# Introduction to Excel

What is Microsoft Excel?

Excel is a spreadsheet (SS) program that provides the user with the ability to organize data, do basic/advanced calculations, do what-if analysis, graph data, create professional reports, publish info to the Web, access real-time data from the Web. We will do all of these things through the four major parts of the Excel application:

- Worksheets: where we will enter, calculate, manipulate and analyze data.
- Charts: to represent our data pictorially.
- Databases: to manage the data. We can search, sort and select.
- Web Support: to save data in HTML format.

Let's begin by going to the Start menu and launching the Excel application. Your screen should look something like the following (only much larger):
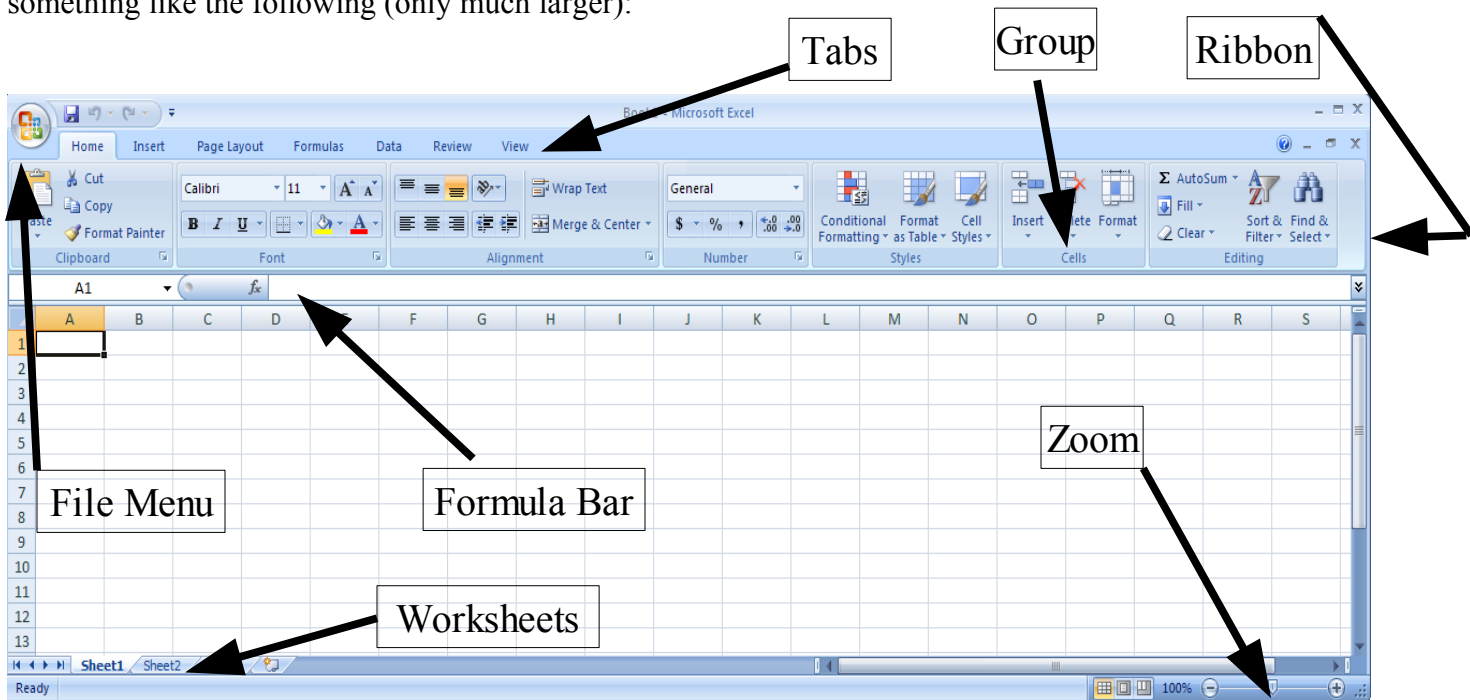
As with all **Office 2007** applications, Excel's functiuonality is divided into Ribbons or Tabs. To use a particular bit of functionality, select the appropriate Tab from the top. Depending on the version of Excel that you are using, the menu bar and toolbar options might look a little different. Also, even though the Mac and Windows versions of Excel are pretty much compatible, there are differences between the UIs (User Interfaces) in the Mac and the Windows environments.

The round **Office Icon** in the top left acts at the File Menu, allowing you to Open, Close, Save, and Print the Spreadsheet file.

Workbook

When you first start Excel, it opens up with a new workbook called **Book1**. This workbook contains three worksheets by default called **Sheet1**, **Sheet2**, and **Sheet3.** This is similar to having a notebook with many sheets of paper.

- Can you rename the worksheets?
  Right click and select **Rename** to rename a worksheet.
- Can you add more worksheets?
  You can add many more (**right click** and select **Insert**).

Worksheet

Worksheets consist of a grid or rows and columns. Each worksheet consists of cells, which are the basic building blocks of every worksheet.

A cell is referred to by its unique **address** or cell reference. The cell address is the Column letter and the Row number, for example D13.

Q1: What is an active cell and how do we know which cell is currently active?
Answer: _____

_____

_____

Cells

You can enter various types of information into cells in various ways. The simplest type of information is text, which you just enter by selecting the cell and typing the text.

You can also enter numbers (or values) by typing in any of the number characters and acceptable symbols. Valid number symbols are = - ( ) , / . $ % E e. Do not put any spaces in a number or Excel will interpret it as text.

Formulas

Formulas are a different type of data that you can enter into the cell. A formula begins with an equal sign followed by a well-formed expression. If the equal sign is missing, chances are that the cell data will be interpreted as text unless a simple number is typed in.

Q2: If we place the formula =3+9/3-1 into cell A1, what value gets displayed? Why?
Answer: _____

_____

_____

_____

Q3: Excel contains several binary arithmetic operators. What is a binary operator and what are the five most common binary operators?

Answer: _____

_____

_____

_____

Q4: What is operator precedence and how does it apply to the above binary operators listed in the previous question?

Answer: _____

_____

_____

_____

Q5: What is the value of each of the following formulas?

- =2+4/2

  _____
- =4/0

  _____
- =0/4

  _____
- =2*3+5/2

  _____
- =2*/3

  _____
- =2*-1

Q6: Consider the formula =2+3+6. When we talk about the operator associativity of an operator, what do we mean and how does it apply to this formula?

Answer: _____

_____

_____

_____

_____

Important concepts: Operator Precedence and Operator Associativity.

Operator Precedence: _____

_____

_____

Operator Associativity: _____

_____

_____

Cell References

Not only can numbers be placed in cell formulas, cell references can be used in cell formulas.

Q7: What does the following formula mean? =A1+2

Answer: _____

_____

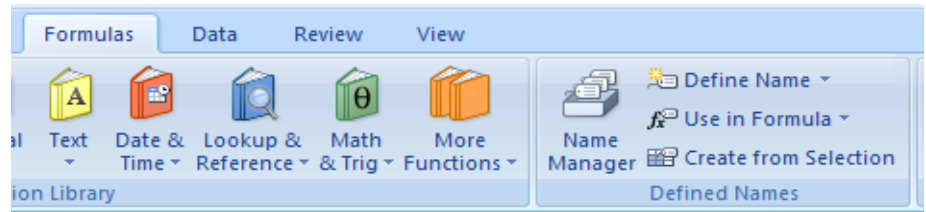_____

_____

_____

Problem 1

Place the values 10, -3 and 22 in the cells A1, A2, and A3 respectively. In cell, A4, write the formula to find the average of the values in cells A1 to A3. Then change the value in cell A2, and the value in cell A4 should be modified as soon as you hit return.

Cell references in formulas can be relative or absolute.

- Relative references: refer to cell references in formulas in relation to the cell that contains the formula. This is what we've been using so far.
- Absolute references: refer to cells in their absolute or fixed position.

Named Cells

You can *name* a cell rather than reference it through its address. This allows us to give meaningful names to values for use in formulas.

| Formulas | Data | Review | View |

al Text   Date & Lookup & Math   More   Name   Define Name
             Time ▾ Reference ▾ & Trig ▾ Functions ▾   Manager   Use in Formula
ion Library   Create from Selection
                                                                Defined Names

Problem: Place your age in cell G1. Using the **Formulas** Tab, **Define Name** of that cell to *MyAge*. In cell G2, write the number of years left you have in college, name that cell *YearsLeft*. In cell G3 write a formula to determine your age when you graduate college.

Write that formula here: _____

Filling

Typically, when creating a SS, you want to get some pattern going so that you can do some kind of fill either down or right. When filling, Excel adjusts the cell references in formulas based on whether they are relative or absolute.

Let's go back to our worksheet. Right now A4 calculates the sum of the values in A1, A2 and A3. What if we want B4 to calculate the sum of the values in B1, B2 and B3, and C4 to calculate the sum of the values in C1, C2 and C3, and so on till column E. Enter the values that we want to sum in B1, B2, B3, C1, C2, etc.

Now, since the formula in A4 uses relative cell references, you can just select that cell, and drag from the bottom right hand corner to the right. This is called filling.

What you'll notice is that B4 now contains the formula =B1+B2+B3.

Question: How can you view the formula in a cell?

An alternative to dragging is to copy A4 and paste it in C4. This is also filling

Problem 2.1

You are just starting college and you have calculated your expenses for your freshmen year as described below. You would now like to project what your expenses will be for each category for the next three years assuming that there will be a 6% increase in all expenses.

```
Category          Expenses
Clothes           540
Entertainment     725
Miscellaneous     355
Room & Board      3480
Tuition & Books   5150
```

How would you proceed? Name your spreadsheet "College"

Assume that you now want to find out what your total expenses for each year will be. What would you need to add?

Now suppose that you would like to see what your expenses will be if the increase was 7% or 8%. What changes would we have to make to the spreadsheet (SS)?

Formatting

Excel provides some advanced formatting capabilities (on the **Home** tab) to make your spreadsheet look more professional. The one that you should start using now is the cell formatting option. You get to this option by selecting the cell or cells you want to format and going through the Home tab and using the Number group. From here you can choose the type of number in your cell. The ones you are interested in now are the currency and percentage options. The Styles group contains predefined formatting options.

From now on, any numbers that you have in your worksheet should be formatted appropriately.

Absolute Cell Reference

What is the difference between a relative and absolute reference again?

Absolute references are specified using a $, so for example, a cell reference of A1 references cell A1 and any subsequent copy of the cell reference into another cell still produces A1.

It is also possible to make just the row or column reference absolute as follows: $A1 or A$1.

Question: How do $A1 and A$1 differ from A1?

Problem 2.2

Modify the college expenses SS so that the user just has to change the yearly percent increase and the rest of the SS is updated with the proper values.

Error messages

Excel has several error messages that you should be aware of and the main ones are:

- # - A ##### error value occurs when the cell contains a number, date, or time that is wider than the cell or when the cell contains a date and/or time formula that produces a negative result.
- #DIV/0! - The #DIV/0! error value occurs when a formula divides by 0 (zero).
- #na - No information is available for the calculation you want to perform.
- #NAME? - The #NAME? error value occurs when Microsoft Excel doesn't recognize text in a formula.
- #NULL! - The #NULL! error value occurs when you specify an intersection of two areas that do not intersect.
- #REF! - The #REF! error value occurs when a cell reference is not valid.
- #VALUE! - The #VALUE! error value occurs when the wrong type of argument or operand is used, or if the Formula AutoCorrect feature cannot correct the formula.

Problem 3

Name your spreadsheet "Meteorology"

A meteorology class found the average weekly temperature for each week of each month for one year. The data follows. You are to find each of the following using a SS:

1. The average monthly temperature for each month.
2. The highest and lowest monthly averages using two functions we have not discussed yet: maximum and minimum. See if you can use the help feature to figure this out.

Month	Week1	Week2	Week3	Week4
jan	33	36	29	31
feb	37	32	39	38
mar	43	47	38	45
apr	49	51	53	50
may	52	55	54	58
jun	56	62	61	60
jul	65	69	73	70
aug	72	74	68	69
sep	67	66	64	60
oct	63	65	60	59
nov	46	42	45	40
dec	38	35	36	35