SPREADSHEETS

- Spreadsheet software refers to ***application software package*** *that are used for* ***calculations*** *and* ***analysis of numerical work***
- They are grid like structures made up of rows and columns

Examples of spreadsheet software application include

- Microsoft excel
- Lotus 1-2-3
- Open office.org calc
- Quattro pro
- Apple numbers
- VisiCalc etc

ADVANTAGES OF USING ELECTRONIC SPREADSHEETS OVER MANUAL SPREADSHEETS

- They have pre existing tables thus there is no need to draw grid lines
- Spreadsheets have in-built **functions** and **formulae** which make work easy.
- They offer different options of data presentation by using charting tools such as pie charts, bar graphs, etc

Advantages continuation

- Electronic spreadsheets can **quickly perform** mathematical, statistical, and financial calculations.
- It is Easy to make changes and corrections (**to edit**) data on the worksheet.
- They easily filter, sort, and arrange data in alphabetical order for better organization.

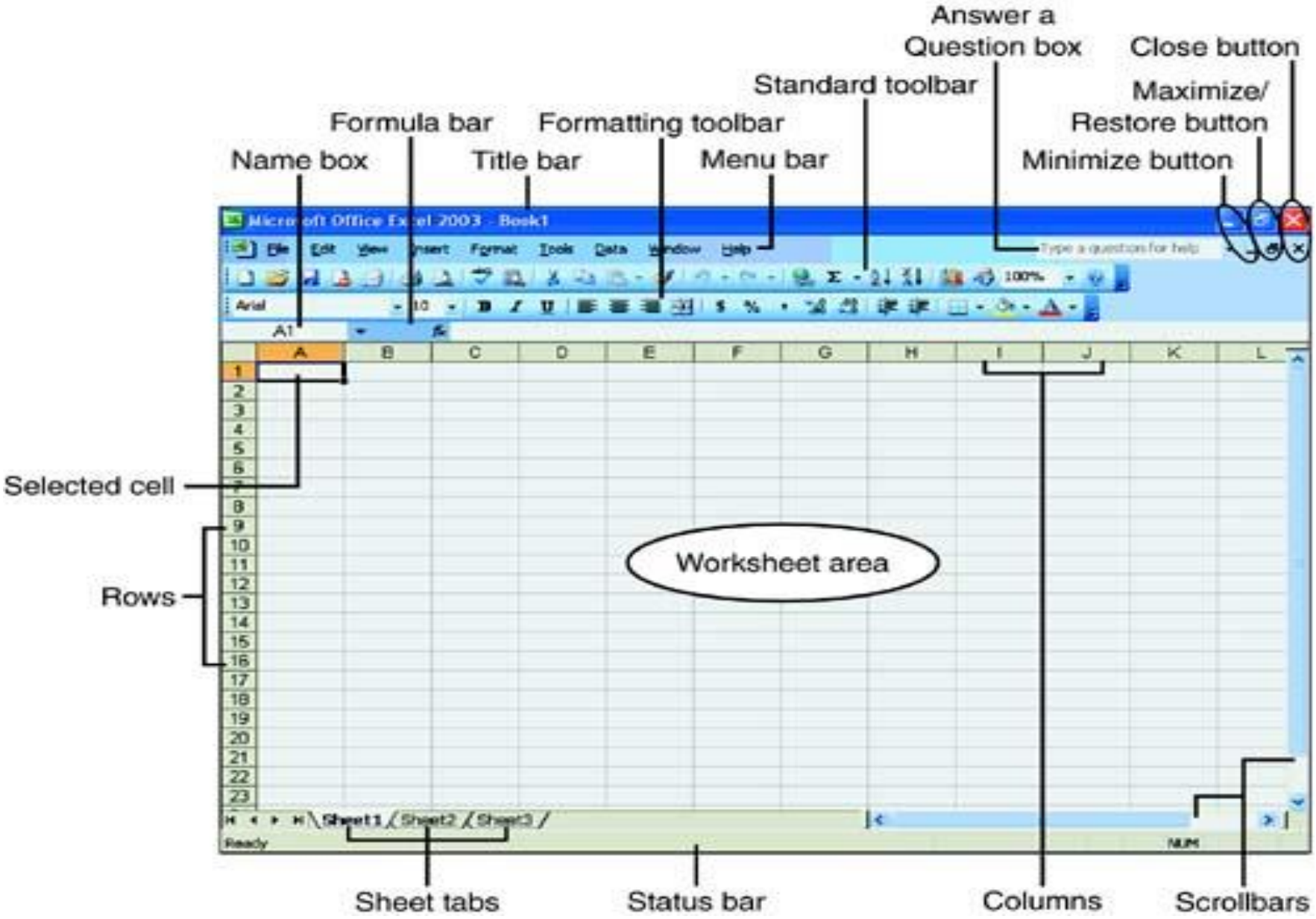
DISADVANTAGES (DEMERITS) OF USING ELECTRONIC SPREADSHEETS

- Electronic spreadsheets require special software and hardware which is **expensive**.
- Spreadsheets require enough time for **training** and practicing before use.
- There is a lot of **complexity** surrounding formulas, functions and their arguments.
- Computers can get system errors, and **virus infections**. These problems can also lead to total loss of data.

Disadvantages continuation

- Electronic spreadsheets cannot be used in areas **without Electricity**.
- There is Difficulty in **finding Data Mistakes** since Electronic spreadsheets have many fields, making it look like a screen full of small boxes.
- **Difficult printing:** Obtaining hard copies becomes very hard especially when the worksheets are too wide as compared to the available page sizes

WORKING WITH THE MICROSOFT EXCEL WINDOW



Features of a spreadsheet

- **A formula** must always start with “=” sign and what the calculations for each cell
- **Grid Lines** - The horizontal and vertical lines on the spreadsheet
- **Sheet tabs** - Tabs that identify the worksheets in a workbook

features continuation

- **Workbook** - A group of many worksheets
- **Worksheet** - One page of a spreadsheet that contains up to 65,536 rows and 256 columns
- **Name Box** - The Name Box is located next to the formula bar above the worksheet area. The Name Box displays the cell reference of the active cell.

features continuation……

- **Columns** - The vertical segments that you see on the spreadsheet are called columns.
- **Rows** - The horizontal segments are referred to as rows.
- **Cells** - Each box that is created from a row and column intersecting is referred to as a cell.
- **Scroll bars** – A worksheet is too large. Scroll bars are used to roll or navigate to other parts of the worksheet that are not visible.

- **Toolbars** are located at the top under the main Menu bar
- **Formula Bar** is located under the toolbars
- A single "grid", or page, is usually referred to as a worksheet. The current worksheet is the main area of the window
- **Task pane** is the panel to the right of the worksheet.
- **Status bar** is located at the bottom of the window

Terms used in spreadsheet

- **Active cell** / **Selected cell** - An active cell is the cell you are currently working on. The cell with a thick outline.
- **Cell Reference** - The column letter and the row number of a cell
- **Value** - A number that can be entered into a cell

DATA TYPES THAT CAN BE ENTERED INTO A SPREADSHEET CELL

A cell may contain

(i) labels or

(ii) values.

- A label is a text entry, such as TOTAL, that cannot be numerically manipulated by the spreadsheet.
- A value can be a number, a date, the answer of a formula, currency, time, percentage, fraction, a logical value, error value e.t.c.

FORMULAS AND FUNCTION

- A formula is used to perform calculations on the data entered in the a spreadsheet. Example: =5+5 or =B2+B3
- A function is an inbuilt formula used perform common calculations on the data entered in a spreadsheet. Example: =SUM(B2,B3)
- Formulas and functions in a spreadsheet begin with an equal sign (=). The equal sign tells the excel that the succeeding characters constitute of a formula or function. If you do not enter an equal sign, excel will treat your entry as a text and the calculation will fail.

ORDER OF OPERATION

- When performing calculations using a formula/function, excel follows certain rules of precedence. Excel calculates expressions within the parentheses first.
- Excel then calculates multiplication and division before addition and subtraction. Excel calculates consecutive operators with the same level of precedence from left to right.

Example: =10+10*2 returns 30

=(10+10)*2 returns 40

Order of precedence rules

Formula (A1=50, B1=10, C1=5)	Order of Precedence Rule	Result
=A1+B1*C1	Multiplication before addition	100
=(A1+B1)*C1	Expression inside parentheses executed before expression outside	300
=A1/B1–C1	Division before subtraction	0
=A1/(B1–C1)	Expression inside parentheses executed before expression outside	10
=A1/B1*C1	Two operators at same precedence level, leftmost operator evaluated first	25
=A1/(B1*C1)	Expression inside parentheses executed before expression outside	1

Arithmetic operators

Operation	Arithmetic Operator	Example	Description
Addition	+	=10+A1	Adds 10 to the value in cell A1
		=B1+B2+B3	Adds the values in cells B1, B2, and B3
Subtraction	–	=C9–B2	Subtracts the value in cell B2 from the value in cell C9
		=1–D2	Subtracts the value in cell D2 from 1
Multiplication	*	=C9*B9	Multiplies the values in cells C9 and B9
		=E5*0.06	Multiplies the value in cell E5 by 0.06
Division	/	=C9/B9	Divides the value in cell C9 by the value in cell B9
		=D15/12	Divides the value in cell D15 by 12
Exponentiation	^	=B5^3	Raises the value of cell B5 to the third power
		=3^B5	Raises 3 to the value in cell B5

Operations in Formulas

operator	Description
:	Colon
	Single space
,	Comma
-	Negation (as in -1)
%	Percent
^	Exponentiation
*	Multiplication
/	Division
+	Addition
-	Subtraction
&	Connects two strings of text
=	Comparison (Equal to)
<	Less Than
>	Greater Than
>=	Greater Than or Equal to
<=	Less Than or Equal to
<>	Not Equal to

Understanding error values

Error type	Description
#####	When your cell contains this **error code**, the column isn't wide enough to display the value
#NAME?	The #NAME? error occurs when the function name is misspelled or Excel does not recognize text in a formula e.g. SU for SUM function
#VALUE!	Excel displays the #VALUE! error when a formula has the wrong type of argument. Example B3(hi), B4(10) =B3+B4 returns #error
#DIV/0!	Excel displays the #DIV/0! error when a formula tries to divide a number by 0 or an empty cell
#REF!	Excel displays the #REF! error when a formula refers to a cell that is not valid

Range of cells

- A range of cells includes the value of every cell within the specified range. Ranges of cells are identified with a colon (:). E.g. Range A1:A4 includes the cells A1, A2, A3 and A4
- Non-adjacent cells can be listed in the formula by separating them with a comma rather than a colon. E.g. =SUM(A2,A4) will add cells A2 and A4 but ***not*** A3 whereas =SUM(A2:A4) will add the range of cells A2, A3 and A4

Cell referencing

Cell reference	Refers to values
A10	The cell in column A and row 10
A10,A20	Cell A10 and Cell A20
A10:A20	Range of cells from A10,A11,A12,…….up to A20
A10:E20	The range of cells in column A through E and rows 10 through 20

Using Relative References

- Relative addressing is what Excel uses by default. This means that when you copy or move a formula to a new location in a worksheet (or even to another workbook), Excel automatically adjusts the cell references in the copied formula to be consistent with the original formula. If the original formula referenced a value five columns to the left and two rows down, then the copied formula will do the same.

Using Relative References

Formula using a relative reference

original formula with a relative reference

	A	B	C	D
1	10	20	30	
2				
3	=A1			
4				
5				

formula copied to a new range (column and row references shift based on cell location)

	A	B	C	D
1	10	20	30	
2				
3	=A1	=B1	=C1	
4				
5				

formula results

	A	B	C	D
1	10	20	30	
2				
3	10	20	30	
4				
5				

Using Absolute References

- Absolute addressing fixes a cell reference so that regardless of where the formula is copied to, it will always reference the same original cell. This feature takes the versatility of formulae to the next level!

Using Absolute References

Formula using an absolute reference

original formula with an absolute reference

	A	B	C	D
1	10	20	30	
2				
3	=$A$1			
4				
5				

formula copied into a new range (column and row references fixed regardless of cell location)

	A	B	C	D
1	10	20	30	
2				
3	=$A$1	=$A$1	=$A$1	
4				
5				

formula results

	A	B	C	D
1	10	20	30	
2				
3	10	10	10	
4				
5				

Using mixed cell references

- A **mixed cell reference** is either an absolute column and relative row or absolute row and relative column. When you add the $ before the column letter you create an absolute column or before the row number you create an absolute row

Using Mixed References

Formulas using mixed references

original formula with a mixed reference

	A	B	C	D
1	10	20	30	
2				
3	=A$1			
4				
5				

formula copied to a new range (row reference fixed on row 1, column reference shifts based on the cell location)

	A	B	C	D
1	10	20	30	
2				
3	=A$1	=B$1	=C$1	
4	=A$1	=B$1	=C$1	
5	=A$1	=B$1	=C$1	

formula results

	A	B	C	D
1	10	20	30	
2				
3	10	20	30	
4	10	20	30	
5	10	20	30	

Entering Relative, Absolute, and Mixed References

- To enter a relative reference, type the cell reference as it appears in the worksheet. For example, enter B2 for cell B2
- To enter an absolute reference, type $ (a dollar sign) before both the row and column references. For example, enter $B$2
- To enter a mixed reference, type $ before either the row or column reference. For example, enter $B2 or B$2

or

- Select the cell reference you want to change
- Press the F4 key to cycle the reference from relative to absolute to mixed and then back to relative

Understanding Function Syntax

- Every function has to follow a set of rules, or **syntax**, which specifies how the function should be written
  - **Arguments**

Categories of Excel functions

Category	Contains functions that
Cube	Retrieve data from multidimensional databases involving online analytical processing or OLAP
Database	Retrieve and analyze data stored in databases
Date & Time	Analyze or create date and time values and time intervals
Engineering	Analyze engineering problems
Financial	Have financial applications
Information	Return information about the format, location, or contents of worksheet cells
Logical	Return logical (true-false) values
Lookup & Reference	Look up and return data matching a set of specified conditions from a range
Math & Trig	Have math and trigonometry applications
Statistical	Provide statistical analyses of a set of data
Text	Return text values or evaluate text

Understanding Function Syntax

Figure 3-7 Math, Trig, and Statistical functions

Function	Category	Description
AVERAGE(*number1* [, *number2*, *number3*, ...])	Statistical	Calculates the average of a collection of numbers, where *number1*, *number2*, and so forth are either numbers or cell references. Only *number1* is required. For more than one cell reference or to enter numbers directly into the function, use the optional arguments *number2*, *number3*, and so forth.
COUNT(*value1* [, *value2*, *value3*, ...])	Statistical	Counts how many cells in a range contain numbers, where *value1*, *value2*, and so forth are text, numbers, or cell references. Only *value1* is required. For more than one cell reference or to enter numbers directly into the function, use the optional arguments *value2*, *value3*, and so forth.
COUNTA(*value1*, [,*value2*, *value3*, ...]	Statistical	Counts how many cells are not empty in ranges *value1*, *value2*, and so forth, or how many numbers are listed within *value1*, *value2*, and so forth.
INT(*number*)	Math & Trig	Displays the integer portion of a number, *number*.
MAX(*number1* [, *number2*, *number3*, ...])	Statistical	Calculates the maximum value of a collection of numbers, where *number1*, *number2*, and so forth are either numbers or cell references.
MEDIAN(*number1* [, *number2*, *number3*, ...])	Statistical	Calculates the median, or middle, value of a collection of numbers, where *number1*, *number2*, and so forth are either numbers or cell references.
MIN(*number1* [, *number2*, *number3*, ...])	Statistical	Calculates the minimum value of a collection of numbers, where *number1*, *number2*, and so forth are either numbers or cell references.
RAND()	Math & Trig	Returns a random number between 0 and 1.
ROUND(*number*, *num_digits*)	Math & Trig	Rounds a number to a specified number of digits, where *number* is the number you want to round and *num_digits* specifies how many digits to which you want to round the number.
SUM(*number1* [, *number2*, *number3*, ...])	Math & Trig	Adds a collection of numbers, where *number1*, *number2*, and so forth are either numbers or cell references.

Inserting a Function

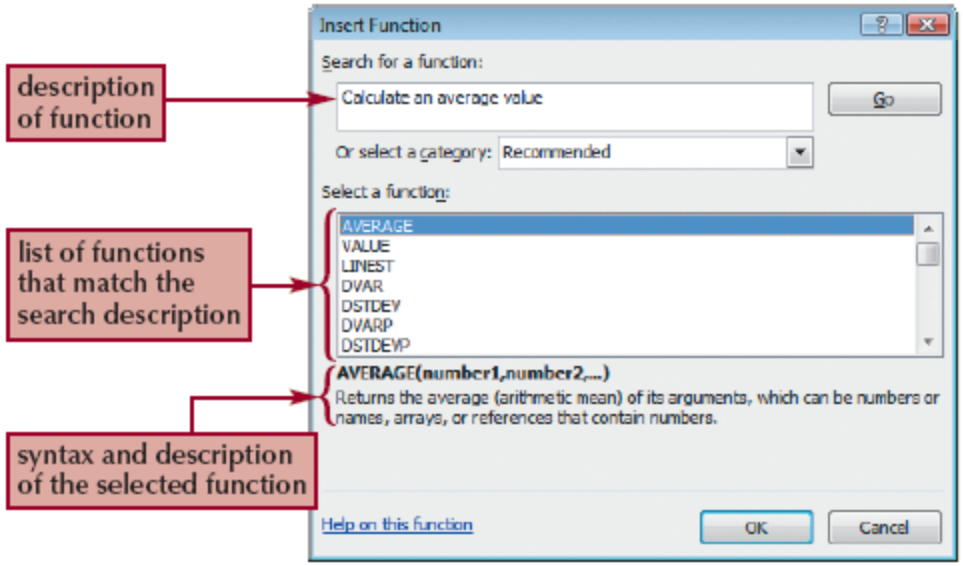
- Click the Formulas tab on the Ribbon
- To insert a function from a specific category, click the appropriate category button in the Function Library group. To search for a function, click the Insert Function button in the Function Library group, enter a description of the function, and then click the Go button
- Select the appropriate function from the list of functions
- Enter the argument values in the Function Arguments dialog box, and then click the OK button

Inserting a Function

Figure 3-10 Insert Function dialog box

Tip

You can also open the Insert Function dialog box by clicking the Insert Function button on the formula bar.



Inserting a Function

Figure 3-8 Function Arguments dialog box

Tip

You can click the Collapse Dialog Box button to shrink the Function Arguments dialog box to see more of the worksheet, select the range, and then click the Expand Dialog Box button to restore the dialog box.