Teaching Notes

These teaching notes were originally developed for computer classes at Durbar High School in Kathmandu, Nepal, using Windows 95 and Office 95. Since then they have been rewritten for Office 97 and extended. Lesson plans have also been developed for some topics to help Cambodian teachers prepare their lessons.

We wrote the notes for our own use so that we have a clear picture of what we will be teaching. They are not really students' notes, though we do encourage students to read them on the computer *after* lessons and to practise the exercises again.

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We realise that they are not perfect, so if you find any mistakes or think certain sections could be clearer then we would appreciate your feedback via e-mail to andy_price@hotmail.com

Happy teaching!

Andy & Ming
9th October 2002

Introduction to Using Excel

Excel is a spreadsheet program, used to perform calculations and data analysis.

Open Excel. Note that it looks much like any other Windows application, with a menu bar, tool bar etc. You will soon become familiar with it. Move the cursor over the buttons on the tool bars and read the "tool tips" to see what they do.

The main work area is divided up into ***cells*****,** rather like a table in Word. This area is called a ***Worksheet***. A cell is where a column and a row meet. ***Columns*** run vertically down the page while ***rows*** run horizontally across the page. Cells are referenced as A1, A2, B1, B2, and so on, with the letter representing a column and the number representing a row:

	A	**B**	**C**
1	A1	B1	C1
2	A2	B2	C2
3	A3	B3	C3

To move around in the worksheet you can use the Tab key, the arrow keys, Enter key or click with the mouse. When a cell is selected, it has a black border. Practice moving around the empty worksheet with both the keyboard and the mouse. If you have scrolled to a different region of your worksheet and want to get back to the active cell quickly, Ctrl+Back Space will zoom back to the last cell selected.

We can also select blocks of cells using the mouse. Click in B2, hold down the left mouse button and then drag the cursor to D5. Note that all the cells in the rectangle B2 to D5 are selected and highlighted in black. To highlight a column click on the letter of the column. To highlight a row click on the number of the row.

You enter text or data directly into a cell or via the ***formula bar***. Place the cursor in cell B2 and type John. Note that the word John also appears in the formula bar. Press Tab to move to C2 and type 55. Check the formula bar, then press Tab. Type 33 in D2 and press Tab. In E2, type =C2*D2. Note that this formula appears in the formula bar as well as the cell. Now press Tab. The formula in E2 is replaced with the value of the expression, 1815. If you now press the left arrow key to return to E2, the value in the cell does not change, but the formula =C2*D2 is shown in the formula bar. Tab back to F2, then click the cursor in the formula bar. Type =C2-D2 (note that this formula is also shown in F2) and then click the green tick symbol to the left of the formula bar or press Enter. The formula bar does not change, but the cell contents change to reflect the result of the expression, 22.

Now you know the relationship between the cell contents and the formula bar!

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Practice
Our first exercise is ***ss xl Marks***. Start with a new document.

Make cell A1 active and then type: Exam Marks, Class 8. **Type it all in A1.**
Press the down arrow key to make A2 active and then type Subject.
Press the right arrow key and type John.
Now enter the rest of the details to complete the table below and save it as *ss xl Marks*:

Exam Marks, Class 8			
Subject	John	Mary	Alan
Maths	58	45	63
English	56	68	80
Chemistry	63	77	68
Total			

Add a column. If we have missed out a student, we can easily add an extra column to contain the marks for this student. Highlight the last column (D) and then click *Insert, Column* on the menu bar. An empty column is inserted to the left, and the columns to the right are renamed so that the marks for Alan are now in column E. Enter the marks for Susan in the empty column: 74, 63, 77.

Add totals. Make cell B6 active and then click the ***AutoSum*** button on the toolbar. You will see that Excel suggests the formula =SUM(B3:B5) for this cell, which would sum the numbers in the three cells above. Since this is what we want to do, click the *tick* button in the formula bar to accept it. Sum the marks for Mary, Susan and Alan in the same way. You can also press Enter or Tab to accept the sum instead of clicking on the tick.

Add a row. Now add an extra row for the History marks. Select row 4 and then click *Insert, Row*. An empty row is inserted above, and the rows below are renumbered so that English becomes row 5 etc. Enter the History marks as follows: 65, 72, 82 and 81. Note that the totals are automatically recalculated as you enter the data.

Your worksheet should now look like this:

Exam Marks, Class 8				
Subject	John	Mary	Susan	Alan
Maths	58	45	74	63
History	65	72	82	81
English	56	68	63	80
Chemistry	63	77	77	68
Total	242	262	296	292

Add averages. Place the cursor in cell A8 and type: Average. Move to cell B8 and then click the ***Function*** button on the toolbar. From the *Function Name* column, select *Average* and then click *OK*. In the *Number 1* box change the range to B3:B6, then click *OK*. The average value for this range of cells will be entered in B8. Why did we choose B3:B6? Because that is the *range* which contains the values that we wish to average i.e. John's marks. The computer incorrectly chose B3:B7, so you must always look carefully at the range it suggests.

Here is another method which is slightly quicker as you do not have to type cell references and there is less chance of making a mistake. Select C8, click the *Function* button, select *Average* and click *OK*. With the contents of *Number 1* box highlighted, click in C3 with the mouse and drag it down to C6 (You might have to move the dialogue box out of the way so that you can see the correct cells). Note that the reference C3:C6 is automatically inserted in the *Number 1* box. Then click *OK*. The average is inserted into C8.

If we had many columns to average, it would be rather slow to have to do this for each of them. Instead, we can "drag" the formula from one cell to the others. Select the cell containing Mary's average mark. Note that the cell has a thick line drawn around it, and in the bottom right had corner is a small square. Place the cursor over this square and it changes to a black cross. Hold down the left mouse button and drag the rectangle over to the right until it covers cells D8 and E8 as well. Release the mouse button and watch what happens.

Format the table. Now that we have completed entering the data we need to format the table.

- To centre the title across the table - highlight cells A1 to E1 and then click *Format* on the menu bar, select *Cells* and click on the *Alignment* tab. In the *Text Alignment, Horizontal* dropdown menu select *Centre across selection*. Click *OK*. Another method which is faster, is to click on the 'Merge and center' button on the Formatting toolbar.

- To bold the Subject row - select the cells and click the *Bold* button. Do the same with the Total row and the table heading.

- To centre the contents of the block B2 to E8 - select cells B2 to E8 and click the C*entre* alignment button.

- To make the Subject row light yellow - select the cells, click the arrow to the right of the *Fill Color* button on the toolbar and select light yellow. Do the same with the Total row. If the button already shows yellow below the "paint pot" you only need to click on the button.

- Click on the *Print Preview* button. Note that the table borders are not visible.

- To add borders to the table - select the whole table by dragging over the cells with the mouse, click the arrow to the right of the *Borders* button and select the *grid* style, which looks like a box with a cross in it.

Click on the *Print Preview* button; the finished table should look like this:

Exam Marks, Class 8				
Subject	**John**	**Mary**	**Susan**	**Alan**
Maths	58	45	74	63
History	65	72	82	81
English	56	68	63	80
Chemistry	63	77	77	68
Total	**242**	**262**	**296**	**292**
Average	60.5	65.5	74	73

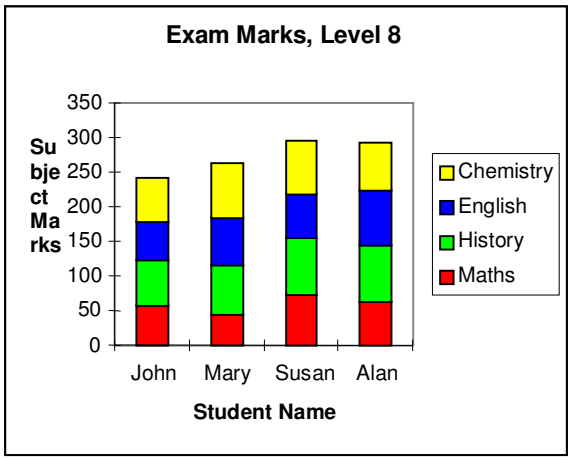
Click the *Spelling* button and spell check your work.

Draw a chart. Now we will use this data to draw a chart to compare the subject marks for the various students. First, select the cells in rows 2 to 6 and click the ***Chart Wizard*** button. Choose the Chart Type *Column* and the Chart Sub-Type *'Stacked Column'* which is the second on the first row, then click the *Next* button.

In Step 2, a sample chart is shown, and we need to choose the series in rows or columns. Choose *row* and click *Next.*

In step 3, you are asked to give the chart a title and to label the X and Y axis. For these, enter "Exam Marks, Level 8", "Student Name", and "Subject Marks" and click the *Next* button.

In step 4, you can choose if the Chart should be on a new sheet or should be included as an object in the existing sheet. Choose *as object in* and click *Finish.* The chart is drawn and now you can resize and move it where you want it. Click the *Save* button to save your completed document. It should look like that below:



Our second exercise, ***ss xl Profit*** refers to a shop which sells many things:

item	a thing e.g. bread, cheese, dress
opening stock	how many you have at the start (of the day, week etc)
closing stock	how many you have left at the end (of the day, week etc)
sales	how many you have sold (in a day, week etc)
purchase cost	how much you paid for one of an item (e.g. one apple)
selling price	how much you sell one of an item for (e.g. one apple)
unit profit	how much you make on selling one of an item (e.g. one apple)
item profit	how much you make on selling the item (e.g. all the apples you sell)

sales = opening stock – closing stock
unit profit = selling price – purchase cost
item profit = sales x unit profit

This exercise introduces more features of Excel. Enter the following data in a new document and save it as *ss xl Profit.*

Sales for w/e 30/4/2000							
Item	Opening stock	Closing stock	Sales	Purchase cost	Selling price	Unit profit	Item profit
Bread	150	32		35	41		
Biscuits	43	28		105	120		
Cheese	32	11		94	120		
Crisps	148	105		43	59		
Apples	68	17		7	12		
Sprite	180	79		8	12		

Notice that some of the headings are too long and will not fit in the standard width of a cell. We can "drag" the edge of a column with the mouse to make it wider and show the entire heading. Try this for the Opening Stock column. There is another (easier!) way though – simply double click on the right-hand boundary of the column heading and it will be resized to the width of the longest entry in that column. Try it with the other columns.

We will now calculate the sales, unit profit and item profit for the first item, bread. This is easy – simply use the cell references!

Sales = Opening stock – Closing stock =(B3-C3)
Unit profit = Selling price – Purchase cost =(F3-E3)
Item profit = Sales x Unit profit =(D3*G3)

You can enter the formula directly in the cells or in the formula bar just above the worksheet. Once these are entered and correct, "drag" the formulae down the columns for the other items.

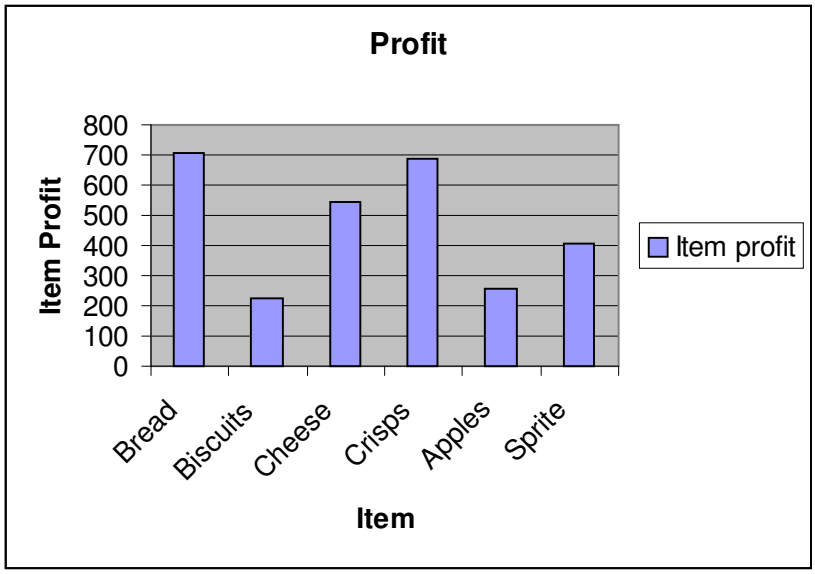
In G9 type Total profit and then use the AutoSum function to give the total profit figure in H9. Save your worksheet.

Now we will format the worksheet to make it more attractive. Add borders to all the cells, make columns A and H light blue, make rows 2 and 9 light blue, make row 1 yellow and make cells G9 and H9 yellow. Make all the headings bold. Make the title 12pt Arial bold and merge the cells in the top row to centre it across the table using the *Merge and Center* button on the toolbar. Your finished table should look like this:

Sales for w/e 30/4/2000							
Item	**Opening stock**	**Closing stock**	**Sales**	**Purchase cost**	**Selling price**	**Unit profit**	**Item profit**
Bread	150	32	118	35	41	6	**708**
Biscuits	43	28	15	105	120	15	**225**
Cheese	32	11	21	94	120	26	**546**
Crisps	148	105	43	43	59	16	**688**
Apples	68	17	51	7	12	5	**255**
Sprite	180	79	101	8	12	4	**404**
						Total profit	**2826**

Now let us draw a chart to illustrate this data. We do not want to select the whole table as we are only interested in the item names and the item profits. So first select cells **A2 to A8** with the mouse, then hold down the Ctrl key and select **H2 to H8.** Then click the *Chart Wizard* button.

In step 1, click C*lustered Column* and choose *Next*. In step 2, choose Series in *Columns* and go to step 3. Enter the title "Profit" and call the X-axis "Item" and the Y-axis "Item Profit" then go to the next step. Choose the option *as object in* and click *Finish*. The chart will be drawn and you can position it where you want. Save your document.



Suppose we want to do another similar table and chart for the next week. We could continue below the existing ones in the current document or start a new document. But Excel has another feature called ***Workbooks*** which allows tables to be constructed in the same document, but kept on separate ***sheets***.

Find the tab labelled ***Sheet 2*** at the bottom of the window and click on it. An empty worksheet will appear. Enter the following data (note that there is an extra column - Purchases):

Sales for w/e 7/5/2000								
Item	Opening stock	Purchases	Closing stock	Sales	Purchase cost	Selling price	Unit profit	Item profit
Bread		100	40		35	41		
Biscuits		20	12		105	120		
Cheese		20	5		94	120		
Crisps		0	16		43	59		
Apples		60	0		7	12		
Sprite		100	43		8	12		

The figures in the Opening stock column should come from the Closing stock column of the previous table. We could simply type them in, but it is easier – and better – to use Copy & Paste. Highlight the figures in column C on sheet 1, click *Copy* and switch back to sheet 2 and click the cursor in cell B3 to make it active. On the menu bar click *Edit,* ***Paste Special***, and in the dialogue box that opens, click the *Paste Link* button. The figures are pasted into the column, and if you look at the formula bar you will see that the contents of the cell are referred back to the source cell on sheet 1.

Now insert the correct formula into the cells in row 3 and then drag them down the columns to copy them into the other rows. Be careful - the formulae will be a little different to those in the previous example, so don't copy them blindly!

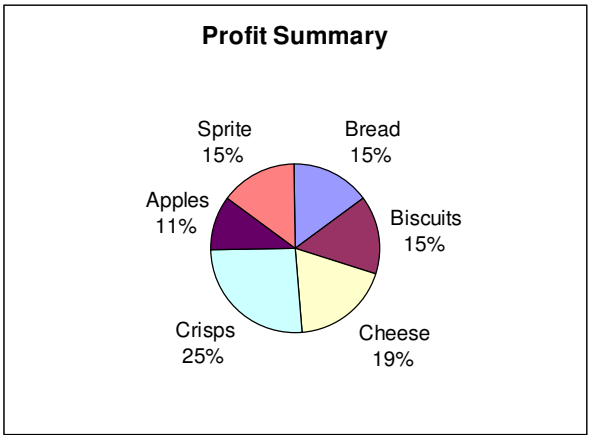
Sales = Opening stock + Purchases – Closing stock =(B3+C3-D3)
Unit profit = Selling price – Purchase cost =(G3-F3)
Item profit = Sales x Unit profit =(E3*H3)

Then add the total field to I9 using the Auto Sum function. Click the save button to save all your hard work.

Now format the worksheet to make it more attractive. Add borders to all the cells, make columns A and I light blue, make rows 2 and 9 light blue, make row 1 yellow and make cells G9 and H9 yellow. Make all the headings bold. Make the title 12pt Arial bold and merge the cells in the top row to centre it across the table. Click the save button again. Your finished table should look like this:

Sales for w/e 7/5/2000								
Item	Opening stock	Purchases	Closing stock	Sales	Purchase cost	Selling price	Unit profit	Item profit
Bread	32	100	40	92	35	41	6	552
Biscuits	28	20	12	36	105	120	15	540
Cheese	11	20	5	26	94	120	26	676
Crisps	105	0	16	89	43	59	16	1424
Apples	17	60	0	77	7	12	5	385
Sprite	79	100	43	136	8	12	4	544
							Total profit	4121

Now use the Chart Wizard to create a plot of this data: highlight cells **A3:A8**, hold down the control key and highlight **I3:I8**. This time choose a Pie Chart in step 1 instead of a Column Chart and choose the first option on row 1. In step 3, click on the Title tab and give the title 'Profit Summary'. On the Legend tab, deselect *'Show Legend'*. On the Data Label tab select *'Show label and percent'*. In step 4 choose *as object in* and click Finish. Your plot should look like that below:



Next we will combine the profit results for these two weeks on Sheet 3.

Click on the tab for ***Sheet 3*** and then add the title 'Summary of Profits" in cell A1. Type "Item Profit" in B2. Type "Item" in A3, "w/e 30/4/2000" in B3, "w/e 7/5/2000" in C3; merge and center B2 and C2; type the item names in A4 to A9.

We could now type the individual profit figures from Sheets 1 and 2 into Sheet 3, but if we do that the data will be "static" i.e. will not reflect any changes made to the original data in Sheets 1 and 2. So instead we will copy and paste the values.

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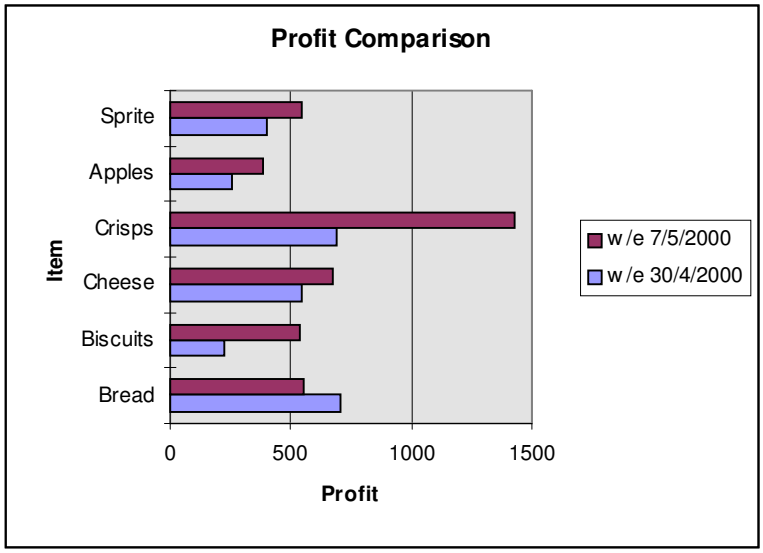
Click on the tab for Sheet 1, highlight the profit figures in cells H3 to H8 and then click the *copy* button on the tool bar. Return to Sheet 3, click the cursor in cell B4 and then click *Edit, Paste Special*. A dialogue box opens; click the *Paste Link* button. The data from Sheet 1 is pasted into column B of sheet 3. Repeat these steps and paste in the profit figures from Sheet 2 into column C.

Format the table in line with those on the other two sheets and then click the save button. Your table should look like this below:

Summary of Profits		
	Item Profit	
Item	w/e 30/4/2000	w/e 7/5/2000
Bread	708	552
Biscuits	225	540
Cheese	546	676
Crisps	688	1424
Apples	255	385
Sprite	404	544

Next, we want to draw a chart to compare the two weeks' profit - highlight cells **A3 to C9** and click the *Chart Wizard* button. In step 1 select *Bar Chart* and chart sub-type "*Clustered Bar*" which is the first option on the first row. Accept the data range if it is correct and then choose "*Series in Columns*" in step 2. In step 3 add the chart title 'Profit Comparison" and label the X-axis 'Profit' and the Y-axis 'Item". In step 4 In step 4 choose *"as object in*" and click Finish. Click the save button.



The beauty of using spreadsheets is that values are automatically recalculated whenever you change the contents of a cell. Even the graphs are re-drawn! And if you link the data in separate spreadsheets by using the Paste Special command, the changes are carried through to those tables too.

To illustrate this, we will change a value in sheet 1 and see how it affects the rest of the data. First, note the profit made on Crisps on both sheet 1 and 2, and look at graph on sheet 3 to see the ratio of profit on Crisps for the two weeks. Remember how they look!

Now change the closing stock figure for crisps from 105 to 75 on sheet 1. Re-check the profit figures and look at the charts to see how the change is reflected throughout. But do not save the changes when you close the Excel workbook.

Our third exercise is to create a new document and see how Excel can be made to format different types of data.

Open a new worksheet and type the title "Interest Payments" in A1. In the next row type the headings Name, Principle, Rate, Term, Interest and Total into cells A1 to F1. Enter the rest of the data shown in the table below:

Interest Payments					
Name	Principle	Rate	Term	Interest	Total
John	50000	0.1225	5		
Mary	45000	0.11	7		
Henry	30000	0.105	6		
Julie	60000	0.127	7		

Now enter the expression for calculating the amount of interest in E3 (=B3*C3*D3) and then drag the formula down the other cells in this column. Next, enter the total amount to be paid back (=B3+E3) in cell F3 and drag this down the column.

Now we will format the cells according to the kind of data they contain. Highlight B3 to B6, click Format on the menu bar, then click Cell and select Currency in the category list. Select the symbol for $English (United States) from the drop down list and then select 0 (zero) decimal places. Check the sample of how it will look at the bottom top the dialogue box; then click OK. The entries in the Principle column will now be formatted in line with the sample. Repeat for columns E and F. Next, highlight the entries in the Interest column, click Format, Cells, Percentage, and select 2 decimal places. Check the sample at the top of the dialogue box to see how it will look and click OK.

We have finished formatting the cells according to data type. Next we will sort the rows so that the highest debt comes first. Highlight cells A3 to F6 and click Data, Sort. In the dialogue box that opens, you can see a drop down box at top left with a list of all the column names. Choose the Total column, click the Descending radio button to its right and then click OK. You will see that the rows have been rearranged so that the highest figure in column F is now at the top.

Finish off the table by formatting it to make it look good: give all the cells a border, merge the cells in the top row, centre the title and make it 12 point and bold with a yellow background; bold and centre the column headings; bold people's names and total figures; centre the figures in the Term column; shade the column heading cells 20% grey. Your completed table should look like this:

Interest Payments					
Name	**Principle**	**Rate**	**Term**	**Interest**	**Total**
Julie	$60,000	12.75%	7	$53,550	**$113,550**
John	$50,000	12.25%	5	$30,625	**$80,625**
Mary	$45,000	11.00%	7	$34,650	**$79,650**
Henry	$30,000	10.50%	6	$18,900	**$48,900**

Save your work as ss xl interest.

Practice: In Practical folder open xl Marks – revision and xl Profit – revision to practise what you have just learned.

Further practice: \Practical\Purchase Bill.

Some shortcut keys:

- Highlight a row — Shift and Space Bar
- Highlight a column — Ctrl and Space Bar
- Insert row / column / cell — Ctrl and Shift and +

Using AutoFill to copy a formula to adjacent cells:

(a) Select the cell with the first entry you want to start from. Note that the cell has a thick line drawn around it, and in the bottom right hand corner is a small square.
(b) Place the cursor over this square and it changes shape to a black cross.
(c) Hold down the left mouse button and drag the rectangle over to the other cells to be filled.
(d) Release the mouse button.

Using AutoFill to generate a series of values e.g. number list, dates:

(a) Select the first cell in the range you want to fill, and enter the starting value for the series.
(b) To increment the series by a specified amount, select the next cell in the range and enter the next item in the series. The difference between the two starting items determines the amount by which the series is incremented.
(c) Select the cell or cells that contain the starting values.
(d) Drag the fill handle over the range you want to fill.