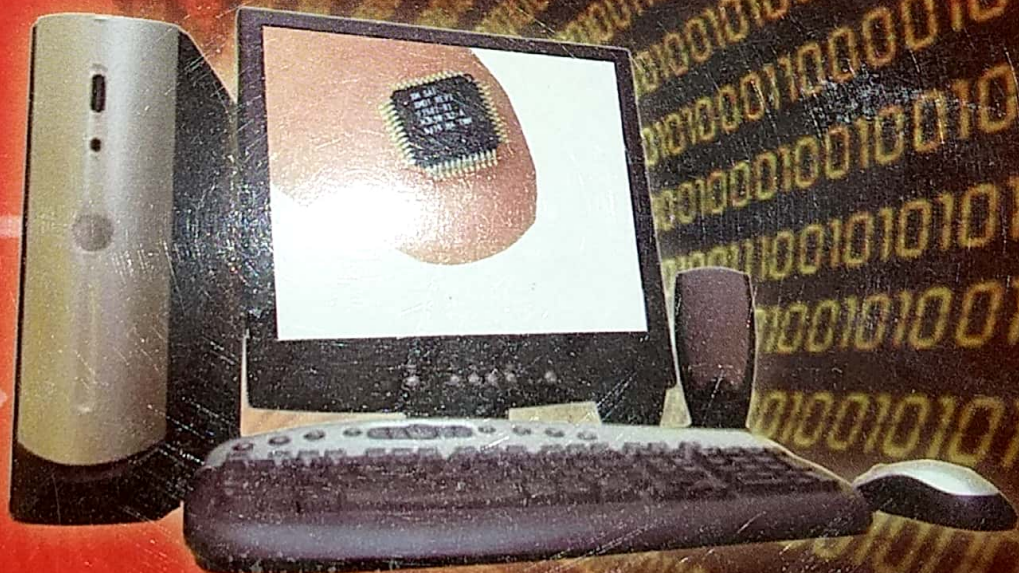


Beyond Windows



Towards Understanding Computers



7

Navdeep Publications

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More Peripherals

About Peripheral Devices

A peripheral device is any device attached to a computer in order to enhance its capabilities.

Printers, scanners, microphones, speakers, and digital cameras are some of the common peripheral devices. Besides these, there are many more advanced peripherals that you might not use directly in your daily life, but which are still extensively used and have an important role to play in the working of organizations such as banks, examination boards, libraries, etc. Let us learn about them.

Basically input and output devices together are known as peripherals.



Biometric Devices

Biometrics refers to the identity verification of living persons using their physical characteristics like the characteristics of their fingers, hands, feet, face, eyes, ears, teeth, veins, voice, odour, etc.

The biometric devices provide automated methods for recognizing distinctive features or actions of an individual like iris recognition, recognition of hand geometry, finger recognition, facial recognition, voice recognition, etc. For example, an employee can be allowed to enter a room, if the shape of his right hand or his voice matches exactly with the sample that is stored into the computer. This in turn is possible only when he or she is the same person. So, there is no chance of somebody else getting in, instead of the right person.



Biometric characteristics



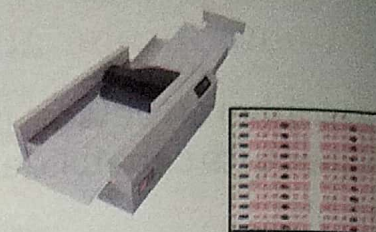
Biometric devices

Remember If a biometric system is to identify a person, it must first have a sample of the relevant physical characteristic of the person, to compare with.

Optical Mark Reader (OMR)

OMR detects the presence or absence of a mark in a specific position. Generally marks are made in specific boxes using a pencil, ballpoint pen, etc.

An Optical Mark Reader throws a light beam onto the document on which marks have been made, and analyses the reflected light to decide the mark position. A mark position is decided as less light is reflected from a marked cell than the unmarked cell.



An OMR test paper

Magnetic Ink Character Reader (MICR)

MICR machine reads the special characters printed (like on a cheque) in a standard font using an ink containing iron oxide.

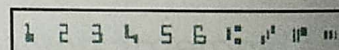
Numbers printed with this type of ink can not be altered with normal ink and alterations are ignored by the reader. Normally in a cheque, the cheque number, the branch code, the account number, etc. are printed using the MICR font and when passed through a MICR reading machine, the correct details of the transactions are interpreted and updated by the computer.



An MICR Reader

Fact File

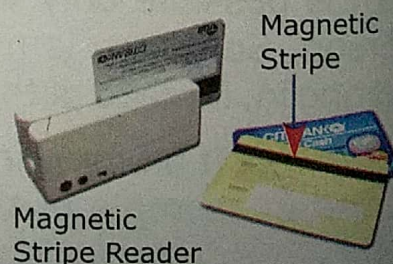
MICR font E-13 originated from USA and consists of a character set having ten numbers (0-9) and four symbols.



Magnetic Stripe Card/Reader

On Magnetic Stripe cards, the data is permanently stored on a magnetic stripe. The card often includes a name and signature or any other details (like a photo) for added security.

To read data from a smart card, the card is swiped through a magnetic card unit, which converts the information into computer readable characters for further processing. ATM cards; Credit cards like VISA, MASTER-CARD; library cards; etc. are some of these types of cards



Magnetic Stripe Reader

Smart Card/Reader

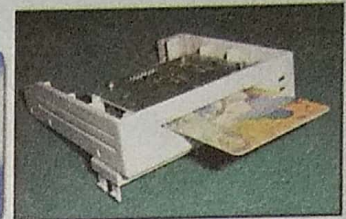
Smart cards are intelligent cards which have inbuilt electronics and memory storage (RAM chip). Lots of data like name, address, blood group type, etc. can be stored and updated on the RAM chip.

When the card is passed through a reader, the details are read from its memory and are also updated in the memory (like balance amount left after the transaction).

A circuit



A smart card



A smart card reader

Liquid Crystal Display (LCD) Projectors

LCD projectors are used when output is required on a big screen. Instead of on a monitor, the output is projected on the big white screen through the LCD projector.

Normally corporate presentations, multimedia educational programs which are presented to a large audience, require a LCD projector.

It also has adjustment controls like focus, type of input, digital zoom, picture shifting, etc. on it.

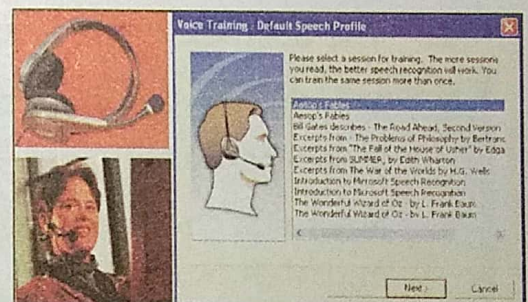


LCD Projector

Voice Recognition System

The Voice recognition system allows a user to use his/her voice as input.

A microphone is used to dictate the speech terms and some other hardware/software can also be used for echo and noise cancellation. A voice recognition system is used to give commands to the computer (such as opening a program, pulling down menus, or saving work) or to dictate text into the computer.



Activity Write the full form of:

LCD _____

OMR _____

MICR _____

Quick Recap

- A peripheral device is any device attached to a computer in order to enhance its capabilities.
- Biometrics refers to the identity verification of living persons using their physical characteristics.
- OMR detects the presence or absence of a mark in a specific position. Generally marks are made in specific boxes using a pencil, a ballpoint pen, etc.
- The MICR machine reads the special characters printed (like on a cheque) in a standard font using an ink containing iron oxide.
- On Magnetic Stripe cards, the data is permanently stored on a magnetic stripe.
- Smart cards are intelligent cards which have an inbuilt electronics and memory storage (RAM chip).
- LCD projectors are used when output is required on a big screen.
- The voice recognition system allows a user to use his/her voice as input.

Exercise Time

1. Write (T) for True and (F) for False statements.

1. Peripheral devices are attached to the CPU. ☐
2. The term OCR stands for Original Character Reader. ☐
3. The MICR machine reads the special characters printed (like on a cheque) in a standard font using an ink containing iron oxide. ☐
4. Magnetic cards are intelligent cards which have inbuilt electronics and memory storage. ☐
5. Lots of data like name, address, blood group type, etc. can be stored on Smart cards. ☐
6. The voice recognition system accepts a voice as the input. ☐

2. Select the suitable word and fill in the blanks.

Biometrics

Smart

OMR

LCD Projectors

Voice recognition

Magnetic

1. On _____ Stripe cards, the data is permanently stored on a magnetic stripe.
2. _____ refers to the identity verification of living persons using their physical characteristics.
3. An _____ detects the presence or absence of a mark in a specific position.
4. _____ cards are intelligent cards which have inbuilt electronics and memory storage.
5. _____ are used when output is required on a big screen instead of on a monitor.
6. The _____ system allows a user to use his/her voice as input.

3. Answer the following in 2-3 lines.

1. Write about Biometric devices.
2. Write about a MICR.
3. Write about Smart cards.
4. What is a Voice recognition system?

4. Draw lines to match the followings:

Biometric Peripherals

Smart Cards

Voice recognition system

OMR

Presence or absence of a mark

Voice Input

Physical characteristics

Inbuilt electronics



Functions and Data Manipulation in Excel

Using Functions

We know how to enter formulae and do calculations in Excel. But to get quick results and handle large volume of data easily, special inbuilt functions are there in Excel.

Functions are the special pre-written formulae and instructions that 'accept' the values as arguments and 'return' the result values in the cell in which they have been typed.

In Excel you will find Functions for every purpose whether it is Mathematical, Statistical, Logical or related to Date and Time. Just put the Arguments inside the brackets of the function in the proper format and you will get the required result. Let us learn about functions and arguments.

General Syntax of a Function

= Function name (Arguments).

For example, =AVERAGE(A1:A7) or =SUM(9,6,12)

↑ ↑ ↑ ↑
Function Arguments Function Arguments

Functions are like ready to eat dishes. I just need to warm it (pass arguments) to make it ready to serve.



Arguments

Arguments can be of the following types :

Constants

These values can be used directly in the Function. For example, =SUM(12,45,13) will return the value 70.

Cells or Range

The Cell reference or the range of cells can also be specified as the Argument. For example, =ABS(C5) or =AVERAGE(A1:A5) are the correct Functions.

Entering the Functions

1. All Functions begin with an "=" sign.
2. Parentheses are used to 'open' and 'close' the Function like *Sum()*.
3. All Arguments are given inside Parentheses.

You can separate the Arguments with a 'comma' or you can also give the Cell range. For example, =AVERAGE(A1,A2,A3,A4) or =AVERAGE(A1:A4) both are correct.

Function Categories

Functions can be broadly classified in the following categories:

1. Text Functions
2. Mathematical Functions
3. Statistical Functions
4. Date & Time Functions
5. Logical Functions

Each Function type is used for different purposes as indicated by the name of the Function. Let us understand these, one by one.

Text Functions

Excel's Text Functions help you to manage the text data in your spreadsheets.

Syntax	Purpose
=concatenate(text1, text2)	Joins multiple text strings into one.
Example : =concatenate("My","Country") = MyCountry	
=len(text)	Returns number of characters including spaces.
Example : =len("Country") = 7	
=lower(text)	Returns text in lower-case.
Example : =lower("COUNTRY") = /country	
=upper(text)	Returns text in upper-case.
Example : =upper("country") = COUNTRY	

Syntax	Purpose
=right(text,n)	Returns n characters starting from the right side.
Example : =right("COUNTRY",3) = TRY	
=mid(text, start position, number of character)	Returns the mentioned number of characters, beginning from the starting position.
Example : =mid("MY COUNTRY",4,5) = COUNT	

Mathematical Functions

Excel's Mathematical Functions can be used to perform common mathematical operations such as addition (SUM function), multiplication (product function), division and finding the squareroot.

Syntax	Purpose
=Sum(num1,num2)	Returns the Sum value of the Arguments.
Example : =sum(7,5) = 12	
=Product(num1,num2)	Returns the Product of the values given as the Arguments.
Example : =product(9,10,12) = 1080	
=Mod(num1,num2)	Returns the Remainder, after dividing the num1 by the num2.
Example : =mod(12,10) = 2	
=Sqrt(num), num>0	Returns the Square root of the number.
Example : =sqrt(4) = 2	

Activity Match the result with the function statements.

Product(25,5)	5
Sqrt(25)	125
Left("My country",2)	count
Mid("My country",4, 5)	My

Statistical Functions

Excel's Statistical Functions can be used to analyse the data in a spreadsheet. For example, they can be used to tell you the average value of your data or finding the maximum or minimum value within the selected data.

Syntax	Purpose
average(num1,num2....)	Returns the average of the Arguments.
Example : =average(10,12,14) = 12	
=max(num1,num2....)	Returns the maximum value out of the Arguments.
Example : =max(10,12,9,7) = 12	
=min(num1,num2....)	Returns the minimum value out of the Arguments.
Example : =min(12,12,9,7) = 7	

Logical Functions

Excel's Logical Functions can be used to introduce decision making into your spreadsheet. In logical functions you pass the condition as the arguments and it will return the result as True or False according to the satisfaction of the criteria of the condition. Here, we will learn about the IF function.

IF function

=IF (logical_test, true_action, false_action)

Returns one value if a condition you specify evaluates to TRUE and another value if it evaluates to FALSE.

- Logical_test is any value or expression that can be evaluated to TRUE or FALSE.
- True_action is the value that is returned if the logical_test is TRUE.
- False_action is the value that is returned if the logical_test is FALSE.

Example

If James secures more than 70 marks, he will get a video game, otherwise he will get a camera. Let us suppose he secures 75 marks.

=IF (B>70, "VIDEO GAME", "CAMERA")

As is clear, James will get the video game.

	A	B
1	james	75
2		

Data Manipulation

There are many options in MS Excel which will help in manipulation of data as required. For example, you can use the Goal seek option to find a value to manipulate the result or you can filter out the records to be displayed, which match some specific criteria or simply sort the data to arrange it into some order.

Using the Goal Seek

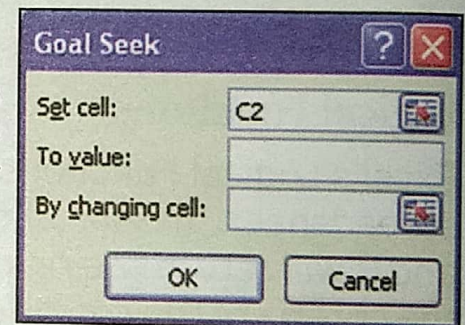
The Goal Seek option is useful when you want to manipulate the result which you have obtained by applying some Formula. Follow the steps given to use the Goal Seek option.

1. Click on the *Data* tab.
2. Click on the *What-if Analysis* arrowhead button. From the drop-down list, select the *Goal Seek* option.
3. The *Goal Seek* dialog box opens.
 - a. In the *Set cell* text box, specify the cell address where you have entered the formula to calculate the result Or place the cursor in the *Set cell* text box and click on the cell whose value you want to fix where you have entered the formula.
 - b. In the *To value* text box, enter the final value, which you want to obtain.
 - c. In the *By changing cell* text box, enter the cell address by changing the value for which you want to obtain the required result from or place the cursor in the *By changing cell* text box and click on that particular cell whose value you want to change. The cell address will be automatically filled in the *By changing cell* text box. Click on the *OK* button.

Nobody knows that in MS Excel, using the Goal Seek, I manipulated my results

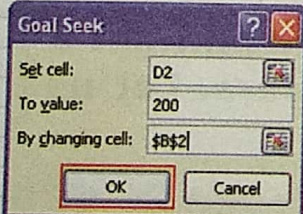
Dad, you are great !

I am proud of you !



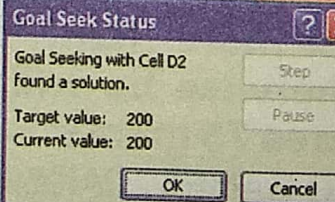
Example To set the total to 200 by changing the Science marks (cell B2).

	A	B	C	D
1	Math	Sci	Eng	Total
2	56	45	74	175
3				
4				
5				
6				
7				
8				
9				
10				



The values defined

	A	B	C	D
1	Math	Sci	Eng	Total
2	56	70	74	200
3				
4				
5				
6				
7				
8				
9				
10				



The final results

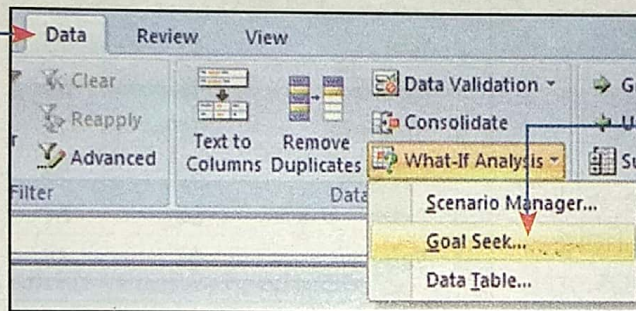
Example

You have obtained 211 marks as the result of the total obtained as the sum of marks in 3 subjects. But you needed 240 marks in total to get a distinction. You can check how many marks you require, in any particular subject (let us say English) to achieve the total of 240.

1. Enter the marks in the three different subjects and apply the formula to find their total in the Cell D2.

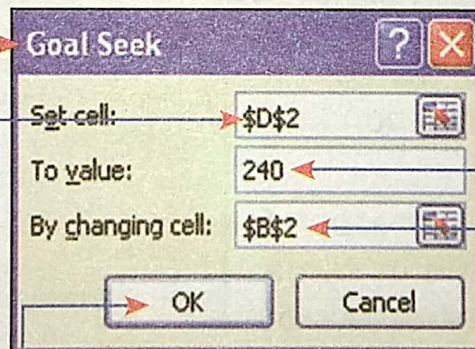
	A	B	C	D	E
1	Math	English	Science	Total	
2	73	65	73	211	
3					
4					

2. Click on the *Data* tab.



3. Click on the *What-if Analysis* arrowhead button. From the drop down list, select the *Goal Seek* option.

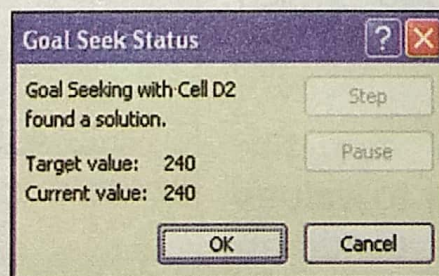
4. The *Goal Seek* dialog box will appear in front of you.



5. In the *Set cell* text box, check that the address of the cell where the formula is entered, is there.

6. In the *To value* text box, enter the required value you need to obtain from the Formula.

8. Click on the *OK* button.



...You will get the required value for the Cell B5, which will calculate the result as 240.

	A	B	C	D
1	Math	English	Science	Total
2	73	94	73	240
3				

7. In the *By changing cell* text box, enter the cell address of the cell which you want to change, (in this case, it will be Cell B2) to achieve the required result or, simply click in that particular cell and the cell address (here. \$B\$2) will be filled automatically.

Using the Filter

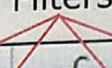
You can use the Filter option from the Data tab to display only those records which meet some specific criteria.

For example, if you have entered the marks of students of your class, using the Filter option you can extract the record of only those students who have scored more than 60 marks.

To do this, follow the steps given:

1. Click on any Cell within the Data.
2. Click on the *Data tab*.
3. Click on the *Filter button*.
4. The Arrowhead buttons will appear next to the field names in the list of entries.

Filters

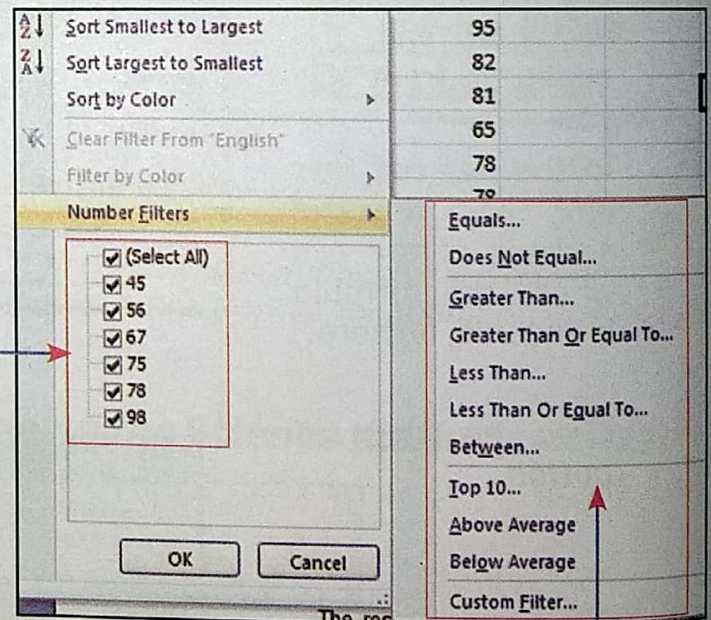


	A	B	C	D	E
1		▼ Maths	▼ English	▼ Science	
2	Ishi	67	75	95	
3	Charu	78	56	82	
4	Shalini	57	78	81	
5	Mitesh	85	98	65	
6	Arun	34	67	78	
7	Saby	87	45	78	

Specifying the Range of Values for Number Filters

You can display records based on some existing value or corresponding to some condition.

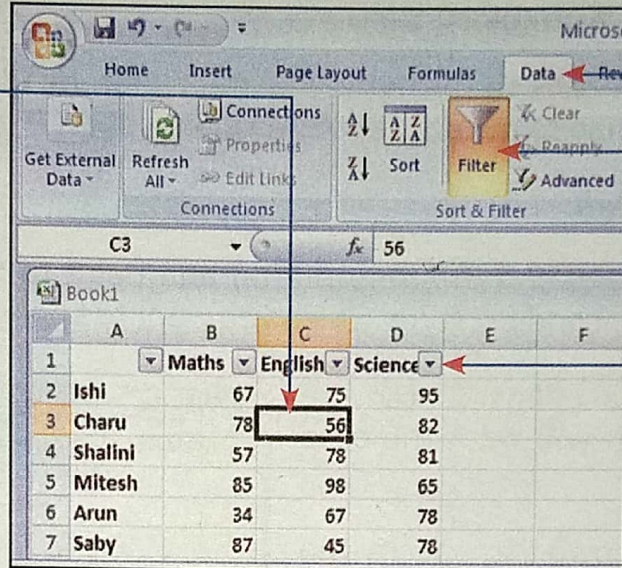
1. To show records which correspond to some particular value in some field, click on the filter arrow of that field, Disable the *Select All* check box, and enable the check boxes corresponding to which values you want to see the records.
2. When you want to see the records corresponding to values which satisfy some condition (like greater than 55, less than 45) or fall within some range like ((greater than 55 and less than 75), (less than 60 or greater than 60)), you can point to *Number Filters*, and select a category.



Example

To find out the list of students who have scored 75 or more marks in the subject English.

1. Click on any Cell within the Data you have entered.



The screenshot shows the Microsoft Excel ribbon with the 'Data' tab selected. The 'Filter' button is highlighted. Below the ribbon, a spreadsheet is visible with columns A through F and rows 1 through 7. The data is as follows:

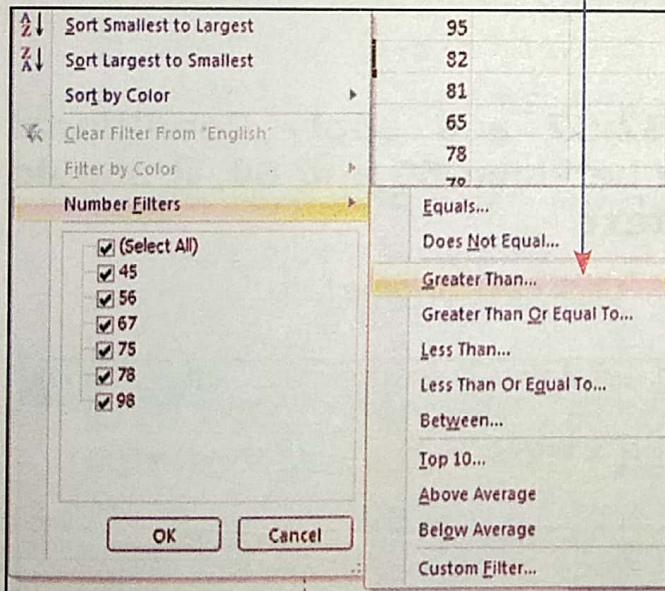
	A	B	C	D	E	F
1		Maths	English	Science		
2	Ishi	67	75	95		
3	Charu	78	56	82		
4	Shalini	57	78	81		
5	Mitesh	85	98	65		
6	Arun	34	67	78		
7	Saby	87	45	78		

2. Click on the Data tab.

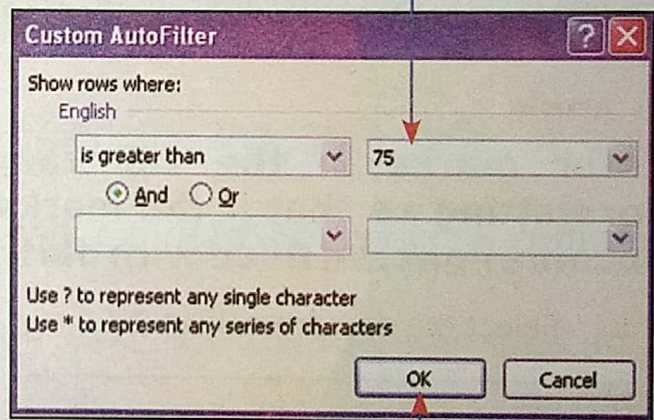
3. Click on the Filter button.

4. You will see the arrowhead buttons (Filter indications) along with the headings.

5. Click on the English Filter arrowhead, point to *Number Filters* and click on the *Greater Than* category.

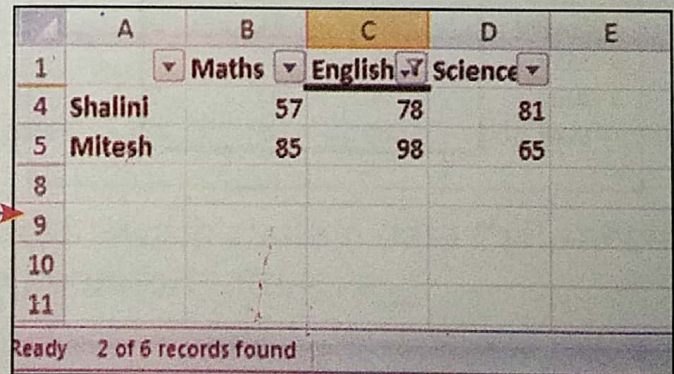


6. The *Custom AutoFilter* dialog box opens. Enter 75 in the text box.



7. Click on the *Ok* button.

The required records will be displayed and other records be hidden.



The screenshot shows the Excel spreadsheet after filtering. Only the rows where the English score is greater than 75 are displayed: rows 4, 5, and 6. The status bar at the bottom indicates 'Ready 2 of 6 records found'.

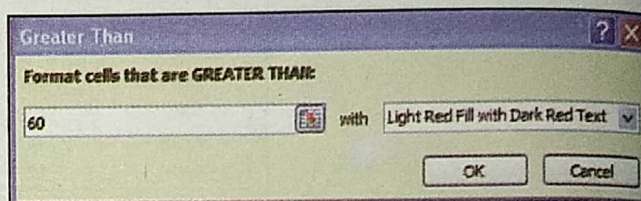
	A	B	C	D	E
1		Maths	English	Science	
4	Shalini	57	78	81	
5	Mitesh	85	98	65	
8					
9					
10					
11					

Conditional Formatting

If you want to apply formatting to cells, which contain data that meets certain conditions, you can use the conditional formatting.

To do this, follow the steps given below:

1. Select the range of cells to format (click on column header, if you want to apply conditional formatting to the entire column).
2. Click on the *Home* tab.
3. Click on the *Conditional formatting* button and point to the *Highlight Cell Rules* button. Click on the condition type which you want to apply.
4. The *Condition* box opens. Enter the condition for which you want the cells to get formatted.
5. In the *With* drop-down list, specify the formatting.
6. Click on the *OK* button when finished.



The Greater Than condition box

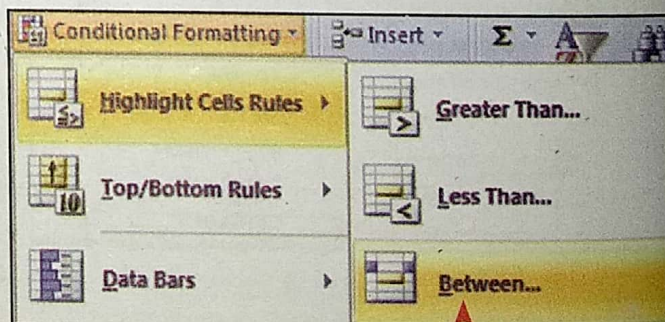
The data will get formatted as specified in the selected range of cells.

Example

Enter marks in the cell range B2:D7 and apply Conditional Formatting so that if the marks are between 60 and 80, it should become light red filled with dark red text.

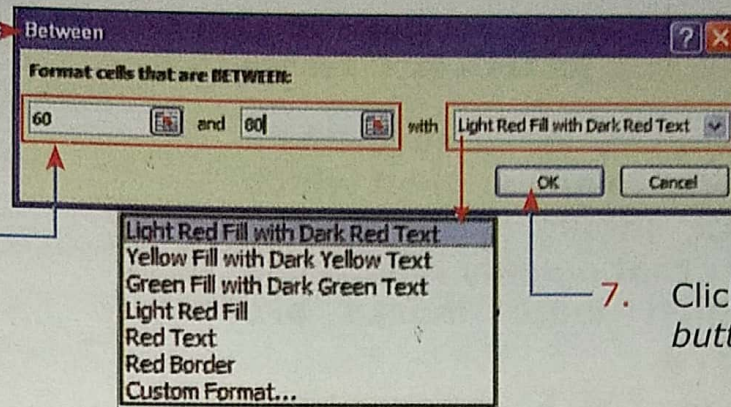
1. Select the data from B2 to D7.
2. Click on the *Home* tab.

	A	B	C	D	E
1		Maths	English	Science	
2	Ishi	67	75	95	
3	Charu	78	56	82	
4	Shalini	57	78	81	
5	Mitesh	85	98	65	
6	Arun	34	67	78	
7	Saby	87	45	78	
8					



3. Click on the *Conditional Formatting* button, point to *Highlight Cells Rules* button and Click on the *Between...* option.

4. The *Between Condition* dialog box opens.
5. Specify the range 60 and 80.
6. In the With drop down list, specify the formatting.
7. Click on the OK button when finished.



All cells in which marks are between 60 and 80 will become light red filled with dark red text.

	A	B	C	D	E
1		Maths	English	Science	
2	Ishi	67	75	95	
3	Charu	78	56	82	
4	Shalini	57	78	81	
5	Mitesh	85	98	65	
6	Arun	34	67	78	
7	Saby	87	45	78	
8					

Quick Recap

- Functions are the special pre-written formulae and instructions that 'accept' the values as arguments and 'return' the result values in the cell in which they have been typed.
- Excel's Text Functions help you manage the text data in your spreadsheets.
- Excel's Mathematical Functions can be used to perform common mathematical operations.
- Excel's Statistical Functions can be used to analyse the data in a spreadsheet.
- Excel's Logical Functions can be used to introduce decision making into your spreadsheet.
- The Goal Seek option is useful when you want to manipulate the result which you have obtained by applying some Formula.
- The Filter command is used to display only those records which meet some specific criteria.
- If you want to apply formatting to cells, which contain data that meets certain conditions, you can use conditional formatting.

Quick Practice

Enter data as shown, Make sure while entering the marks in any subject which are less than 40, should appear in the red colour. After that display only those records in which math marks are between 30 and 70.

	A	B	C	D
1	Name	Math	Science	English
2	Arun	30	23	44
3	Saby	90	60	55
4	Ishi	85	56	74
5	Charu	35	34	80
6	Shalini	85	95	9

1. Enter the headings as shown in the data.
2. Select the cell range B2:D6.
3. Click on the Home tab. Click on the Conditional Formatting arrowhead button, point to Highlight cell Rules and select the Less Than option.
4. The Less Than dialog box opens. Enter the number condition as 40 and the formatting condition as Red Text. Click on the Ok button.
5. Now enter data in the cell range B2:D6.
6. Click anywhere in the data. Click on the Data tab and click on the Filter button.
7. Click on the Math Filter arrowhead button, Point to Number Filters and click on the Between option.
8. In the Custom AutoFilter dialog box, set limits as 30 and 70. Click on the Ok button.

Exercise Time

1. Write (T) for True and (F) for False statements.

1. In the function =SUM(A1:A12), the argument is SUM. ☐
2. The sqrt(Num1) function returns the Square of the number Num1. ☐
3. The =max(num1, num2,...) function returns the maximum value out of the Arguments. ☐
4. The =average(12,14,16) will give the result 16. ☐
5. The logical functions return the result as True or False. ☐
6. If you want to apply formatting to cells, which contain data that meets certain conditions, you can use conditional formatting. ☐

2. Select the suitable word and fill in the blanks.

Goal seek

Len

arguments

Left

Filter

Mod

1. Functions are the special pre-written formulae and instructions that accept the values as _____ and 'return' the result values.
2. The _____ function returns number of characters including spaces.
3. The _____ function returns n characters starting from the left side.
4. The _____ function returns the Remainder, after dividing the num1 by the num2.
5. The _____ option is useful when you want to manipulate the result which you have obtained by applying some Formula.
6. You can use the _____ option to display only those records which meet some specific criteria.

3. Answer the following in 2-3 lines.

1. What are functions?
2. Name the five categories of functions. Explain any three functions from any three categories.
3. What is the Goal Seek option and how is it useful?
4. What is the use of the Filter option?
5. What is the use of Conditional Formatting?

Practical Workshop

Practical 1 Enter the data as shown and perform the following operations on it:

1. Find the maximum marks obtained in Math (in cell B7) and copy the function to find the maximum marks obtained in other subjects.
2. Find the minimum marks obtained in Math (in cell B8) and copy the function to find the minimum marks obtained in other subjects.
3. Find the average marks obtained (in cell E2) for the student "Arun".
4. Copy the function to find the average marks of other students.

	A	B	C	D	E
1	Name	Math	Science	English	Average
2	Arun	30	23	44	
3	Saby	90	60	55	
4	Ishi	85	56	74	
5	Charu	35	34	80	
6	Shalini	85	95	9	
7	Max				
8	Min				

Practical 2 The marks obtained by Harry in four subjects are as shown. Using the Goal Seek option find out how many marks should he get in the subject Science to get a total of 300.

	A	B	C	D	E
1	Maths	Science	English	Hindi	Total
2	64	67	74	69	
3					
4					

Practical 3 Enter the data as shown and use the Filter option to solve the following problem:

1. List all the records for the items which come from the city Delhi.
2. Show back all the records.
3. List all the records for the items which are coming from the city Chandigarh.
4. Show back all the records.
5. List all the records whose cost is more than 50.
6. Remove the filter applied.

	A	B	C
1	ITEM	CITY	COST (Per Unit)
2	Soap	Delhi	45
3	Powder	Chandigarh	57
4	Shampoo	Delhi	58
5	Hair Oil	Amritsar	34
6	Sauce	Delhi	87
7	Magazines	Chandigarh	25
8			

Practical 4

Your teacher has to enter the marks for the students in the cell range B2:D5. Also, she has to find out the students, who have scored more than 80 marks. Set conditional formatting, so that whenever the marks > 80 are entered, they become green and filled with dark green text.

	A	B	C	D
1	Name	Math	Science	English
2	Rajan			
3	Sunny			
4	Munish			
5	Raman			