# ASA Research

Microsoft Excel
Functions, Macros &
Data Commands
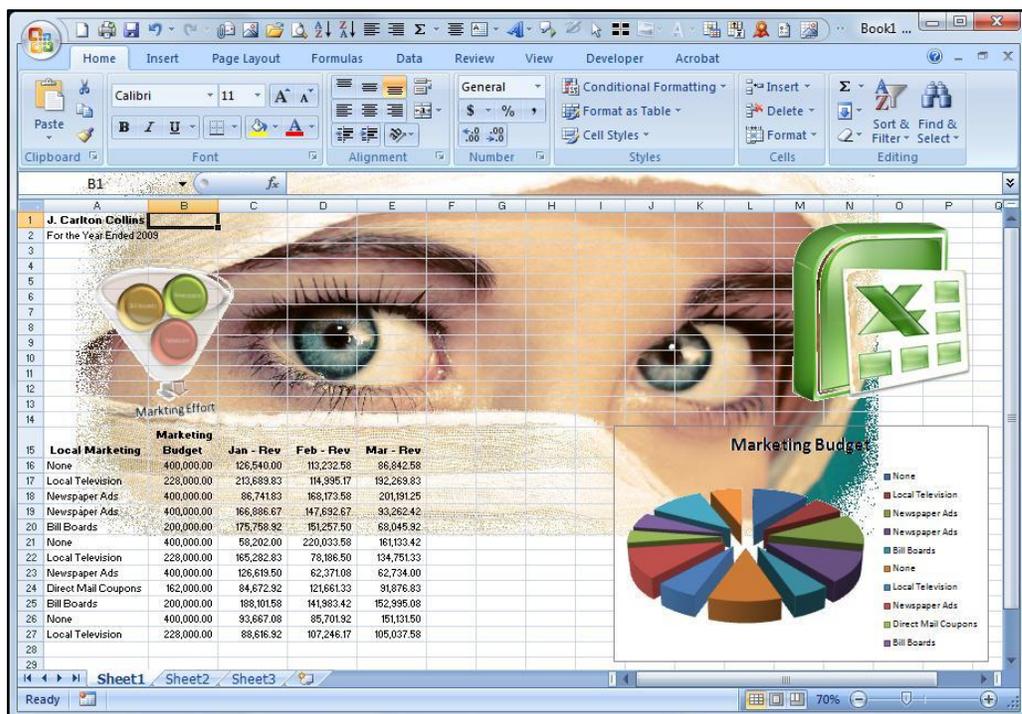
J. Carlton Collins, CPA
ASA Research
Atlanta, Georgia
770.842.5902
Carlton@ASAResearch.com

ENTER THE PARTICIPANT PRIZE DRAWINGS

To show our appreciation to you, we are giving away a technology product
each month, and a new Windows 7 computer system at year-end

Prize Code for this Course: MEXDAI

Here at ASA Research, we've given away thousands of door prizes to participants attending our CPE courses, consisting of thousands of copies of Microsoft Office and Peachtree Software, more than seventy-five 21-speed bicycles, hundreds of optical mice, headsets, web cameras, keyboards, computer speakers, copies of virus protection software, and yes, numerous ceramic chickens and other silly stuff. Thousands of attendees have won door prizes and in 2011, we are stepping up the giveaway with a new online giveaway program, which provides you with the opportunity to keep winning long after the course is over. This is our way of saying thank you to our wonderful, loyal attendees.

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Example Prizes

Official Rules & Fine Print

1. Entries are cumulative and do not expire. Each time you enter, your name remains entered. For example, a person who obtains 3 prize codes and enters three times, will have three chances to win each month, every month thereafter.

2. You may enter once for each prize code you receive. multiple times using the unique prize codes printed in each of Mr. Collins' CPE courses you attend, and provided for each online CPE course you take.

3. You must enter a prize code to enter. Prize codes can be obtained by attending a CPE course taught by Mr. Collins, or by taking Mr. Collins' online CPE courses. Bonus prize codes are also awarded occasionally throughout the year to those CPAs who are friends of CPE for CPAs Facebook page and CPAs who follow us on Twitter.

4. A prize will be awarded each month to at least one person, selected at random from among the cumulative entries. An e-mail will be sent to the winner(s) requesting a mailing address for prize delivery.

5. Prizes will continue to be awarded each month until this prize giveaway is terminated. Monthly prizes generally consist of less expensive technology items such as headsets, optical mice, GPS devices, camcorders, cordless keyboards, digital cameras, USB thumb drives, SD flash cards, computer monitors, wireless routers, etc. and will also include an annual grand prize of a new Windows 7 computer system.

6. ASA Research reserves the right to change these rules at any time, without notice. ASA Research reserves the right to terminate this prize giveaway at any time, without notice.

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Additional Materials & Example Files on the Web at www.CarltonCollins.com:

The actual material covered will vary depending upon the knowledge level of the audience, questions from the audience, and based on Carlton's polling the audience for areas of interest. Accordingly, much of the following web-based material is eligible and may be covered in this course, depending upon these factors.

Chapters, Sessions & Additional Topics	Example Files
New Features in Excel 2010	File – Carlton's Top 75 Functions
61 New Functions in 2010	File – Carlton's IF Function
New Features in 2007	File – Carlton's Data Cleaning
Missing Features in 2007	File – Carlton's Copy Shop
Excel Data Commands	File - Carlton's Formula File
Copy Shop Case Study	File - Carlton's 50 Quick Tips File
Excel Macros	File - Data Bar Formatting
Excel Data Analysis	File - More Functions File
Excel & the Internet	File - Data Commands File
Portfolio Case Study	File - Roth IRA Analysis
Advanced Excel Concepts	File - Gantt Example
Excel & Accounting Systems	

"The secret to a good lecture is to have a good beginning and a good ending and have the two as close together as possible."

Excel Functions, Macros & Data Commands
Course Information

Learning Objectives	To increase the productivity of accountants and CPAs using Excel's functions, macros, & data commands
Course Level	Intermediate
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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4480 Missendell Lane, Norcross, Georgia 30092 770.734.0450

Contact Information for J. Carlton Collins
Carlton@ASAResearch.com
www.Facebook.com/CarltonCollins

Chapter 1
Excel Functions

Introduction to Excel Functions

Excel Functions are preprogrammed formulas 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:

Categories & Number Of Functions In Each Category

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)

Relevance to CPAs - 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 75 functions are most relevant to the CPA; therefore in my opinion, CPAs wishing to increase their command of Excel functions should concentrate on these functions first.

Carlton's List of The Top 75 Functions Most Relevant to CPAs
(Sorted By Carlton's Opinion of Usefulness)
Open an Excel file Containing Function Examples:
http://www.ASAResearch.com/web/functions.xlsx

1. **IF** - Specifies a logical test to perform
2. **SUM** - Adds its arguments
3. **SUBTOTAL -** Returns a subtotal in a list or database
4. **SUMIF** - Adds the cells specified by a given criteria
5. **COUNT** - Counts how many numbers are in the list of arguments
6. **COUNTA** - Counts how many values are in the list of arguments
7. **AVERAGE** - Returns the average of a range of numbers
8. **COUNTBLANK** - Counts the number of blank cells within a range
9. **COUNTIF** - Counts the number of nonblank cells within a range that meet the given criteria
10. **VALUE** - Converts text to a number
11. **TEXT** - Formats a number and converts it to text

12. **VLOOKUP** - Looks in the first column of an array and moves across the row to return the value of a cell
13. **HLOOKUP** - Looks in the top row of an array and returns the value of the indicated cell
14. **TWO WAY LOOKUP** – Using both VLOOKUP and HLOOKUP together
15. **LOOKUP** - Looks up values in a vector or array
16. **MATCH** - Looks up values in a reference or array
17. **TRIM** - Removes spaces from text
18. **PROPER** - Capitalizes the first letter in each word of a text value
19. **LOWER** - Converts text to lowercase
20. **UPPER** - Converts text to uppercase
21. **LEFT** - Returns the leftmost characters from a text value
22. **RIGHT** - Returns the rightmost characters from a text value
23. **MID** - Returns a specific number of characters from a text string starting at the position you specify
24. **FIND** - Finds one text value within another (case-sensitive)
25. **SUBSTITUTE** - Substitutes new text for old text in a text string
26. **LEN** - Returns the number of characters in a text string
27. **REPLACE** - Replaces text in a string with alternative text
28. **CONCATENATE** - Joins several text items into one text item
29. **CLEAN** - Removes all nonprintable characters from text
30. **NOW** - Returns the serial number of the current date and time
31. **TODAY** - Returns the serial number of today's date
32. **DATE** - Returns the serial number of a particular date
33. **MONTH** - Converts a serial number to a month
34. **DAY** - Converts a serial number to a day of the month
35. **YEAR** - Converts a serial number to a year
36. **WEEKDAY** - Converts a serial number to a day of the week
37. **ROUND** - Rounds a number to a specified number of digits
38. **ROUNDDOWN** - Rounds a number down, toward zero
39. **ROUNDUP** - Rounds a number up, away from zero
40. **MAX** - Returns the maximum value in a list of arguments
41. **DMAX** - Returns the maximum value from a table array based on a list of arguments
42. **MIN** - Returns the minimum value in a list of arguments
43. **DMIN** - Returns the minimum value from a table array based on a list of arguments
44. **MEDIAN** - Returns the median of the given numbers
45. **MODE** - Returns the most common value in a data set
46. **PERCENTILE** - Returns the k-th percentile of values in a range
47. **PERCENTRANK** - Returns the percentage rank of a value in a data set
48. **PMT** - Returns the periodic payment for an annuity
49. **NPV** - Returns the net present value of an investment based on a series of periodic cash flows and a discount rate
50. **DSUM** - Adds the numbers in the field column of records in the database that match the criteria
51. **DCOUNT** - Counts the cells that contain numbers in a database
52. **DCOUNTA** - Counts nonblank cells in a database
53. **AND** - Returns TRUE if all of its arguments are TRUE

54. **OR** - Returns TRUE if any argument is TRUE
55. **CHOOSE** - Chooses a value from a list of values
56. **TIME** - Returns the serial number of a particular time
57. **FV** - Returns the future value of an investment
58. **IRR** - Returns the internal rate of return for a series of cash flows
59. **YIELD** - Returns the yield on a security that pays periodic interest
60. **CELL** - Returns information about the formatting, location, or contents of a cell
61. **INFO** - Returns information about the current operating environment
62. **ERROR.TYPE** - Returns a number corresponding to an error type
63. **ISBLANK** - Returns TRUE if the value is blank
64. **ISNA** - Returns TRUE if the value is the #N/A error value
65. **GETPIVOTDATA** - Returns data stored in a PivotTable
66. **HYPERLINK** - Creates a shortcut or jump that opens a document stored on a network server, an intranet, or the Internet
67. **TRANSPOSE** - Returns the transpose of an array
68. **ABS** - Returns the absolute value of a number
69. **RAND** - Returns a random number between 0 and 1
70. **RANDBETWEEN** - Returns a random number between the numbers you specify
71. **REPT** - Repeats text a given number of times
72. **SLN** - Returns the straight-line depreciation of an asset for one period
73. **SYD** - Returns the sum-of-years' digits depreciation of an asset for a specified period
74. **DDB** - Returns the double declining balance depreciation of an asset for a specified period
75. **DGET** - Extracts from a database a single record that matches the specified criteria

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All 333 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, $\Gamma(x)$
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 2
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:

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

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

	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

	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.

| | J13 | | fx | ^A. Single | | | | | | | | |

If Example - 2009 IRS Tax Rate Schedules:

	A. Single		B. Married/Widower		C. Married - Sep		D. Head /Household		Tax Rate
	Low	High	Low	High	Low	High	Low	High	
	-	8,350	-	16,700	-	8,350	-	11,950	10%
	8,351	33,950	16,701	67,900	8,351	33,950	11,951	45,500	15%
	33,951	82,250	67,901	137,050	33,951	68,525	45,501	117,450	25%
	82,251	171,550	137,051	208,850	68,526	104,425	117,451	190,200	28%
	171,551	372,950	208,851	372,950	104,426	186,475	190,201	372,950	33%
	372,951		372,951		186,476		372,951		35%

			A. Single	B. Married/Widower	C. Married - Sep	D. Head/Household
Taxable Income	124,325					
Taxpayer Status	A. Single					
Tax Base			23,030	16,975	34,461	32,886
Incremental Rate			28%	25%	33%	28%
Threshold			82,251	67,901	104,426	117,451
Tax	34,811		34,811	31,081	41,027	34,811

Drop down list: A. Single / B. Married/Widower / C. Married - Sep / D. Head /Household

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 3

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

If you dry your razor after each use, it will stay sharp for an entire year.

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:
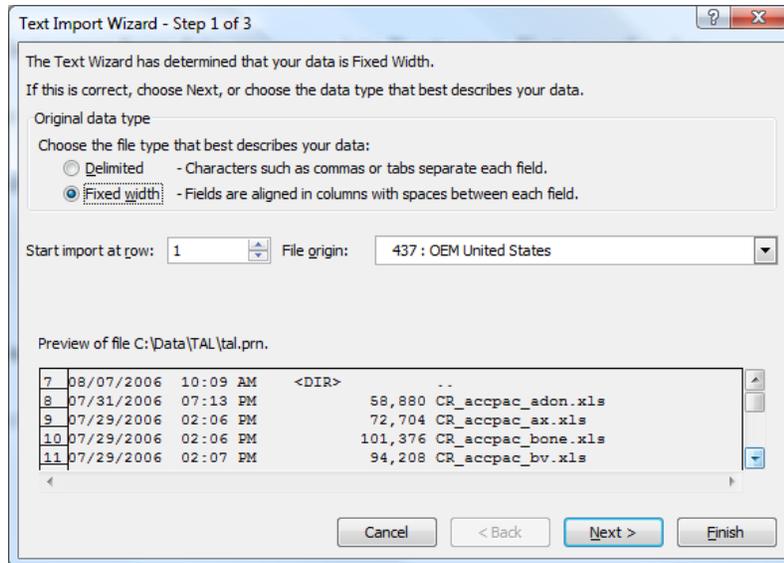
If items in the text file are separated by tabs, colons, semicolons, spaces, or other characters, select Delimited. If all of the items in each column are the same length, select Fixed width. In step 3, click the Advanced button to specify that one or more numeric values may contain a trailing minus sign. Also click the desired data format for each column to be imported.
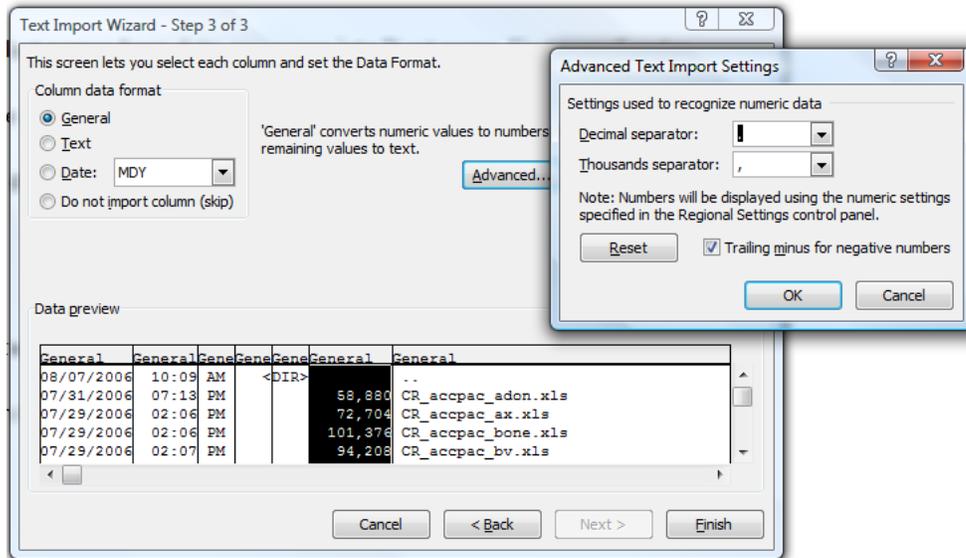
2. **Text to Columns** – The Text to Columns command located on the Data Ribbon works exactly the same way as described above – the user simply launches it to convert data within an existing worksheet.

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.
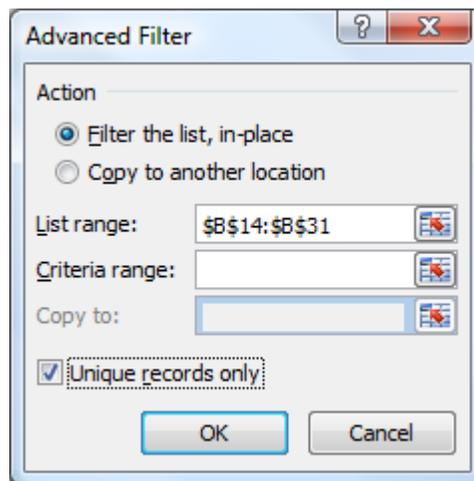
4. **Find and Replace Text –** This tool can be used to identify and remove leading string, such as a label followed by a colon and space, or a suffix, such as a parenthetic phrase at the end of the string that is obsolete or unnecessary. You can do this by finding instances of that text and then replacing it with no text or other text.
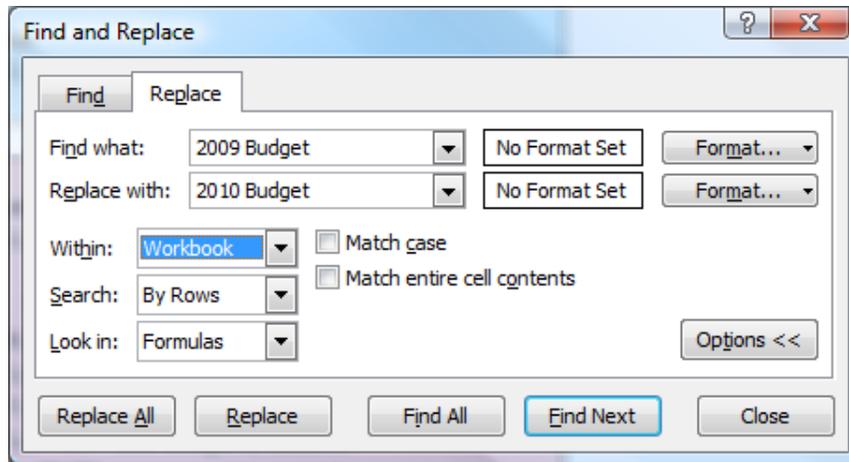
Noteworthy Find and Replace Points:

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.
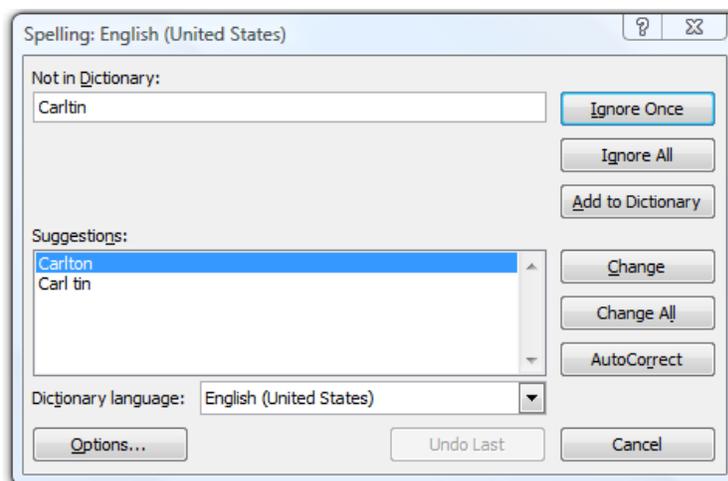
Changing The Case Of Text – You can use one or more of the three Case functions to convert text to lowercase letters, such as e-mail addresses, uppercase letters, such as product codes, or proper case, such as names or book titles.

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

A15	fx =UPPER(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

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

A15	fx =LOWER(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

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	fx =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	fx =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	fx =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.

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.

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

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

	A	B	C	D
	D4		f_x	=CLEAN(B4)
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.

	A	B	C	D
	B15		f_x	=FIXED(B13,2)
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.

	A	B	C	D
	B15		f_x	=DOLLAR(B13,2)
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		f_x	=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.

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.

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:

	A	B	C	D	E	F
SUM		X ✓ fx	=A4			
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.
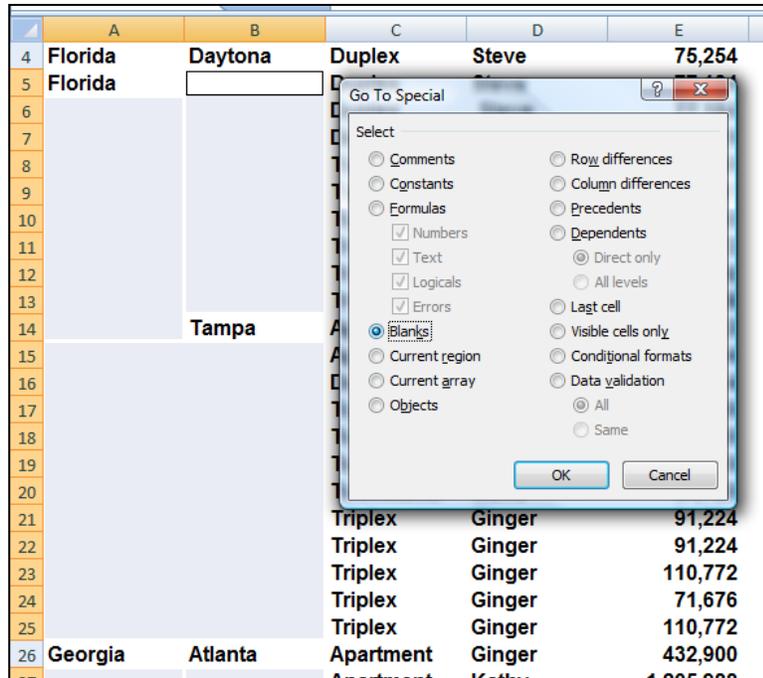
This action will cause all data labels to repeat in the empty cells beneath. Next:

      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.

If you happen to over-salt a pot of soup, just drop in a peeled potato. The potato will absorb the excess salt.

| F15 | | f_x | =VLOOKUP(F13,B4:F10,1) | | | | | |

	A	B	C	D	E	F	G	H	I	J
1		=VLOOKUP							Income Statement - Schedule C	
2										2009
3		Schedule Y-1 — Married Filing Jointly or Qualifying						Revenue		
4		If Taxable Income	But Not Over--	The Tax Is:	Base Tax	Tax Rate		Sales		$2,300,322
5		$0	$14,600	over $0	-	10%		Cost of Goods Sold		1,546,577
6		$14,600	$59,400	15% of the amount	1,460.00	15%		Gross Margin		$ 753,745
7		$59,400	$119,950	the amount over	8,180.00	25%				
8		$119,950	$182,800	28% of the amount	23,317.50	28%		Expenses:		
9		$182,800	$326,450	33% of the amount	40,915.50	33%		Rent		$ 86,230
10		$326,450	no limit	35% of the amount	88,320.00	35%		Salaries		326,300
11								Supplies		12,988
12								Insurance		36,788
13		Taxable Income (from profit & loss statement on Sheet 2)				224,209		Travel		67,230
14								Total Expenses		$ 529,536
15		Taxable Income Threshold Amount (from Column 1 Above)				182,800.00				
16								Net Income Before Taxes		$ 224,209
17		Tax Rate (from Column 5 Above)				33%				
18								Taxes		$ 54,580
19		Base Tax Amount (from Column 4 Above)				40,915.50				
20								Net Income After Taxes		$ 169,629
21		Total Amount of Taxes Due				54,580.47				
22										

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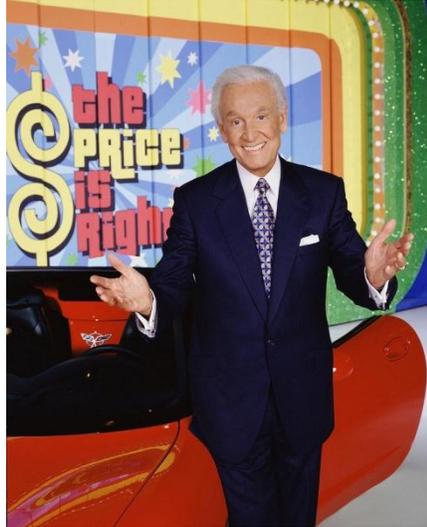
32. **=HLOOKUP** - Searches for a value in the top row of a table or an array of values, and then returns a value in the same column from a row you specify in the table or array.

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.
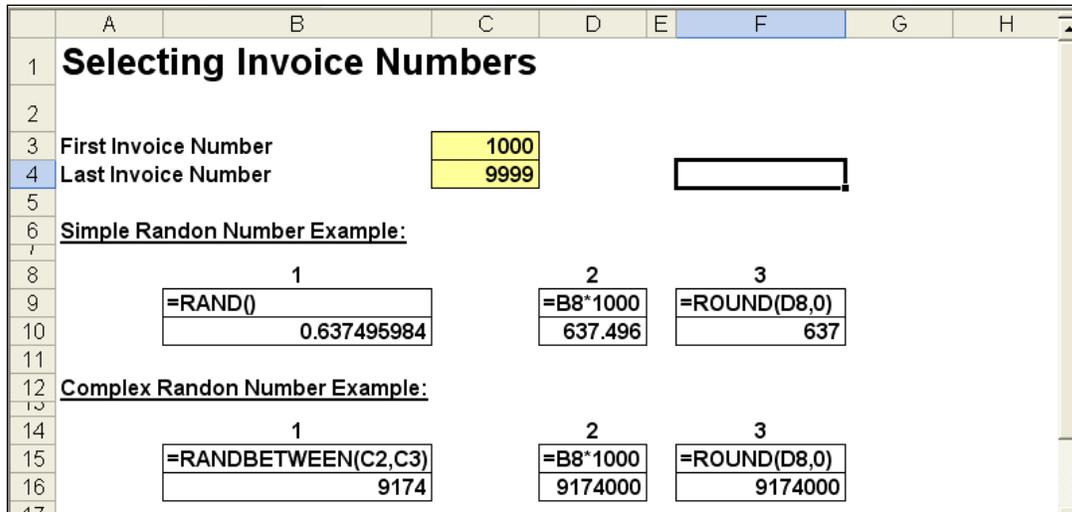
38. Informational Functions

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 4

Data Commands

The Heart & Soul Of Excel

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.
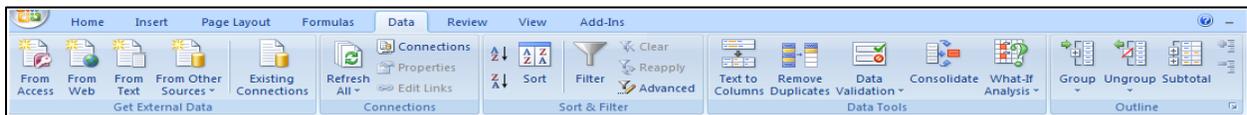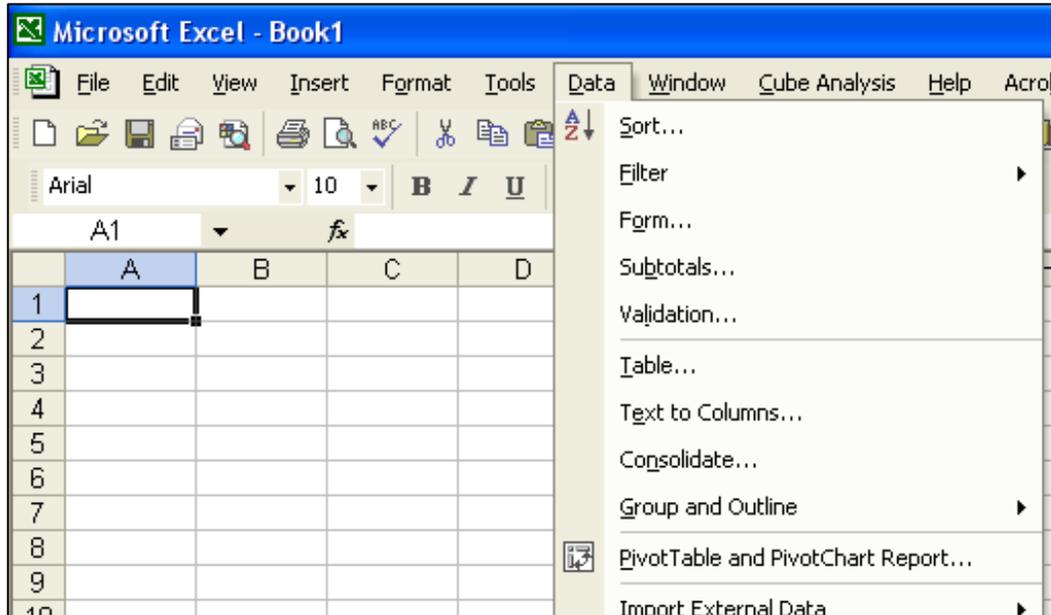
Data Sort - The Sort tool does exactly what it implies – it sorts and data. Key sorting points are as follows:

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.
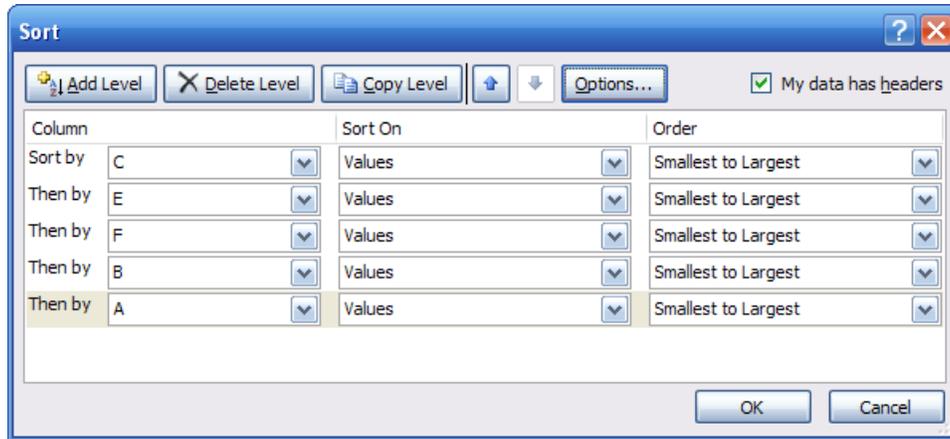
4. **Sort Left to Right** – Excel has always provided the ability to sort left to right. To do so, select the options box in the Sort Dialog box and click the check box labeled "Sort left to Right" as shown below.

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.
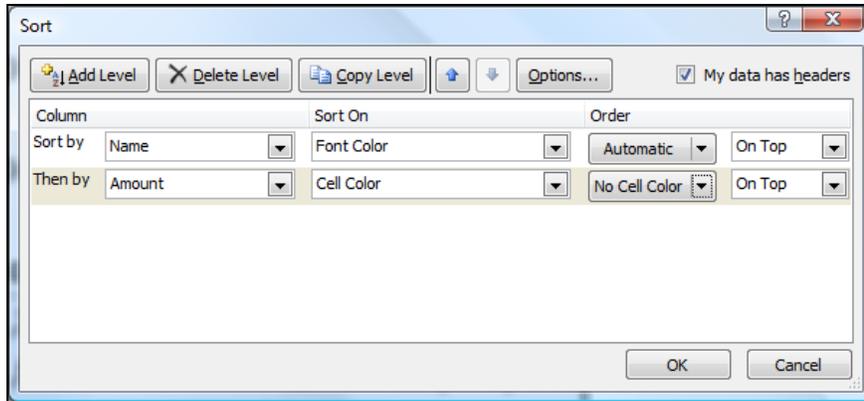
To be accurate, it was possible to sort by color in Excel 2003. To accomplish this task, you needed to use the =CELL function in order to identify information about a given cell such as the cell color or font color. Thereafter, the results of that function could be used to sort rows – which effectively 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.

	State	City	Type	Manager	Revenue	Expenses	Profit	Vacancy Rate
9			Apartment	Kathy	1,205,988	1,073,329	132,659	43.2%
10			Apartment	Ginger	432,900	367,965	64,935	24.7%
11			Apartment	Kathy	328,563	305,564	22,999	39.8%
12			Apartment	Steve	296,700	216,591	80,109	23.3%
13			Triplex	Ginger	181,988	205,646	(23,658)	43.2%
14			Apartment	Ginger	217,504	184,878	32,626	53.3%
15			Triplex	Ginger	91,224	127,714	(36,490)	24.7%
16			Triplex	Ginger	110,772	125,172	(14,400)	23.3%
17			Triplex	Ginger	110,772	125,172	(14,400)	31.8%
18			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			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%

The filter dropdown shows: Sort A to Z, Sort Z to A, Sort by Color, Clear Filter From "City", Filter by Color, Text Filters, (Select All), Atlanta, Daytona, Macon, Savannah, Tampa, OK, Cancel.

Tabs: 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.

	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.
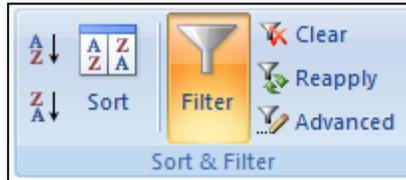
4. **Filters are Additive** - Each additional filter is based on the current filter and further reduces the subset of data.

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.
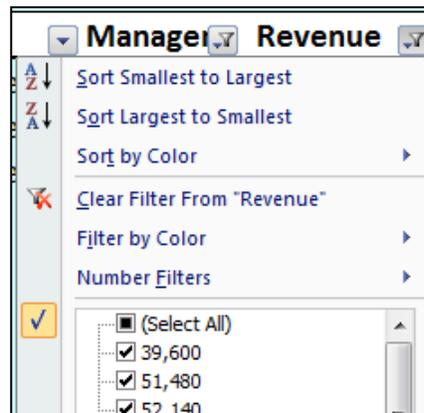
6. **Filters Enabled -** A drop-down arrow means that filtering is enabled but not applied.

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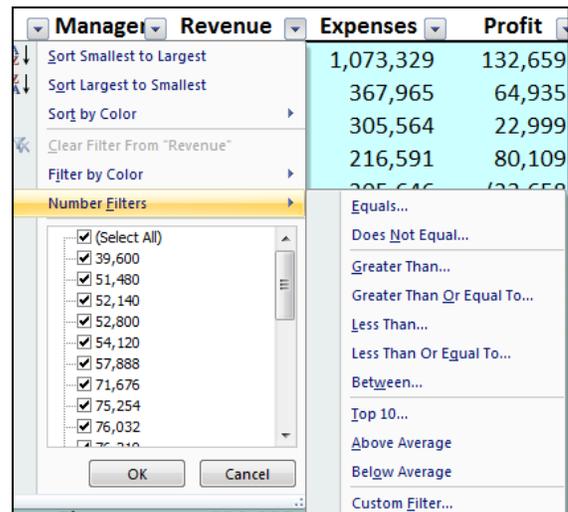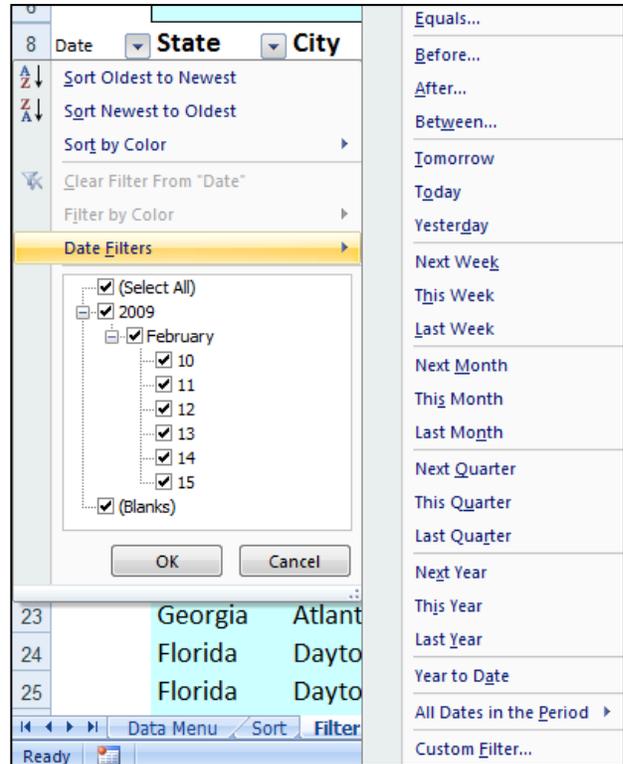
14. **Filtering Out Blanks** - To filter for blanks, in the AutoFilter menu at the top of the list of values, clear (Select All), and then at the bottom of the list of values, select (Blanks).

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.)
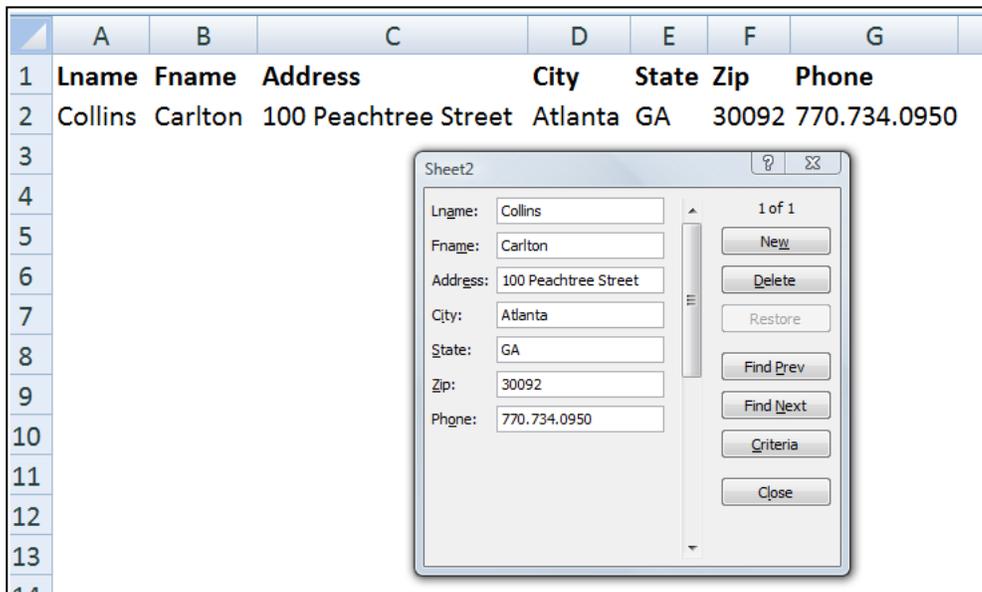
A data form provides a convenient means to enter or display one complete row of information in a range or table without scrolling horizontally. You may find that using a data form can make data entry easier than moving from column to column when you have more columns of data than can be viewed on the 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.
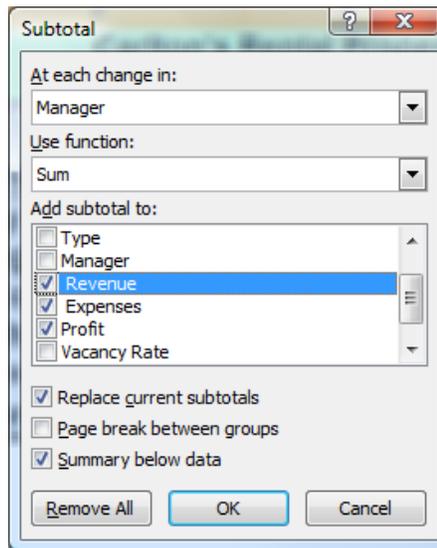
		Carlton's Rental Properties					
5		2009 Analysis					
6							
8	**Type**	**Manager**	**Revenue**	**Expenses**	**Profit**	**Vacancy Rate**	**Police Visits**
22		**Billy Total**	1,938,977	1,640,126	298,851		75
40		**Ginger Total**	2,340,914	2,211,002	129,912		78
54		**Jacob Total**	3,128,030	2,763,405	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.
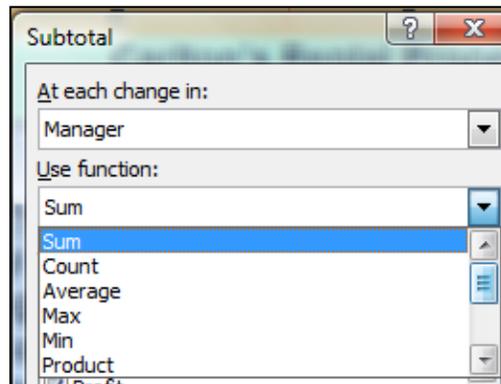
4. **Subtotals in 2007 Tables** – Excel 2007 deploys Subtotaling a little differently in that the Subtotal tool appears at the bottom of each column in each table, as shown in the screen below.

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.
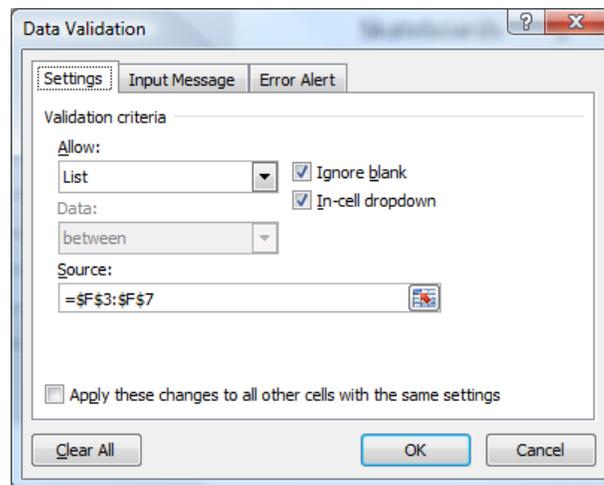
After making all the necessary selections in the validation list dialog box, your worksheet will behave as shown below.

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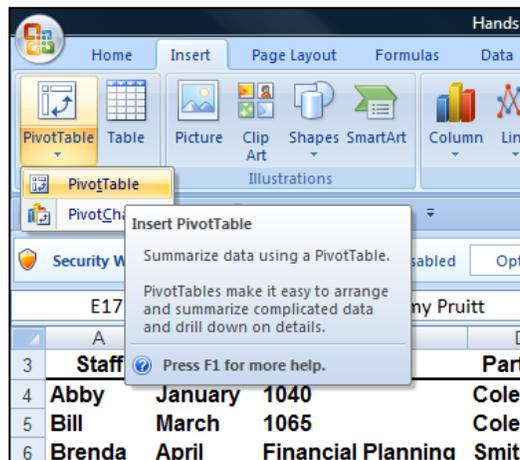
For learning purposes let's right mouse click on the pivot table and select PivotTable Options, Display, Classic PivotTable Layout. Your screen will now appear as follows:
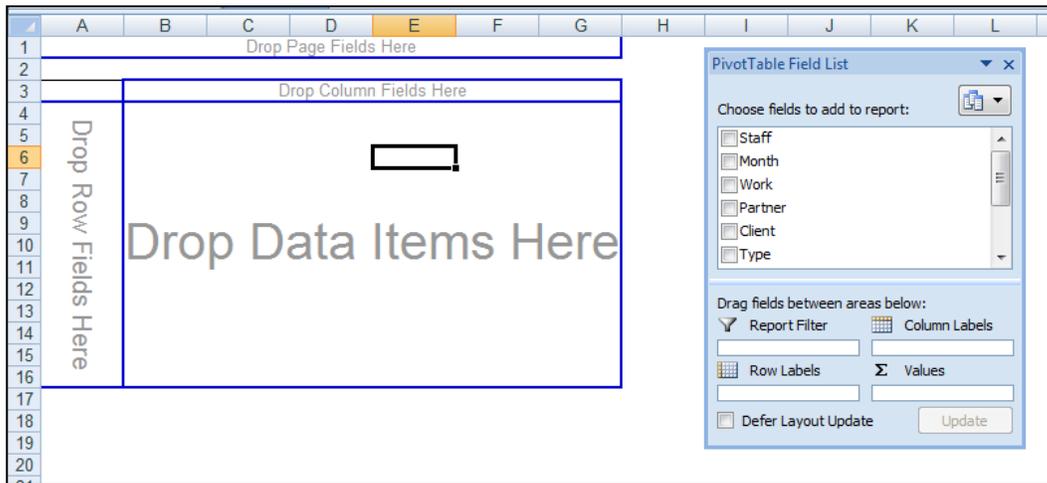
I like for CPAs to learn how to use Pivot Tables in this view because it visually helps them understand the all important relationship better the blank pivot palette and the PivotTable field List, both elements of which are shown in the screen above.

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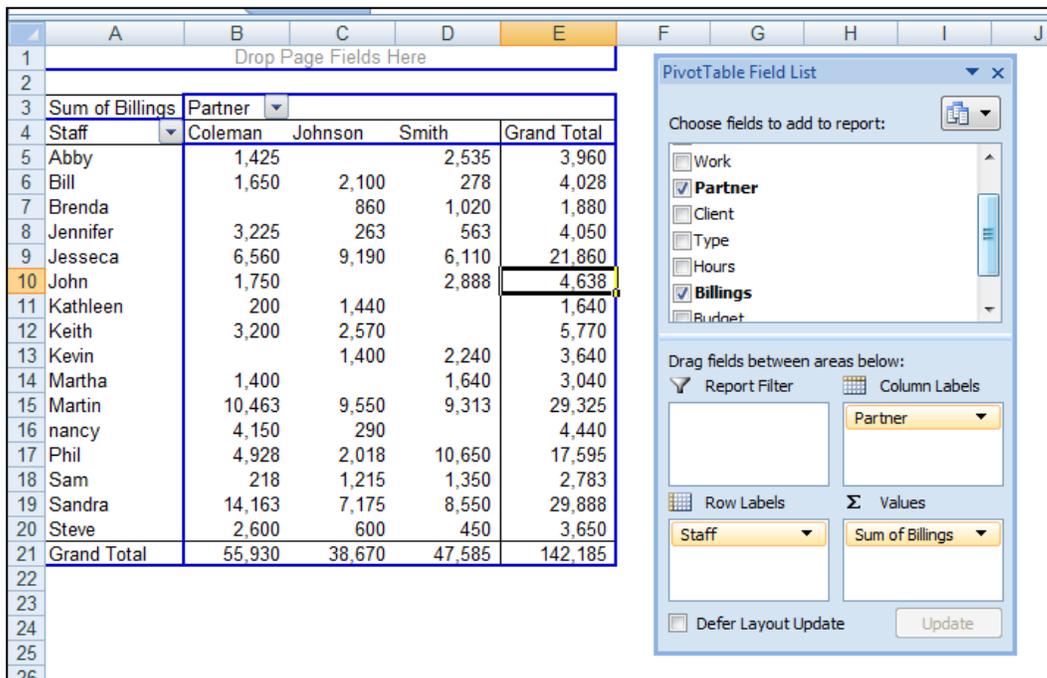
Next format and filter the Pivot Report. Very quickly your report comes together as shown below. Notice the filter button has been applied and a Pivot table style has also been applied for appearance.

	Coleman	Johnson	Smith	Grand Total
Sum of Billings Partner ▾				
Staff ▾				
Brenda		860	1,020	1,880
Jennifer	3,225	263	563	4,050
Jesseca	6,560	9,190	6,110	21,860
John	1,750		2,888	4,638
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.
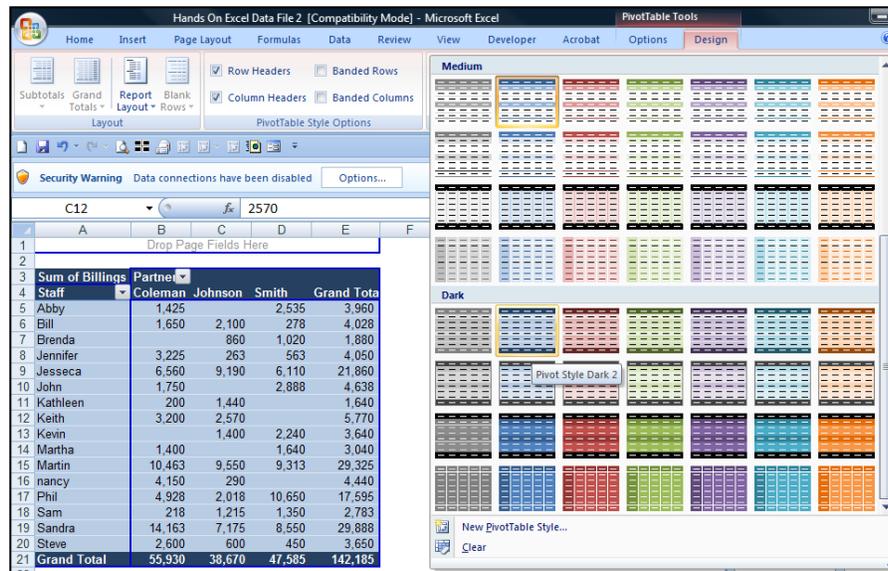
k.   Subtotals and grand totals can be displayed or suppressed at the users desire.

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.
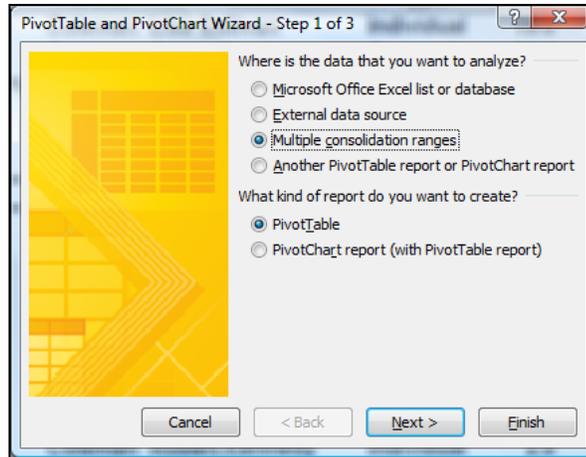
s. Excel also provides a PivotChart function which works similarly to PivotTables. Presented below is an example PivotChart.
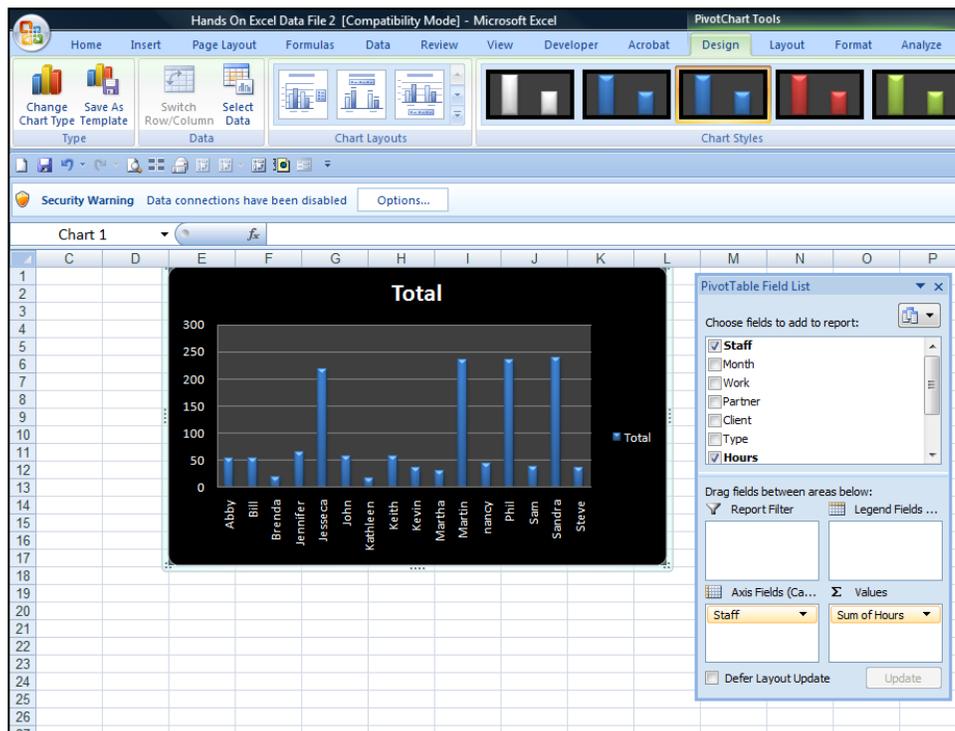
Excel 2003 PivotTables work very similarly as shown below. Excel creates a blank PivotTable, and the user must drag and drop the various fields from the PivotTable Field List onto the appropriate column, row, or data section. As you drag and drop these items, the resulting report is displayed on the fly. Here is the blank Pivot Palette view.
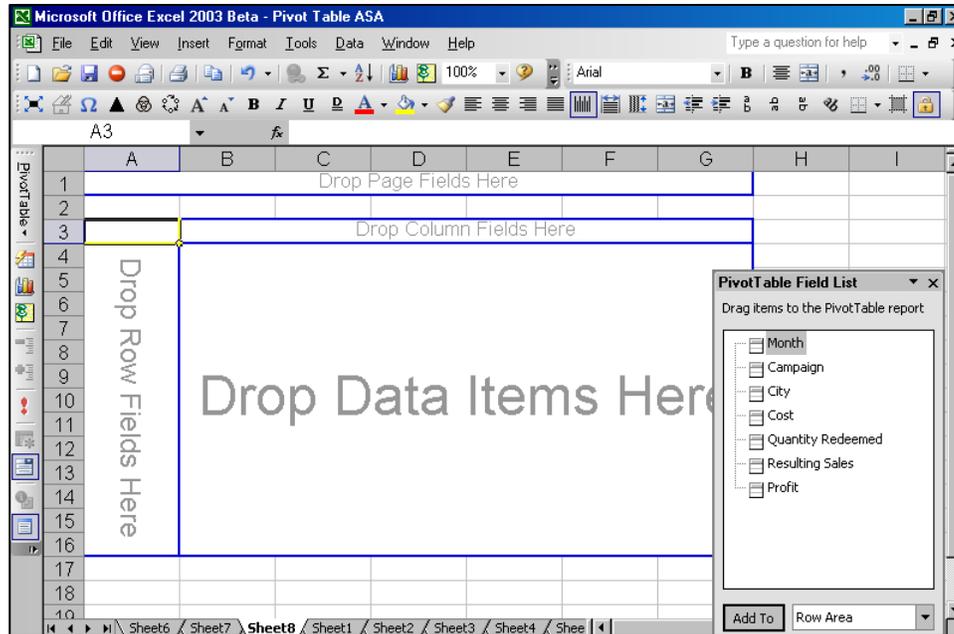
Now drag and drop field names from the Pivot Table field list onto the Pivot pallet. This action will automatically create Pivot Table reports – and they will change each time you drop additional field names, or move field names around. Presented below are but a few examples of hundreds of possible reports that could be viewed with this data through the PivotTable format.

Sum of Resulting Sales	Campaign				
Month	Coupon	Direct Mail	Local Ads	Radio Spot	Grand Total
January	37485	27846	67116	19992	152439
April	101507	45101	62713	117691	327012
July	64855	58072	77588	101150	301665
October	82943	115549	54264	61047	313803
Grand Total	286790	246568	261681	299880	1094919

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

Sum of Resulting Sales	Campaign				
Month	Coupon	Direct Mail	Local Ads	Radio Spot	Grand Total
January	3.42%	2.54%	6.13%	1.83%	13.92%
April	9.27%	4.12%	5.73%	10.75%	29.87%
July	5.92%	5.30%	7.09%	9.24%	27.55%
October	7.58%	10.55%	4.96%	5.58%	28.66%
Grand Total	26.19%	22.52%	23.90%	27.39%	100.00%

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.

		Atlanta	Columbus	New York	Grand Total
3	Sum of Resulting Sales	City			
4	Campaign	Atlanta	Columbus	New York	Grand Total
5	Coupon	6.25%	16.22%	3.73%	26.19%
6	Direct Mail	7.49%	3.21%	11.82%	22.52%
7	Local Ads	3.00%	1.27%	19.63%	23.90%
8	Radio Spot	3.25%	6.99%	17.15%	27.39%
9	Grand Total	19.99%	27.68%	52.33%	100.00%
10					

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.
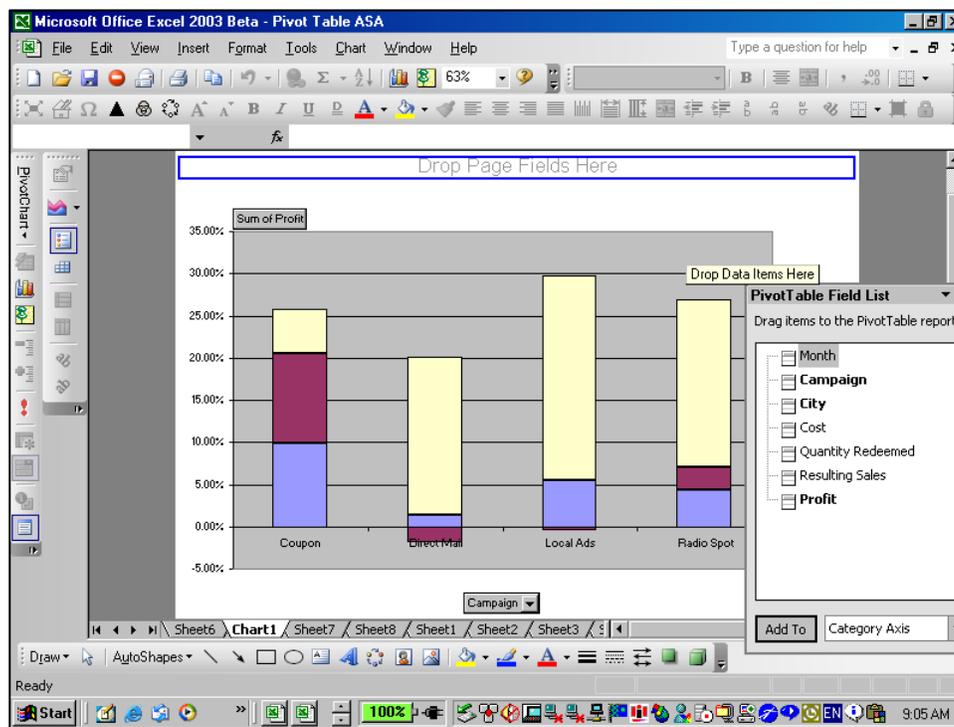
Filtering Pivot Tables - If you take a close look at your resulting pivot tables, you will notice that Excel automatically inserts a filter button on each field list as shown by the drop down arrows in the screen below:
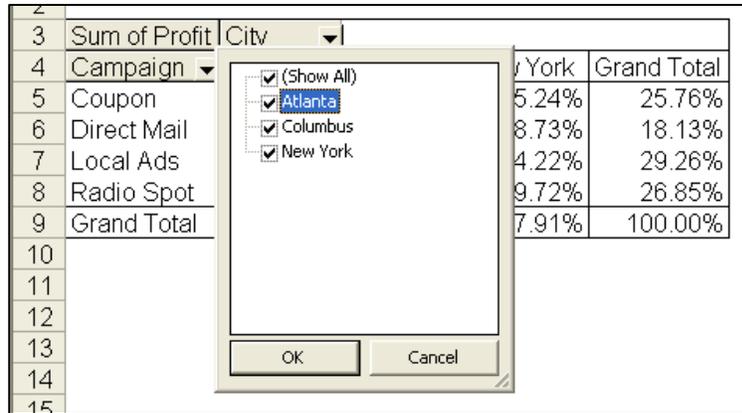
This drop down filter list makes it easy to refine your report to include just the data you want.

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:
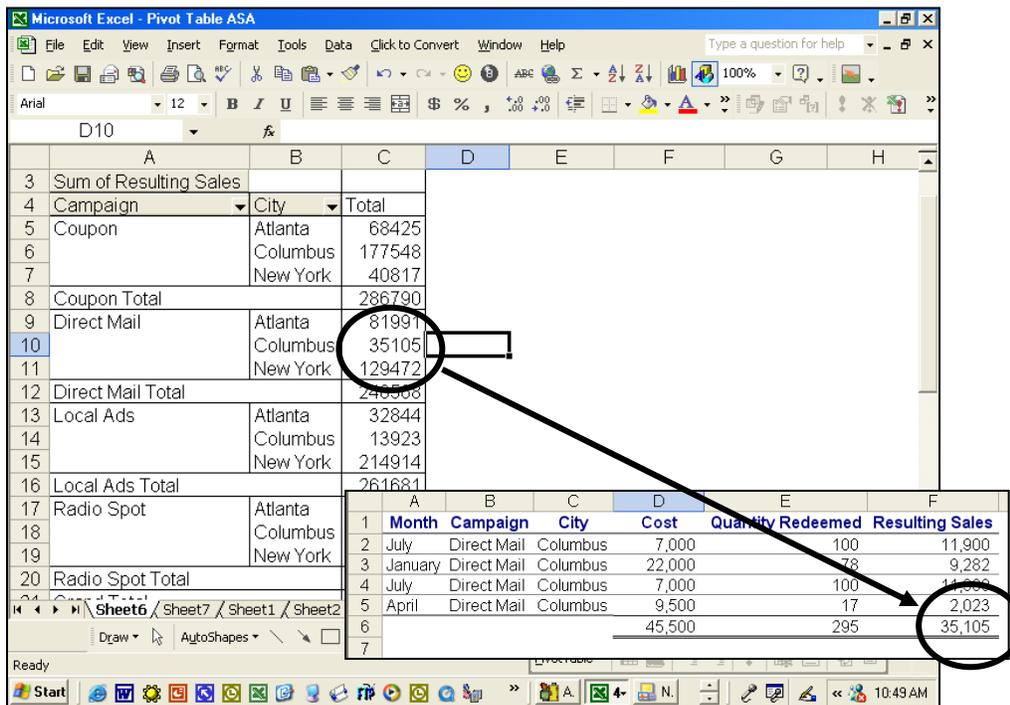
Pivot Table Options - By right mouse clicking on your pivot table you will reveal several option settings boxes as shown below. For example, these options boxes control the types of subtotals produced in your pivot reports. Excel also offers a pivot table options box as well as a layout wizard that makes producing pivot tables a little easier.
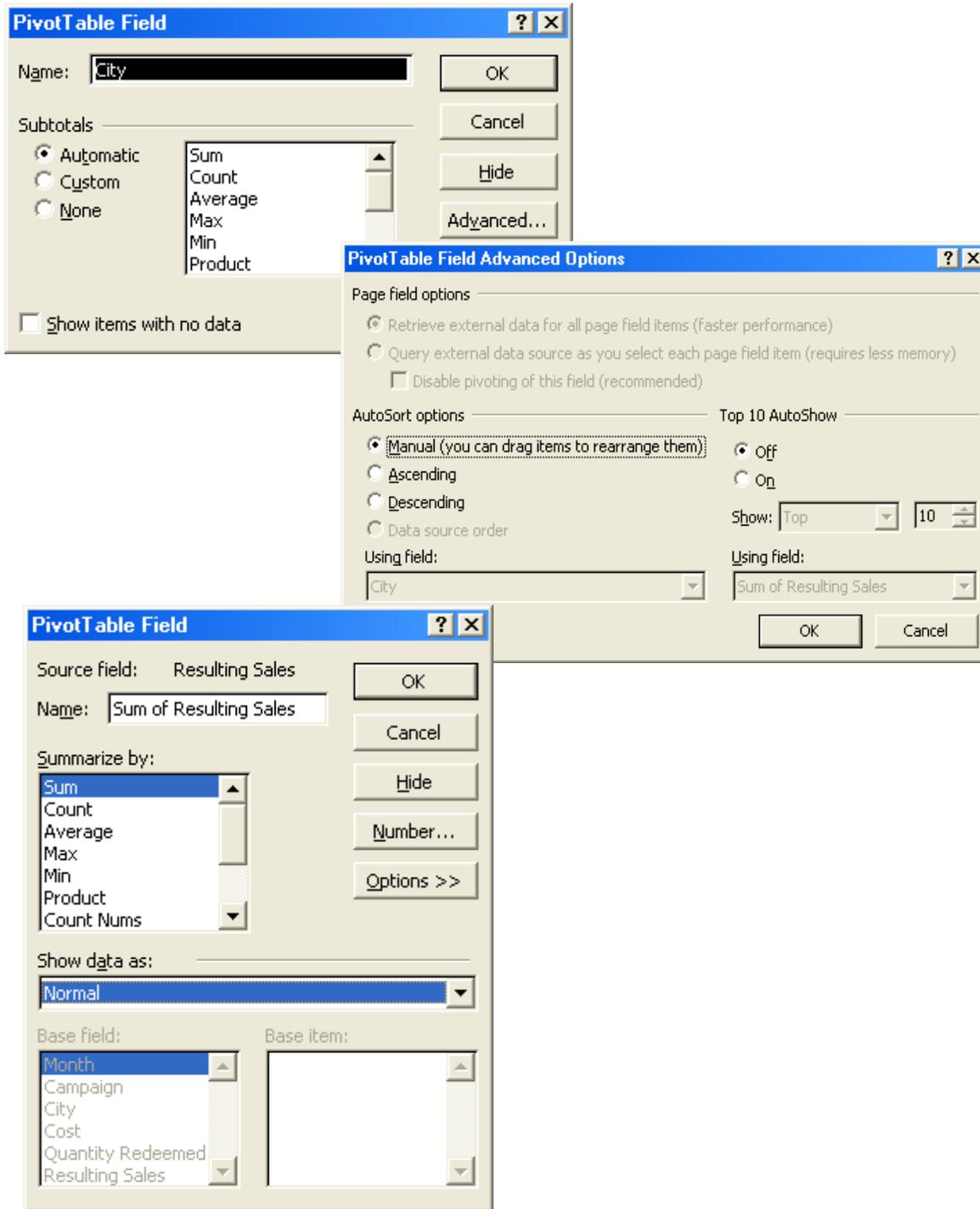
Data Table ("What-if Analysis")

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.

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.
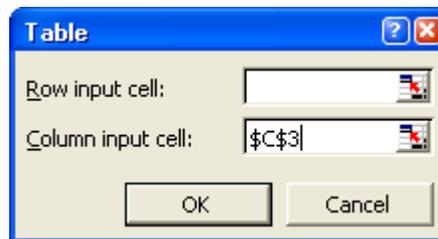
This process will generate the following table:

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.
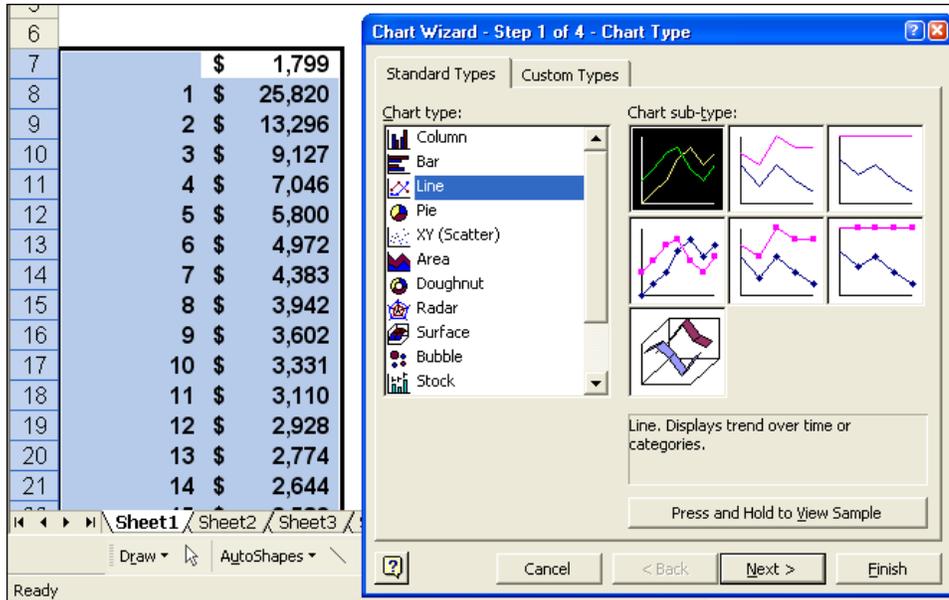
The resulting chart is shown as follows:
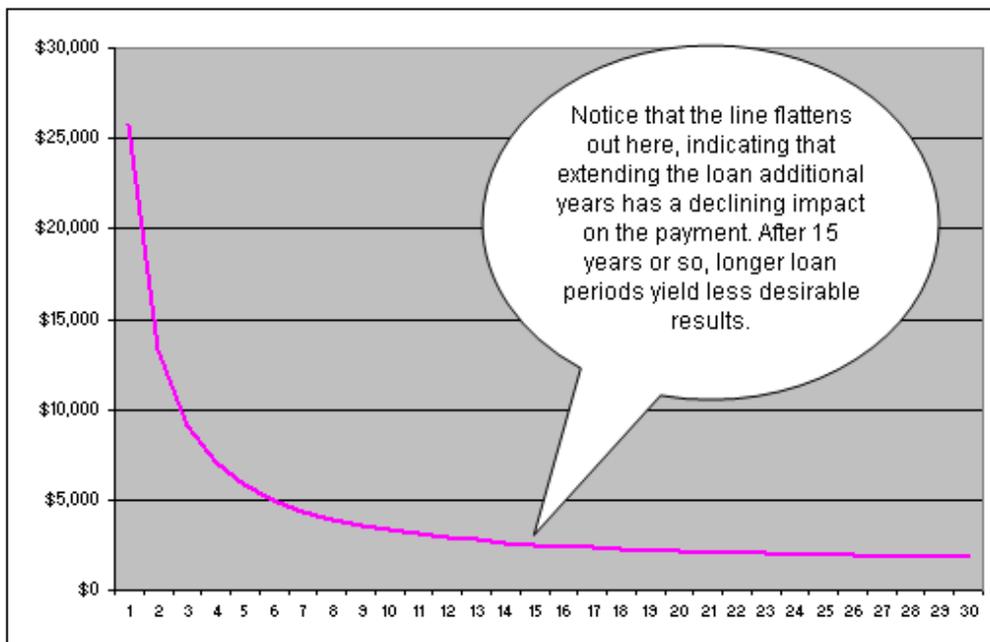
Based on this, no one should ever obtain a fair market loan for more than 15 years, the reduction in payments simply aren't worth the additional length of the loan. This same basic behavior is seen whether the interest rate is 1% or 100%. The only time you might be

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 ▼		
3				
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 situations 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.

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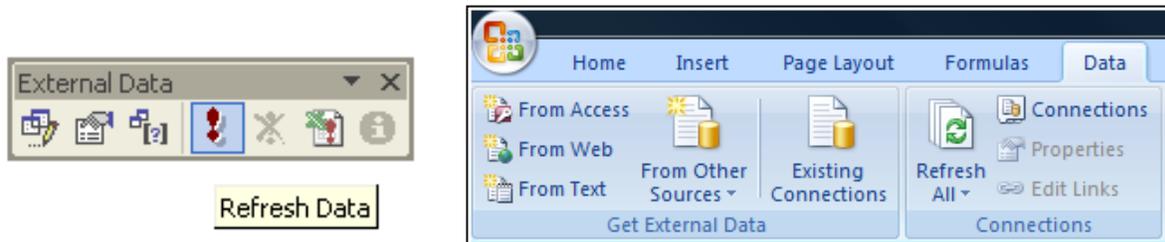
Query Parameters - There are numerous options to help you extract exactly the data you want they way you want it. The "Web Query Parameters Box", "Web Query Options box" and "External Data Properties Box" provide numerous options for controlling your web query.

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.
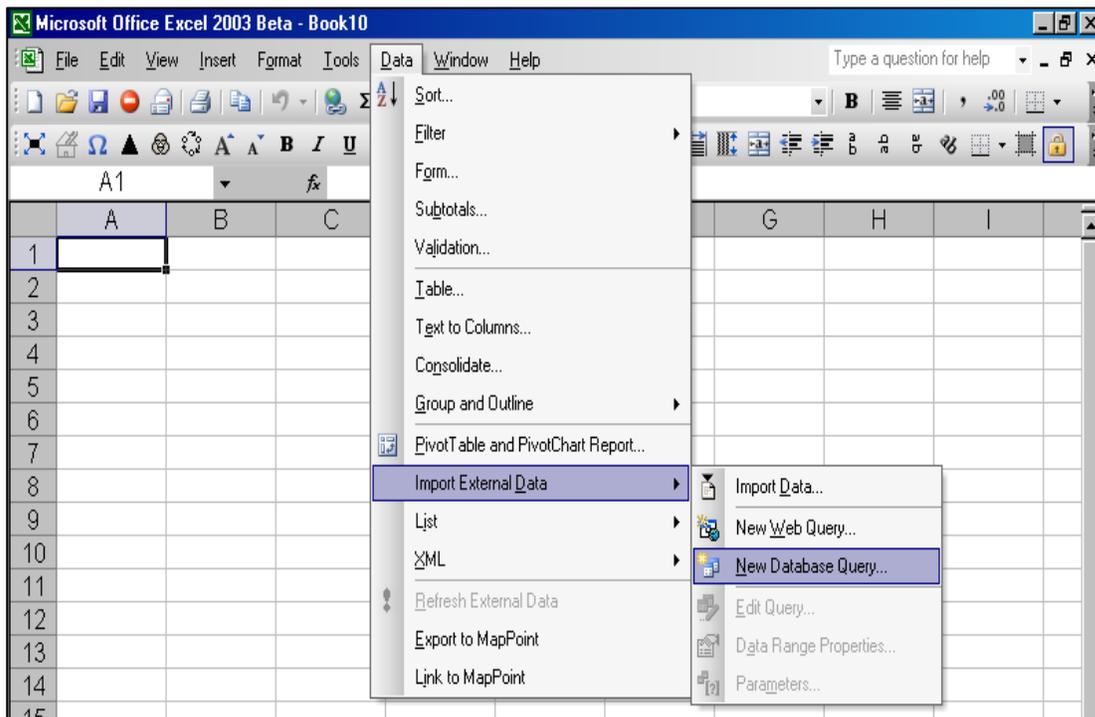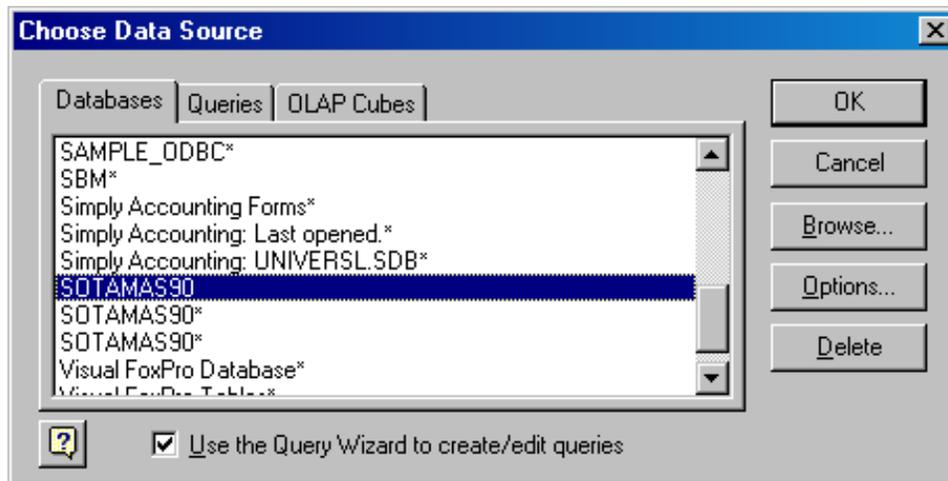
The first step is to select the type of database you want to query and to select the specific database.
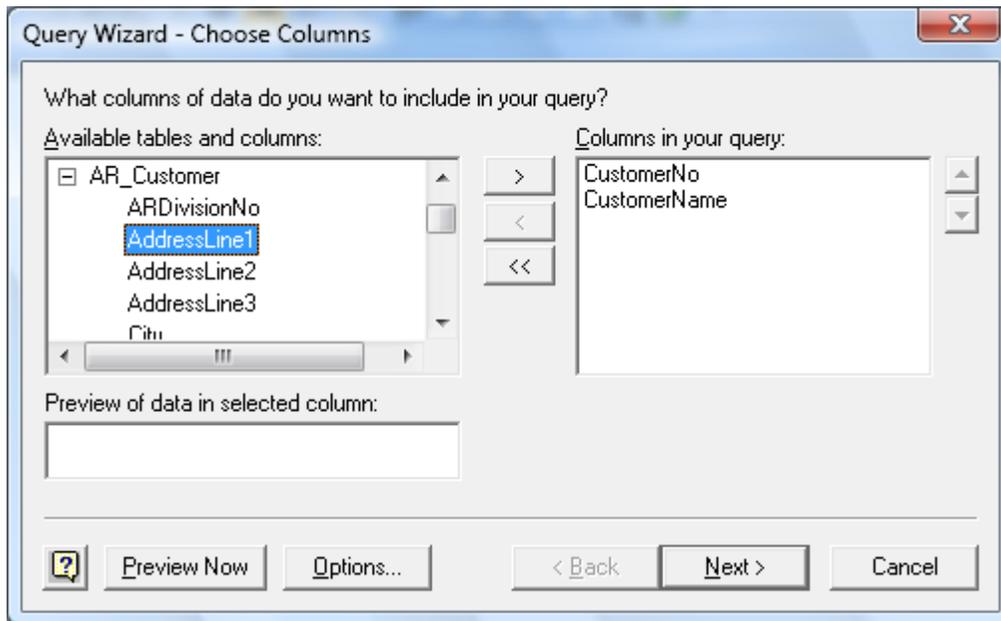
Upon the selection of the desired database a list of tables will be presented. Choose the desired tables, and select the desired data fields to be imported. You will then have the option to filter and sort the data before it is imported. Finally you will be given the option to save the query so that 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.

When boiling eggs, add a pinch of salt to keep the shells from cracking.

Chapter 5
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.

Six Major Points for Creating Macros

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.

Steps for Creating A Macro

1. **Launch Macro Recorder** - Select **Record Macros** on the **View** tab, or in the **Code Group** on the **Developer** Tab.

2. **Macro Name** - Enter a name for the macro In the **Macro Name** box.

   a. The first character of the macro name must be a letter.
   b. Subsequent characters can be letters, numbers, or underscore characters.
   c. Spaces cannot be used in a macro name (an underscore character is often used as a word separator.
   d. 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.

3. **Shortcut** – (This is optional) Assign a CTRL key combination (such as CTRL+A to run the macro by typing any lowercase letter or uppercase letter that you want to use in the Shortcut key box.

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

4. **Macro Location** - In the **Store Macro In** dropdown box, select the workbook where you want to store the macro.

   a. If you want a macro to be available in all Excel workbooks, 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.

      i. In Windows Vista, this workbook is saved in the C:\Users\username\AppData\Local\Microsoft\Excel\XLStart folder.
      ii. In Microsoft Windows XP, this workbook is saved in the C:\Documents andSettings\user name\Application Data\Microsoft\Excel\XLStart folder.
      iii. Workbooks in the XLStart folder are opened automatically whenever Excel starts.

b. **Note -** If you want the 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.

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

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

7. **Start Typing -** Perform the actions that you want to record. New in Excel 2010, macros can now record the manipulation of objects, such as inserting or moving a text box.

8. **Stop Recording** – When you are done click "Stop Recording" in the "Code Group" On the "Developer Tab". You can also click **Stop Recording** on the left side of the status bar.

9. **Assign the Macro to an Object, Graphic in the Worksheet** – Insert an object (like a Star shape or text box) or graphic image (like a picture) in your worksheet, then right-click on that object or graphic image and select **Assign Macro** from the popup menu. In the **Macro Name** box, select the macro that you want to assign to that object or graphic image and click **OK**.

10. **Menu Navigation Not Recorded –** Keep in mind that 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.

11. **Turn On The Developer Tab –** By default, the Developer tab is turned off, but you can turn it on in Excel 2010 by clicking the **File** tab select **Options, Customize the Ribbon,** and check the checkbox next to **Developer Tab.** In Excel 2007, click the Microsoft Office Start Button in Excel 2007, select **Excel Options, and under** the **Popular** category, **Top options for working with Excel**, select the **Show Developer tab in the Ribbon** check box, and then click **OK**.

12. **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.
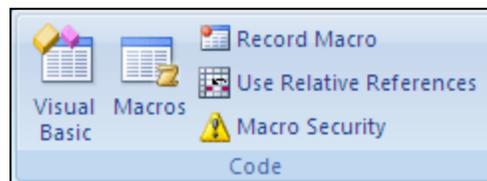
Under Macro Settings, click **Enable All Macros** (*this is not recommended by Microsoft because potentially dangerous code can then run without your approval*), and then click **OK**.

13. **Example Macros You Might Find Useful**

A. **Insert Headers and Footers Macro –** Start recording a new macro called **Insert_Headers**. Select all of the worksheets, then from the **Page Layout** tab, double click the Page Setup dialog box button to display the Page Setup dialog box. Continue to 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 for quick and easy access. Thereafter, inserting headers and footers in your worksheets will be a breeze.

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

C. **Delete Data Macro –** Do you have a frequently used template 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.

D. **Macro Case Study – Carlton's Copy Shop** – See the following chapter for a detailed case study for using macros.

If you aren't sure how fresh your eggs are, place them in about four inches of water. Eggs that stay on the bottom are fresh. If only one end tips up, the egg is less fresh and should be used soon. If it floats, it's past the fresh stage.

Chapter 6
Copy Shop Sales Order
Case Study

As an accounting software installer, I've learned from experience that most businesses can pick blindly from among the top accounting systems in the world and pretty much get the job done. From one business to the next, accounts payable needs, payroll needs, trial balance needs, reporting needs, and even inventory needs are similar and well covered by today's top accounting systems. However, there is one area which differs dramatically - and that area is in the sales order. It turns out that each company sells differing kinds of products and services with options so varied, that few accounting systems are prepared to handle those needs. In this situation, I make a bold claim that an Excel template can be easily used to fill in the missing gaps and supplement any accounting software system to provide excellent order taking capabilities.

In this case study, let us assume that we are working with a small copy shop – a small family owned company with about $300,000 in revenue. In this case they have determined that QuickBooks meets all of there needs, except for order taking. Therefore our goal will be to build a Sales Order system using Excel in only a few minutes. Listed below are the key elements that you will learn in this case study:

1. Neat and Organized Worksheet Design
2. =NOW()
3. Data Validation Lists
4. =VLOOKUP
5. Creating Macro Buttons
6. Creating Macros
7. Relative versus Absolute Macros
8. Worksheet Protection

Think about a copy shop for a minute, what is so difficult about taking an order in a copy shop? It is the options. How many copies would you like? Do you want that printed on front and back? Stapled or Bound? What kind of binding? What size paper? What color paper? What pound paper? Do you want regular or fast delivery? These are all standard questions asked by a copy shop, yet QuickBooks, nor any high end accounting system is able to take such an order. Even the million dollar solutions aren't equipped to take such an order. These companies must instead resort to purchasing a software application called a "product configurator", solutions which can costs $75,000 to $750,000 or more. To make matters more difficult, there are often rules associated with various options – for example, when ordering a car, if you order the sun roof option, you can not also order the T-Top option. Product configurators must account for and accommoate these types of situations.

1. Let us begin by simply labeling our sales order form. As you can see in the screen to the right, we've added some labels and highlighted some data input fields with yellow background and gridline borders.

   (For purposes of this case study, we will only build in options for color and size, but once you get the hang of it, adding in additional options for paper weight, binding, duplex printing, etc is a rather simple matter.)

2. **=NOW()** – Next we type in the Excel Function =NOW(). This will cause Excel to display the computer's date and time each time an order is produced. You can see the =NOW() function in the formula bar and the results displayed in cell B2 below.

3. **Calculations for Base Rate** – Next we add simple calculations to multiply the total number of pages to be copied by the total number of copies and the base rate per copy. To make it easier to visualize, I have added some customer data. (The formula contained in cell B11 is displayed in the formula bar.)

4. **Color Options** – Next I created a table of the color options along with a sur-charge rate per page for each color. Notice that there is a "zero" sur-charge when selecting white paper. Make sure to sort your table in descending order because we plan to refer to that table via a Lookup function – and as we all know, lookup functions do not work properly unless the table array is sorted in descending order. To make the table of options more readable, I applied gridlines and a greenish background.

5. **Data List Validation** – Now this is where the excitement begins. Next I create a data validation list in cell B13 using column one of my options table. To do this, select B13, and choose Data validation from the Data Ribbon. Next select List and use the Cell Chooser to highlight the options in column one of your color options table.

6. **=VLOOKUP** – Next I inserted a =VLOOKUP function in cell B14 to return the Sur-Charge rate based on the Color Selected.

Notice that when you select different colors in cell B13, the rate in Cell B14 changes according to the Color Option table.

7. **Size Options -** Repeat steps 4,5 & 6 above to also create Size Options.

8. **Invoice Total** – From here it is an easy step to add calculations to total the invoice. Of course your complete invoice would also include sales tax calculations as well. Our example is kept as simple as possible to make sure that the key points come across as easy as possible. Here's what we have so far:

9. **Macro Buttons** – To make the Sales Order form easier to use, next we will add three macro buttons. We start this process by creating a single text box, and using the Drawing Tools to make it look fancy. Here are steps:
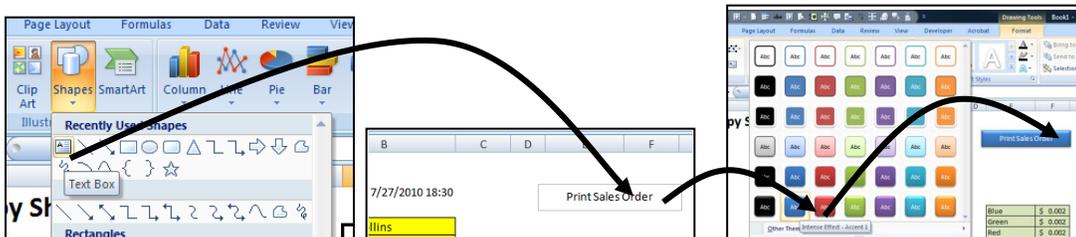
10. **Create the Print Macro** – Next create a print macro by selecting "Macro, Record Macro" from the "View Ribbon" *(make sure that no spaces are used in your macro name and save the macro to "This Workbook)*. Set the "Print Area" appropriately to display your Sales Order Form. Next simply highlight your Sales Order Form and print three copies, then stop recording your macro by selecting "Macro, Stop Recording" from the "View Ribbon". Once completed assign the Macro to the Print Sales Order Button by right mouse clicking and selecting "Assign Macro".   The right click menu as well as the Assign macro Dialog box are shown in the two screens below.
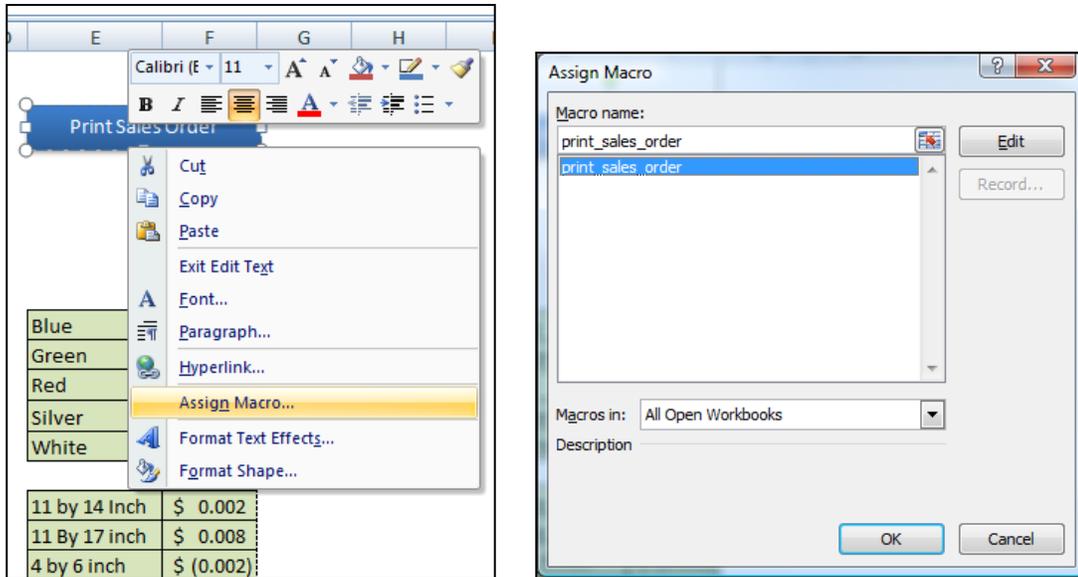
You want to print three copies of the Sales Order as follows: One for your customer's records; One for your product people to follow when making the copies, and one for bookkeeper to use when entering the invoice amount into QuickBooks.

11. **Additional Macro Buttons** – Next right click on the edge of the existing macro button twice, and choose "Copy"; then click away from the button and Paste twice. This will create two exact copies of your macro button. (You must right click twice on the edge of the button to display the second menu of options.)
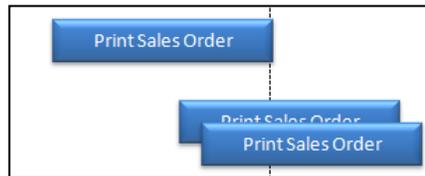
Next select the "Select Objects" menu option from the "Home" Ribbon's "Find and Select" menu in the "Edit" Group. Then lasso the three buttons and from the "Drawing Tools", use the Alignment tools to left justify and Distribute Vertically the three buttons.
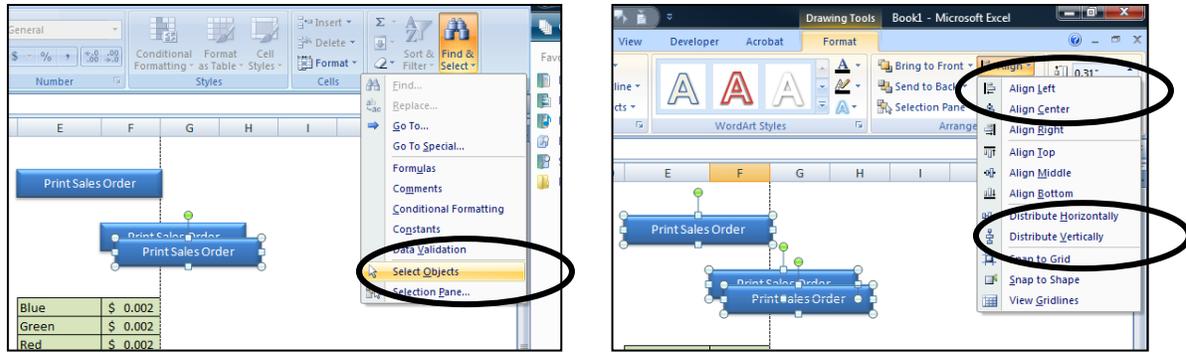
The results will appear as follows:
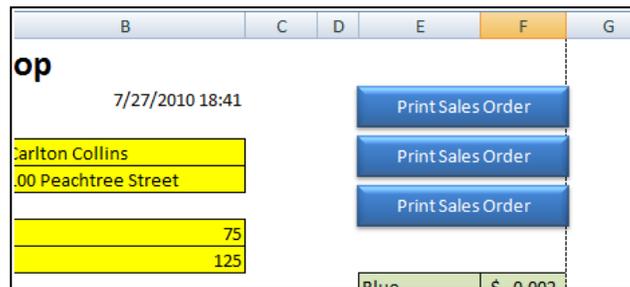
Press escape to deselect the "Object Pointer" tool, and return your cursor to normal.

12. **Post Sales Order Macro Button** – Next I created a macro to post the sales order information to a database. This is complicated and I will demonstrate several teaching points in class to help you fully understand the process of writing a combination relative and absolute Here are the steps:

    a. Relabel the second Macro Button to Read "Post Sales Order". This will require you to first right mouse click on the button and select the text, or if you prefer, remove the macro before continuing.

    b. Highlight cells B2 thru B21 and label that range "salesorderdata" using the Name Box.

    c. Go to Cell H1 and enter the phrase "Database" in cell H1.

    d. Label cell H1 "database" using the Name Box.

    e. Copy the labels in cells A2 thru A21 and Paste Transpose them to cell H2.

    f. Start recording a macro named "postsalesorder".

    g. Click the "Use Relative References" option from the Macros Group on the View Ribbon.

    h. Press the F5 key to launch the GoTo Dialog Box.

    i. Select the range "salesorderdata" by double clicking on the word "salesorderdata".

    j. With your cursor hovering above the selected range, right mouse click and choose "Copy".

    k. Press the F5 key to launch the GoTo Dialog Box.

    l. Select the range "database" by double clicking on the word "database".

    m. Press the End key, followed by the Down Arrow. (You will now be on the last row.)

n. Press the Down Arrow. (You will now be on a blank row underneath the last row.)

o. With your cursor hovering above the selected range, right mouse click and choose "Paste Special".

p. In the paste Special Dialog Box, check Values and Check Transpose, and click OK.

q. Place your cursor on cell A1.

r. Stop recording the macro by selecting "Macro, Stop Recording" from the "View Ribbon.

s. Assign the newly recorded macro to the Post Sales order macro Button.

t. Select Column H and format it to display Time and Date.

u. Adjust the width of your database columns to your preference.

13. **New Sales Order Macro Button** – Finally, edit the Third macro Button to Read "New sales Order" and create a macro that selects the yellow background data cells and deletes the contents. (Make sure to toggle the "Use Relative References" option off because this macro needs to be an absolute macro.) (Also make sure to select Cell B4, then hold the CTRL key down while you also select the other yellow back ground cells). Before you Stop Recording this macro, click on cell B4 so your cursor will be in the correct place to start recording a new sales order.

	A	B	C	D	E	F	G	H	I	J	K
1	**Molly's Copy Shop**							**Database**			
2	Date Time	7/27/2010 19:25						Date Time	Name	Address	
3								7/27/10 7:16 PM	Carlton Collins	100 Peachtree Street
4	Name	Sandra Williams			Print Sales Order						
5	Address	65 Nestle Way			Post Sales Order						
6					New Sales Order						
7	Number of Pages	45									
8	Number of Copies	100									
9					Blue	$ 0.002					
10	Standard Copy Rate	$ 0.03 Per Page			Green	$ 0.002					
11	Standard Base Rate	$ 135.00			Red	$ 0.002					
12					Silver	$ 0.005					
13	Which Color Paper?	Green			White	$ -					
14	Sur-Charge for Color	$ 0.002									
15					11 by 14 Inch	$ 0.002					
16	What Size Paper?	11 By 17 inch			11 By 17 inch	$ 0.008					
17	Sur-Charge for Size	$ 0.008			4 by 6 inch	$ (0.002)					
18					5 by 7 Inch	$ (0.001)					
19	Total Sur-Charges	$ 45.000			8.5 by 11 Inch	0					
20											
21	Total Invoice Price	$ 180.00									
22											

14. **Testing** – Test your three macros by filling in new sales order information, then click the three macro buttons in sequence to print, post and delete your data.

15. **Unlock Data Input Cells** – Next, select the cells containing the yellow background and also select the database columns (Hold the CTRL key down to make multiple selections. Then format the those cells to unlock them by right mouse clicking atop your selection and selecting "Format Cells, and unchecking the Locked Box on the protection tab – as shown below:
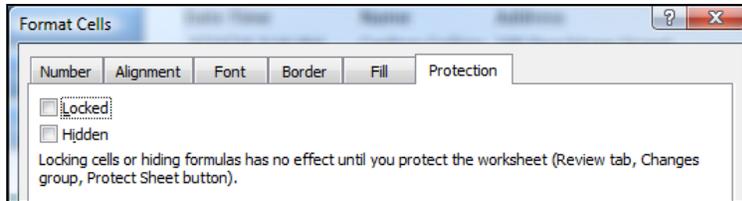
16. **Protect Your Worksheet** - Finally turn on worksheet protection by selecting "Protect Sheet" from the Review ribbon. Enter a password and repeat the password. This will prevent you or others from making accidental changes to the formulas and data contained in your template.

17. **Keep in Mind** – This case study covered the basics, but you could enhance this template a number of ways. Here are a few example hints:

   a. Combine the three macro buttons into one button that performs all tasks – printing, posting, and deleting.
   b. You might add an invoice number to the top of the page. Each time you post, your macro might also create a temporary formula in an empty cell that refers to the invoice number and adds one, then copies pastes that result atop the invoice number cell using the paste value command. Make sure the macro then deletes the formula in the temporary cell.
   c. You could easily add more options to your order form.
   d. Notice that we also included an option to decrease our price if a smaller paper size is selected.
   e. The sales order form could be dressed up to look far more professional. Colors, grids, logos, etc. could all be added to make the sales order form match the accounting system, for example.
   f. You could copy the worksheet and edit a second order for to be used in different situations. For example, Worksheet A might contain an order form that charges regular rates when a regular customer enters the store, and Worksheet B could charge higher rates when a lawyer enters the store – and so on.
   g. The resulting database will continue to compile each sales order as posted, adding new orders to the bottom of the database area each time you post.
   h. The bookkeeper need only record the date, customer name, address, and total amount   due in QuickBooks. The printed Sales Order copies on file will serve as supporting documentation.
   i. You can download a copy of this example template from www.CarltonCollins.com – click the Excel Link.

Plan and book your vacations well in advanced, that we you will get to look forward to them longer, and you may benefit from research and feedback you get from your friends for making the trip more enjoyable.

Chapter 7
Miscellaneous

Excel's 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.

The key to making solver work is the solver Parameters dialog box shown below.
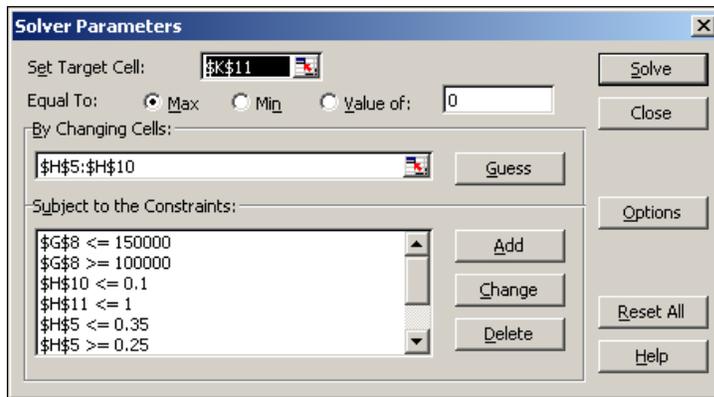
The target cell is set to refer to the total portfolio value at the end of the year because this is the value that we want to maximize. The changing cells are set to reference the percentages of each investment. Finally the various constraints are expressed as formulas as shown in the lower left hand 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.

Creating a New Worksheet can be a Drag

Q. How can I insert new worksheets in my Excel workbook without having to constantly setup new headers and footers in those new worksheets?

A. Excel 2003, 2007 and 2010 allow you to duplicate a worksheet by holding the **Ctrl** key down and **dragging the worksheet's tab** to the left or right. This action will insert a new worksheet, complete with the same headers, footers, margins, column widths, and cell contents, as the original worksheet. (In many situations, this method is quicker and easier than inserting a new worksheet and then adding headers, footers, margin settings and content.)
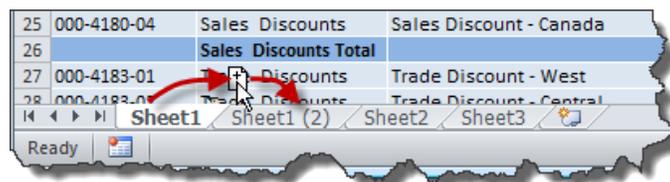
Alternative Approach: You can achieve the same results using the menus by selecting a worksheet tab (or group of tabs), right-mouse clicking on that worksheet tab (or group of tabs), selecting **Move or Copy**, checking the **Create a copy** checkbox, and clicking **OK**.

Hint: You can also use this procedure to duplicate multiple worksheets at the same time. To do this, select the first worksheet to be duplicated by clicking on the worksheet tab. Next, while holding down the **Shift** key, select the last worksheet to be duplicated by clicking on its' tab. (This action will select those two tabs, and all worksheet tabs in between.) Complete the copy by holding the **Ctrl** key down and **dragging the group of worksheet tabs** to the left or right.

A Refreshing Change in Your Portfolio

Q. I've heard that you can create a stock portfolio in Excel that is updated automatically via the Internet. Can you please tell me if this true, and if so how this is accomplished?

A. You've heard correctly. Excel provides a built-in query tool that can link your worksheet to 20-minute delayed stock quote information. This query tool uses Open Database Connectivity (ODBC) to establish a permanent connection between the source data and your Excel workbook. Once the link has been created, your Excel workbook can be updated with current stock price information simply by clicking the **Refresh** button. To build an ODBC-based stock portfolio, make sure that your computer is connected to the internet, and create a basic portfolio as suggested in the screen image below:

	E3		f_x	=C3*D3		
	A	B	C	D	E	F
1						
2	**Name of Stock**	**Ticker Symbol**	**Number of Shares**	**Price Per Share**	**Total Value**	
3		MSFT	5000		0	
4		KO	5000		0	
5		HD	5000		0	
6		IBM	5000		0	
7		WMT	5000		0	
8		GLD	5000		0	
9					0	
10						

Be sure to include valid ticker symbols for each of the stocks, mutual funds, ETFs and other investments you own. Next, create the query as follows:

1. Launch the **Import Data** dialog box as follows:

    a. In Excel 2007 and 2010, from the **Data Ribbon**, select **Existing Connections** from the **Get External Data Group**. This action will launch the **Existing Connections** dialog

box. In the **Existing Connections** dialog box, select **MSN MoneyCentral Investor Stock Quotes**.

b. In Excel 2003, from the **Data Menu** select **Import External Data**, **Import Data**. This action will launch the **Select Data Source** dialog box. In the **Select Data Source** dialog box, select **MSN MoneyCentral Investor Stock Quotes**.

2. In the **Import Data** dialog box, select the option for **New worksheet** as shown below, and click **OK** to display the **Enter Parameter Value** dialog box.
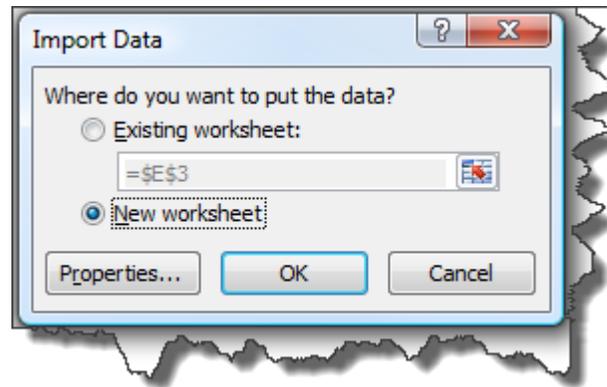
In the **Enter Parameter Value** dialog box, click the **Cell Chooser** icon and highlight the cells in your portfolio containing the stock ticker symbols as shown below. Check the box labeled **Use this value/reference for future refreshes** and click **OK**.
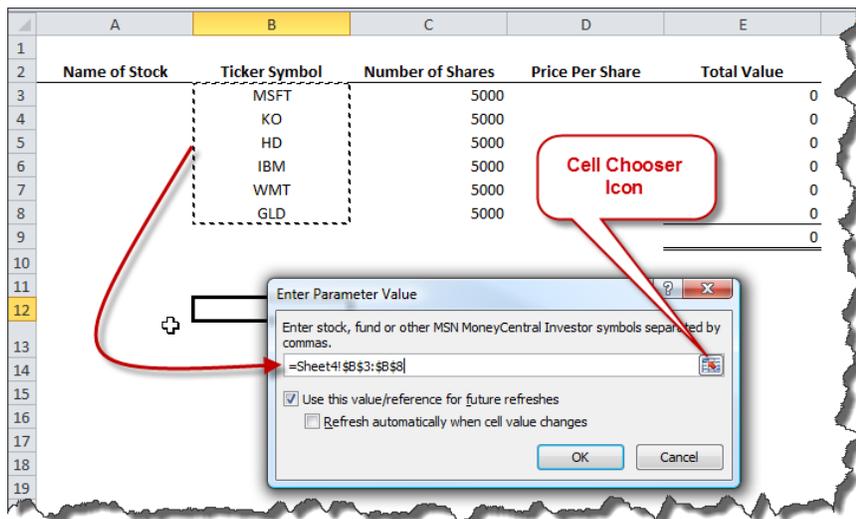
This action will retrieve and display an array of stock quote information from the **MSN MoneyCentral Investor** database in a new Excel worksheet. This information includes the name of each investment and 20 minute delayed price per share data, among other information. An example of the resulting stock quote query is shown below.

Return to your portfolio worksheet and fill in the missing name and stock price information using simple reference formulas to refer to the investment names and stock price information on the query worksheet. For example, select cell D3 in your portfolio worksheet, and enter the formula =QueryWorksheet!D4 (assuming the worksheet containing your query is named QueryWorksheet). Thereafter, each time you click the **Refresh All** button, Excel will update the query results, which in turn will update your portfolio.

Tip 1: If you plan to print your portfolio report, insert the formula **=NOW()** in cell A1 (or any blank cell) to ensure that the date and time your portfolio was printed appears on the report.

Tip 2: If you prefer to use the **Refresh** button (ie: instead of the **Refresh All** button), you must first select a cell (or cells) within the query.

Tip 3: If you later add more line items to your portfolio, you can change the query parameters by right mouse clicking on the query and selecting **Parameters** from the drop down menu.

XPS versus PDF

Q. I see that Microsoft Office 2007 and 2010 offer a new format called XPS. I have read that this new format supports the paperless environment and I wonder if our firm should be using this format as we go paperless. Can you tell me what this is?

A. XPS (XML Paper Specification) is a new format developed by Microsoft that offers an alternative to Adobe System's PDF (Personal Document Format) format. A key advantage of both XPS and PDF formats is that the fonts used in the document are embedded in the file so that the document will display and print properly on other computers and printers. For Word 2007 and 2010 users, an advantage of the XPS format is that no additional software is required to view the XPS based documents because Microsoft Word automatically views documents with the XPS format. However, PDF documents require the user to download a PDF reader, such as the Acrobat Reader in order to view the document. To create an XPS document in Word 2007 or 2010, from the **Office Start** button **or File** tab, select **Save As**, and select the **XPS Document** option form the **Save as type:** drop down box shown below, provide a file name in the **File name**: box, and click **OK**.
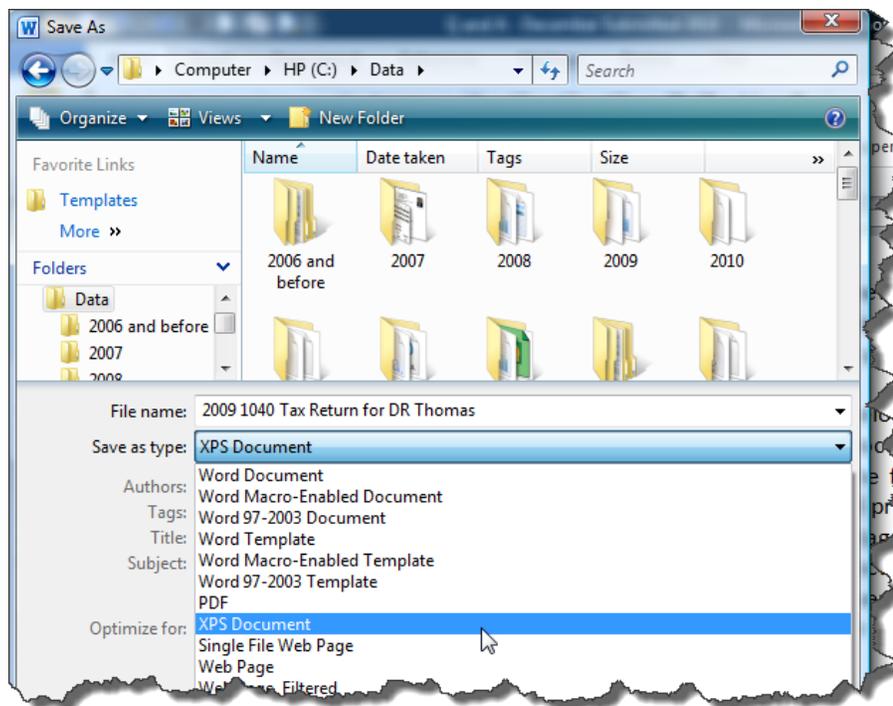
Be aware that once you have saved a Word document as a PDF or XPS file, it cannot be easily edited or converted back to a Microsoft Office file format without specialized software or a third-party add-in. Both PDF and XPS file formats are frequently used to produce finalized documents to be shared. For example, financial reports, tax returns, legal documents, contracts, newsletters, and resumes are examples of documents that are commonly converted to PDF or XPS formats prior to sharing.

Excel's New Slicer - It Slices, it Dices…

Q. We maintain a large amount of data for more than 100 restaurants and we analyze sales and expenses daily, weekly and monthly by location, city, state and territory, and even by type of restaurant. Overnight, the results of operations for the previous day feed into a database and we analyze the data in Excel using pivot tables. Despite preparing dozens of reports, my superiors desire more detailed reports and analysis. Can you offer a good solution?

A. Excel 2010's new Slicer may be the answer you are looking for. Slicer is an enhancement to Excel 2010's PivotTables that inserts filter boxes that your superiors can click to display precisely the reports they desire. To use Slicer, position your cursor anywhere in a PivotTable report and from the **Insert** ribbon, select **Slicer** from the **Filter** group. This action will open the **Insert Slicers** dialog box shown below.
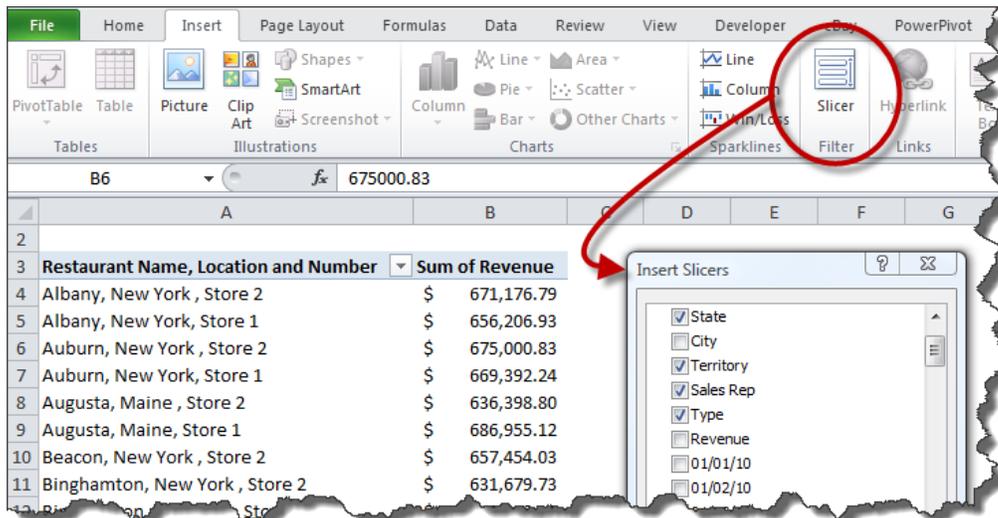
Place a **checkmark** in the checkbox for each slicer you want to display and click **OK**. Excel will insert slicer dialog boxes containing filter buttons in the worksheet for each field name you select, as shown below.

Simply click the various filter buttons to display different views of your data. For example, the report below summarizes revenue for those "Dine-In" and "Drive-Thru" restaurants managed by "Caroline" and "Madison" in the "Atlantic" and "Great Lakes" regions. (Holding down the **Ctrl** key allows you to make multiple selections within a Slicer dialog box.) The selected filter buttons are highlighted and the non-selected filter buttons are greyed out, allowing you to see which filters have been applied to the report.

In the example shown above, the reader could produce up to 720 different views of this one report (9 States times 4 Types times 4 Territories times 5 Sales Reps). In your situation, you could add three similar PivotTable reports summarizing your data by week, month, and quarter, and e-mail the entire workbook to your superiors. This would limit the total number of reports you would need to prepare to just four, yet provide your superiors with the ability to view the data thousands of different ways, according to their preference.

Advanced Tip: A Slicer can be shared with multiple PivotTable reports so that when filters are applied in one Slicer, multiple PivotTable reports are filtered. To share a Slicer, click on the Slicer to be shared to display the **Slicer Tools, Options** tab. In the **Slicer** group, select **PivotTable Connections** and place a **checkmark** next to the PivotTables you want to share the Slicer as shown below.
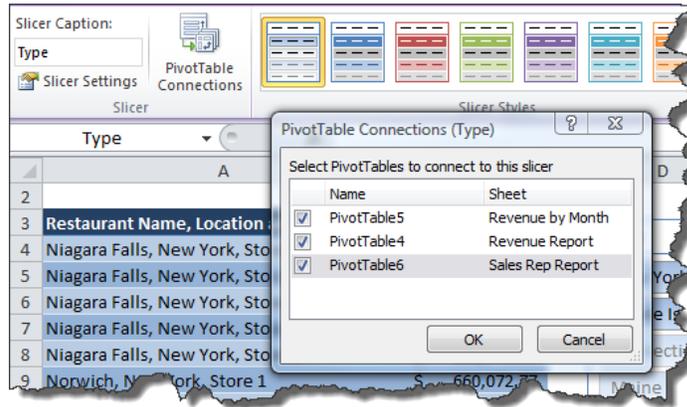
Hint: You can resize and re-position your slicers on the worksheet, and apply matching styles to both the PivotTables and Slicers to produce professional looking results.

E-Mail a Single Worksheet

Q. What is the easiest way to send a single Excel worksheet to a staff member without sending them the entire workbook?

A. You can send a single worksheet (ie: not the entire workbook) from within Excel using the integrated Outlook **Send this Sheet** applet, as follows:

1. Launch the **E-Mail** dialog box tool as follows:

    In Excel 2003 - Select **File, Send to Mail Recipient**.

    In Excel 2007 and 2010 – Right mouse click on the Quick Access Toolbar and select **Customize Quick Access Toolbar**. In the **Choose commands from:** drop down box, select **Commands Not in the Ribbon**. Scroll down and select **Send to Mail Recipient**, and click the **Add>>** button to include this command on your **Quick Access Toolbar**. Click **OK**. Click the **Send to Mail Recipient** icon on the **Quick Access Toolbar**.

2. In the **E-Mail** dialog box, select the radio button labeled **Send the current sheet as the message body**, and click **OK**.
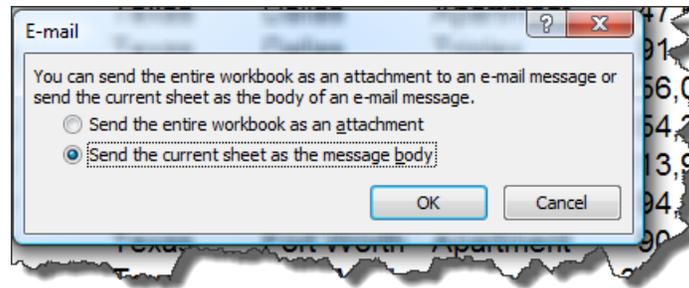
3.   This action will create an e-mail message using the worksheet contents as the e-mail message with limited Outlook tools and functionality as shown below. Indicate the e-mail recipients and subject as you would normally when preparing an E-mail message and click **Send the Sheet**.
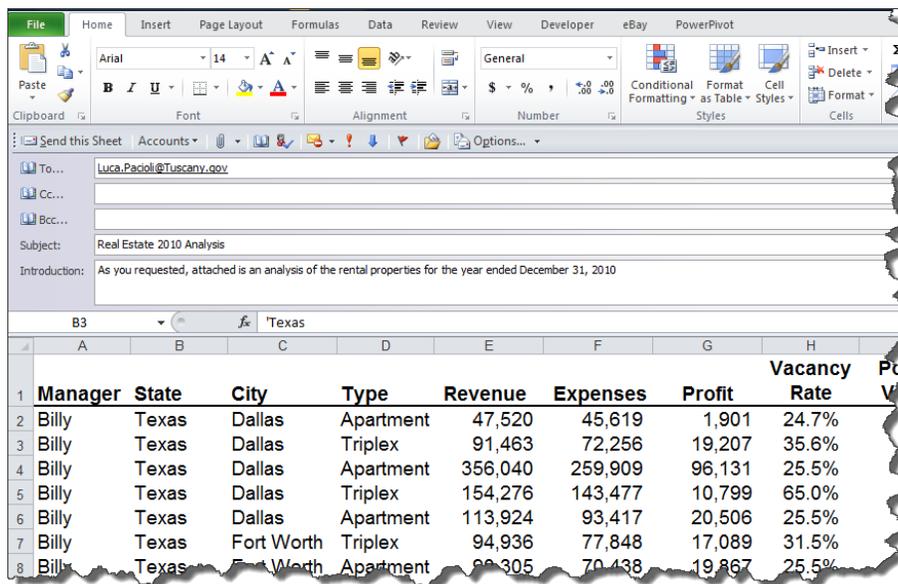
The **Send This Sheet** menu is integrated with Outlook so that the **To…**, **Cc…**, and **Bcc…** drop down fields will display your contacts and contact groups you maintain in Outlook. Once the e-mail is sent, a copy of the e-mail appears in your Outlook **Sent Items** box, similar to that of a regular e-mail.

Cautionary Note 1: When using this **Send the current sheet as the message body** option, the Excel data is converted from an Excel format into a table format containing only values. To send a single worksheet with the Excel formulas intact, make a copy of the workbook, delete all of the worksheets except for the one you intend to send, and repeat the steps above using the **Send the entire workbook as an attachment** option.

Cautionary Note 2: When sending e-mails from within Excel, your default signature block is not inserted into the e-mail.

Cautionary Note 3: This functionality works well with Outlook, but does not necessarily work with other e-mail client applications.

Displaying a Two Digit Year

Q. How can I force Excel to display a two-digit year (instead of a four-digit year) by default?

A. Many of Excel's default settings are determined by the setting in the Windows **Regional and Language Options**. To adjust these settings, launch the **Regional and Language Options** dialog box as follows:

1. In Windows XP, launch **Control Panel** from the **Start Menu**, and double click the **Regional and Language Options icon.**

2. In Windows Vista and Windows 7, launch **Control Panel** from the **Start Menu.** Select **System and Maintenance,** then in the left hand menu select **Clock, Language, and Region, Regional and Language Options.**

In the **Regional and Language Options** dialog box, click the **Customize this format…**to open the **Customize Regional Options dialog box.** On the **Date Tab,** click the **Short date: drop down arrow** in the **Date formats** group and select a date format that includes a two-digit date as shown below.
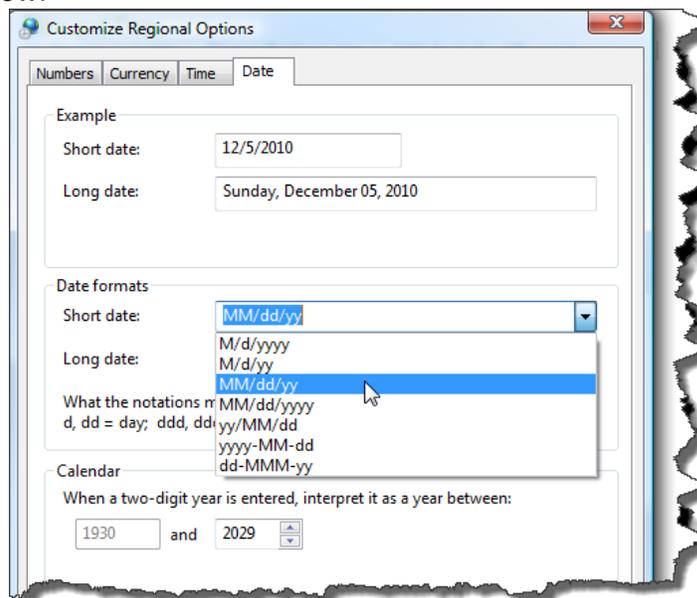

You must close and restart Excel for this change to take effect. Thereafter, Excel will display the two-digit date format you specified as the default.

Cautionary Point: It is important to understand that even when you are displaying 2-digit years, you should still make it a habit to enter 4-digit years, otherwise Excel may assume the wrong century. This is because Excel interprets two-digit years ending in 00 through 29 as years 2000 through 2029. (For example, if you type the date 6/2/20, Excel assumes the date is June 2, 2020.) However, Excel interprets two-digit years ending in 30 through 99 as years 1930 through 1999. (For example, if you type the date 6/2/60, Excel assumes the date is June 2, 1960.) You can change the way Excel interprets two-digit years by adjusting the **Calendar** setting located at the bottom of the **Customize Regional Options** dialog box (shown above).

Dating Tips

Q. When entering dates in Excel, it would be much simpler if I could enter the date as just the numbers without the forward slash character – 061010 or 06102010 instead of 06/10/10 or 06/10/2010. Entering the slash makes the exercise a two-handed exercise instead of one-handed exercise via the numeric keyboard. Is there a way to enter data into just one cell so I can avoid using multiple cells and then concatenating?

A. You can enter dates into Excel 2003, 2007 and 2010 without using slash marks by applying a custom format. Start by highlighting the range of cells and right-mouse click on that range to display the pop-up menu. Select **Format Cells** to display the **Format Cells** dialog box. On the **Number** tab select **Custom,** and enter the following custom format in the **Type** box: **00\/00\/0000**, then click **OK**. (Because the forward slash has special meaning in a custom format, you must precede it with a backslash for Excel to recognize the slash mark as a literal character, not its special meaning.) Thereafter, dates entered without slash marks will display slash marks, and the date will behave like a date instead of text. An example is shown below.
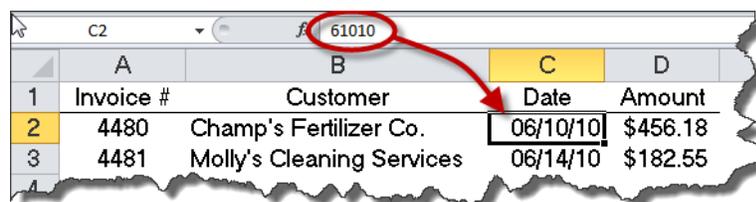
Once created, Excel remembers the custom format so you won't have to create it again in the future.
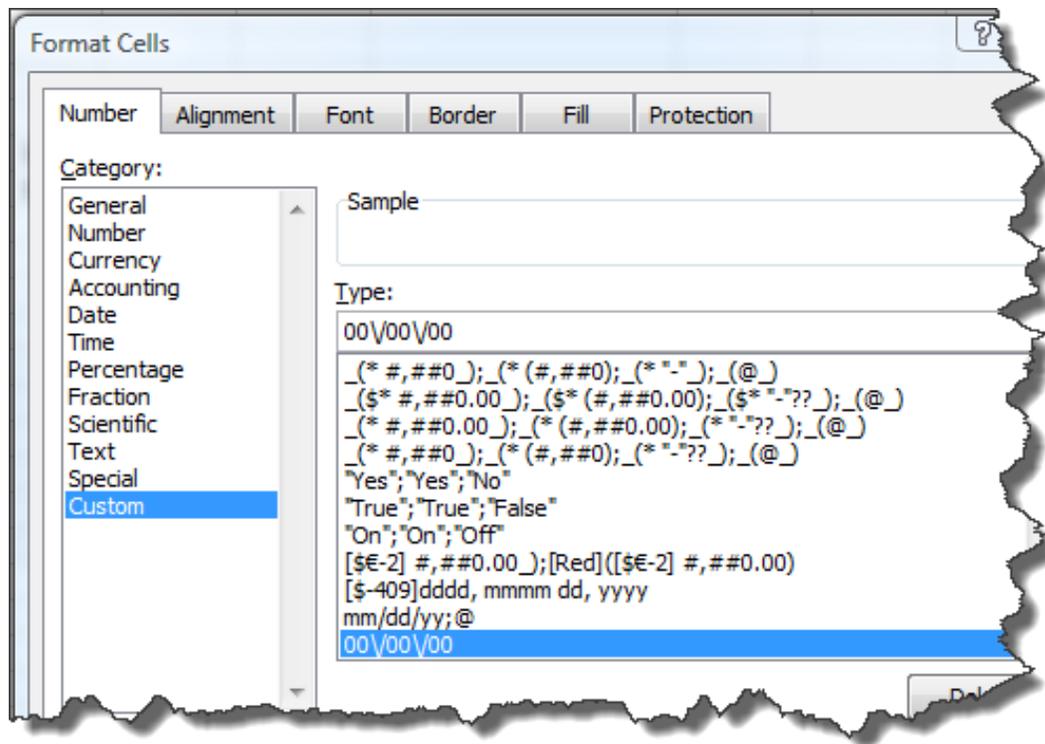
Hint: To display dates without the preceding zeros, use this custom format. **##\/##\/##**.

Hide Me Quick

Q. I am constantly hiding, un-hiding and re-hiding columns to generate reports in a multitude of report layouts, and I can't figure out how to display only the hidden column that I need without having to display all my hidden columns? Can you help?

A. Because hiding and un-hiding columns is a frequent task for many CPAs, I will address your specific question, and then offer a different solution. To unhide a specific column in Excel 2003, 2007 or 2010, press the **F5** key to launch the **Go To** dialog box and type in any cell address within that column (such as G1), and click **OK**. This will place your cursor within column G, even if hidden. Next, type the keyboard shortcut sequence **Alt, O, C, U** to unhide the column.

Alternatives – There are many alternatives for un-hiding columns, several of which are presented below so you can use the approach that work's best for you.

1. **Menu Options -** To unhide a column using the menu in Excel 2007 and 2010, from the **Home** tab, select **Format** from the **Cells** group, **Hide & Unhide**, **Unhide Columns**. To unhide a column using the menu in Excel 2003, select **Column**, **Unhide** from the **Format** menu.
2. **The Traditional Unhide Shortcut -** In Excel 2003, 2007 and 2010, Windows XP users can unhide a column by typing **Ctrl + Shift +)**, but this keystroke combination appears to be inactive in Windows Vista and Windows 7.

3. **Column Width -** Instead of un-hiding a column, you could simply increase the column width to make it visible. Start by pressing the **F5** key to open the **Go To** dialog box and enter a cell address to go to a hidden column. To resize column widths in Excel 2007 and 2010, from the **Home** tab, select **Format** from the **Cells** group, **Column Width**, enter the desired width, and click **OK**. To resize a column width in Excel 2003, from the **Format** menu select **Column**, **Width,** enter the desired width, and click **OK**.

Advanced Hint: To make your task easier, assign a name to a cell in each column you wish to hide or unhide using the **Name Box** (located just above the Column A heading). For example, you might assign the name **YTD** to cell G1, and the name **Budget** to cell H1. This will make it easier for you to use the **Go To** command because the name makes it obvious which column is which, whereas you might have a difficult time remembering which column label is which. Further, you could also use the **Name Box** to assign a name to a group of columns, and use the same procedure described above to hide or unhide that group. For example, you might assign the name **PriorYear** to cells J1 thru M1, and use the **Go To** command to go to those columns and unhide the entire lot.

A Better Suggestion - Rather than constantly hiding and un-hiding columns, a better approach would be to use the **Custom Views** feature in Excel 2003, 2007 and 2010. By creating custom views, you can easily toggle back and forth between all of your views. To create your first custom view, unhide all of your columns and from the **View** tab (or **View** menu in Excel 2003), select **Custom Views.** Click the **Add** button and enter a description in the **Name** box, then click **OK**. Next, hide various columns in your workbook and repeat these steps to create a second view of your data that includes selected hidden columns. Continue to create additional custom views for each of your desired hidden column layouts. Thereafter, you can reduce or eliminate the need to hide and unhide columns in the future by simply changing the view. To toggle between custom views, from the **View** tab by select **Custom Views** in the **Workbook Views** group, and double click the desired custom view as shown below.
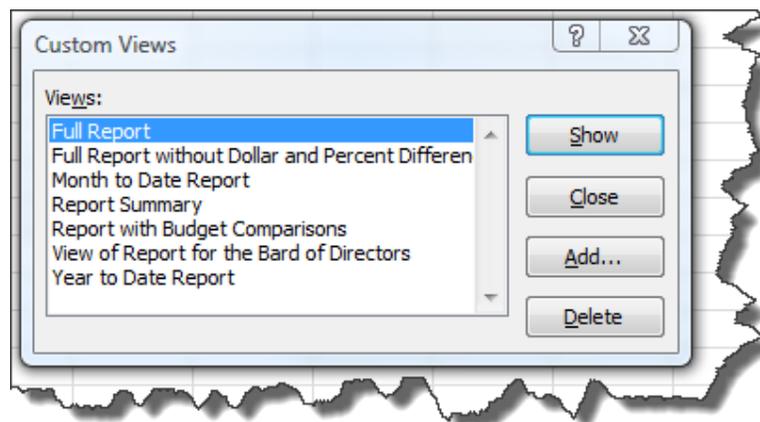
Animate Excel Charts in PowerPoint by Data Series

PowerPoint 2010 allows you to animate your charts by data series as follows. Start by creating a chart in PowerPoint, or if you prefer, copy and paste a chart from Excel into PowerPoint. **Click** on the chart to **select it**, and click **Animation Pane** from the **Animations** tab to display the Animation Pane. Again, with the chart still selected, from the **Animation** tab, click **Add Animation** and select an **Entrance** animation such as **Bounce**, for example.

In the **Animation Pane** click the **drop down arrow** next to the animation and click **Effect Options** to open the **Bounce** dialog box. Next, on the Chart Animation tab, click the **Group chart drop-down arrow** and select **By Series,** and click **OK**. Thereafter, when you display the slide show, each data bar series will bounce in individually, helping your audience identify the specific data series you are discussing. The screenshot below depicts the data series for sales representative Scott as the bars are bouncing into position.
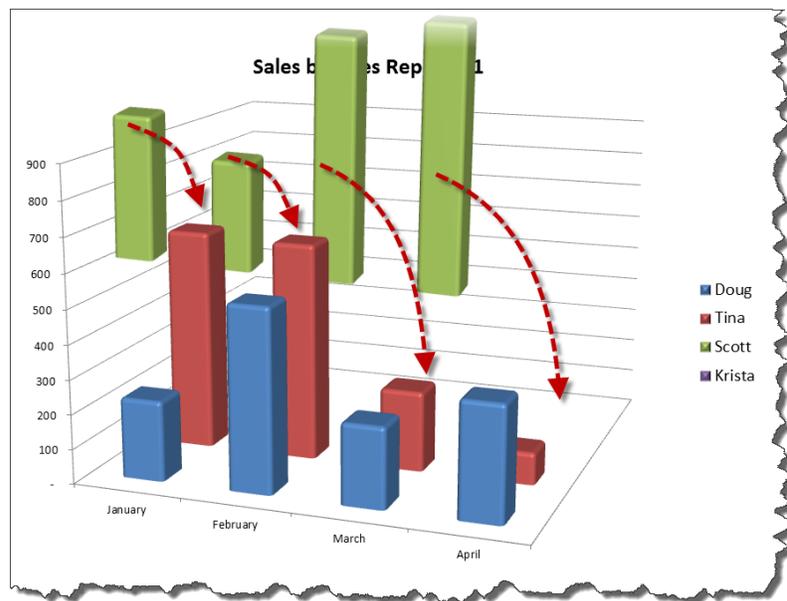

Hints: The ability to animate charts by data series first appeared in PowerPoint 2007, and the instructions are similar, but not identical to those described above. This feature is not available in charts that contain links to other applications, such as Excel.

An Excellent Arrangement

Q. Last year my office upgraded to two monitors at each workspace. Having simultaneous full-screen views of two different files is a vast improvement over split-screen windows. Is it possible to display a different tab from the same Excel worksheet on two monitors?

A. Start by displaying Excel across both monitors as follows: Click the **Restore Down** button in the upper right corner of the Excel window. Use the mouse to drag the edge of the Excel window across both monitors.

To display two views of the same workbook in Excel 2007 or 2010, select **New Window** from the View menu, then select **Arrange All**, **Tiled**, **OK** also from the **View** menu. In Excel 2003, select **New Window** from the **Window** menu, then select **Arrange**, **Tiled**, **OK** also from the **Window** menu. You can view multiple worksheets from the same workbook side-by-side on a single monitor. In this situation, each window will scroll independently and best of all, according to reader Rick McNeil, updates entered into one window will automatically update the other windows. An example of multiple windows for the same workbook is shown below.

Data Bar Formatting Example:1				Data Bar Formatting Example:2		
	A	**B**	**C**		**D**	**E**
4	Expense:	**Budget**	**Actual**	**3**		
5	Automobile Expense	50,000	38,765	**4**	**Difference**	**% Difference**
6	Bank Service Charges	700	940	**5**	11,235	22%
7	Conference Registration Fees	3,600	4,000	**6**	(240)	-34%
8	Contract Labor	234,600	266,548	**7**	(400)	-11%
9	Contributions	16,200	12,825	**8**	(31,948)	-14%
10	Dues and Subscriptions	72,600	60,511	**9**	3,375	21%
11	Equipment Purchase	3,700	3,710	**10**	12,089	17%
12	Equipment Rental	500	654	**11**	(10)	0%
13	Hardware Purchase	31,600	39,501	**12**	(154)	-31%
14	Insurance	97,100	116,970	**13**	(7,901)	-25%
15	Marketing Giveaways	11,100	11,849	**14**	(19,870)	-20%
16	Memberships	1,100	900	**15**	(749)	-7%
17	Miscellaneous	222,700	210,103	**16**	200	18%
18	Office Supplies	83,000	68,618	**17**	12,598	6%
19	Online Computer Services	49,800	57,897	**18**	14,382	17%
20	Outside Services	3,900	3,915	**19**	(8,097)	-16%
21	Partner Salary Draw	1,857,600	1,720,000	**20**	(15)	0%
22	Postage And Delivery	13,100	12,612	**21**	137,600	7%

Sheet1 Income Statement Sheet | Sheet1 Income Statement Sheet2 Sheet3 Sheet4

Hint: To ignore other workbooks you have open, and arrange the windows for your current workbook only, check the **Windows of active workbook** checkbox in the **Arrange Windows** dialog box in Excel 2010, or the **Arrange All** dialog box in Excel 2007.
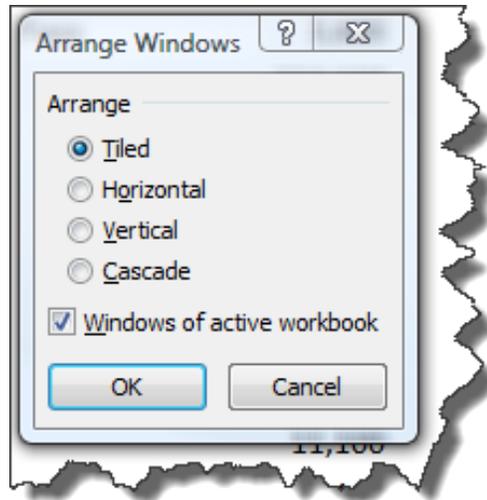
Pasting Away Again…

Q. Often in Excel, I need to copy and paste the account number from one cell location to multiple cell locations. However, as soon as I use the Excel menu, the account number data from the source cell is deselected, and I must keep going back to recopy the original cell. Is there a trick to pasting contents to multiple cells without having to copy it repeatedly?

A. This solution should help. Before you copy the contents of the source cell, click the **F2** key to enter edit mode. Use your mouse to select the entire contents of the cell, then **Right Mouse Click** and select **Copy** from the popup menu (or press **Ctrl + C**). This action will copy the contents of your source cell to the **Windows Clipboard** where it will remain until you copy something else to clipboard. This will allow you to continue to paste the contents of the original cell multiple times without losing the source data, even if you use the Excel menu.
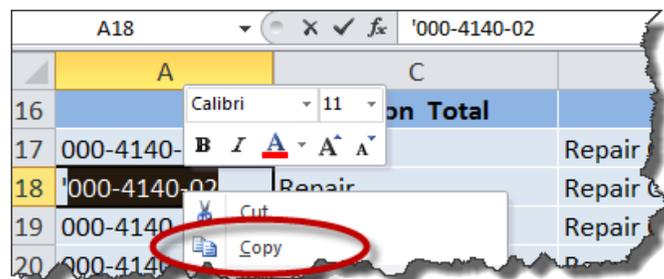
Add Value, Instantly
Opening two Workbooks in one Instance of Excel across Multiple Monitors

Q. When I open Excel on my two separate monitors, Excel doesn't allow me to use **Paste Special, Value, Add**; it only works when I have the two workbooks opened on the same monitor. What's going on and how do I fix this?

A. The issue is not that you are using two computer monitors, the issue is that you have two instances of Excel open at the same time, and Excel's paste function behaves differently when pasting between two instances of Excel compared to pasting between two workbooks opened in the same instance of Excel.

Last month's topic titled "An Excellent Arrangement" provided instructions for displaying two views of a single Excel workbook side-by-side on a single monitor. Building on this foundation, presented below are similar steps for displaying two different Excel workbooks side-by-side in a single instance of Excel stretched acorss two monitors. This approach will enable you to both view and use **Paste Special, Value, Add** between two different workbooks displayed on separate monitors.

1. **Open** only one instance of Excel.
2. **Restore down** the Excel window by double-clicking the **Title Bar** located at the top of the window.
3. **Stretch** the window across both monitors by hovering your mouse pointer over either the left or right edge of the window until your pointer becomes a double arrow, then click and drag the window across both monitors.
4. **Open** two Excel workbooks.
5. In Excel 2007 and 2010, select **Arrange All** from the **View** tab to display the two workbooks side-by-side, each appearing in a sepeate monitor. In Excel 2003, select **Arrange** from the **Window** menu, select **Tiled**, and click **OK**.

You can now use **Paste Special, Value, Add** between the two Excel workbooks.

Foot Your Financials in Excel
Attaching Footnotes to Excel-based Financial Statements

Q. We produce financial statements from Excel, but typing the footnotes at the bottom of the financial statements is a headache because Excel does not offer word wrap, outlining and other word processing features. We have tried using different solutions such as Excel's Justify command, and pasting from Word, but these solutions fall short, especially when edits are needed. Is there a better approach?

A. Embedding a Word document in Excel as an object is a solution that provides Word processing functionality in Excel. To embed a Word document in an Excel 2003, 2007 or 2010 worksheet, select **Object** from the **Insert** tab or menu, then select **Microsoft Word Document** and click **OK**. Use the mouse to reposition and resize the resulting embedded Word Document Object underneath the financial statement (or in the appropriate position) as pictured below.
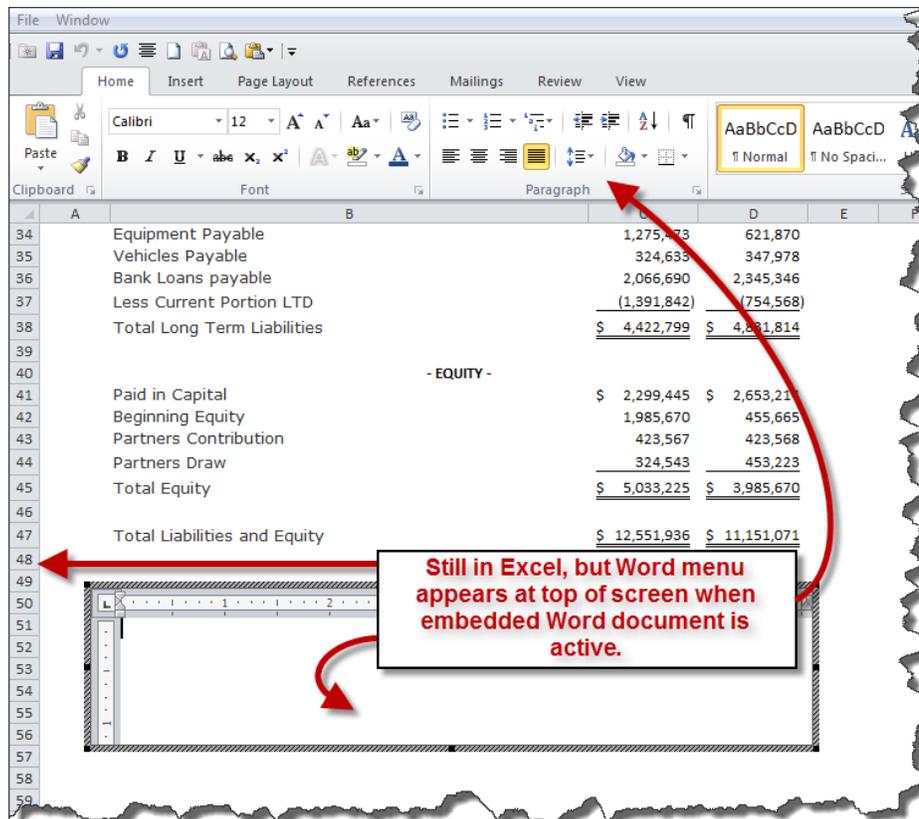
The embedded Word object allows you to type using the same word processing functionality provided by Word, such as outlining, paragraph justification, indenting, and Word shortcuts (such as Shift+F3 to change case). When you click away from the Word object, the Word menus disappear and the Excel menus return to normal. Double clicking on the Word object reactivates the embedded object allowing you to further edit its' contents using word processing functionality.
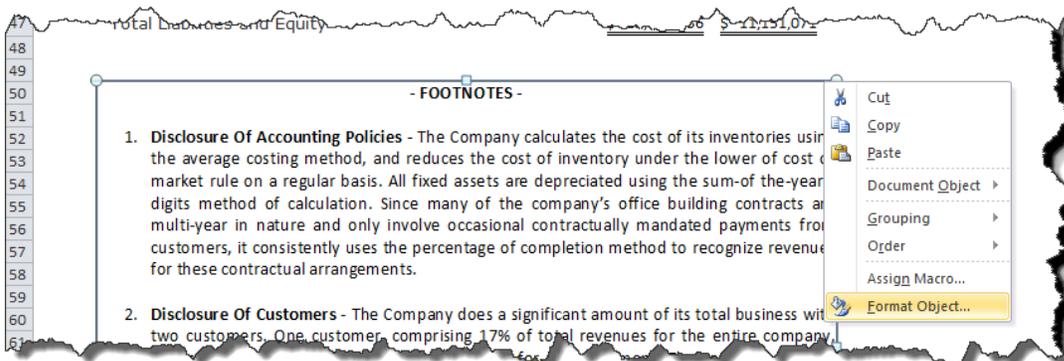
To finalize your footnotes, consider adding the following finishing touches:

1. **Font -** For consistency, change the footnote font to match the font used in the financial statements.

2. **Border -** Click away from the Word box to deactivate the object, and click the Word box once to select it. Right-mouse click on the edge of the Word object to display the popup menu, and select **Format Object** as pictured above. On the **Colors and Lines** tab, click the **Line Color** drop down arrow and select **No Line,** and click **OK**.

Once printed, the resulting footnotes will appear seamlessly at the bottom of the financial reports, as shown below.

A Colorful Preview

Make Print Preview Display Charts and Tables in Color

**Q.** I developed a presentation consisting of numerous Excel charts and data tables on my desktop computer, and I plan to use Print Preview to deliver the presentation. In practice, on my desktop computer this approach works well; but when I transfer the presentation to my laptop, the presentation previews in black and white, not color. I can't find a setting anywhere to make my laptop preview in color. Can you help?

A. I applaud your ingenuity; using Print Preview can sometimes be a quick and easy method for organizing and displaying selected portions of your Excel worksheet to an audience. Excel's Print Preview uses the system's default printer as a basis for rendering the preview. If you change your computer's default printer to a color printer, the previewed print job will display in color.

To change your default printer setting, launch **Control Panel** from the **Start** button, and:

1. In Windows 7, select **Hardware and Sound**, **Devices and Printers**,
2. In Windows Vista, select **Hardware and Sound**, **Printers**,
3. In Windows XP, select **Printers and Faxes**,

Right click on a color printer, and select **Set as default printer** from the popup menu as pictured below.
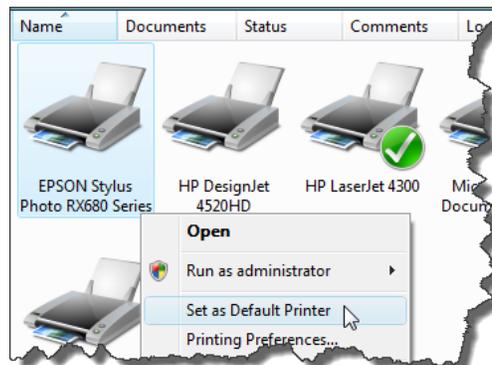
You can set up and use a color printer for Print Preview purposes, even if you do not have a color printer attached to your laptop computer. To add a color printer:

1. Launch **Control Panel** and:

   a. In Windows 7 and Vista, select **Hardware and Sound**, **Add a printer**,
   b. In Windows XP, select **Printers and Faxes,** and under the **Printer Tasks** menu, select **Add a printer**,

2. In the **Add Printer** dialog box, select **Add a local printer**,
3. Choose any port from the **Use an existing port** drop down menu and click **Next**,
4. Select any manufacturer and color printer model and click **Next**,
5. Provide an appropriate name in the **Printer Name** box, click **Next**,
6. If asked to share the printer, select **No,**
7. Click **Finish**.

One Tall Solution

Leave the Tall Print Setting Blank when Scaling to Width

Q. When printing large worksheets in Excel 2003, is there an easy trick to figuring out how many pages tall the print job needs to be to ensure that my worksheet prints out as wide as possible on the page, but no wider? I usually set the page width to 1 page, then use the trial and error method to figure out how many pages tall the print job needs to be.

A. Yes, there is an easy solution. Simply leave the **tall** box blank in **Page Setup**, and Excel will automatically calculate the number of pages tall the report needs to be to print your worksheet based on the number of pages wide you specify.
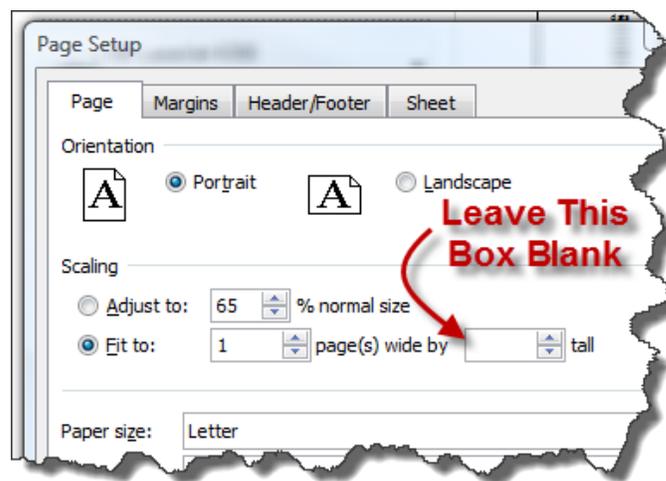
Note: Excel 2007 and 2010 both provide the menu option **Fit All Columns on One Page** that accomplishes the same result.
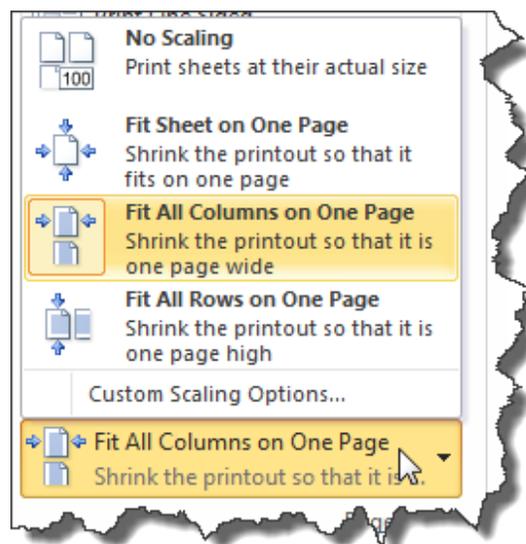
I Hope to See You Zoom

Q I use Excel 2003 and I sometimes find it difficult to read the small font in my worksheet. To make the worksheet more readable, I use the **View, Zoom, 200%** option, but I find it tedious to switch back and forth from 100% to 200% view. Is there a better approach that I am missing?

A In Microsoft Excel 2003, 2007 and 2010, you can zoom in and out instantly by holding down the **Ctrl** Key while **rolling the wheel** on your scrolling mouse. This approach is not only faster, but it also allows you to zoom up to a 400% view, down to a 10% view, and any option in between. This works in Microsoft Word too.

Microsoft Office 2007 and 2010 now include a new Zoom tool at the bottom right hand corner of the screen which accomplishes the same result.

It's Time to Split

Q. I have a large Excel worksheet and I need to be able to compare data throughout the worksheet. I've been using the **View, Freeze Panes** tool to temporarily freeze rows or columns so that I can view and compare data in different parts of the worksheet, but this method requires a lot of freezing and unfreezing. Is there a better option?

A. Excel 2003, 2007 and 2010 contain two **Split Screen** tools which allow you to quickly split the Excel worksheet horizontally, vertically, or both. Like the Freeze Pane tool, the split screen tools also allow you to view and compare different portions of your data. To use these tools, click and drag the split screen tools to the desired positions. The **Split Screen** tools are located in the upper right hand corner and lower right hand corner of the worksheet area, as shown below.
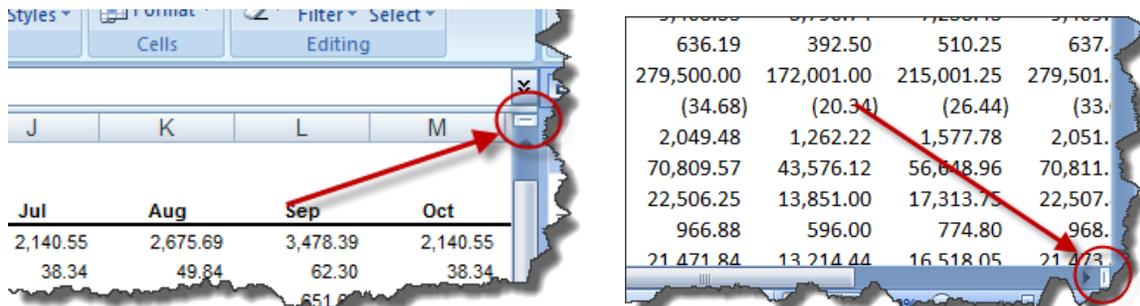
In the example below the **Vertical Split Screen** tool has been used to display data for the 1st quarters of 2009 and 2010. (Notice that the columns jump from column E to column O). Additionally, the **Horizontal Split Screen** tool has been used to fix the column headings at the top of the worksheet. (Notice that the row numbers jump from row 3 to row 7.)

	B	C	D	E	O	P	Q	R	S
1									
2									
3	Expenses:	1/31/2009	2/28/2009	3/31/2009	1/31/2010	2/28/2010	3/31/2010	4/30/2010	
7	Contract Labor	26,654.80	34,651.24	43,314.05	29,320.28	24,255.87	38,982.65	26,654.80	
8	Contributions	1,282.53	1,603.16	2,084.11	1,154.28	1,442.85	2,292.52	1,026.02	
9	Dues And Subscriptions	6,051.13	7,866.47	9,833.09	7,866.47	8,653.12	8,849.78	5,446.02	
10	Equipment Purchase	370.96	463.70	602.81	482.25	370.96	602.81	296.77	
11	Equipment Rental	65.41	85.03	106.29	45.79	110.54	116.92	65.41	
12	Hardware Purchase	3,950.05	4,937.56	6,418.83	4,740.06	6,418.83	6,418.83	4,740.06	
13	Insurance	11,697.00	15,206.10	19,007.63	12,866.70	18,247.32	13,305.34	11,697.00	
14	Marketing Giveaways	1,184.87	1,481.09	1,925.41	947.90	1,332.98	2,503.04	1,540.33	
15	Memberships	90.00	117.00	146.25	99.00	105.30	146.25	90.00	

I Command You

Q. Recently, I upgraded to Excel 2007 and I can't seem to find all of the same commands I used in Excel 2003, such as the ability to e-mail a single worksheet or pivot multiple ranges of data. Why did Microsoft get rid of some of Excel 2003's commands and are there any good work-around procedures for these missing capabilities?

A. The missing functionality you mention is still there in Excel 2007 and 2010, but it is hidden. When Microsoft redesigned the menus for Excel 2007 and 2010, they excluded 219 commands from the newer menu ribbon. To view a complete list of these hidden commands follow these steps: Start by right-mouse clicking on the **Quick Access Toolbar** and choosing the option to **Customize Quick Access Toolbar.**
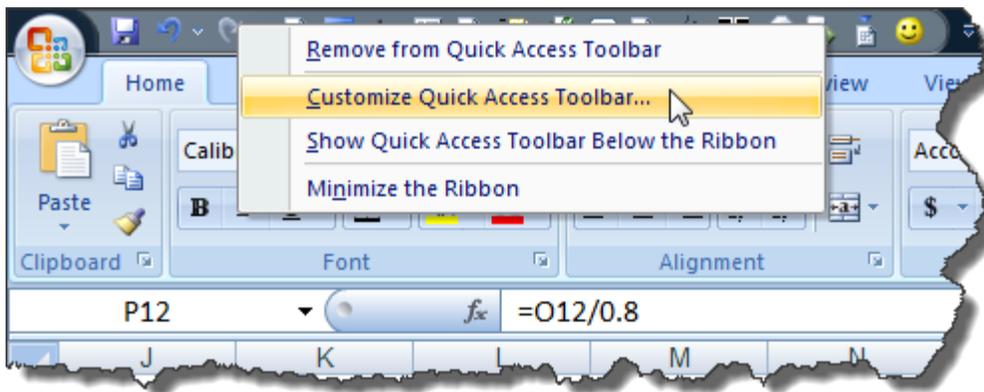
Next, in the **Choose commands from** drop down box, select the option to view **Commands Not in the Ribbon**.
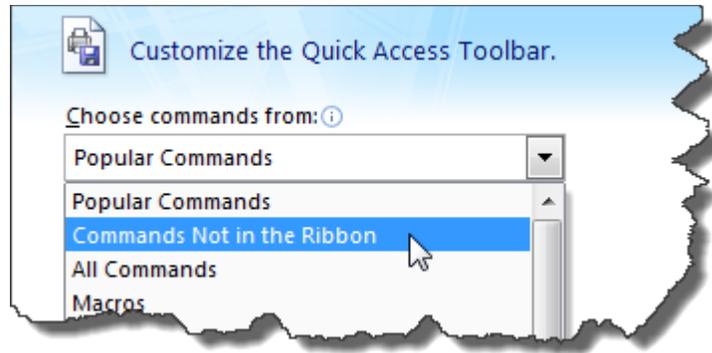
This action will display the list of 219 commands not included in the ribbon on the left side of the dialog box, and those commands that are included in your Quick Access Toolbar on the right side of the dialog box.
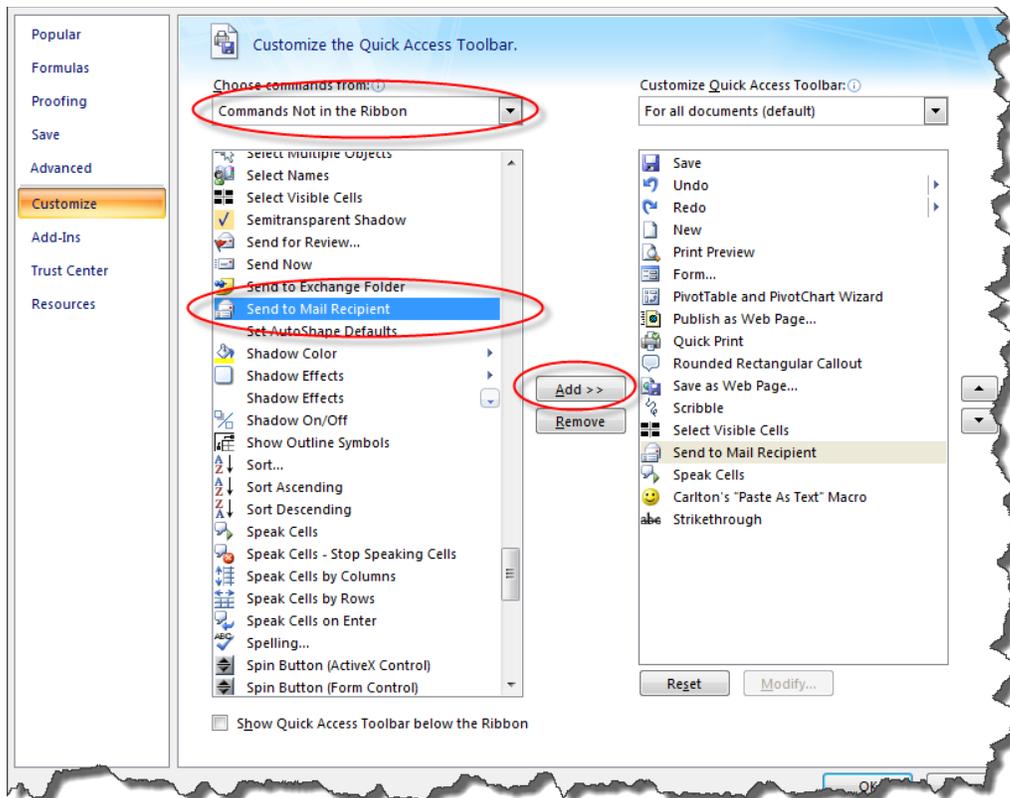
To access these hidden commands, you must first add them to your **Quick Access Toolbar** by highlighting the desired command in the left column, and clicking the **Add>>** button to include it in the right column. Most of the hidden tools are obscure and seldom used, however some of them are among my favorites. The seven Excel 2003 commands that are most notably missing from the Excel 2007 and 2010 menu ribbon are shown below.

Form...	
PivotTable and PivotChart Wizard	
Publish as Web Page...	
Save as Web Page...	
Select Visible Cells	
Send to Mail Recipient	
Speak Cells	

New	
Save	
Encrypt Document	
Print Preview	
Quick Print	
Create PDF	
View Side by Side	
Datasheet Formatting	
Scribble	
Sort Ascending	
Sort Descending	
Calculator	
Clipboard	
Increase Font Size	
Decrease Font Size	
Select Current Region	
Strikethrough	
Camera	
Rounded Rectangular Callout	
Close All	

While the particular commands you choose to add to your Quick Access Toolbar will depend on personal preference, I recommend that you add the above mentioned commands to your Quick Access Toolbar, as well as the following twenty additional commands (shown to the right) which I personally find more useful, to make them easily assessable.
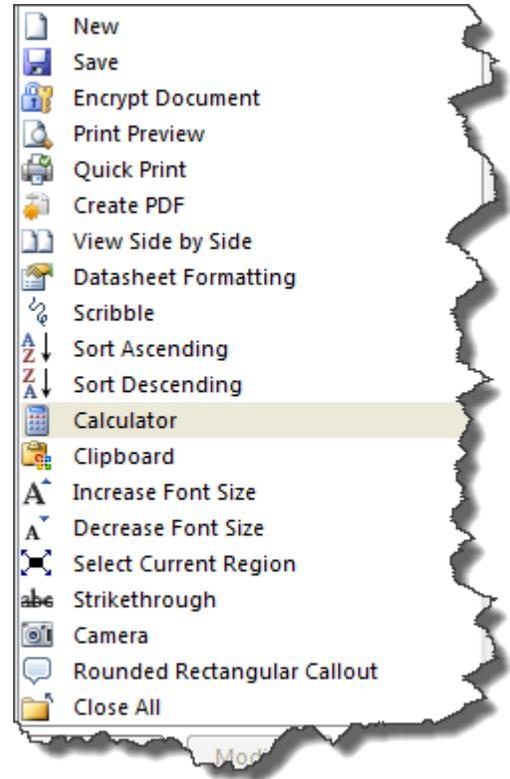
Note: There are a few Excel 2003 capabilities that have disappeared from Excel 2007 and 2010. For example:

1. You can no longer publish web pages in an interactive format (The interactive format command in Excel 2003 allows you to publish HTML pages in which readers can input data directly via their browser).

2. Embedded video clips and sound clips no longer play as embedded objects in Excel 2007 and 2010; instead those clips are played in your computer's default media player application.

3. There is no longer an auto format option which automatically highlights your subtotal rows.

I price check almost everything I buy at Pricegrabber.com – which checks millions of products from hundreds of thousands of stores. I frequently save 50% by buying refurbished computer gear, it's still under full warranty.

Chapter 8

XML Data

Overview of XML in Excel

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
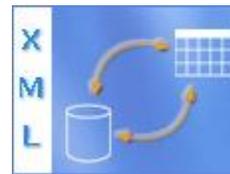
Why use XML in Excel?

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:
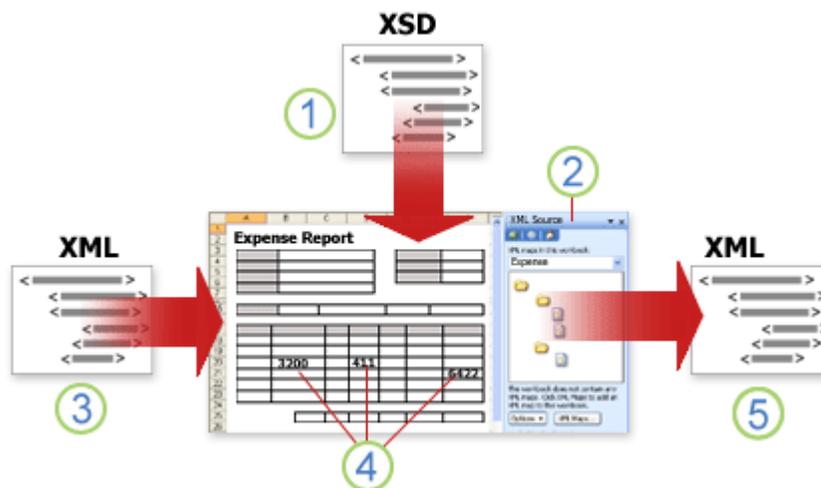
1. Adding an XML schema file (.xsd) to a workbook
2. Mapping XML schema elements to individual cells or XML tables
3. Importing an XML data file (.xml) and binding the XML elements to mapped cells
4. Entering data, moving mapped cells, and leveraging Excel functionality, while preserving XML structure 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.
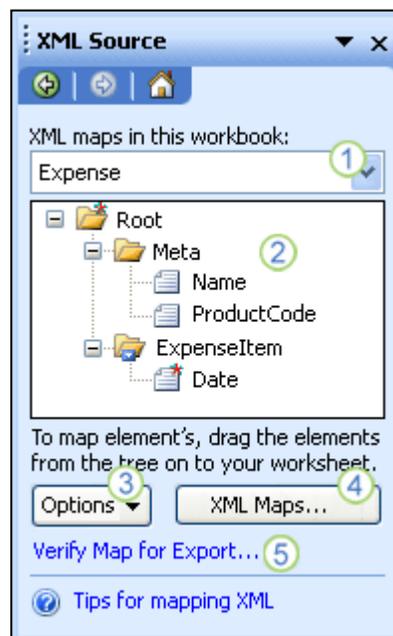
1. Lists XML maps that were added to the workbook
2. Displays a hierarchical list of XML elements in the currently listed XML map
3. Sets options when working with the **XML Source** task pane and the XML data, such as how to preview the data and control headings
4. Opens the **XML Maps** dialog box, 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 9

What's New in Microsoft Excel 2010

What's New in Microsoft Office 2010?

Microsoft has announced that it will begin shipping Office 2010 in Spring 2010. This begs the question, what's new in Office 2010? The short answer is that there are a dozen or so interesting improvements each in Word, Excel, PowerPoint, and Access - but for the most part Office's core products are unchanged. This is because when Office 2007 was released in January 2007, the new menus only appeared in 4.5 of the applications – Word, Excel, Access, PowerPoint and half of Outlook. With Office 2010, Microsoft has brought the other applications up-to-date with the newer menu style as well. Therefore don't expect to see many differences in Word, Excel, Access, or PowerPoint. However, these are a few improvements Office 2010's core products, as follows:

What's New in Excel 2010?

1. **Sparklines** – Sparklines are small cell-sized charts that you can embed in a worksheet next to data to get a quick visual representation of the data. For example, if you had a worksheet that tracked the performance of several dozen stocks, you could create a Sparkline for each stock that graphed its performance over time, in a very compact way. Here is an example:


2. **Conditional Formatting Improvements** – Microsoft has improved and added more styles and icons regarding the ability to apply a format to a range of cells, and then have the formatting change according to the value of the cell or formula.

3. **Improved Sharing** – As with all of the Office 2010 applications, Excel **2010** has new and improved tools for sharing data with other people, including multiple people working on a document at a time.

4. **Millions of Rows -** Microsoft now offers Project Gemini add-on for Excel 2010 that can handle very large amounts of data -- even worksheets that include hundreds of millions of rows. It will ship as part of SQL Server 2008 R2 in the first half of 2010; a community technology preview will be available in the second half of 2009.

5. **Enhanced Ribbon Toolbar -** The Ribbon tool bar has been enhanced to be highly customizable now.
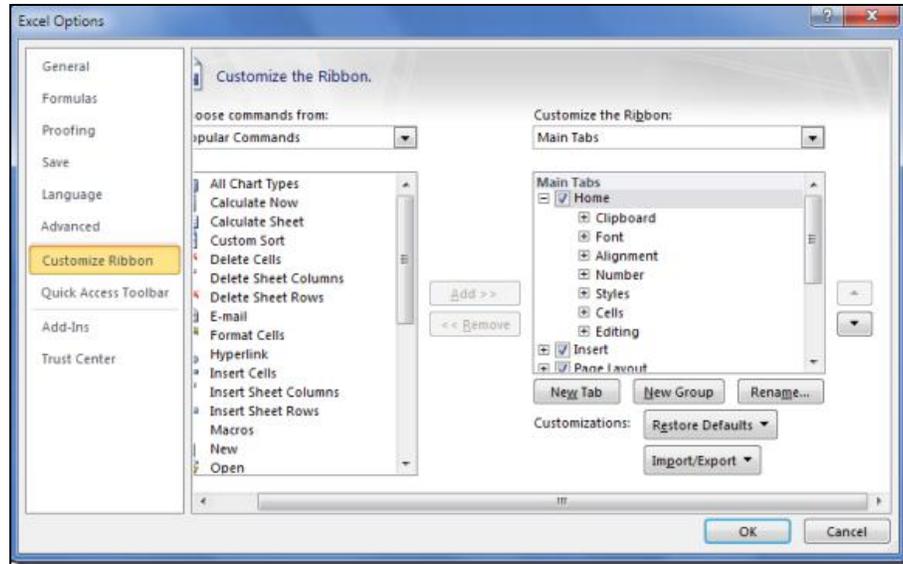
6. **Compatibility of .xlsx -** In Excel 2007, Microsoft introduced a new XML format (.xlsx) which was not compatible with former .xls spreadsheet formats. This problem has been resolved - Excel files created in Excel 2010 may easily be opened in versions of Excel prior to Excel 2007. Now Excel 2010 will save files just as safe as the former Excel 2007, and the spreadsheet size is 75% smaller than the old .XLS version.

7. **Protected Mode -** Each time you download a document , Microsoft Office 2010 automatically opens it in Protected Mode which means that Excel will not allow you to edit the documents unless document editing is enabled. To do this, click the *Enable Editing* option in order to enable document editing as shown in the following screen shot.
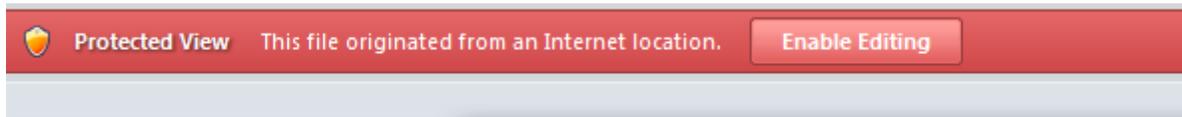
8. **Slicer -** The Slicer feature provides new slice and dice capabilities within PivotTables – this helps you dynamically segment and filter the data. This feature is located on the *Insert* Tab.
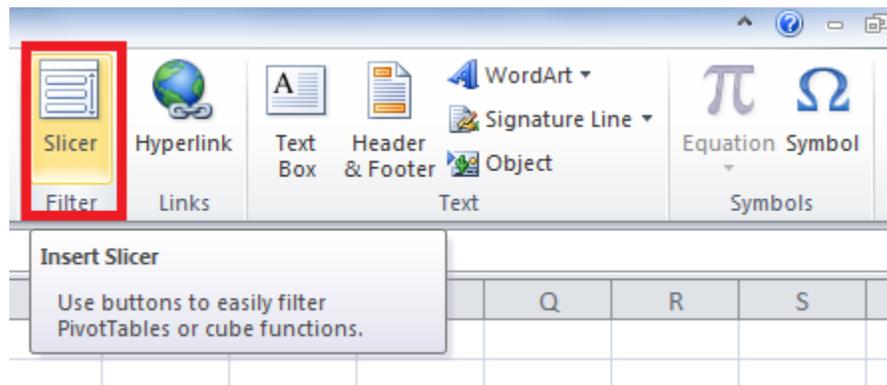
9. **Macro -** Macros in Excel 2010 now support working with shapes, including creating, moving or editing shapes.

10. **Enhanced Chart Diagram -** In Excel 2010 double clicking a chart element automatically opens the chart's format dialog box.

11. **Web Version of Excel 2010** – A new web version of Excel 2010 allows you to create, edit and save spreadsheet via your web browser directly and share them online. The web version reportedly will be available for free to everyone who has Windows Live account. The web version is as same as the Excel 2010 on desktop, with some of Excel functionality disabled.

12. **64-bit version of Excel 2010** - Excel 2010 is now available in a 64-bit version, which means that it can take full advantage of your computer's 64-bit motherboard and access more than 4 GBs of RAM. The result is even faster performance.

13. **Microsoft SQL Server PowerPivot for Excel** - Excel 2010 now includes an add-in tool called Microsoft SQL Server PowerPivot which is a Business Intelligence tool that enables you to query multiple SQL Server databases across multiple corporate systems and web data on a real-time basis to produce PivotTables that can be shared via SharePoint. You can try this online at the following Virtual Labs web site:

    https://cmg.vlabcenter.com/prepare.aspx?moduleid=ad3bd3e9-8d2b-498d-94fa-e41e1b09730d&ticks=633992819904236083.

14. **Named Sets -** Named Sets have been added to Microsoft Excel 2010, allows you to create your own named sets. Simply locate the *Fields, Items, & Sets* button under the Ribbon, and it will allow you to define your own Named Sets.

Bio for J. Carlton Collins, CPA

ASA Research   Carlton@ASAResearch.com   **770.842.5902**

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 books, articles, and web pages and is the author of the monthly technology Q&A column for the Journal of Accountancy. As a public speaker, Mr. Collins has delivered more than 2,000 lectures in 44 states and 5 countries addressing more than 500,000 CPAs and business professionals. As a consultant, Mr. Collins has assisted 275+ large and small companies with the selection and implementation of accounting systems. Mr. Collins has a Bachelor's degree in Accounting from the University of Georgia, is a 25+ year member of the American Institute of CPAs and the Georgia Society of CPAs, and is also a licensed realtor.

Summary of Selected Positions, Awards & Accomplishments:

1. Honored as one of the CPA Industries Top 25 Thought Leaders by CPA Technology Advisor Magazine
2. Author of the monthly Technology Q&A column for the Journal of Accountancy.
3. Recipient of the AICPA's Lifetime Technical Contribution to the CPA Profession Award.
4. Chairman of the Southeast Accounting Show - the South's largest CPA event.
5. Recipient of the Tom Radcliff Outstanding Discussion Leader Award.
6. Named "Top Ten CPA Technologists" by Accounting Technologies Magazine (multiple years).
7. Named "Top 100 Most Influential CPAs " by Accounting Technologies Magazine (multiple years).
8. Has personally delivered over 2,000 technology lectures around the world.
9. Recipient of the Outstanding Discussion Leader Award from the Georgia Society of CPAs.
10. Lead author for PPC's Guide to Installing Microcomputer Accounting Systems.
11. Has installed accounting systems for more than 200 companies.
12. Chairperson of the AICPA Technology Conference.
13. Recipient of the ACCPAC Partner of the Year Award.
14. Determined by SAP to be one of the country's "Top Ten Most Influential ERP Systems Consultants".
15. Has delivered keynote and session lectures at dozens of accounting software conferences.
16. Sworn in as a Certified Public Accountant on September 18, 1985.
17. Member of the American Institute of CPAs since 1985.
18. Member of the Georgia Society of CPAs since 1982.

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 (or assisted in preparing) feasibility studies and financial forecasts for nearly 300 projects seeking more than $3 billion in startup capital. Mr. Collins is familiar with bond issues, Medicare and Medicaid reimbursement, and conventional financing matters. In 1992, Mr. Collins contributed and demonstrated more than 500 pages of suggested design improvements to the Microsoft Excel development team of programmers - and many of those improvements are found in Excel today.

At the University of Georgia, Mr. Collins was elected President of the Phi Eta Sigma Honor Society, was initiated into the BIFTAD Honor Society, served three years in the Judicial Defender/Advocate program, and was a member of Alpha Tau Omega fraternity. At Glynn Academy High School, Mr. Collins was Senior Class President, Class Valedictorian (1 of 6), and received a principle nomination to Annapolis Naval Academy. Mr. Collins has been married for 27 years and has two children. He devotes his leisure time to family, travel, tennis, fishing, snow skiing, and riding motorcycles (both dirt and street). Mr. Collins is president of his homeowners association, participates in the Gwinnett Clean and Beautiful program, and volunteers for Cooperative Ministries food drive.

Because I had an extra page left in this book, I'll throw in a few jokes and quotes to brighten your day. Enjoy!

- I'm so poor I can't even pay attention
- I have enough money to last me the rest of my life...unless I buy something.
- It's so simple to be wise. Just think of something stupid to say and then don't say it!
- I'm searching for fun and happiness that does not involve food or money...
- We make a living by what we get, we make a life by what we give.
- Count your age with friends but not with years.
- Never play leapfrog with a unicorn.
- Friction can be a drag.
- When I want your opinion, I'll remove the duct tape.
- Light travels faster than sound. That's why some people appear bright until you hear them speak.
- Football is a combination of two of America's worst elements: Violence and committee meetings.
- I haven't spoken to my wife in years; I don't like to interrupt her.
- My fake plants died because I did not pretend to water them
- Never let a computer know you're in a hurry.
- I totally take back all those times I didn't want to nap when I was younger.
- I planned to surprise my wife with a new centerpiece for the table...but the taxidermist was closed.
- I have kleptomania, but when it gets bad, I take something for it.
- For every action, there is an equal and opposite government program.
- Even free advice costs more than it used to.
- Love is holding hands in the street. Marriage is holding arguments in the street.
- I always try to hold hands with my wife...because if I let go she'll start shopping!
- My back goes out more than I do.
- An Adult is a person who has stopped growing at both ends and is now growing in the middle.
- The journey of a thousand miles ... begins with a broken fan belt.
- I'm getting serious about exercising - I've moved my TV set much farther away from my refrigerator.
- A Freudian slip is when you say one thing but mean your mother.
- While in the army, Will never liked the phrase "Fire at will".
- Studies have shown that you can live longer by having more birthdays.
- My wife keeps saying that I don't listen to her...or something like that.
- My life goal is to be filthy stinking rich...well, 2 out of 3 ain't bad.
- A child of five would understand this. Send someone to fetch a child of five.
- Warning: Dates in Calendar are closer than they appear.
- Because of these hard economic times, I have started selling furniture on the side. The trouble is, it is my own.

Carlton's CPE Prayer
Now I lay me back to sleep.
The speaker's dull; the subject's deep.
If he should stop before I wake,
Give me a nudge for goodness' sake.