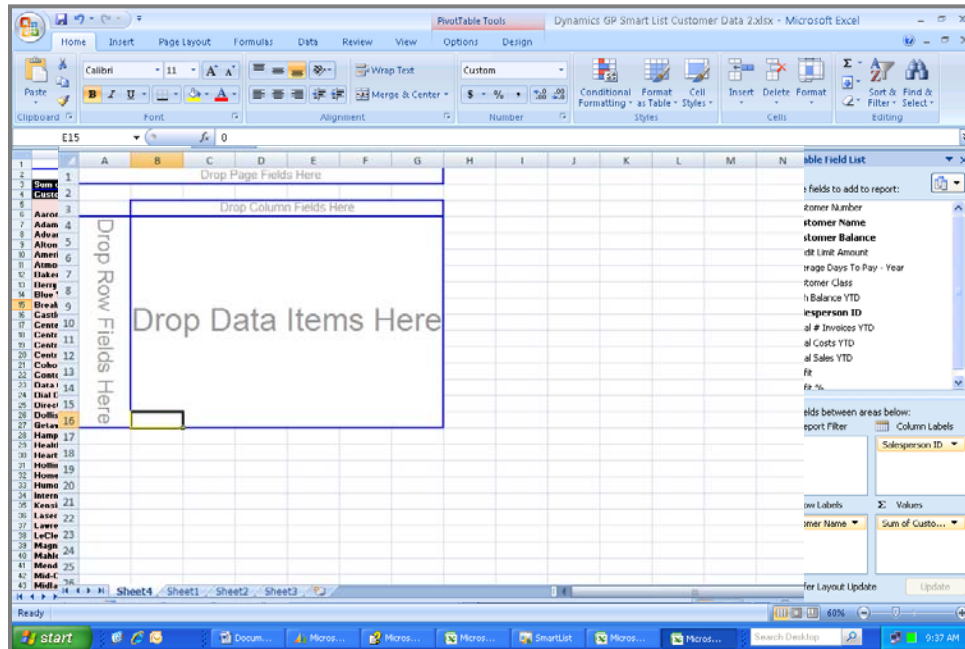
A Blank PivotTable palette in Excel 2007

To complete a PivotTable Report simply drag and drop the field names shown in the PivotTable Field List at the right of the screen onto the appropriate spot on the Pivot Palette. For example, if you drop the customer name field along the top of the report, then Excel will display customer names across the top. If you drop the customer name field along the left side of the report, then Excel will display customer names down the page (as shown below).

This PivotTable report was created in Excel from Data Exported from Dynamics GP.

The next step might be to filter the data to display only those line items that show a balance in the "Balance Due" column. Perform this task by right clicking on the "Customer Name" title in the PivotTable and choose "Filter By Values" to create a filter rule to display only those line items where the balance due is greater than zero. This data can then be sorted by any column simply by placing the cursor in the desired column and choosing "Sort A to Z" or "Sort Z to A" from the "Data Ribbon".

A PivotTable Report which has been filtered to suppress display of line items with a zero balance.

You might further filter the PivotTable Report to display selected data by column. For example, in the screen below we have filtered by salesperson ID to display the data for Greg, Nancy, Paul and Sandra only.

PivotTable Report filtered further by Column to display data only selected Salespersons.

As seen in the example above, a PivotTable can be created quickly and easily to condense large volumes of data down into small reports that are easy to read and understand. In this case a CFO might want to analyze the current balances due of customers from 4 different salespersons for purposes of determining which salesperson to let go – or perhaps to determine which salesperson is most worthy of a promotion. The data extracted from Dynamics GP could be used to produce numerous PivotTable reports – all tied to the same raw data. In our example only one PivotTable Report was created, but dozens of additional PivotTable Reports could be added using the same raw data.

Once a PivotTable has been created, you can double click on any number in a PivotTable to drill down into the underlying data beneath that number. The screens below show how double clicking on the $3,939.264 outstanding AR balance for Nancy drills to a complete listing of all AR balances for Nancy. This "Drillability" enhances the user's ability to follow, study and better understand the underlying data behind all PivotTable amounts.

Double clicking any number in a PivotTable Report instantly generates a supporting schedule.

As shown in the screen above, Excel 2007's Table Tools make it easy to insert formulas below each column of numbers.

Excel provides another useful data tool in PivotCharts, which work similar to PivotTables to produce a wide variety of charts that are linked to the raw data. For example, presented below is the resulting chart that appears by inserting a new PivotChart in Excel from the worksheet containing the raw data exported from Dynamics GP.
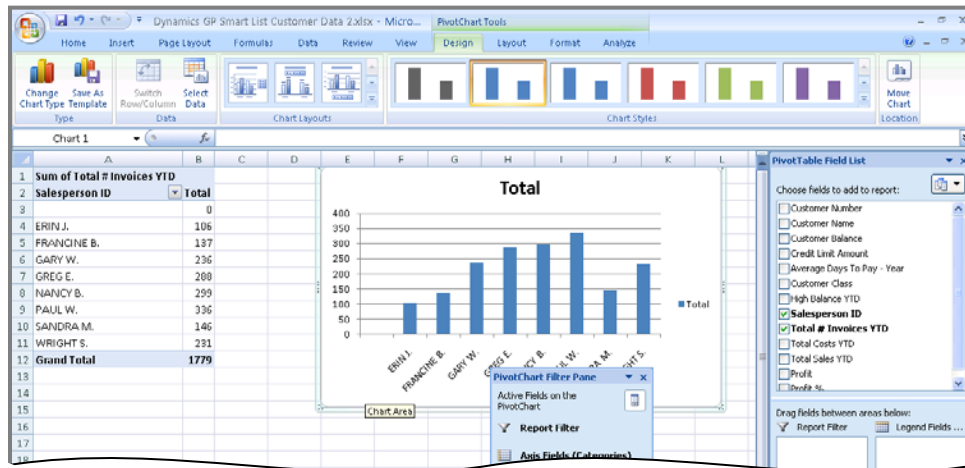
A PivotChart Produced in Excel 2007 from data Exported from Dynamics GP.

From here, you could choose a different chart type, such as an exploded 3-Dimensional Pie chart from the "Change Chart Type" dialog box. You could also use the PivotChart Design Tools to select a predefined chart layout using the Chart Gallery shown below.
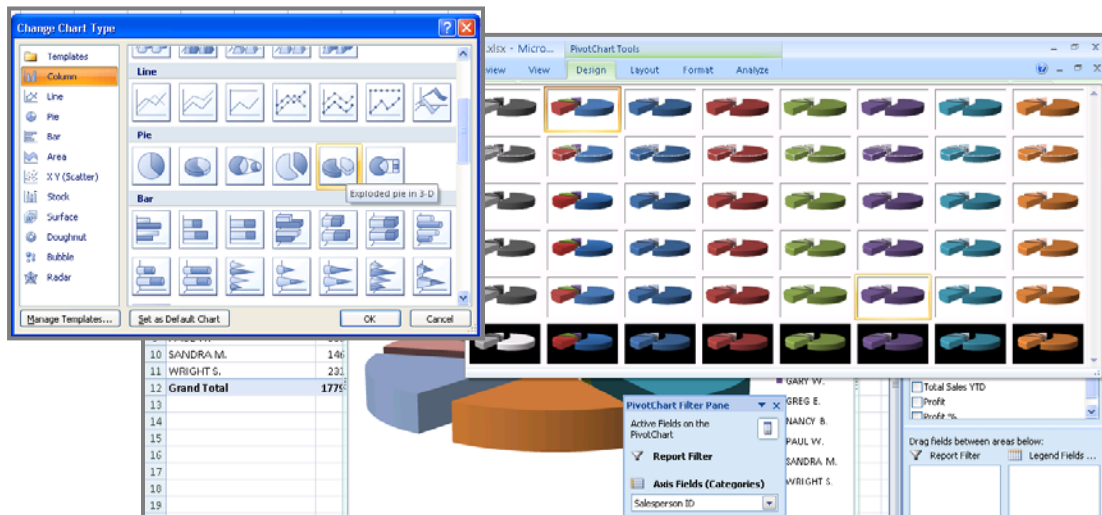
Example Exploded 3-Dimensional Pie PivotChart

Additional charting tools can be used to add a legend, title, rotation, or even data labels as shown below.
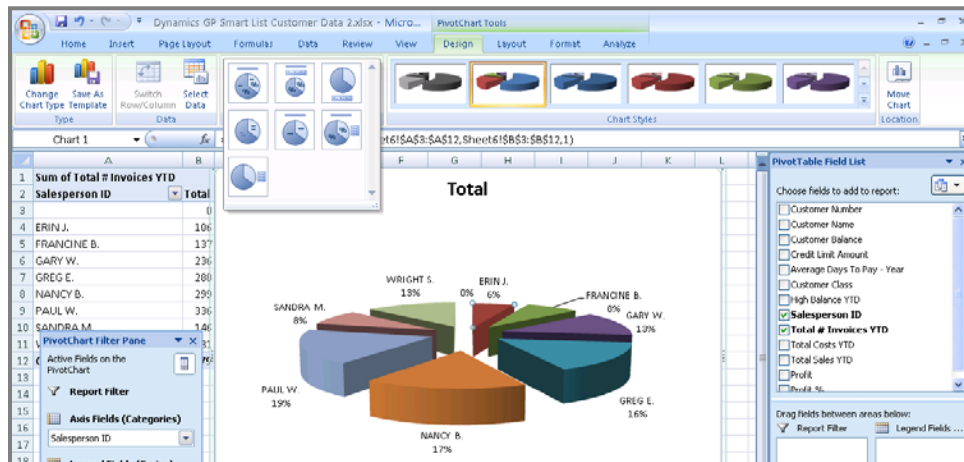
Data Labels are added to an Exploded 3-Dimensional Pie PivotChart.

In this next screen we see the same chart shown above has been transformed into a Bar Chart with Beveled Top, Orange Walls, and the picture of each sales rep has been inserted in each individual bar.
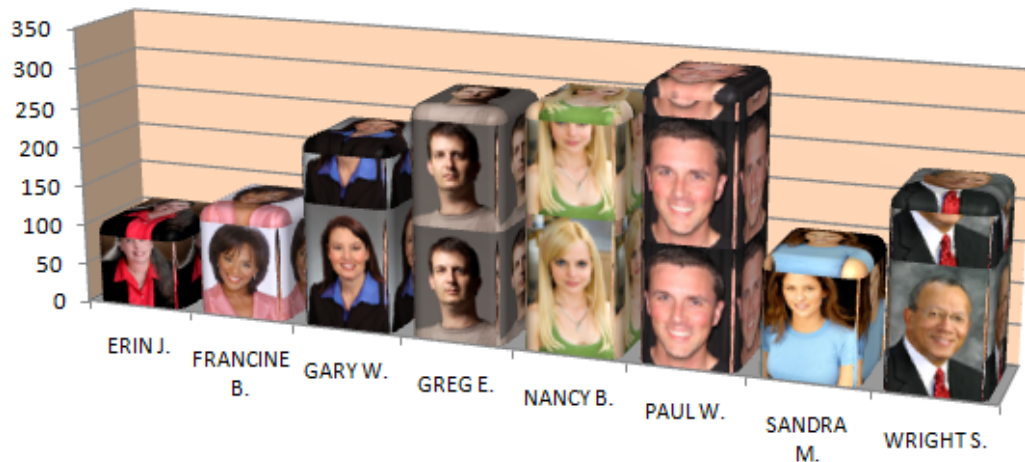
Automating the Task of Exporting Data

Of course the idea of export and manipulating data each day, week, month quarter or year does not appeal to most CPAs because there is usually so much labor involved in the whole process. However this is not the case with some accounting systems. In Dynamics GP there are several methods for extracting the same data each day, week, month, quarter or year with a simple click of a button and the resulting data is sent to Excel where the PivotTables, PivotCharts, and reports you have already created are instantly linked to the new data, or are linked to the new data via a simple copy paste procedure. Listed below are five different approaches for automating the task of sending data to Excel from within Dynamics GP; each method has merit.

1. Dynamics GP SmartList Builder and Export Solution.
2. Dynamics GP Macro Recorder.
3. Excel ODBC Driver for Dynamics GP.
4. Excel OLAP Data Cubing.
5. Dynamics GP Dashboard Reporting.

As an example, the Dynamics GP SmartList Builder and Export Solution screen is shown below. This dialog box can be used to create data queries which are automatically generated in Dynamics GP and sent to Excel merely by clicking on the icon shown in the Export Box below. As you can see in the "Document Field" below, this export is already linked to the appropriate Excel workbook, and a simple double click in Dynamics GP updates the workbook with fresh data.
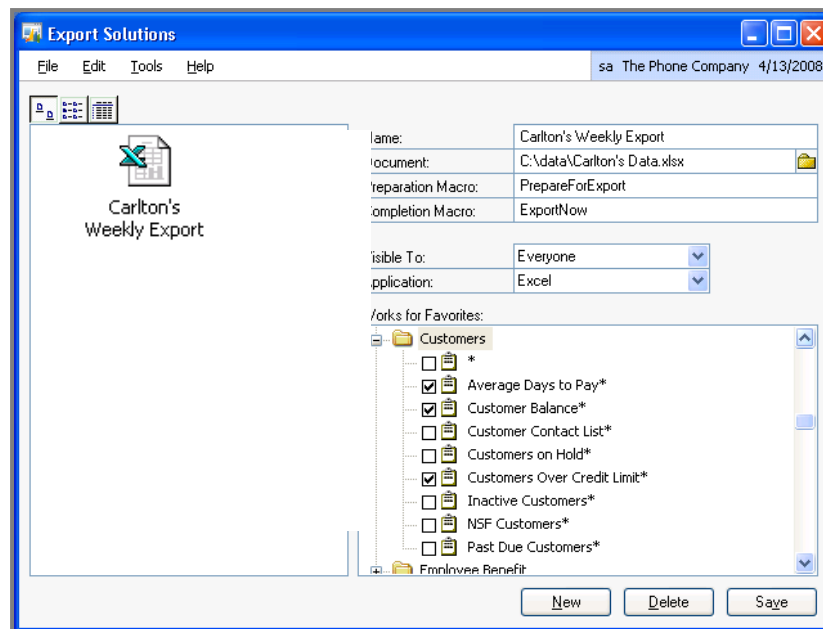
The Dynamics GP Export Solution Dialog Box helps Automate the Task of Sending Data to Excel

Another option for sending data to Excel is the Dynamics GP Macro Recorder which works just like the macro recorder in Microsoft Excel. Simply select "Record a Macro" from the Dynamics GP menu, provide a name for the macro, and then export your data. When you are done exporting your data, simply select "Stop Recording" from the Dynamics GP menu and the macro is completed. Next time, simply run the macro and

Dynamics will replicate all of your keystrokes in an instant, generating all relevant data and sending that data out to an Excel format. Once the data appears in an Excel format, you need only open that new workbook, copy the entire worksheet of data and paste into the raw data page of your workbook containing your PivotTables, PivotCharts and formula based reports. Because the field names will always be the same, your reports will be instantly updated to reflect the new data. If this copy and paste approach still seems like too much work, you can also instruct Dynamics GP to send the data directly to the desired workbook as shown in the example on the previous page.

The following screens show how to create an export macro in Dynamics GP. Start by selecting "Tools", "Macro", "Record" from the Microsoft Dynamics GP menu. In the "Name the macro" dialog box, create a name for the macro that will make it easy for you to identify later.
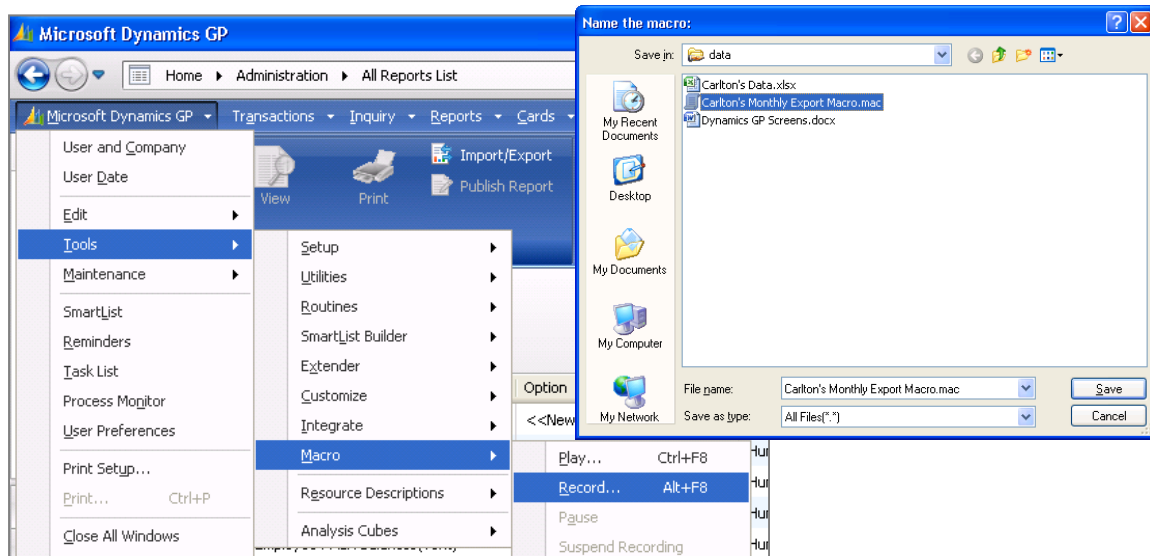
Creating a Macro in Dynamics GP – The Macro Menu Options and Name the Macro Dialog Box

Next export all of the data that you intend to export using the standard export procedures you prefer. When completed, select "Tools", "Macro", "Stop Recording" from the Microsoft Dynamics GP menu. Next time you want to repeat the export process, simply run this newly created macro, and the export process will be performed for you.

Similar results can be achieved without using the macro, but by instead creating a Pivot Report. To do this select "Tools", "Setup", "Analysis Cube", "Pivot Report Creation Setup Options" from the Microsoft Dynamics GP menu as shown below. This option will launch the Create PivotTable dialog box shown below. Select the data you want to appear in the resulting PivotTable and save the results. In the future you can simply run this PivotTable tool which will send updated information to Excel in the form of a PivotTable automatically.
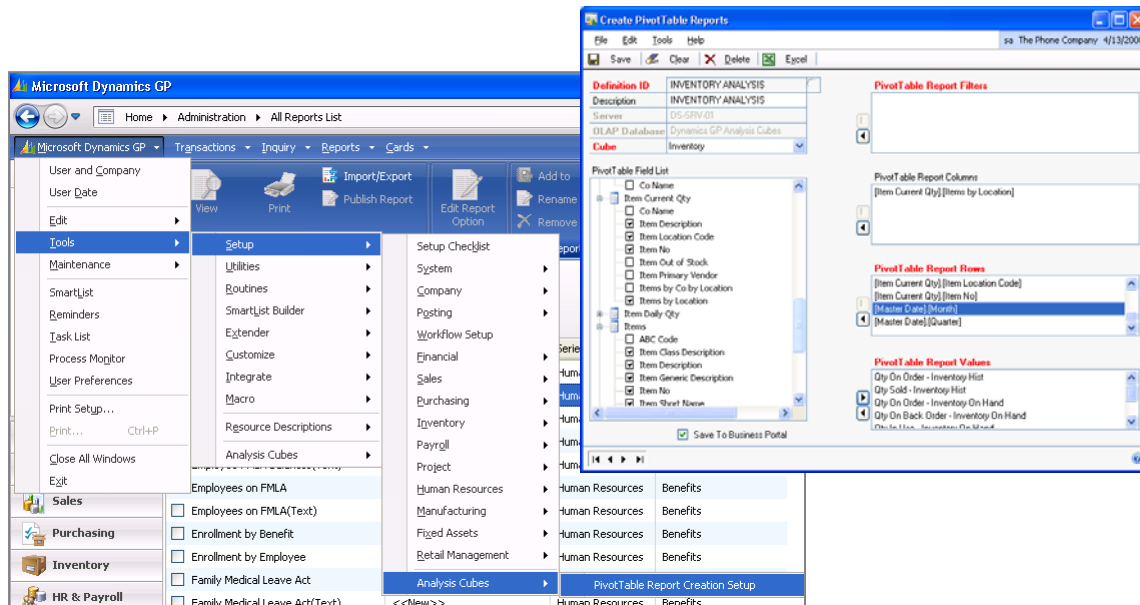
Object Linking and Embedding (ODBC)

Another approach for tying accounting system data to Excel is through the use of ODBC drivers to establish a permanent connection to external data that can be re-retrieved with the click of the Refresh button. This approach prevents the need to repeatedly copy and process the data - an operation that can be time-consuming and error-prone. The connection information for an ODBC link can be stored in the workbook, in a connection file (such as an Office Data Connection (ODC) file (.odc)), or a Data Source Name file (.dsn). In our example we will create a connection from Excel to Dynamics GP by saving the connection information in the Excel workbook.

Simple Portfolio Example

To help you understand the concept, let's start with the following simple stock portfolio example. Excel includes a pre-designed query that can retrieve the current stock price for any stock, fund or other investment with a ticker symbol. To create an ODBC link to stock quotes, you will need a connection to the internet and some stock ticker symbols. In Excel 2007 select "Existing Connections" from the "Get External Data" tool on the "Data Ribbon" as shown in the screen below.
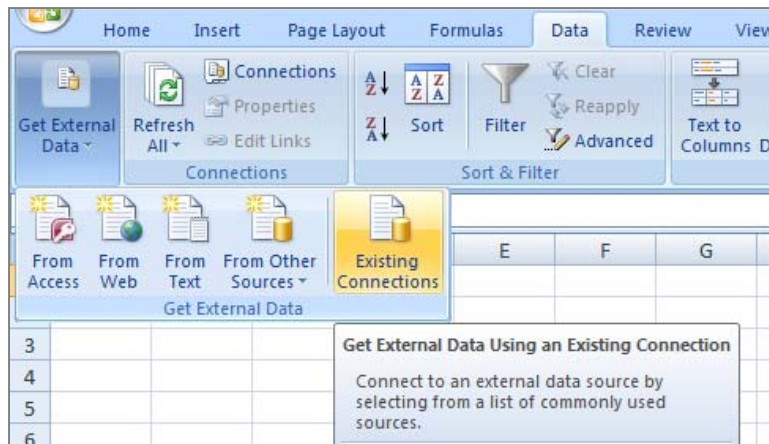
The "Existing Connections" dialog box will appear. Double-click the option for "MSN MoneyCentral Investor Stock Quotes" as shown below.
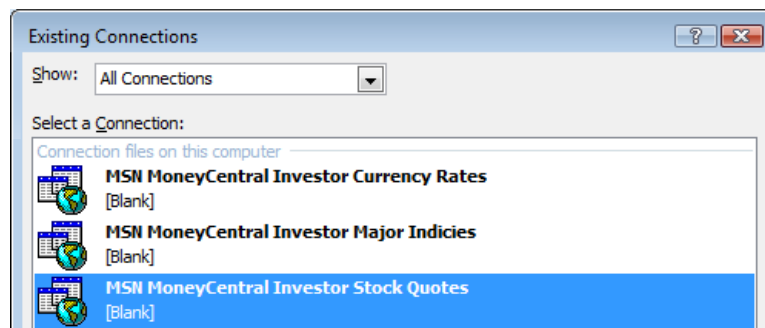
Next the "Import Data" wizard (shown below) will appear to walk you through the data connection process. Click OK in the first dialog box and in the second dialog box enter the ticker symbols you are interested in separated by commas, and check the box titled "use this value for future refreshes". Here I have entered ticker symbols for Microsoft, Coca-Cola, Google, Intel and Apple Computers.
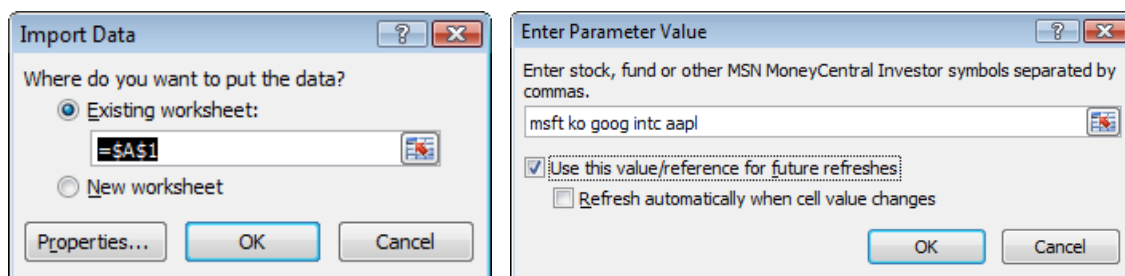
Press OK to complete the data connection. The following information will be displayed in Excel.
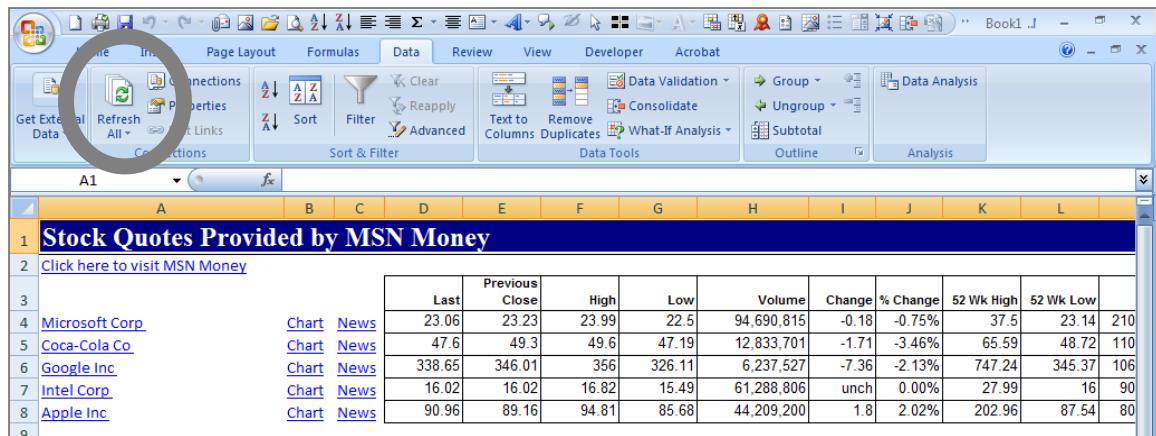
Each time you refresh the data (circled above), new stock data will be instantly retrieved. These amounts can then be referenced in a stock portfolio report including the number of shares of stock and formulas to calculate the investment values. As the raw data is refreshed, the total value of the portfolio will be updated. For example note the two screens below.

In the time it took me to paste the first portfolio above, the portfolio had increased a total of $12,600 – as shown in the second screen. By the time I wrote this sentence, the portfolio had increased another $7,850. The point is that now I can see my total portfolio value simply by clicking the refresh button.

Accounting System Example – Connecting to Dynamics GP

Let us now take this example further by connecting to an accounting system database rather than a database of stock values. The difference is that we will need to browse to the database and dig through the various tables in order to identify the data fields that we want displayed in our query. These extra steps make accounting system queries a little more difficult to create, but once they are created, all it takes is a click of the refresh button to retrieve new accounting data. The following example will walk you through the process step-by-step.

Note: to use Microsoft Query to retrieve external data, you must:

4. **Have access (permissions) to an external data source** - If the data is not on your local computer, you may need to see the administrator of the external database for a password, user permission, or other information about how to connect to the database.

5. **Install Microsoft Query** - If Microsoft Query is not available, you might need to install it.

6. **Specify a source to retrieve data from, and then start using Microsoft Query** -   For example, if you want to insert database information, display the Database toolbar, click Insert Database, click Get Data, and then click MS Query.
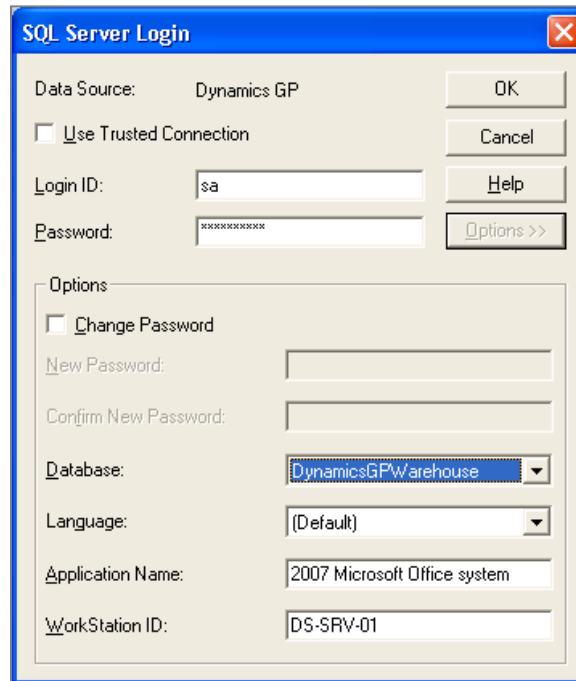
Continue by selecting "From Microsoft Query" from the "From Other Sources" option in the "Get External Data" chunk on the "Data Ribbon" as shown below.
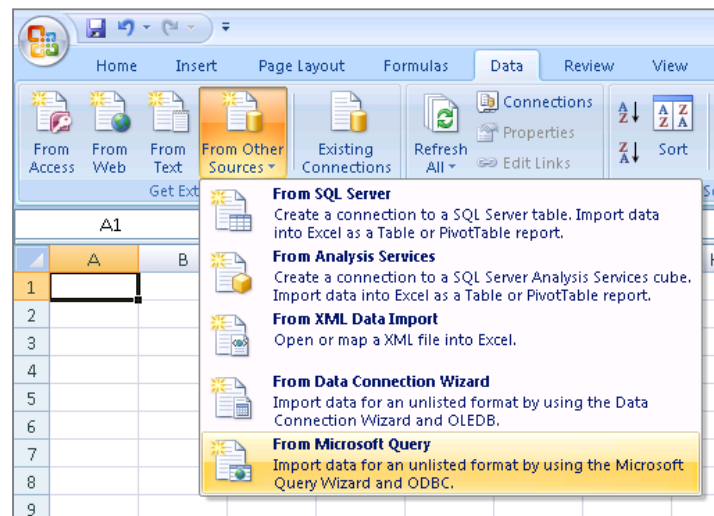
Excel will display a list of databases that it sees automatically. (If the database you want to query is located on a another computer file server, then you will need to click the "Browse" button and browse to the actual database.) In the example below, Excel automatically sees Dynamics GP is loaded on the computer.

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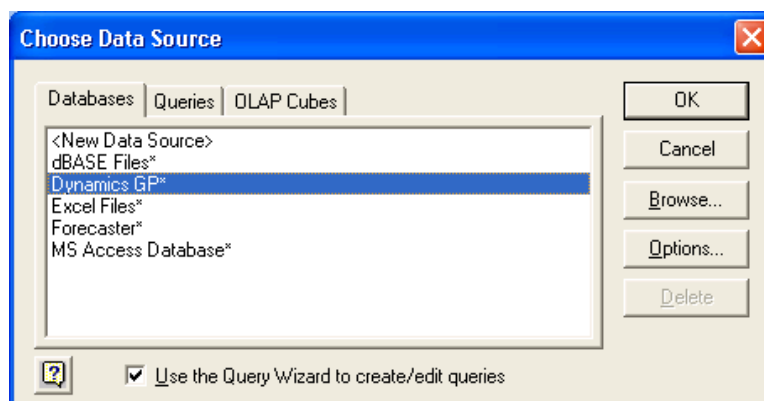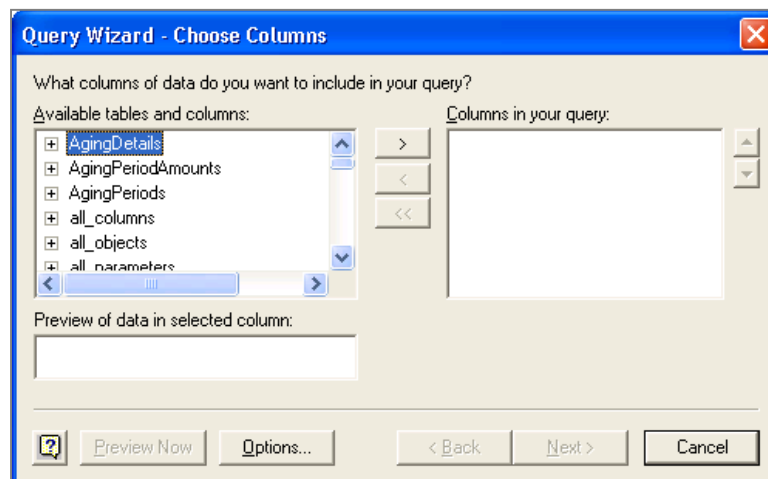
Select the Dynamics GP option and login to the database as shown below. Note that ODBC connections and web queries obey all database permissions; therefore a password is typically needed to create this type of connection.

Upon logging in, the Excel Query wizard will display a list of table names. Scroll through the list and find the table that contains the data you want. This is usually the hardest part of the process because it can be difficult to know exactly which table contains the data you are after. However with a little bit of effort, trial and error search, and perhaps a sense of humor, eventually you will find data you are after.

In this example I have scrolled to the "Customer Table" and I have selected the several data field names from this table by clicking the greater than sign located in the middle of the dialog box. This process shoves the data fields from the "Available Data Fields List" on the left to the "Columns in Your Query" list on the right. This is how you select the particular data to be extracted from the accounting system. The results will appear as follows:
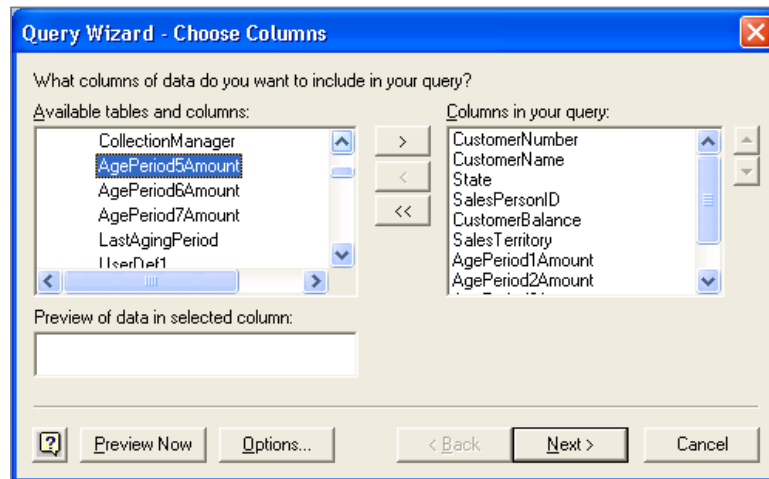
If desired, the Query Wizard will provide you with options to filter and sort the data before retrieving it into Excel. As examples, the two dialog boxes shown below depict a filter to return only customer information for customers in California and the resulting data will be sorted by balance due in descending order.
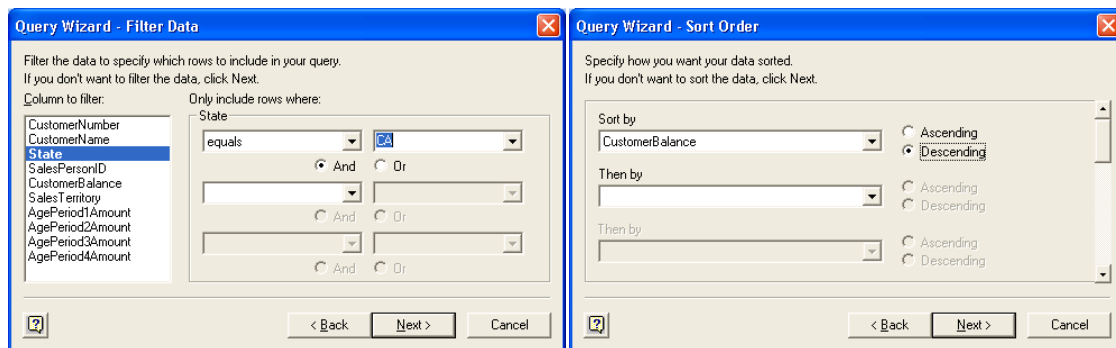
At the end of the Query Wizard you will have the option to display the data in Excel, view the data via a query window, or save the query for future use. Clicking "Finish" will provide additional options for displaying the data as a Table, PivotTable, or PivotChart. These options are shown below:
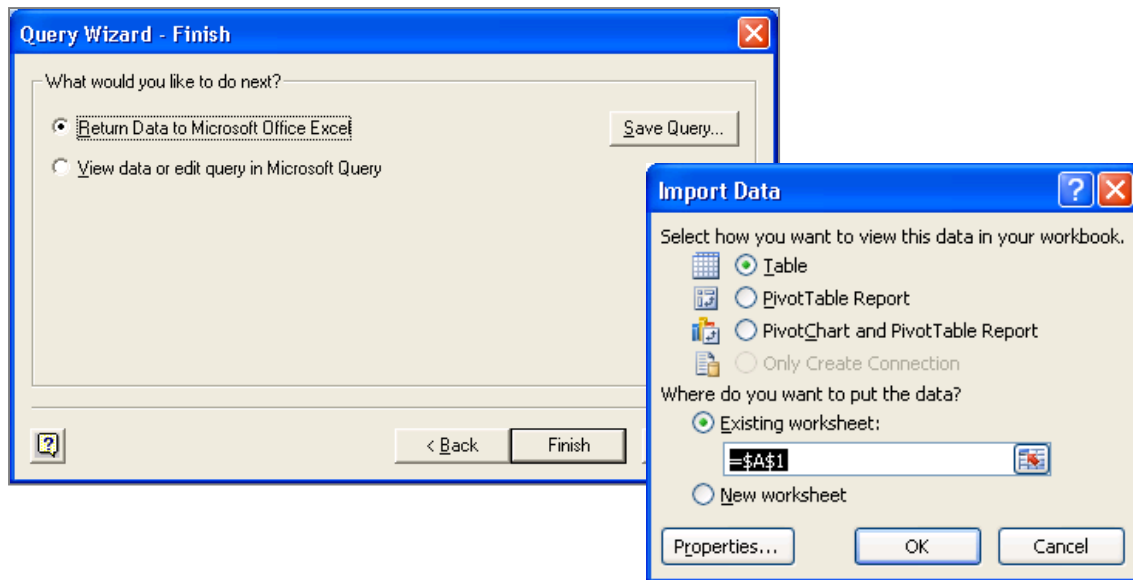
Notice also that a Properties button on the import data dialog box provides a few other options which will probably be of interest. These options include OLAP drilling, time elapsed refreshes, and most important – the ability to save the password necessary to refresh the query in the future without re-entering the password each time. These additional options are shown below.
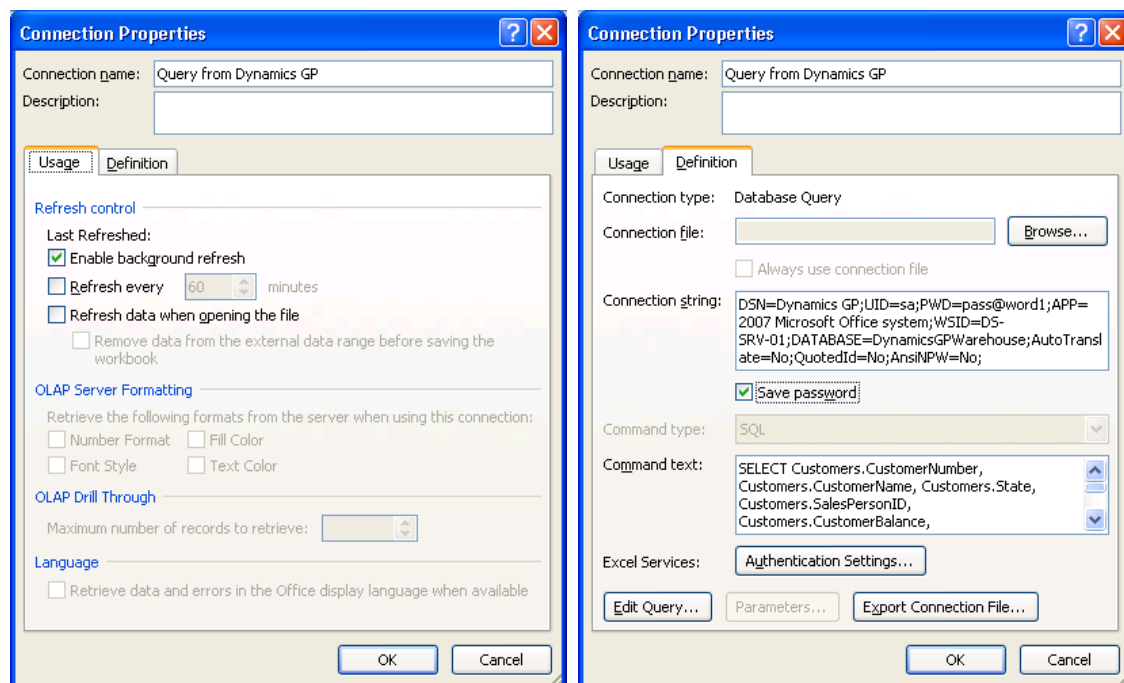
Clicking the OK button completes the query and the resulting Dynamics GP data is displayed in Excel as shown below.

In the future you need only click the "Refresh" button to retrieve updated information from Dynamics GP.

Now that the raw data has been retrieved from Dynamics GP and displayed in Excel, all of Excel's power can then be used to manipulate and analyze the data. As examples, notice that the data is ready to pivot. We can create a PivotTable easily by placing our cursor in any cell of the raw data range, and selecting PivotTable from the Insert Ribbon as shown below.
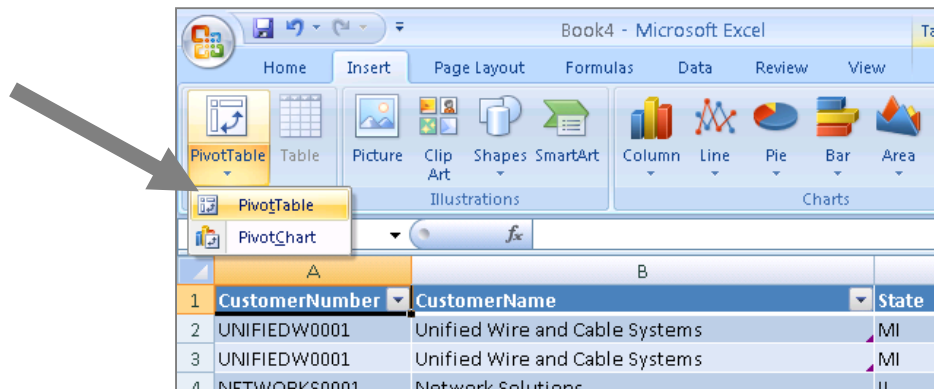
This process creates a blank PivotTable palette like the one shown below. (I've enabled the Classic PivotTable view in Excel 2007 by right clicking the palette and clicking the "Classic PivotTable Layout" option under the Display tab on the PivotTable Options box.)
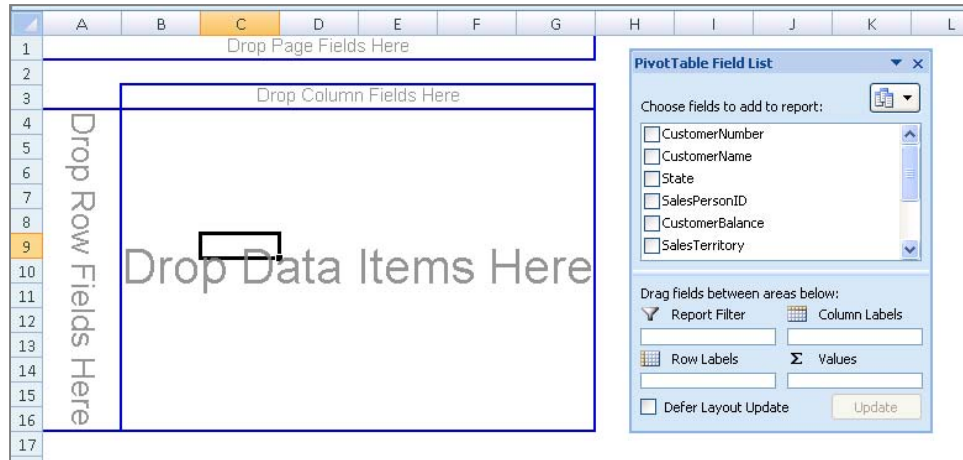
Next I drag and drop the "CustomerName", "CustomerBalance", and "SalesPersonId" fields onto the palette to create the following PivotTable report.

Because some customer balances and salesperson balances are zero, I apply a "Value Filter" to show only those customers and salespersons with actual amounts due (that is amounts greater than Zero). I apply the same type of filter to the salesperson field as well.
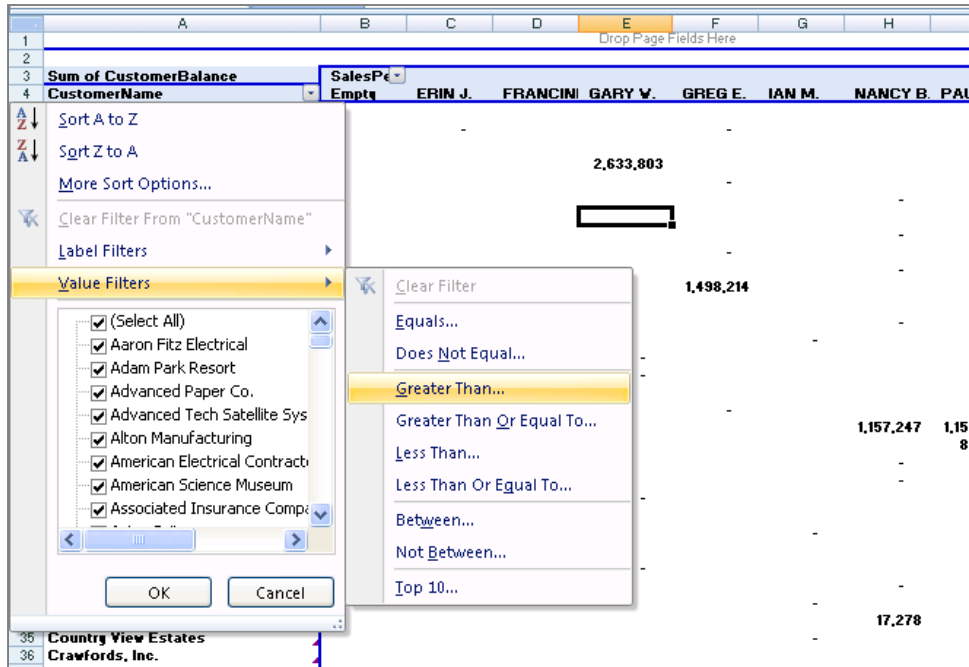
The result provides a detailed listing of all customer balances due stratified by sales person. The report fits nicely on my screen and at anytime that I click the Refresh All button, this report will be instantly updated, as shown below:
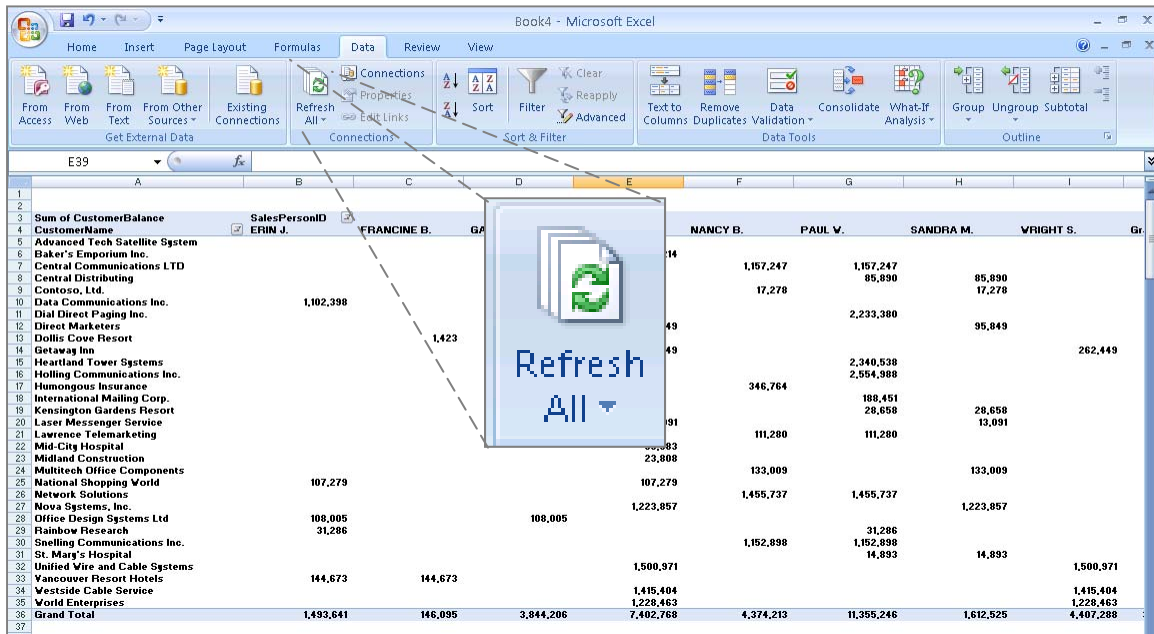
Similar procedures could be used to create PivotCharts like the one shown below. For example, in this PivotChart I can see the "Total Customer Balances Due by State".
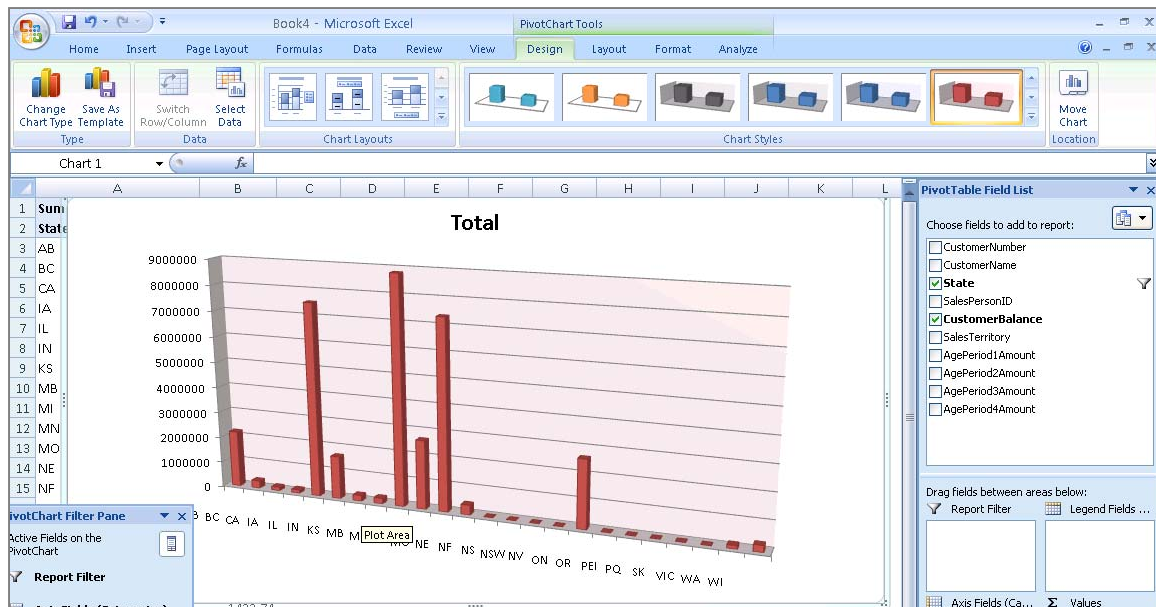
Analyzing Inventory in Excel

As another example, let us apply the same ODBC techniques described above to analyze inventory. In this case we browse to the "Inventory Item Master Table" and retrieve the following information:

Count	Number	Description	Type	Cost	Shipping Weight	Sales Price	Location	Profit Margin	Profit Margin %	Quantity On Hand
1	1GPROC	1 Ghz Processor	Sales Inventory	110.00	0	318.08	WAREHOUSE	208.08	65.4%	80
2	1GPROC	1 Ghz Processor	Sales Inventory	110.00	0	241.06	WC1	131.06	54.4%	-
3	100XLG	Green Phone	Sales Inventory	28.46	500	77.28	NORTH	48.82	63.2%	1
4	100XLG	Green Phone	Sales Inventory	28.46	500	66.7	SOUTH	38.24	57.3%	-
5	100XLG	Green Phone	Sales Inventory	28.46	500	79.73	WAREHOUSE	51.27	64.3%	80
6	100XLG	Green Phone	Sales Inventory	28.46	500	42.43	WC1	13.97	32.9%	-
7	SDRAM - 1 GIG	1 Gig SDRAM	Sales Inventory	152.10	0	384.64	NORTH	232.54	60.5%	31,683
8	SDRAM - 1 GIG	1 Gig SDRAM	Sales Inventory	152.10	0	349.64	SOUTH	197.54	56.5%	-
9	SDRAM - 1 GIG	1 Gig SDRAM	Sales Inventory	152.10	0	380.01	WAREHOUSE	227.91	60.0%	48
10	HD-600	600 Gig Hard Drive	Sales Inventory	224.10	100	526.49	SOUTH	302.39	57.4%	-
11	BACK FRAME	Wood chair back frame	Sales Inventory	9.88	0	27.69	WC1	17.81	64.3%	-
12	BOT100G	Handset Bottom	Sales Inventory	0.50	0	1.31	NORTH	0.81	61.8%	-
13	BOT100G	Handset Bottom	Sales Inventory	0.50	0	1.02	SOUTH	0.52	51.0%	-
14	BOT100G	Handset Bottom	Sales Inventory	0.50	0	1.14	WAREHOUSE	0.64	56.1%	510
15	BLACK INK	Black ink cartridge	Sales Inventory	0.50	0	1.1	WAREHOUSE	0.6	54.5%	15
16	BLACK INK	Black ink cartridge	Sales Inventory	0.50	0	1.41	WC1	0.91	64.5%	-
17	CAP100	Capacitor	Sales Inventory	0.02	0	0.05	WAREHOUSE	0.03	60.0%	10
18	CB100	Circuit Board	Sales Inventory	1.50	0	3.85	WAREHOUSE	2.35	61.0%	10
19	CBA100	Circuit Board Assembly	Sales Inventory	14.14	0	39.92	WAREHOUSE	25.78	64.6%	10
20	CORDG	Green Cord	Sales Inventory	3.50	0	7.82	WAREHOUSE	4.32	55.2%	510
21	COV100G	Green Cover	Sales Inventory	2.00	0	4.53	SOUTH	2.53	55.8%	-
22	CDROM	CD ROM drive	Sales Inventory	30.00	0	62.84	WAREHOUSE	32.84	52.3%	20
23	CHAIR	Standard wooden chair	Sales Inventory	80.42	0	165.99	WAREHOUSE	85.57	51.6%	1
24	CORDG	Green Cord	Sales Inventory	3.50	0	9.27	MFG70CONV	5.77	62.2%	-
25	DVD	DVD drive	Sales Inventory	120.00	0	270.41	WC1	150.41	55.6%	-
26	DVD ROM	DVD ROM internal drive	Sales Inventory	120.00	0	309.77	WAREHOUSE	189.77	61.3%	20
27	LEG	Wooden chair leg	Sales Inventory	2.40	0	7.15	WAREHOUSE	4.75	66.4%	16

In total, this action retrieves inventory data for 5,399 items in Dynamics GP, and the whole process from beginning to end takes only 20 seconds. In this example, I have added an additional two columns to calculate the "Profit Margin" and "Profit Margin Percentage" for each inventory item in columns "I" and "J". This enables me to sort the data by profit margin to identify those items that are priced below the desired profit margin. I can further apply a value filter to column "J" to display only those items with profit margins below a set percentage. This information can used to identify any item priced substantially lower than the desired profit margin for correction purposes.

This procedure should be performed by any company who handles inventory. Consider the following case study:

> Stephanie has owned and operated a furniture store for the past 17 years. I ask her two questions as follows:
>
> 1. How much profit do you want to make next year, and
> 2. How much sales do you anticipate next year?
>
> Stephanie responds – "that's easy, we've been growing at 8% a year for the past five years so we will probably hit $12 million in revenue next

year. Also, I'd like to make a million dollars profit – I think that's a reasonable goal.

With just this little bit of data, we can work backwards based on Stephanie's prior year financial statements and advise her as follows: "Stephanie your fixed costs are $2 million and you want to make another $1 million in profit. $3 million is 25% of your anticipated sales of $12 million, therefore you need to price your furniture with a 25% margin to achieve the desired results. Further analysis shows that Stephanie's furniture is currently priced at just 22% margin, which works out to a potential profit of just $640,000. At this point we tell Stephanie the story about the good ole boys who were selling onions. It goes like this:

These two Florida boys were running up to Georgia and buying Vidalia onions at 4 for $1.00 which they then sold for a quarter a piece on the streets of Jacksonville. After six months, one boy turned to the other and said – "you know, I don't think we're making any money – what do you think we need to do different?" The other boy thought real hard and then blurted – "I think we need a bigger truck".

OK, it's an old story. Also, it's an exaggerated story as well. But there is a lesson to be learned here. If you don't price your products to make a profit, you will never make a profit. And, if you don't price your products to make your desired profit, you will never make your desired profits. This "Target Profit Margin" is a rather easy calculation for any CPA to make – yet CPAs often fail to make this simple calculation. Still there is another issue in that fluctuating costs make it almost impossible to hit the targeted sales process unless you make daily price adjustments. This is where a strong accounting system will help.

In our example above, Stephanie should consider using the "Margin Pricing Option" in her accounting system to always adjust prices to reflect a profit margin of 25%. In this manner, if her costs go up or down, her price will adjust accordingly to provide the desired profit margin. The result is that Stephanie will then have the chance to achieve her goals. (There are of course, other factors at play that may prevent success, but without adequate pricing, Stephanie will have no chance at all of hitting her target - think about it.) The screen below shows how margin pricing is applied in Dynamics GP.

The Item price List Maintenance Screen in Dynamics GP provides numerous pricing options.

As you can see above, we have set the gross margin for this Digital Cordless Headset Phone to be priced 25% above costs – no matter what the actual cost is and even if the costs change daily. With this option, companies can price their inventory as a percentage of costs. If the cost goes up, it chases up the sales price of the item. If costs decline, the sales price drops in step to pass along the savings to the customer. This pricing method allows the company to sell goods at the lowest possible price which still covers their fixed costs, variable costs, and desired profit margin. All a company needs to do is determine it's desired profit margin and they are "off to the races".This approach will help Stephanie have a better chance of achieving her goal of making one million dollars in profit.

Business Alerts

Using these Excel data tools, you could easily import or link to accounting system data and create formulas to alert you when amounts drop below or exceed predefined levels. For example you might create alerts to identify when cash falls below $100,000 or when an outstanding customer balance rises above $$50,000. You could create alerts formulas to help identify inventory levels that need attention or to check that payroll amounts are reasonable. An example is shown below.

In this example, a formula has been created that compares the client's AR balance to 90% of the customer's highest previous balance. As you can see, some of the customers have already reached this threshold and this may be a good indicator to use in stepping up collection or credit measures regarding these particular customers.

Of course the best Business Alert solutions are provided by the accounting systems themselves. As an example, consider the Business Alert capabilities provided by Dynamics GP.

Dynamics GP can monitor hundreds of critical measurements on a continual basis and bring these measurements to a user's attention when they deviate significantly from desired levels. For example, Dynamics GP can automatically warn a user in the event that cash balances fall, inventory levels are too high, or gross margins decline below acceptable levels. In Dynamics GP, these events trigger e-mails to the appropriate personnel in a timely manner, so that corrective measures can be taken quickly. This type of event-triggered reporting is commonly referred to as Business Alerts which is included in Dynamics GP as a part of the core financial system. The Dynamics GP solution provides the following wizard for creating or editing business alerts.

Dynamics GP Business Alerts provides a wizard for creating complex calculations, scheduling calculations, and reporting
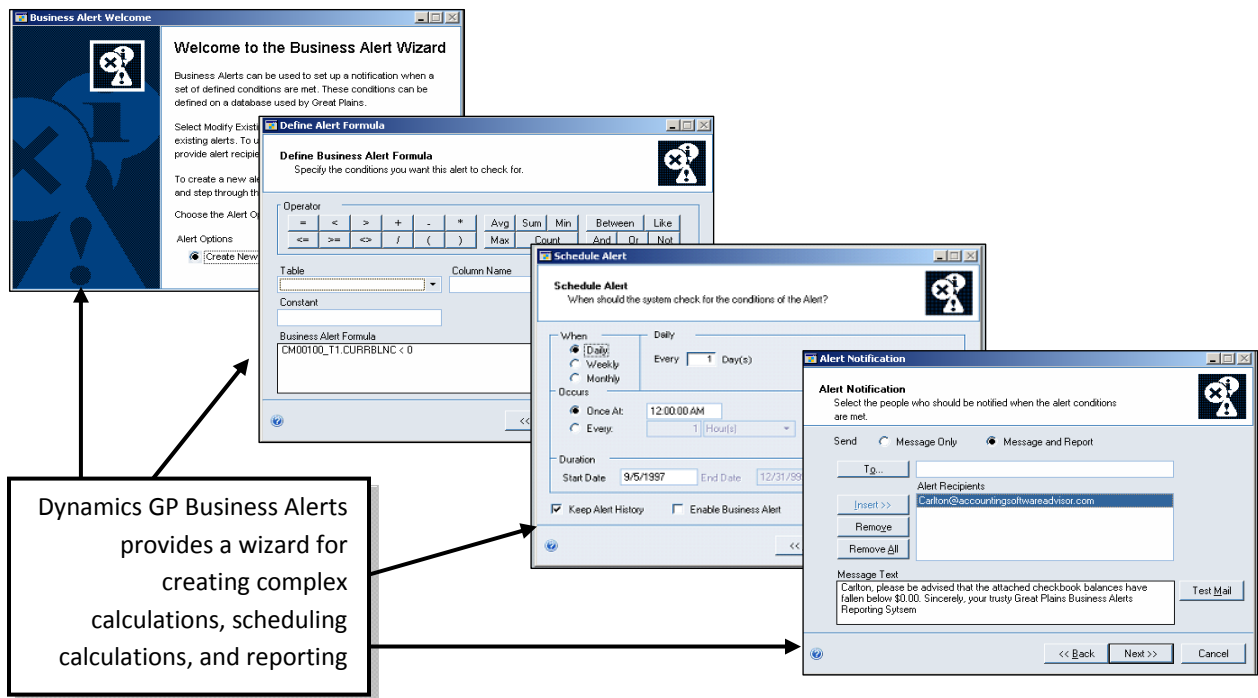
Creating Budgets in Excel using Linear Regression Analysis

Excel provides the ability to extrapolate data from your accounting system to produce budgets, projections or forecasts using the least squares method of linear regression analysis. The process is extremely easy as follows.

In this example we start by exporting 3 years worth of monthly trial balance data from Dynamics GP to Microsoft Excel. In Dynamics we have printed the report to the screen and also to a comma separated value print file.

This same data is then opened in Excel as shown in the following screen. I have deleted the balance sheet account line items and inserted a column called Category to help tidy the data.

To create a budget for 2009, we will start by using the Subtotals Tool located on the Data Ribbon. This action inserts subtotals in each column below each change in the category column.

Next we collapse the outline to display only row totals and use the "Select Visible Cells Tool" to select the visible data in Excel. With only the subtotal and grand total rows displayed, we apply a color and then expand the outline. The result is that formatting has been applied to the subtotal and grand total rows to make them easier to read.

To create the budget, select the 36 columns with numeric data, then click and drag the "Fill Handle" out twelve additional columns to create the 2009 budget as shown below.

The result is that Excel uses linear regression analysis to predict the future values. Once you have completed this process you should insert better numbers on those line items where you have better budget amounts. For example, you would look to the lease agreement to determine the best amount to use for rent expense. You would use your depreciation schedule to provide numbers for depreciation expense. However for those numbers where you have no better basis to use for budget preparation purposes, why not use Linear Regression Analysis to provide the answer.

After all numbers have been updated, use the =ROUND() function to duplicate the budget on a separate workbook with all amounts properly rounded. Format as desired, label the budget appropriately, and you are done. A complete monthly budget prepared in less than 5 minutes. The great news now is that same budget can be imported back into Dynamics GP without reentering the data.

Other Accounting System to Excel Functionality

There are many additional ways in which Excel can work with your accounting system. For example you could use Excel to perform Ratio Analysis, generate OLAP data cubes, import accounting transactions from Microsoft Excel, maintain and edit master file data using Microsoft Excel (such as account descriptions, item prices, etc). You could also use Excel to "mail-merge" contact information contained in your accounting system. With a good imagination, the clever CPA will always find many ways to use Excel to work with accounting system data.

Biography & Contact Information

J. Carlton Collins, CPA , ASA Research, carlton@asaresearch.com, 770.734.0950

J. Carlton Collins, CPA is a Certified Public Accountant with experience in technology, tax, auditing, accounting systems, financial reporting, and bond financing. He is an author, lecturer, and technology & accounting systems consultant. He has published more than two dozen books, two hundred articles, and thousands of web pages. As a public speaker, Mr. Collins has delivered more than 2,000 lectures in 44 states and 5 countries addressing more than 500,000 business professionals, including numerous keynote lectures at national and international conferences. Key awards include: "AICPA Lifetime Achievement Award", "Tom Radcliffe Outstanding Discussion Leader Award", "GSCPA Outstanding Discussion Leader Award", and "Accounting Technologies' Top Ten CPA Technologists Award". As a consultant, Mr. Collins has assisted 275+ large and small companies with the selection and implementation of accounting systems. Mr. Collins has a Bachelors degree in Accounting from the University of Georgia, is a 27 year member of the AICPA and the Georgia Society of CPAs, and is also a licensed realtor.

At the University of Georgia Mr. Collins was elected President of the Phi Eta Sigma Honor Society, was initiated into the BIFTAD Honor Society, was a member of Alpha Tau Omega fraternity, and served three years in the Judicial Defender/Advocate program. At Glynn Academy High School Mr. Collins was Senior Class President, Class Co-Valedictorian, and received a principle nomination to Annapolis Naval Academy. Mr. Collins has been married for 25 years and has two children. He devotes his leisure time to family, travel, tennis, fishing, snow skiing, and riding motorcycles (dirt and street). Mr. Collins is president of his home owners association, participates in the Gwinnett Clean and Beautiful program, and volunteers for Cooperative Ministries food drive. He was a finalist in the 2009 South's Funniest Accountant Competition which raises money for Junior Achievement.

Selected Positions, Awards & Accomplishments:
1. 2008 and 2009 Chairman of the Southeast Accounting Show - the south's largest CPA event.
2. Recipient of the 2008 Tom Radcliff Outstanding Discussion Leader Award.
3. Named "Top Ten CPA Technologists" by Accounting Technologies Magazine; Named "Top 100 Most Influential CPAs " by Accounting Technologies Magazine in multiple years.
4. Has personally delivered over 1,500 technology lectures around the world.
5. Has published 80+ pages of accounting software articles in the Journal of Accountancy.
6. Recipient of the AICPA Lifetime Technical Contribution to the CPA Profession Award.
7. Recipient of the Outstanding Discussion Leader Award from the Georgia Society of CPAs.
8. Lead author for PPC's Guide to Installing Microcomputer Accounting Systems.
9. Has installed accounting systems for more than 200 companies.
10. Past Chairperson of the AICPA Technology Conference.
11. Has delivered keynote and session lectures at dozens of accounting software conferences including seven Microsoft Partner Conferences, five Sage Conferences, and multiple conferences for Epicor, Open Systems, Exact Software, Sage ACCPAC ERP, Dynamics.NAV, Dynamics. AX, SouthWare, Axapta .
12. Has provided consulting services to many computer companies (including Compaq, IBM, Microsoft, Apple, Novell, Peachtree, Epicor, Sage Software, Exact, ACCPAC, Intuit, Peachtree, Great Plains, and others).

As an auditor Mr. Collins has audited businesses in the areas of health care, construction, distribution, automobile dealerships, insurance, manufacturing, and general business. Mr. Collins' tax experience includes corporate, individual, partnership, fiduciary, and estate tax planning work. In the area of finance, Mr. Collins has prepared feasibility studies and financial forecasts for nearly 300 projects seeking more than $3 billion in startup capital, including field work for 80 of those projects. Mr. Collins is familiar with bond issues, Medicare and Medicaid reimbursement, and conventional financing matters. As a consultant, Mr. Collins worked with the entire Microsoft Excel development team contributing more than 500 pages of design improvements - many of which are found in Excel today.

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CPE Course Evaluation Form

(In accordance with State Board guidelines, this form is retained as a permenant record of your attendance)

COURSE TITLE: _____ DATE: _____

NAME: _____

COMPANY: _____

ADDRESS : _____

CITY, STATE, ZIP: _____

TELEPHONE: _____ E-MAIL: _____

Instructor's Name: **J. Carlton Collins**

Excellent= 5   Very Good=4   Average=3   Fair=2   Poor=1

	Excellent=5	Very Good=4	Average=3	Fair=2	Poor=1
1. The Discussion Leader's knowledge of the subject matter was:	⑤	④	③	②	①
2. The Discussion Leader's presentation skills were:	⑤	④	③	②	①
3. The learning objectives were met	⑤	④	③	②	①
4. The course materials were valuable and contributed to learning	⑤	④	③	②	①
5. The course content was relevant	⑤	④	③	②	①
6. Time allocations were appropriate	⑤	④	③	②	①
7. Please rate the quality of the facilities	⑤	④	③	②	①
8. Were prerequisite requirements appropriate	⑤	④	③	②	①
9. Please rate the effectiveness of the audio / visual systems	⑤	④	③	②	①

COMMENTS

My Area is:
- Public Practice
- Industry
- Government
- Education
- Other:

My Work Experience is:
- None
- 0-5 years
- 6-10 years
- 11-20 years
- More than 20 years

My Industry is:
- Finance
- Manufacturing
- Retail
- Services
- Other:

The Size of my Company is:
- 5 or less employees
- 6 to 25 employees
- 26 to 100 employees
- 101 to 500 employees
- 501 or more employees

My Position is:
- Owner or Partner
- Manager/CFO
- Supervisor
- Senior or Staff
- Administrative
- Other

My Reason for Attending:
- Course Reputation
- Instructor
- Location
- Price
- Subject
- Other:

I heard about this course:
- Course Brochure
- Newsletter Ad
- Telemarketing Call
- Web Site
- Word of mouth
- Other:

My Computer Experience is:
- None
- Very Little
- Moderate
- Substantial
- Excellent

I Use the Internet:
- Never
- A Little Bit
- Moderately
- Daily
- All the Time
- Other :

My Primary Computer is:
- New
- 1 year old
- 2 years old
- 3 years old
- 4 years old
- 5 years old

My Opinion of Computers:
- Can't live without them
- They are very useful
- Somewhat useful
- Occasionally useful
- More trouble than worth
- I hate them

I get my CPE from:
- CPA Society Seminars
- Other Seminars
- Self Study Courses
- Online CPE web sites
- Conferences
- Other: