

Excel Training Seminar

Monday, August 23, 2010

9AM to 4PM (various sessions – see schedule below)

Kenneth C. Rowe Management Building

6100 University Ave.

Room 4001 (20 seats)

Instructor: Dave Tughan (david.tughan@gmail.com ; <http://tughan.ca/seminars>)

There will be six sessions, covering the general topics below. Each session will be one half-hour interactive demonstration (following along as I walk through the topics below), followed by a hands-on exercise where you can apply whatever we've just gone over.

Time	Topics
9-10	<ul style="list-style-type: none">• Workbooks, worksheets, rows and columns, cells and ranges, data types• Relative and absolute cell references• Copying and filling• Simple formulas
10-11	<ul style="list-style-type: none">• Simple functions• Formatting
11-12	<ul style="list-style-type: none">• Dealing with data (sort, filter, removing duplicates ...)• Splitting and combining data fields• Moving columns and rows
Lunch	
1-2	<ul style="list-style-type: none">• Analyzing data• Creating charts and graphs
2-3	<ul style="list-style-type: none">• Functions that make choices• Combining functions
3-4	<ul style="list-style-type: none">• Special request: Mail Merge and labels

Please feel free to come for the sessions you are interested in – you don't have to come to the first (introductory) session if you're already familiar with those aspects of Excel. Likewise, you don't have to stay for the last (mail merge) session if you don't ever plan to do a mail merge. That said, there should be something worthwhile in each session for every level of user, even if it's just a matter of learning another way to do something.

If you have any questions about the sessions or the material, please contact me at the email address above. Seminar materials will be available on my website (on the day of the seminars and afterwards).

For the eager, there is a good set of introductory tutorials online at < <http://www.baycongroup.com/el0.htm> >. Feel free to get your toes wet before jumping in at the seminar.

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Excel Training Seminar – Session 1 – Intro

Monday, August 23, 2010 ; 9AM – 10AM

Outline

1. The interface has a **ribbon** across the top, with different tabs. Some **conditional tabs** show up only when you do specific things (click on a chart, for example). Note also the view options in the bottom right corner (views and zoom level). Finally, note the undo and redo arrows at the top, and the “office menu” – the circle in the top left.
2. An Excel file is called a **workbook**. It is composed of **worksheets** (‘sheets’) which can be renamed and re-ordered (and created and deleted, for that matter). Each sheet is basically a grid of rows and columns, with the columns being lettered and the rows numbered. At the intersection of each is a **cell**, referred to by its column and row (A1, A2). A **range** of cells is described by using the top left and bottom right corners of the range, with a colon between (A1:B2). Type or edit cell values in the cell or in the **formula bar** above the column labels.
3. Each cell has a **data type**. This is ‘general’ by default, but can also be set to Number, Currency, Date, Percentage, and so on. Some calculations don’t work (or only work) on some content formats, so be aware of these (especially when pasting from elsewhere). Somewhat confusingly, it also has a **format**, which can include things like colours, fonts, bold, whether or not text wraps, how negative numbers are displayed, and so on (we’ll use some of these later on).
4. Columns and rows can be resized in several ways. Individually, you can just mouse over the column or row label border, and click and drag to resize. If you select several labels (column or row), you can resize them all at once. You can also resize to a specific width from the right-click menu (for one or many rows or columns). Finally, double-clicking on the row or column border will “auto-size” it to the largest existing content (this works for all selected rows or columns).
5. Cells and ranges can be selected by clicking and dragging, or by typing a range into the name box. You can also click in the top left between A and 1 to “select all” (CTRL-A will also do this).
6. Cells or ranges can be copied and pasted (CTRL-C to copy, CTRL-V to paste, CTRL-X to cut ; Home > Clipboard ; right-click menu). Note also the “**Paste Special**” option in the right-click and ribbon menus. There are a lot of options here, some of which we will be using later on.
7. Cells can also be “**filled**” across rows or columns by dragging the **fill handle** in the bottom-right corner of the cell you want to fill the others with. This can be done with regular content, or with formulas (we’ll do this in a minute). Content fills will attempt to continue patterns.
8. Columns and rows can be inserted by selecting the labels (as many as you want to insert) and Right-click > Insert. This often has to be done before pasting content in, to make a hole for it.
9. So far so good – we can put stuff in cells and tell Excel what kind of stuff it is (number, text, date, whatever). This is good, but it doesn’t actually do anything. That’s where **formulas** come in. You tell Excel you’re using a formula by starting the cell content with an ‘=’ sign. That’s what lets you do “active” things, like calculations and so on (everything interesting, in fact).
10. The easiest formulas are those that do math. Common arithmetic operators apply: ‘+’ and ‘-’ (plus and minus), ‘*’ and ‘/’ (multiply and divide). You can also use ‘(’ and ‘)’ parenthesis to set the order in which operations are processed (force addition before multiplication, for example).
11. Formulas can also use the contents of other cells (adding A1 to A2, for example). Cell references can be typed in, or inserted by clicking on the cell or range you want to use. These cells can even be from other worksheets – just start your formula, use the worksheet tabs to select the sheet you want, and click on the cell as usual.
12. Normally, filled formulas use “**relative cell references**,” so that the cells referenced change as the formula is copied. This is often what you want. Sometimes, though, you want to fill using the same cell reference over and over (an “**absolute cell reference**”). You can do this by using \$A\$1 as the cell reference (typing the ‘\$’ signs or using F4 to cycle them). This way, when you fill the formula across rows or down columns, A1 will always be used. You can also do just the row or just the column, depending on what you’re trying to do (\$A1, or A\$1).

Hands-On Exercise

1. Open a new copy of Excel 2007, and save the workbook as "Session1".
2. Rename Sheet1 to "Data". Rename Sheet2 to "Summary". Delete Sheet3. Move "Summary" before "Data".
3. **Select the "Data" worksheet.**
4. Type or fill the months January – December in cells B1:M1. Type or fill the years 2000-2010 in cells A2:A12. Set the months to type "text". Set the years to type "number" with no decimal places.
5. We're going to cheat and use a function to fill in the data. Type "=rand()*100" (without the quotes) in cell B2, then hit ENTER to complete the formula. Format this cell as a number with no decimal places. Fill this formula down then across (or across then down) to put in random values for each month in each year. These values will change every time the sheet refreshes, but they're just fake numbers anyway. These will be our "units sold" for each month of each year.
6. Add the labels "Total:" in N1 and "Average:" in O1. Make these text cells.
7. In N2, use a formula to add up the values from B2 to M2 (adding each of the cell values for 2000).
8. In O2, use a formula to get the average of those values (dividing the total by ...).
9. Format N2 so that it is a number with no decimal places. Make O2 a number with 2 decimal places.
10. Fill N2:O2 down to N12:O12.
11. Click on the formulas in N4 and O4 to see how filling works with relative cell references. The fill uses the values from row 4 in the formulas filled there (as you would expect). Note that filling also copies the type (so that these are already numbers with the right decimal places).
12. **Switch to the "Summary" worksheet.**
13. Add a label, "Profit per Unit:" in A1, and make that a text cell. Resize the column so the label fits.
14. Add a currency value, with 2 decimal places, of \$23.32 in cell B1.
15. Add a text label "Year" in A3, and a label "Gross:" in B3.
16. Add the years 2000-2010 in A4:A14. Make these numbers with no decimal places. Set the type of B4:B14 to currency. Make sure it has two decimal places (it may have already, but it may not).
17. In B4:B14, what we want to do (in each case) is multiply the "Total:" value from our data sheet for that year by the profit per unit to find out how much we made that year. This takes several steps. As before, get one cell working first, then fill the others.
 - a. Start a formula in B4, and add the value from Data!N2 (by typing it, or by clicking to the "Data" sheet and the cell you want) and hit ENTER.
 - b. Now, in the formula bar, edit this formula to include the multiplication by our unit profit (B1).
 - c. Fill this formula down to B14. You should get \$0 for the other years. This is because in B5 (for example), you are multiplying by B2 (which is one row before B1 which was used in the cell above, but is also blank, or 0). You can click on B5 to see this for sure. This is a relative cell reference problem (Yay)!
 - d. Undo the fill, or delete the values in B5:B14.
 - e. Edit the formula in B4 so that it refers to your profit per unit (B1) as an absolute cell reference instead of a relative one. Now, fill the modified B4 formula down to B14. This should work much better. B5, for example, should also be multiplying by \$B\$1.
18. Click and drag to select A3:B14. Cut these cells, click on A4 and then paste to move all the cut cells down one row. There is another way we could have done this. Can you think of what that would have been?
19. Add a label of "Tax per unit:" in A2 and a value of 0.125 to B2. Change B2 to a percentage data type (12.5%).
20. Add column labels for Tax in C4 and Net in D4. Add formulas and format the rows beneath to calculate and display these values correctly for each year (Tax on the Gross income for that year, and then net profit; Net is Gross – Tax). If you need to, refer back to the steps b-e of #17 to get the tax formulas working correctly with appropriate absolute and relative cell references.
21. Save your work.
22. Take a moment to stretch out or whatever.

Excel Training Seminar – Session 2 – Functions and Formatting

Monday, August 23, 2010 ; 10AM – 11AM

Outline

1. We now know about formulas – we can get Excel to do calculations on the contents of cells from any sheet in our workbook. Functions allow us to do more complicated things, or to do the same things with much less work.
 - a. SUM
 - b. COUNT
 - c. AVERAGE
 - d. MAX
 - e. MIN
2. Functions ask for specific inputs (displayed as you enter the function name and values – also in the **Insert Function** wizard). Given these values, the functions can handle complex calculations for you.
3. Finding functions is easy if you have some idea what it is that you want to do. **Formulas > Insert Function** allows you to type and search. You can also use the **Function Library** to find functions if you know what category they belong to.
4. As an example, let's find out how much you would have to pay on a monthly basis to pay off a \$50000 loan over five years, at 2.25% annual interest.
 - a. The function is PMT (search for "loan payment" or find it in **Financial Formulas**)
 - b. The first value is the rate (interest per payment period, so annual / 12)
 - c. The second value is the number of payment periods (12 months * 5 years)
 - d. The third value is the Present Value of the loan (-50000 ; negative numbers for debts)
 - e. The last two values are not needed for loan payments (as opposed to investments)
 - f. So, we need to pay \$881.87 per month to clear a \$50000 loan in five years (I'm sure there's somebody who could figure that out by doing the math, but I sure couldn't)
5. We'll come back to some other functions later (when we look at making choices) but they all work the same way. Choose a function, fill in the required values, enjoy the results.
6. We discussed data types last session, but I just want to reiterate that some formulas and functions will not work on some data types. Some require numbers as opposed to text. If you're having problems, data types should be the first thing to check. For example, trying to multiply "5 years" by 12 gives you an error, not 60.
7. Formatting worksheets is quite important, though it seems less crucial than the numbers and formulas and so on. The idea behind formatting is to make it obvious to the reader where the important data is, and what groups of data belong together. Also, you want column headings or row labels to stand out and be as legible as possible.
8. One element of formatting to consider is splitting your data into different sheets. Rather than having one enormous sheet that you have to scroll around to understand, it might be better to have a "Summary" sheet where all the important results are gathered, and then other sheets that are used as data for those results. That way, the user can go to one place to get the answers they want, and then check out the data later.
9. The other basic element of formatting is to make tables of data look like tables. Since all Excel is in rows and columns, it is important to make blocks of data look like they belong together. This can involve spacing, borders, colours, and so on.
10. In the Home ribbon, you can use "format as table" to bind a range into its own table, and then apply formatting to that table. This includes colours, borders, and emphasizing rows or columns with just one click. Note that when you click in a table, you get a **conditional tab** for table design.
11. You can also do borders, text formatting, and colours manually if you want to, on a cell or range of cells.
12. **Conditional Formatting** allows you to create formatting that changes based on the cell values. One example of this is to conditionally fill cells that are less than 20 with red text and background, and to fill cells with values greater than 20 with green text and background. You can also format the top and bottom values, or provide visual analysis (data bars, colour scales, icons, and so on).

Hands-On Exercise

1. Open your file from the last session, and re-save it under a new name (session 2 or something like that).
2. We'll start off with using functions instead of formulas on the data sheet
 - a. Replace your "Totals" formula in N2 with a SUM function (same result, less typing)
 - b. Replace your "Average" formula in O2 with an AVERAGE function
 - c. Fill these down for the other months
3. Format A1:O12 as a table. Pick any style you like, and try changing to a few others just to see the differences.
4. The heading over our years has "Column 1" in it. Replace this with "Years".
5. Try using the conditional table design tab to change the formatting of the rows or columns, to add a total row (we already created one, but Excel will try to add one where it thinks one might belong), and so on. Note that some design choices don't change anything in some styles. Also, sometimes having a totals row is a good idea, sometimes not (same with banded rows or columns, and so on).
6. The ugly grey arrow boxes in your column headings are to allow filtering. You can turn them off in **Data > Filter**. This applies to the whole table.
7. Format your summary table as well. Again, clean up what Excel gives you by default. Make the formatting on this one fairly minimal, so that the stuff we do below shows up.
8. Format the first two values and their labels on the summary sheet (profit per unit and tax per unit) manually. Maybe make the labels bold or something. Try adding different borders (manually) as well.
9. Add conditional formatting rules to the Summary sheet's Net Income values. Emphasize the top and bottom 25% in some way that makes the top look "good" and the bottom look "bad". Use **Formulas > Calculate Now** to refresh all those random data values on the "Data" sheet, and watch the conditional formatting change.
10. Under the formatted table on the summary sheet, type your first and last name into a cell. See if you can find a formula that will tell you the length of a text value (how many characters are in your name). Put it in beside your name. Does it count spaces? What about trailing spaces (spaces after your name)?
11. Under your name, insert a financial formula to calculate the number of periods (months) needed to pay off a \$50000 loan at 2.25% annually, if you pay exactly \$600 per month. Change the cell number formatting so no decimals show. Remember that it's the interest rate per period (not the annual rate) and that the "present value" of the loan is a negative number. The correct answer is 91 (with no decimal places, rounded up), just so you can check.
12. Again, have a stretch or something. Only one more to go before lunch.

Excel Training Seminar – Session 3 – Dealing with Data

Monday, August 23, 2010 ; 11AM – 12AM

Outline

1. Data often comes to you in a poorly- (or non-) formatted way, as Excel is often used to open up “dumped” data from databases and so on. We have discussed data types already, but getting those set correctly is the first step toward cleaning up your data.
2. You can import data into Excel manually (using **Data > Get External Data**), or you can (sometimes) just open the file directly (depending how your computer is set up).
3. Sorting data alphabetically is easy. If your data is formatted as a table, clicking anywhere within it will sort the whole table. If not, then you have to select the data manually. You can also do more specific or complicated sorts by using the **Data > Sort** button.
4. Filtering data works more or less the same way, except that the effects are not permanent. Filters allow you to show only some of the available data, removing those you choose not to display. Clearing the filter re-displays the filtered data. Remember that this doesn’t “really” remove the data, but just changes the display. Sums based on the data (for example) do not change when the data is filtered.
5. Removing duplicates checks that everything you check for is identical. If any of the fields is different, the row is not removed. Otherwise, though, this is a quick and easy way to clean up data dumped from multiple sources (combining several address lists, for example).
6. Splitting and combining data is not difficult, so long as you remember that the final data should be dealt with as a value, not as the result of a function. So, if you are combining several fields to make a date, for example, you can do this with a formula and then copy and **paste values** to keep just the dates (not the formula). This way, when you move the data, the function or formula references don’t matter anymore. This is often done when you create a series of columns just to sort or combine data, but you’re really only interested in the result (you don’t need the parts that went into creating it), and will delete your “work” once you have the data the way you want it.
7. Splitting data is usually easiest with the **Data > Text to Columns** button. Combining is often a matter of **CONCATENATE**-ing the different column values back together, possibly with a comma or space or dash between the different values. In special cases, it may be easier to use special functions like DATE that take a year, month, and day and return an Excel date display.
8. Dates are an interesting example, actually, because Excel doesn’t really deal with dates at all. It stores the dates as a number, with the integers defining the day and the decimals hours and minutes (so noon on January 20, 1962 is really 22666.50 to Excel). Custom cell formatting allows you to show hours, minutes, and seconds along with your date if you want to. So, when working with dates, the idea would be to get them into a format Excel understands and can then display however you want, rather than treating them like text.
9. Columns and rows can be inserted or deleted. Moving them is really a matter of making a hole for the data to fit into, and then cutting and pasting it. Selecting multiple columns or rows and then doing an **insert** will create multiple new blank columns or rows for you to move data into, or add data manually. Note that inserting and deleting updates cell references in formulas and functions, so you don’t have to go back and change all your calculations after doing this.

Hands-On Exercise

1. Create a new blank workbook, and save it as session 3 (or something).
2. Make sure you have the **ExcelTrainingSeminar_Session3Addresses.csv** file available.
3. Use **Data > Get External Data > From Text** to open this file. You need to tell the wizard that it is **delimited**, by **commas**, and then just leave everything as general. It will insert the addresses at A1 in the current worksheet.
4. Format the whole imported data block as a table. You can leave the filters in, as we will be playing with them later on. Ignore (answer “Yes” to) the popup warning about external data ranges.
5. A couple of things need to be changed initially. Jack’s phone number should be 111.1120 but because the phone numbers are “general” format, the zero is cut off. Change them to “text” and add the zero back on.
6. The dates in the final column are Excel-style numbers. Change the data type for those cells to show the date as YYYY-mm-dd. You may need to use a custom cell format to do this, depending on how your PC is set up. Remember that what Excel displays isn’t the “real” value, but rather just a conversion for display.
7. Duplicate the rows from Isobel down to Norman. There are several ways to do this. You can make a hole by inserting blank rows, and then copy and paste the duplicate content. You can also copy it, then use insert to push everything else down. Feel free to try both, as we’re just going to try sorting and removing duplicates next.
8. Your table should now have two or three copies of those middle rows. Apply an alphabetical sort to the whole table, to see them group together. Try a more complicated sort, by birthdate descending. Of course since these first and last names have the same letter, that’s not a whole lot of use on the sorting front. Try adding a filter, based on dates or numbers or something. Clear the filter, and note that the data “returns”.
9. Try **removing duplicates** and re-sorting (if you need to) to get back to the original data.
10. Then undo this (to get the duplicates back), and try changing something in one of the rows (Isobel’s phone number, for example). Then remove duplicates again and re-sort. That row should have remained (you should still have two Isobels). Undo the remove, and try once again without the phone number selected. This time, they should all disappear (even the one with the modified phone number).
11. Copy I2:I23 and **paste values** into K2:K23. The dates should show as numbers (general) again, so set the data type as date, and get it to display as YYYY-mm-dd again. Column K should match column I exactly.
12. Use **Data > Data Tools > Text to Columns** to split the dates into year, month and date (delimited, other, the dash). The data will be split into three columns, but the year column needs to be set to number (with no decimals) or general before it will display correctly (Excel interprets 1960 in a date field as sometime in 1905, for example). You should end up with three columns, with numbers for the year, month, and day.
13. We are going to combine these in two different ways. First, in J2, use the DATE function to combine K2, L2, and M2 back into a date again. This field, if set to number, will display the “proper” Excel numbers again.
14. Then, use CONCATENATE(K2,”-“,L2,”-“,M2) to manually create a YYYY-MM-DD date in N2. Then, in O2, use DATEVALUE(N2) to change this “text” date into a real Excel (number) date. Changing the data format to number for each column should show the same numbers in each (or all three, if you check column I as well).
15. Use **Insert** on column K to add a blank space, then copy the **values** from column P (your final converted concatenated date values) into column K. Remember to paste the values, not the formulas. Then delete columns L-P (the values in K should remain if you handled the “paste values” correctly). Note that the values in column J do disappear, as this was a formula looking at L, M, and N (now gone). Something to bear in mind as you split and combine data – always paste the values (not the formulas) if you’re cleaning up later. For now, delete columns J and K, as we already have the dates in column I.
16. Insert a new column after last name, and change the header to read “username”. We are going to concatenate the first and last names, with a period between them, to use as a label for each person. Use the now-familiar concatenate function to do this (**Formulas > Text > Concatenate**).
17. These lab PCs reboot and erase everything if left alone for 20 minutes. So, if you want to save your workbook(s), you will need to email them to yourself, or put them on a USB stick, or something. We’ll need the files from this session for the mail merge later one, so please save them somewhere.
18. Enjoy your lunch. We’ll start again at 1PM.

Excel Training Seminar – Session 4 – Charts and Graphs

Monday, August 23, 2010 ; 1PM – 2PM

Outline

1. Analyzing data is fairly simple when the responses are numeric. Many surveys include rating scales (0 for not applicable, 1 for terrible, 5 for excellent and so on). Other answers might be a length of time, or an age, or other numeric data. A lot of surveys also include free text responses, though, and the person designing the survey usually either decides to code these individual responses according to a numeric code, or just deals with them individually. Without numeric coding, there is little that Excel can do to help you with analyzing a survey. With numbers, though, Excel allows you to do some analysis.
2. The first thing you would want to do is clean up the data as much as possible. Ideally, you would want a summary sheet with the numbers we are going to produce (the analysis) and then a data sheet with the raw survey information. You might also include a description sheet, which would include information about the survey, the survey author, the original questions, and so on. That way, you would have more chance of understanding the results if you come back to it years later. The same would apply to someone new taking a look at the data.
3. Some simple statistical analysis might be useful. We have seen the AVERAGE (or “mean”) function before. There are similar functions for MEDIAN (middle number in a set) and MODE (most common number). Some of you who do a lot of stats work may have other calculations you would want to do. Standard deviation and variance are, for example, quite often seen in survey analysis, and give information about the spread of inputs around the mean. Excel includes a lot of statistical functions under **Functions > Function Library > More Functions > Statistical**.
4. Creating charts in Excel can be fairly easy, or it can be an exercise in frustration. I will suggest a method that should be reasonably reliable. The first step you want to take is to decide what type of chart you want in the first place. Generally speaking, those would be:
 - a. Pie chart (for displaying proportions of a whole)
 - b. Bar or column chart (for displaying amounts that are not part of a whole)
 - c. Line chart (for displaying trend information – changes over time)
 - d. Scatter chart (to show individual data points)
5. Once you know which type of chart might work best for the type of data you are dealing with, you can just select the data that you want to chart, and then **Insert > Charts** and pick the type you want. I suggest picking the simplest option, and getting it set up correctly, before checking to see what the more stylish options look like. Some more complicated chart types do things to your data that you might not expect.
6. Once you have a chart made, you have a new conditional tab for **Chart Tools**, with ribbons for design, layout and format. The layout tab allows you to add or remove chart elements like titles, legends, data tables and so on. Design and format are more about how the chart looks, but the design ribbon also allows you to change the type of chart, which can be useful.
7. Charts can be cut and pasted between sheets (or into Word, for that matter), or can be made into their own sheets. Having the chart on its own page makes it easier to see and to print, but you may find that it is too big if it's a simple chart. For the more complicated ones, though, this might be the way to go. You can handle all of this in **Design > Move Chart**, which lets you choose between existing sheets, or a new sheet for the chart alone.
8. Everything in the charts is changeable. By right-clicking on the chart, you can use **Select Data** to change the labels on either axis. Right-clicking on bars or lines allows you to format the **Data Series** (making them a different colour, or not displayed at all, for example).
9. The only real way to get comfortable with these charts is to make a few of them, and play around with the options. Remember that you can always **Undo** whatever changes you have just made, and that you can change the **Chart Type** from the **Design** ribbon as long as you've clicked on the chart first.

Hands-On Exercise

1. The session files included an ExcelTrainingSeminar_Session4Survey.xlsx file. Open that file now.
2. There are two sheets initially. One has the raw survey data (answers to 10 questions). The second has the survey analysis that this company provides. Ideally, we would like to do something similar (though not as complicated or complete in this example). We'll just set things up and analyze one question as an example.
3. Create two new sheets for the description (who and why) and the summary (what) information.
4. Add some contact information and a brief outline to the description sheet. You may find that the easiest way to do this is to **Insert a text box** for long blocks of text (saves having to fiddle with cell widths and text wrapping).
5. We are going to do our own analysis on question one, which asked respondents to choose an age range from a pre-set list. The list is on the Q1-Q10 page (remember that this might not be provided for you). Add a label for "Question 1" in A1 of our summary sheet. Copy and paste the question text from the age question on the Q1-Q10 sheet into A2. Copy the age ranges and the number of respondents for each from Q1-Q10!A4:B11 and paste them into the Summary!A3:B10 (we will look at how to count these ourselves in the next session). Don't copy the total or the statistical analysis or the gender breakdowns.
6. Select B3:B10, and use the **Formulas > AutoSum** function to add a total row below them. Add a "Total" label. Use **Home > Font > Borders** to style this row so that there is a single top border and a double bottom border around the total.
7. Below "Total" add labels in column A for Average, Median, Mode, Standard Deviation, and Variance.
8. Switch to the "Raw" sheet. Notice all the response numbers have little green marks in the top left corner. If you click on any one of them, a little exclamation mark pops up to the left. Clicking on this reveals that these are numbers that have been stored as text, and gives you the option to convert them to numbers. Don't do that just yet, but do bear it in mind for the next step.
9. Find formulas to calculate the values from #7 above for the B2:B401 range on the raw data sheet. You can either start the function and then click over to "Raw" and select your cells, or type in the range as Raw!B2:B401. You should get an error (Division by 0) because of that text problem we noted in #8 above. Switch to "Raw", and convert all the survey response data to numbers. Switch back to "Summary" and your average should show correctly now. Once you have all the formulas filled in, check your numbers against those for question 1 on the Q1-Q10 sheet. They didn't do a median or a mode, but the others should match up.
10. So now on to the charts. Our first will be to show the proportions of respondents in each age group. Proportions of a whole are best displayed with a pie chart. So, select A3:B10 (the group labels and their numbers) and **Insert a Pie Chart**. Choose the first one offered to begin with. Once your chart is created, use **Chart Tools > Layout** to add a title above the chart contents. Add some data labels wherever you think they look best (I like "Center" myself). You can, if you like, change the colours for the whole pie or for individual series. Get it looking as neat and clear as possible. Feel free to try other types of pie as well.
11. Make sure you save this workbook for the next session, as we will be continuing on with the analysis of this survey data using some more advanced functions.

Excel Training Seminar – Session 5 – Functions that Choose

Monday, August 23, 2010 ; 2PM – 3PM

Outline

1. In order to get the most from Excel, you need to have functions that act based on choices. For example, using the survey data from the last session, we might want to be able to gather the “income” information for each age group. This requires us to count the responses for each age group – effectively, Excel runs through all the data, and counts only responses that match age group 1, then age group 2, and so on. This can also be done to match text (doing a sum if the person’s name matches, for example).
2. These functions (the “choosing” ones) are in a group of **Logical Functions**. The simplest of these is the IF function, which has a test (the question) and then a different answer based on the results of the test. The function looks like this: IF(test, result if true, result if false). So, IF(B1>=20,”Yes”,”No”) would show Yes in the cell of B1 was 20 or more, and No if it was less than 20. You can show text, or do another calculation, or even do another IF formula.
3. Many other functions also have an IF version (like SUMIF, COUNTIF, AVERAGEIF, and so on). These do what you would expect, but based on a test. SUMIF adds the number if the test is met and ignores it if not. There are also versions that deal with multiple criteria (SUMIFS, COUNTIFS, AVERAGEIFS, and so on). These are found with their regular versions (SUM in Functions > Math, COUNT in Functions > More > Stats, and so on).
4. These functions can be “nested” as well. This means that one function can contain another one. So, for example, your IF function might contain a COUNT function that would only happen in the case that the first IF test was true. So, IF(B2>20,COUNT(B2:B33),0) would return the number of values in B2:B33 if B2 was greater than 20, or zero if it wasn’t. While it is possible to make these as complicated (as nested) as you want, it is usually easier to read and fix errors if the calculation is broken down into smaller stages. If you are doing the main work on separate sheets and just displaying the results on the summary sheet, there’s no real advantage in having one extremely long formula all in one cell, as opposed to breaking it down over several cells and using the final result in your summary sheet.
5. Logical tests can evaluate numbers (as equal to, greater than, or less than), true or false results from other tests, and text. Text matching can be exact, but can also include **wildcards** (special characters used to match any possible character). For example, a question mark replaces any one character, and an asterisk replaces any number of characters. So, *at would match cat, what, wererat, and so on. Ap* would match apply, apple, apt, and so on. A?ple would match apple and ample (?), but not apply. When matching a name, you have to be careful that all the names are in the same order, that first names are all abbreviated or spelled out fully, that there are no trailing spaces (as we saw, LEN counts trailing spaces – matching checks them as well). Clean data is essential to using functions to evaluate your data for you.
6. The basic method of creating these extended formulas is simple, but if you skip this step the process is likely to take a great deal of time. You have to be able to say (or preferably write out) in English what it is you mean to do. No matter how complicated your task is, it can (and must be) broken down into single steps and verbally explained before you start trying to string formulas together. As you do this, think a bit about how you might lay out the data and the formulas on a sheet, so that they will be readable and easy to work with.
7. When things go wrong, as they inevitably will, there are a few simple things to check first, before getting frustrated and giving up (or going for help):
 - a. Is there a problem with the data types being evaluated? Maybe numbers stored as text, maybe your dates are in text format, and not Excel numbers.
 - b. Is there a problem with relative and absolute cell references? If you are copying functions from cell to cell, is Excel helpfully changing something you didn’t want changed?
 - c. Can you break a long formula down into smaller steps, so you can see where it is going wrong?
 - d. Can you test your formula on a smaller data set (maybe only 5 rows that you can count manually and compare to your results)?
8. The “problem” with computers is that they do exactly what you tell them to do, not what you meant to tell them ... very rarely will you find that the problem was that “Excel doesn’t work”. Sorry about that.

Hands-On Exercise

1. Open the file from session 4, and re-save it as session 5 (or something).
2. We are going to do two COUNTIF functions (actually, one COUNTIF and one COUNTIFS) to demonstrate the idea of doing something based on a test. This can be pretty useful, and is one of the things people have wanted to do with the schedule spreadsheets.
3. Before we start, though, we're going to name a few ranges of data in our Raw sheet. Go there, and select B2:B401. Under **Formulas > Define Name** you can give this range a name (I used SurveyAge). Then name F2:F401 SurveyIncome. You can see what ranges have been named under **Formulas > Name Manager**.
4. On our summary sheet from the last session, we had copied and pasted the counts for each age group (the number of people who checked off that response). We're going to re-do those counts ourselves, using a COUNTIF. In Summary!B3, we want to add a function to count all the values in our named range "SurveyAge" that are equal to 1 (the number of the first age group).
 - a. First of all, copy and paste the original values from B3:B10 into C3:C10. We'll just keep them for reference.
 - b. Enter the COUNTIF formula. You can type in "SurveyAge" (without the quotes), or use **Formulas > Use in Formula** to drop the name in. The test is simply the number 1.
 - c. If this worked correctly, you should get the same value as before (51), and as in column C.
 - d. Fill this down through the different age groups, and then switch the test (to 2 for the second age group, 3 for the third, and so on). The results in each case should match column C's values. If they do, then delete the copied values in column C, and update your chart's source data to reflect the new column B values again.
5. This next section will create a table that shows how many people in each age group reported being in each income group. We will have a table with age groups on the side and income groups across the top. Each cell in this table will have a count of the number of people who gave that response. Take a minute to think about how to ask the question. The formula we are going to use is COUNTIFS – a count that has multiple ranges and criteria. Basically, in our table, the cell for age group 1 and income group 1 needs to count every time those two variables match up. So, if there are 10 people in age group one who reported being in income group 1, that's the count we need to show. This will let us graph the results and so on.
 - a. Set up the row and column labels for our little table somewhere on the Raw sheet. You will need age ranges vertically on the left from 1 to 8, and income ranges horizontally at the top from 1 to 7. You might also want to label the age and income numbers so that you will know what they are if you return to them later on. **Home > Alignment** has some nice **merge and center** and **text direction** options that might help here.
 - b. So, in your 1-1 cell, insert a COUNTIFS formula, with the first range being "SurveyAge" with a test for it equaling 1. The second range is SurveyIncome, also testing to equal 1. Notice that we have the numbers (the two '1's in this case) available, so you will want to use cell references here rather than typing in the numbers each time. This formula should give you the answer "5".
 - c. Check your absolute cell references, and fill the formula across the rows (you want to keep the age check the same, but let the income cell reference change). If you didn't use cell references, you will have to change the numbers for every cell.
 - d. You can then select the whole row and fill it down, but not before switching the absolute cell references (so that the age ranges change, but the income references remain the same). This is a bit fiddly, but it still beats changing them all manually (unless you're doing it that way).
 - e. You should now have a small table with an accurate count of each income response for each age group.
6. Copy and paste the table **values** (values only, and not the numbers for the age or income ranges) into your summary sheet. Paste in the age range labels and the income range labels (from the Q1-Q10 page) so that the information is labeled. Add some **conditional formatting > data bars** to make the data more visible.
7. Create a column chart to show the number of people who identified as making under \$20,000 in each age group. You will need to clean up the chart (a legend for one data series makes no sense).
8. What other charts could you make that would show something interesting?

Excel Training Seminar – Session 6 – Mail Merge

Monday, August 23, 2010 ; 3PM – 4PM

Outline

1. A mail merge is basically a way of using a data source to provide information to Word, so that a series of letters or labels can be printed. These letters or labels will be set up so that they are looking for specific information from the data source (our Excel sheet with the addresses on it).
2. The first step is to make sure your data source is ready. We're going to use the file from session 3, but any Excel file with addresses in it, or an Access Database, or an Outlook address book, can be used as a source. Excel is pretty good for this type of thing, as it's easier to use than Access and it has great editing capabilities (as we've seen).
3. The next thing is to open a new document in Word. There is a whole tab for **Mailings**. We are going to use almost all of these – the only one we won't use is the left-most section (**Create**) because that's designed for single envelopes or labels. Feel free to try it out later; after the mail merge, single items won't be much of a shock.
4. Mail merges are based on inserting specific **mail merge fields** into your Word documents. These fields typically include an address block and a greeting line, though there are other options as well. As you construct your letter and add in fields, Word also allows you to preview the results so that you can make sure the merge is doing what you thought it would.
5. The easiest way to manage all this, at least in the beginning, is to use the **Mail Merge Wizard**, which will walk you through selecting and previewing a data source, writing the letter, and finally printing off the results.
6. If you are printing envelopes or labels as well, these have to be dealt with as a separate mail merge, though the steps are nearly identical. You would use the same data source, and just do envelopes instead of letters.

Hands-On Exercise

1. In session 3, we played around with a list of addresses (for the Sorting and combining stuff). Open that file now, or open my copy (ExcelTrainingSeminar_Session3Complete). Take a look at it to refresh your memory of what's there. We won't be working with this file anymore, so you can close it (just remember where it is saved).
2. Start off a new (blank) Word document. Switch to the **Mailings** tab, and start up the **Step by Step Mail Merge Wizard** (under **Start Mail Merge**).
 - a. We are going to do a letter, so make sure that is selected, then click "Next" at the bottom of the wizard.
 - b. We are going to do a new letter, so select "Use the current document" , and then "Next".
 - c. We have an existing list of recipients, so browse to find our Excel address file. Our addresses are in sheet 1, and we want to keep them all. Note that you can filter, remove duplicates, and so on at this stage as well, should you need to at some point. Generally, it's better to clean up the list in Excel so that the changes are permanent, but if you only wanted people in Halifax or something for this particular mailing, this would be one way to do that.
 - d. Now you just write the letter. You may have a return address at the top, and then you want the recipient's address under that. So, in the wizard on the right, there is a button for "Address Block" that will insert that field for you. You don't see the full address yet, but it will be inserted where the field tag is. You might also want a greeting line, and there are a few options to choose from there. There are also "More items" depending on what was in the Excel file.
 - e. Write something for the text of the letter, and then a salutation and signature. Many people have a scanned version of their signature to paste into letters like this, or some just leave the typed one, or actually sign the letters by hand after they're printed.
 - f. Once the letter is written and had the **mail merge fields** added in, use the "Next" button at the bottom of the wizard to move on to a preview of the finished product. Now, you can see the addresses and greeting lines as they will appear when printed. Scan through several recipients, and make sure everything is showing up as you expect. If you're happy with the results, you can finalize and move on to printing the results (don't actually print them, of course). If you're not happy, you can still edit the letter until you get what you want.
3. The procedure is the same for envelopes or labels. Select a source, type the content on the envelope or label, using **fields** where appropriate, preview, and print.
4. You can save mail merge documents, but if you move them or the data source, you will have to go and match the source up again. Also, if you close and re-open the document, you will get a prompt about whether you want to include the data once again.