EXCEL

A workbook for statistics students
Developed for Excel 2010
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Excel is an extremely powerful tool that has many applications in the business world.

In this workshop we will touch on some of the features of Excel. It is not intended to turn you into an Excel expert, rather to give you some knowledge and familiarity of its capabilities, jargon and basic features. Help, Google and on-line courses can all be used to enhance the knowledge you gain from this workshop.

There are multiple ways to do things in Excel – we will show you some of these.

Each activity in the workbook has

a) instructions for the steps

b) information about what to do with the mouse/keyboard to follow the instruction.

c) a picture so that you can see you are correct

To complete the workshop, you will need access to the data file “consultation data”.
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Exercise 1 – Basics

In this exercise we are going to

a) learn about Rows, Columns and Cells
b) enter data
c) save data
d) add data and format the total
e) find the minimum and maximum of a set of data
f) use conditional formatting
g) add/delete rows
h) change column widths

Open Excel

Double click on the Excel icon on the desktop. You will obtain the following screen:

Rows, Columns and Cells

Spreadsheets are arrays of rows and columns. The rows go across (row the boat across the river) and the columns are vertical. Rows are identified by numbers at the left edge and columns are identified by letters at the top of each column. Where each row and column intersects is called a cell. Cells are identified by the column and row letter/number combination, so you can see that the cell highlighted by the rectangle outline, which is where anything you type would be entered, is called A1 because it is in column A and row 1.

When you move the mouse around in Excel, it takes different shapes, depending on what you are doing (it is a blank white cross while you move it around). If you click in any cell, that cell will be highlighted with a rectangle outline, and its name (such as E2) will show in the Name Box at the left, just above the column letters. As you type into the cell, what you type is also shown in the formula bar, to the right of the Name Box. These are shown in the next diagram:
Entering data

Charlie has the results for 10 students for the mid-session exam. The results are: 78, 67, 78, 88, 79, 65, 82, 69, 82, 92

Enter the data into Column A of the spreadsheet, as follows:
Click your mouse in cell A1 (This cell will be highlighted with a rectangular outline.)
Type 78 into A1
Press Enter. The highlighted cell will now be A2.
Type 67 into A2.
Press Enter. The highlighted cell will now be A3.
Type 78 into A3
Press the Down Arrow key. The highlighted cell will now be A4. You have just seen that Enter and the Down Arrow key do the same thing when entering data.

Enter the rest of the data.

If you make a mistake, you can use the Backspace key, or the Undo button.
Save the file to the desktop

*Click on* **File**

*Click on* **Save As**

Select **This PC** then **Desktop**. Type “Your name” (e.g., “Alison”) in the **Filename** box.
Click **Save**.

**Calculate the total marks**

*Click in A11*

*Click on the **Autosum** button*

Your screen should look like this:

![Excel spreadsheet with formula =SUM(A1:A10)](image)

Note the formula =SUM(A1:A10). All *Excel* formulae start with “=”. This tells *Excel* to calculate. SUM tells *Excel* to add up A1:A10 tells *Excel* to use the cells from A1 to A10

Press **Enter** (or you can click on the tick to the left of the formula bar). The total should be 780.
Format with a border
To format the total

**Click on the total**
*In the Home Tab, Font Section, click on the little arrow next to the Border Box.*
*Click on Top and Double Bottom Border*

This is what it should look like:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>82</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>92</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>780</td>
</tr>
</tbody>
</table>

Calculate the average

**Click in A12**
*Click on the Formulas tab*
*There are lots of formulae in Excel*

Select [Insert Function]. Note there is an explanation of what the function does.

**Click AVERAGE. Then Click OK.** You will see the result and the numbers it is going to average.
Something is not right here. When we entered the data, all values were less than 100. Therefore, the average can’t be more than 100. Excel has included the total (780) in the data as it is using A1:A11. We need to change the range.

*Click in the Number1 box and make changes so that it says A1:A10.*

The result is now showing as 78. (Remember the total was 780, there are 10 pieces of data so the average is 780/10 = 78). This looks right. *Click OK.*

**Calculate the maximum and minimum**

**Maximum**

*Click in A13. Select Formulas Tab, Select Insert Function, Select MAX.* (Hint, you will have to type “maximum” in the search bar and look for MAX).

*Click OK.* The screen will look like this:

This doesn’t look right as the maximum isn’t 78. It should be 92. Excel is showing 78 as it is only looking at the number in A12. We need to tell it to look from A1:A10.

*Click in the Number1 box. Delete A12. Click and hold down the left mouse button on A1 and drag it down to A10.*
Make sure you are only doing A1:A10. Click OK. The answer should be 92.

Minimum

Click on A14.

Click [Formula] tab, Select [Insert Function], Select MIN. Make sure you are only using A1:A10. Click OK. The answer should be 65.

Conditional formatting

We want to quickly see who scored less than 75 and who scored more than 90. This is only formatting for visual presentation. It doesn’t change the underlying data.

Scores less than 75


On the [Home] tab, [Styles] section, Click [Conditional Formatting] icon

Select [Highlight Cells Rules], Select [Less Than]. The screen should look like this:
Type 75, click **OK**. All the scores that are less than 75 should now be red.

Scores greater than 90

*Click on A1 and highlight the cells A1 to A10 again.*

*Home* tab, *Styles* section, Click *Conditional formatting* icon.  
Select **Highlight Cells Rules**, Select **Greater Than**. The screen should look like this:

![Conditional formatting screen](image)

*Delete 78.5 and type 90.*  
*Select the drop down arrow on the edge of the box*  
*Choose Green Fill with Dark Green Text, click **OK**.*

The sheet should look like this:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>78</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>57</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>78</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>88</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>79</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>82</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>69</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>82</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>92</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>780</td>
<td></td>
</tr>
</tbody>
</table>

What happens if you change 88 (cell A4) to 98?

*Remove conditional formatting:*  
*Highlight the cells (A1:A10)*  
*Click on Conditional Formatting*  
*Select Clear Rules*  
*Select Clear Rules from Selected Cells*

**Change the name of the worksheet**

We want to change the name of the worksheet so we remember what it is.
Double click on “Sheet1” in the tab name (at the bottom of the screen). Type “Marks”. Press Enter.

Change the size and font of the data

We want to change the font to Times New Roman and the size to 14. Click on A1. Home tab, Font Section, Click on the little arrow next to 11. Select 14. Now type “Times” instead of “Calibri”. The box will prefill with “Times New Roman”. Press Enter. This will change the size and font for cell A1.

Applying changes to other cells using Format Painter.

Click on the cell with the format you want to copy (A1). Home tab, Clipboard section, Click on Format Painter. The cursor will change to a paintbrush. Click A2. This will change the font size and shape of A2 to that of A1. To do this for all the other cells, click on A1, then click on Format Painter. Click on the left mouse button and drag the cursor all the way to A10.

Add a row

We want to add a row to put in a title. Click on the 1 at the front of Row 1. The whole row should be highlighted.
Home tab, Cells Section, Click Insert icon,

Click Insert Sheet Rows. Your sheet should look like this.

<table>
<thead>
<tr>
<th></th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>78</td>
</tr>
<tr>
<td>3</td>
<td>67</td>
</tr>
<tr>
<td>4</td>
<td>78</td>
</tr>
<tr>
<td>5</td>
<td>88</td>
</tr>
<tr>
<td>6</td>
<td>79</td>
</tr>
<tr>
<td>7</td>
<td>65</td>
</tr>
<tr>
<td>8</td>
<td>82</td>
</tr>
<tr>
<td>9</td>
<td>69</td>
</tr>
<tr>
<td>10</td>
<td>82</td>
</tr>
<tr>
<td>11</td>
<td>92</td>
</tr>
<tr>
<td>12</td>
<td>780</td>
</tr>
<tr>
<td>13</td>
<td>78</td>
</tr>
<tr>
<td>14</td>
<td>92</td>
</tr>
<tr>
<td>15</td>
<td>65</td>
</tr>
</tbody>
</table>

Type “Mid-Session” in A1. It probably flows into Column B.

Changing column widths

Click on the line between Column A and Column B, (in the row of Column Letters). The cursor will change to a small vertical line with an arrow on both sides. Hold the left mouse button and drag to the right to widen the column – stop when the width is more than 30.

To bring the column back to the width of the largest cell: Double click on the line between Column A and Column B

Delete a row

We want to delete the rows with the total, average, maximum and minimum values Click on 12, 13, 14, 15 at the front of Column A
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>82</td>
</tr>
<tr>
<td>11</td>
<td>92</td>
</tr>
<tr>
<td>12</td>
<td>780</td>
</tr>
<tr>
<td>13</td>
<td>78</td>
</tr>
<tr>
<td>14</td>
<td>92</td>
</tr>
<tr>
<td>15</td>
<td>65</td>
</tr>
</tbody>
</table>

Right click, Select Delete
Exercise 2 – Writing your own formula

We now want to add the Final exam marks. They were: 72, 52, 95, 80, 90, 68, 0, 75, 80, 82
The mid-session was worth 40% and the final was worth 60%.

Excel uses the following symbols in formulae:
   a) + add
   b) – subtract
   c) * multiply
   d) / divide
   e) ^ power
   f) () brackets

Writing formulae and copying down

Type “Final” in B1.
Enter the marks (see above) in B2 to B11.
Type “Total Mark” in C1.
We need to create a formula to calculate the total mark.
In C2, type “=”. The “=” tells Excel that you are going to enter a formula.

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Midsession</td>
<td>Final</td>
<td>Total Mark</td>
</tr>
<tr>
<td>2</td>
<td>78</td>
<td>72</td>
<td>39.2</td>
</tr>
<tr>
<td>3</td>
<td>67</td>
<td>52</td>
<td>38.8</td>
</tr>
<tr>
<td>4</td>
<td>78</td>
<td>95</td>
<td>57.0</td>
</tr>
<tr>
<td>5</td>
<td>88</td>
<td>80</td>
<td>52.8</td>
</tr>
<tr>
<td>6</td>
<td>79</td>
<td>90</td>
<td>53.4</td>
</tr>
<tr>
<td>7</td>
<td>65</td>
<td>68</td>
<td>41.4</td>
</tr>
<tr>
<td>8</td>
<td>82</td>
<td>0</td>
<td>49.2</td>
</tr>
<tr>
<td>9</td>
<td>69</td>
<td>75</td>
<td>52.5</td>
</tr>
<tr>
<td>10</td>
<td>82</td>
<td>80</td>
<td>52.8</td>
</tr>
<tr>
<td>11</td>
<td>92</td>
<td>82</td>
<td>65.6</td>
</tr>
</tbody>
</table>

Click on A2. (This says “Use the information in A2”)
Type “*.4”. (This says “Multiply by 0.4 or 40%”)
Type +. (This says add)
Click on B2. (This says “Use the information in B2”)
Type “*.6”. (This says “Multiply by 0.6 or 60%”)

Your screen should look like this:
We could repeat this for the next student but there is a quicker way. Click on C2. Hover over the bottom right hand corner until the cursor turns into a +. Hold down the left mouse button and drag down to C11. Let go.

The sheet should now look like this:

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midsession</td>
<td>Final</td>
<td>Total Mark</td>
</tr>
<tr>
<td>78</td>
<td>72</td>
<td>=A2*.4+B2*.6</td>
</tr>
<tr>
<td>67</td>
<td>52</td>
<td></td>
</tr>
<tr>
<td>78</td>
<td>95</td>
<td></td>
</tr>
<tr>
<td>88</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>79</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>65</td>
<td>68</td>
<td></td>
</tr>
<tr>
<td>82</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>69</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>82</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>92</td>
<td>82</td>
<td></td>
</tr>
</tbody>
</table>

Press Enter, or click on the tick in the formula bar

You can see that the totals have calculated immediately. If you click on C7, for example, you will see the following formula in the formula bar:
You will notice that the A2 and B2 have become A7 and B7. In this case Excel is using Relative Cell referencing. When we drag down A2 in the formula, it becomes A3, then A4, then A5, etc. Note that 0.6 and 0.4 are fixed. If we want to change these, we have to use absolute referencing.

You can also copy formulas by highlighting from the formula to where you want it to copy to (in this case from C2 to C11), then in the Home tab Editing section, click Fill, then Down.

**Formatting a cell**

You might like to present the Total Marks to 2 decimal places.

*Click on C2.*

*On the Home tab, Number section, Click on Increase decimal.* (Hint: hover over the icons to get an explanation.)

Another method:

*Click on C3, Right click, select Format Cell*

*Click on Number in the Number Tab. Note the default of 2 decimal places, so you can click OK straight away.*

Use the Format Painter to format the rest of the cells.
IF statements

If a student didn’t get at least 60 on the final exam, they fail the subject.

Type “Exam Result” in D1.
Click in D2.
Formula Tab, Click Insert Function, Click IF.

You can change the “Select a category” box to “All” to see all the functions.

Click OK
Click in the Logical_test box
Click B2. (This says “Use the information in B2”.)
Type “>60”. (This says “greater than 60”.)
Click in “Value_if_true”
Type “Pass”. (This says that if B2 is greater than 60, “Pass” will be put in D2.)
Click in “Value_if_false”
Type “Fail”. (This says that if B2 is less than 60, “Fail” will be put in D2.)

Your screen should look like this:
Notice the “Formula result = Pass”! *Excel* is telling you the result of the function so you can check it is what is expected. Click **OK**. The formula box will show:

This shows the format of an IF function: IF(condition, what happens if it is true, what happens if it is false).

**Drag the formula down to D11**

**Absolute referencing**

We want to do some modelling on what happens if we change the weightings. For example, Mid-session could be worth 20% and Final 80%, or Mid-session could be worth 50% and Final also 50%. We could do this by writing a Relative reference formula each time. There is another way: using absolute referencing.

Type “Mid wt” in G1. *(This will be the weighting for the mid-session.)*
Type “Final wt” in H1. *(This will be the weighting for the final.)*
Type “.2” in G2, and type “.8” in H2.
Type “Model” in E1.
Click in E2, Type = 
Click on A2, Type *
Click on G2. Press F4. In the formula bar G2 will become $G$2. The $ fix the amount in the cell that is used.
Type +
Click B2, Type *
Click on H2. Press F4 In the formula bar H2 will become $H$2. The $ fix the amount in the cell that is used.

Your formula bar should look like this:
Press Enter.

Drag the formula to E11

Your spreadsheet should now look like this:

Press Enter.

Drag the formula to E11

Click on E7. The formula bar now looks like this. The absolute referencing has forced the formula to keep using the values in G2 and H2.

Changing the weightings

We now want to change the weightings. Type “.5” in G2, and “.5” in H2. The data change automatically.
Before finishing this worksheet, try to
   a) Fit the columns to the correct width
   b) Make the font size and type the same for all of the cells
   c) Save the workbook

**Delete columns**

We no longer need columns C, D, E, F, G, H.
Click on C, hold left mouse button down and drag to H.
Home Tab, Cells, Click on Delete icon, Click on Delete Sheet Columns
Exercise 3 – creating charts

We are going to create a chart. To reduce data entry, we are going to use the same data. However, this time it is sales data for two different stores, one in Eden, one in Bega.

Copy work sheet

We are going to create a new work sheet using the same data. 
Hold down Ctrl and Click on the worksheet tab called “Marks”

As you drag, the cursor should become a small sheet with a +.
Drag the small sheet behind the tab called “Sheet 2” – it will now be called Marks (2).

Rename the sheet “Sales”, Press Enter.

Format cells – Bold and $

We are going to make the column headings bold and the numbers $.
Click in A1. This will allow you to edit the cell contents. Type “Eden”.  
Click in A2 (or Tab or Right Arrow), type “Bega”.

To make the headings bold

Click in A1, hold left mouse button down, drag to B1.
On Home tab, Font section, Click on B.  (An alternative method: Highlight the row, then Click on B.)

To turn the numbers into $
Click in A2. Hold left mouse button down and drag to B11.
Home tab, Number section, click on $
Insert column

These are sales figures for different months. We need to add a column with the months.

**Click on A at the top of Column A.** This will highlight the whole column. **Right mouse click, Select Insert.** This will add a new column. (An alternative method is to use Home tab, Cells Section, Insert icon.)

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Eden</td>
<td>Bega</td>
</tr>
<tr>
<td>3</td>
<td>$78.00</td>
<td>$72.00</td>
</tr>
<tr>
<td>4</td>
<td>$67.00</td>
<td>$52.00</td>
</tr>
<tr>
<td>5</td>
<td>$78.00</td>
<td>$95.00</td>
</tr>
<tr>
<td>6</td>
<td>$88.00</td>
<td>$80.00</td>
</tr>
<tr>
<td>7</td>
<td>$79.00</td>
<td>$90.00</td>
</tr>
<tr>
<td>8</td>
<td>$65.00</td>
<td>$68.00</td>
</tr>
<tr>
<td>9</td>
<td>$82.00</td>
<td>$</td>
</tr>
<tr>
<td>10</td>
<td>$69.00</td>
<td>$75.00</td>
</tr>
<tr>
<td>11</td>
<td>$82.00</td>
<td>$80.00</td>
</tr>
</tbody>
</table>

**Click on A1, Type “Month”.

Autofill months

**Click on A2, Type “July”, Press Enter.**

**Click on A2.**

**Hover over the bottom right hand corner of A2 until a + appears.**

**Hold left mouse button down and drag to A11.**

The column should fill with the names of the months.

This is a really useful feature of Excel. If it can guess what the pattern is, it will autofill. It works with Days, Months, Years and numbers.
Draw a chart

We want to compare the sales figures for the Eden and Bega stores.
*Click in A1. Hold down left mouse button and drag to C11. This will highlight all the data.*
*Insert tab, Charts section, select Column.*

Select the first option in 2D.

A chart will be placed on the work sheet and the Design tab will open.

Changing the layout of the chart

We can change the layout. We want a title for the chart, and titles on the axes, and we want to keep the “key” (or “legend”).

Design Tab, Chart Layouts, click on the little arrow in the pulldown box:
Click on Layout 9. This one shows title, axis and key.
Click on Chart Title. This will outline the box.
Click in the box, Delete “Chart Title”, and Type “Sales Figures”.

Click on the horizontal Axis Title. This will outline the box.
Click in the box.
Delete “Axis Title”.
Type “Month”.

Click on the vertical Axis Title. This will outline the box.
Click in the box.
Delete “Axis Title”.
Type “Sales”.

You can also do all this using Layout Tab, Chart Tools

Changing the chart type

We can change the chart type. We now want a line graph.
Click on the Chart.
Design Tab, Type section, Click on Change Chart Type icon.
Click on Line
Click on the 4th one
Click OK

You should get this:

Sales Figures

<table>
<thead>
<tr>
<th>Month</th>
<th>Eden</th>
<th>Bega</th>
</tr>
</thead>
<tbody>
<tr>
<td>July</td>
<td>$50.00</td>
<td>$40.00</td>
</tr>
<tr>
<td>August</td>
<td>$60.00</td>
<td>$30.00</td>
</tr>
<tr>
<td>September</td>
<td>$70.00</td>
<td>$20.00</td>
</tr>
<tr>
<td>October</td>
<td>$80.00</td>
<td>$10.00</td>
</tr>
<tr>
<td>November</td>
<td>$90.00</td>
<td></td>
</tr>
<tr>
<td>December</td>
<td>$100.00</td>
<td></td>
</tr>
</tbody>
</table>

Moving chart to a new sheet

We want to move the chart to a new sheet.

Design Tab, Location Section, click on Move Chart icon.

The Move Chart box appears.
Click on **New Sheet**
Type “Sales Graph” in the box, Press **Enter**

You will now have a new worksheet, called Sales Graph (you can see the tab at the bottom of the screen). This will have the graph on it.

**Adding data labels**

We want to show the actual values on each data point.  
*Click on a line between 2 data points, for example, between July and August for the Bega line.* This will highlight each point.  
*Right click. Select **Add Data Labels***

Each data point will now show its value.
An alternative method:

Click on a line between 2 data points, for example, between July and August for the Bega line.

Layout Tab, Labels Section, Pull down the arrow on the Data Labels icon. You can then select where you want the label and other options.
Exercise 4 – analysing data

Use the data file “consultation data”. It shows fictitious data for students attending workshops. Data has been collected showing student surname, campus, age, gender, degree, and the number of consultations they’ve attended. We are going to analyse this data in a number of ways.

Sorting

Who attended the most consultations? We can sort the data to find out.

*Highlight the data from A3 to F15.*

*Click on Data Tab, Sort & Filter section.*

*Click on Sort.*

The sort selection box appears:

Note the box “My data has headers” has been ticked. This means we have included the titles in the data. This makes it easier to do the sorting.

*Click on the arrow next to the Sort by box*  
*Select “Consults”.*
The order box has changed from “A to Z” to “Smallest to Largest” because we are dealing with numeric data.

Change “Smallest to Largest” to “Largest to Smallest”, Click OK.
The list should now be sorted in descending numeric order.

Filtering

We want a list that only has nursing students. We could sort the data and then delete or hide the other degrees. However, this destroys data that we might need later. Another option is filtering.

Find all Nursing students
Highlight all the data including the headings
Data tab, Sort & Filter section, click Filter

Click on the arrow next to “Degree”. You will see that Select all and each of the degrees has a tick.
Click in Select All. This will remove all the ticks.
Click in the box next to “Nursing”. Click OK

The data now looks like this:

<table>
<thead>
<tr>
<th></th>
<th>Student Name</th>
<th>Campus</th>
<th>Age</th>
<th>Gender</th>
<th>Degree</th>
<th>Consult</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Egg</td>
<td>Small</td>
<td>19</td>
<td>M</td>
<td>Nursing</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>Deer</td>
<td>West</td>
<td>F</td>
<td>Nursing</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Sun</td>
<td>Big</td>
<td>18</td>
<td>F</td>
<td>Nursing</td>
<td>1</td>
</tr>
</tbody>
</table>

Note that some of the line numbers are blue e.g. 4, 7, 12 and that they are no longer sequential. This indicates that data has been hidden. Also note the filter symbol next to Degree – this shows you that the data is filtered.

Finding all Nursing & Science students

Now we want to see all Nursing and Science students. Click on the filter next to “Degree”. Click on the box next to “Science”. This will include the Science students in the list.

The data now looks like this:

<table>
<thead>
<tr>
<th></th>
<th>Student Name</th>
<th>Campus</th>
<th>Age</th>
<th>Gender</th>
<th>Degree</th>
<th>Consult</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Egg</td>
<td>Small</td>
<td>19</td>
<td>M</td>
<td>Nursing</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>Deer</td>
<td>West</td>
<td>F</td>
<td>Nursing</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Yacht</td>
<td>Small</td>
<td>18</td>
<td>F</td>
<td>Science</td>
<td>2</td>
</tr>
<tr>
<td>12</td>
<td>Sun</td>
<td>Big</td>
<td>18</td>
<td>F</td>
<td>Nursing</td>
<td>1</td>
</tr>
<tr>
<td>15</td>
<td>Red</td>
<td>Big</td>
<td>27</td>
<td>M</td>
<td>Science</td>
<td>0</td>
</tr>
</tbody>
</table>

Filtering is a useful tool to clean data. If you filter by age, you will find that there is a “blank”. This should not happen.

To turn off filtering

Click on the arrow next to “Degree”
Click in the box next to Select All
Click OK.

Check that there are no blue line numbers!

Get rid of the filtering arrows.

Click on the filter symbol in Data, Sort & Filter.
Subtotalling

We want to know how many consultations were used by each Campus. To do this, we need to sort the data and then use the Subtotalling function. This is because Subtotalling works by adding items when there is a change in a variable.

**Subtotal by campus**
Sort the data by “Campus” in alphabetical order.
Highlight all the data.
*From Data, Outline, select Subtotal*

The subtotal box appears

Click on the arrow next to “Student Name”
Select “Campus”.
Click OK.

The data will now look like:
<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>consultation Figures for May</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Student name</td>
<td>Campus</td>
<td>Age</td>
<td>Gender</td>
<td>Degree</td>
</tr>
<tr>
<td>4</td>
<td>Queen</td>
<td>Big</td>
<td>23</td>
<td>F</td>
<td>Commerce</td>
</tr>
<tr>
<td>5</td>
<td>Sun</td>
<td>Big</td>
<td>18</td>
<td>F</td>
<td>Nursing</td>
</tr>
<tr>
<td>6</td>
<td>Goal</td>
<td>Big</td>
<td>25</td>
<td>X</td>
<td>Commerce</td>
</tr>
<tr>
<td>7</td>
<td>Red</td>
<td>Big</td>
<td>27</td>
<td>M</td>
<td>Science</td>
</tr>
<tr>
<td>8</td>
<td>Big Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Egg</td>
<td>Small</td>
<td>19</td>
<td>M</td>
<td>Nursing</td>
</tr>
<tr>
<td>10</td>
<td>Fire</td>
<td>Small</td>
<td>63</td>
<td>F</td>
<td>Maths</td>
</tr>
<tr>
<td>11</td>
<td>Yacht</td>
<td>Small</td>
<td>18</td>
<td>F</td>
<td>Science</td>
</tr>
<tr>
<td>12</td>
<td>Lemon</td>
<td>Small</td>
<td>19</td>
<td>M</td>
<td>Education</td>
</tr>
<tr>
<td>13</td>
<td>Small Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Table</td>
<td>West</td>
<td>58</td>
<td>M</td>
<td>Education</td>
</tr>
<tr>
<td>15</td>
<td>Deer</td>
<td>West</td>
<td></td>
<td>F</td>
<td>Nursing</td>
</tr>
<tr>
<td>16</td>
<td>Joy</td>
<td>West</td>
<td>22</td>
<td>F</td>
<td>Commerce</td>
</tr>
<tr>
<td>17</td>
<td>Wheel</td>
<td>West</td>
<td>45</td>
<td>M</td>
<td>Maths</td>
</tr>
<tr>
<td>18</td>
<td>West Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Grand Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This shows 22 consultations in all, 3 at campus Big, 11 at campus Small and 8 at campus West. We can see this more easily by clicking on the 2.

To remove the subtotals:

1. Click on the [Data] tab.
2. Click on [Outline].
3. Select [Subtotal].
4. Click on [Remove all].
Pivot tables

We want to know the number of consultations by gender for each degree.

*Highlight all the data.*

*Insert* tab, *Tables* section, *Click on Pivot Table*, and *Pivot Table* again.

The *Create PivotTable* box appears

We want to use the same worksheet.

*Click on Existing Worksheet*
*Click on A18, then OK.*

The page looks like:
In **Pivot Table Field List** (on the right of the screen), click in the box next to “Gender”. It puts “Gender” under Row Labels. 
**Drag “Degree” to column labels, Drag “Consults” to Values.** It automatically sets this to Sum of Consults.

The data selection should look like this:

![Pivot Table Field List](image)

The Pivot Table looks like:
Now we can see that there were 12 consultations with females (not 12 females had consultations because we know from the data that some had more than one), of these, 4 were in Commerce, none in Education, 3 in Maths, 3 in Nursing, 2 in Science.

We can also see that at least one student identified as Gender X. They didn’t have any consultations.

**Using count instead of sum**

We can redo the pivot table to see how many students we had information about.

*Click on the Pivot Table* to bring up the *Pivot Table Field List* (if it is not still on the screen).

*Click on Sum of Consults.*

*Click on Value Field Settings*

*Click on Count*

*Click OK*

The Pivot Table now looks like this:
This shows that the data contained 6 Females, 5 males and 1 X. Of the 6 Females, 2 were in Commerce, none in Education, 1 in Maths, 2 in Nursing and 1 in Science. We can’t say that all of these had consultations because we know that the data includes people who had 0 consults.

We can remove the 0 consults from the data by applying a filter.

*Applying a filter to a Pivot Table*

*Drag Consults to [Report Filter]*

This changes the Pivot Table to:
Select the arrow next to “Consults (All)”
Tick the box next to Multiple Items
Untick the box next to 0
Click [OK].
The Pivot table changes to:

Compared to the previous one, we can see that only 10 of the 12 students in the data set had consults.

Pivot tables are very powerful tools to analyse data.

**TIPS:**
- Make sure you understand your data. Know what you expect to see.
- Be clear about the question you are asking
- Check the results – from what you know about the data, do they make sense?

**Where can I find more help?**

- Google your query. For example, “how do I make a Pivot Table in Excel 2010?”. Someone, somewhere will have posted something! Good for specific questions.
- Use the Help Link in Excel. Good if you know the term.
- Videos on the internet, for example, Khan Academy, Excel is Fun YouTube. Useful to see how it is done – generally, one item per video
- Excel courses on Lynda.com. This provides access to an entire professional on-line course for software. It is free to UOW students. From the Library Website, select A-Z Databases, select L, select Lynda.com. Search for Excel courses. (You will need to set up an account.)
- Help sessions with Learning Development.