COMPUTER

COMPUTER SYSTEM

Computer is information processing machines used in different departments and organizations. They can be connected all over the world. Therefore, more productivity and good quality with less cost. The computers are good for repetition tasks and for those tasks that require high speed, accuracy and calculations. They are good for combining, storing and retrieving data.

Computers perform three main operations:

1. Receive input (data raw facts).
2. Process it according to predefined instructions.
3. Produce output (information, which is meaningful data).

DATA: are numbers, encoded characters, or alphabetic characters and symbols, which are used as operands by the instructions.

Information Technology

A set of tools that are used to receive, process, store retrieve, print and transmit information in an electronic form through computers. These forms can be text, sound, picture or video.

Computer System Components

System unit
Monitor
Mouse
Keyboard
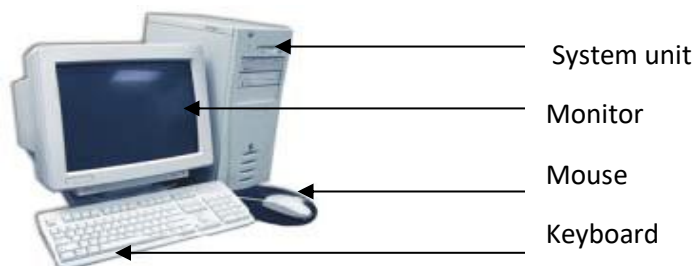
There are two main parts of computer system**:**

1. Hardware . 2. Software .

Hardware: The physical equipment you can see and touch when using the computer system e.g. Keyboard, mouse, monitor, hard disk, etc.

Parts of Hardware

Part 1: INPUT UNIT DEVICE:

Accepts data and converts the data into electrical pulses that sent to the CPU for example Keyboard, Mouse, and Scanner.

Examples of Input Device

A- Keyboard: contains the standard typewriter keys plus a number of specialized keys. The standard keys are used to enter words and numbers. Examples of specialized keys are called function keys, labeled F1, F2, ---- and so on.
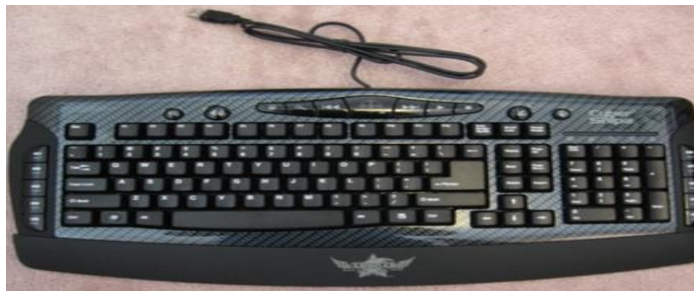
B- Mouse: a small hand-held device, which has the shape of a mouse. As it is moved, a rolling ball on the underside transmits information to the computer, which moves the cursor. The cursor is the symbol on the screen (usually an arrow) that shows where data may be entered next. It has two or three buttons to perform many actions. It works when any of the buttons are pressed down. The movement of the mouse causes a corresponding movement of a pointer on the screen. The pointer moves around the screen as you move your mouse.

Wheel

Right mouse button
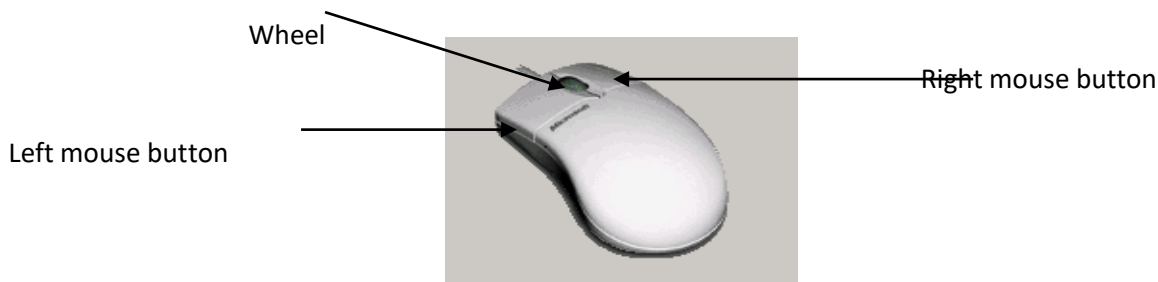
Left mouse button

Operations of Mouse

1. **Click**: means to position the pointer on an object. Then quickly press and release the left mouse button.
2. **A double click**: involves the same motion as a click, but the mouse button is pressed and released twice in rapid succession.
3. **Drag:** When you drag an object, you will hold down the left mouse button while moving the mouse.

A mouse has a primary and secondary mouse button:

1. **Primary Mouse Button (Left Button)**: Use the primary mouse button to select and click items, position the cursor in a document, and drag items. The primary mouse button is normally the left button on the mouse.

2. **Secondary Mouse Button (Right Button)**: Use the secondary mouse button to display a menu of tasks or options that change depending on where you click. This menu is useful for completing tasks quickly. Clicking the secondary mouse button is called right-clicking.

Note: some of mouse has the middle button (wheel, roll the wheel with your forefinger to move up or down in a document or on a web pages).

Functions of some keys in keyboard

1- **Enter**: executes a typed command, performs a selected option from a menu, marks the end of a line, or create a blank line.
2- **Back space**: deletes one character to the left of the flashing cursor each time you press it.
3- **Delete**: deletes the character above or to the right of the flashing cursor each time it is pressed.
4- **Space bar**: used to insert a blank space between words or sentences.

5- **Shift**: selects the uppercase letters for the typewriter keys and produces the punctuation symbols that share the number keys. You can also use this key in conjunction with other keys in order to perform a function or task in a program.

6- **Ctrl** (control): You can use the control key with another key to perform specific task, (as Ctrl & A) to select all items.

7- **Alt** (alternate): You can use the alternate key with another key or to perform specific task, (as Alt & F4) to close the window.

Part 2: CENTRAL PROCESSING UNIT (CPU):

The microprocessor chip is the "brain" of the computer   is located on the motherboard. The CPU is sometimes called the processor, or in the personal computer field called microprocessor. It is the component that receives and executes instructions from the software programs and the user.

The speed of Microprocessor:

Each model or type of CPU processes information and instructions at a different speed measured in Megahertz (MHz) or Gigahertz (GHz). CPU speed is indicated by the frequency of the system clock in megahertz (MHz, millions of cycles per second). While the bit width or size determines the quantity of information that may be transferred in any one cycle, the speed determines the number of such transaction per second. The contents of CPU as follows

1. **Control unit (CU)**
    a. Read and interpret the program's instruction from main memory to the arithmetic and logic unit.
    b. Control every operation inside the CPU.
    c. Send electric signals between memory and ALU and between main memory and input output device.

2. Arithmetic and logic unit (ALU):

Performs operations such as addition, sub, AND, OR,…. The arithmetic logic unit (ALU) component does the actual processing. It receives data and instructions and delivers a result. For example, if it received the numbers 3 and 5, and the instruction Sum, it would return 8.

Part 3:   Memory unit: Components that store software and data until it is needed. Storage components include hard drives, USB flash drives, and DVDs.

A computer cannot work without some form of memory to store programs and routines .computer memory is used to store the sequence of instruction and related data, It is also used to store temporary or permanent data used or created by the program.

Data Representation in the Memory

The memory is divided into same sized locations that each of them has a unique address. All information processed by computer is handled and stored in the binary form 1 or 0, which is called BIT. A group of 8 bits is called a BYTE. A byte is a memory unit, which represents a character, so it is used to measure the memory capacity. The amount of data that can be represented by one circuit is formally called a binary digit and is usually referred to as a bit. Bits hold one of two values: 0 or 1. They are the smallest unit of information that a machine can hold. When eight of these bits are combined, there is enough memory, or on-off switches, to represent a letter, number, or other character. This amount of memory is called a byte.

1	0	1	1	0	0	1	0

Bit   Bit
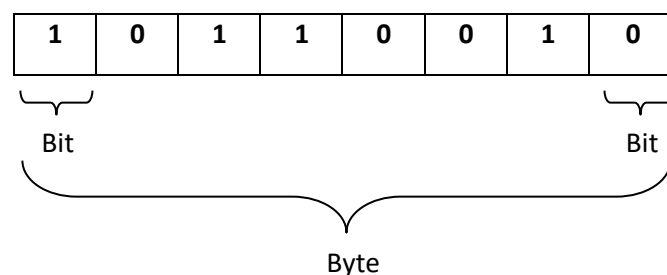
Byte

Storage capacity is represented by

Kilo Byte (K.B) $= 2^{10}$ (1024 Byte)

Mega Byte (M.B) $= 2^{20}$ (1024 K.Byte)

Gega Byte (G.B) $= 2^{30}$ (1024 M.Byte)

Tera Byte (T.B) $= 2^{40}$ (1024 G.Bytes)

The decimal system has ten digits (0-9). The binary system has only two digits (0,1). The computer can be represented (0) by the electrical circuit

being off and (1) by the electrical circuit being on. All data and programs that go into the computer are represented in terms of these binary numbers. Computers use a transistor, which is a tiny electrically operated switch that can alternate between on and off millions of times per second.

Kinds of Memory

1- **Main memory**

    A- RAM (random access memory): is the location where data and programs are stored (temporary), until they are no longer needed. RAM is volatile, means that the data is only there while the power to the computer is turned on, when the computer is shut off, the content of RAM is erased. RAM is divided into same sized locations that each of them has a unique address.
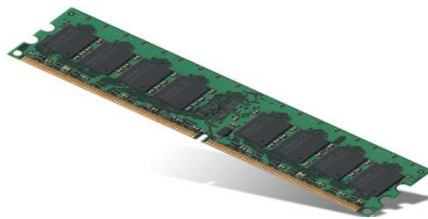
    B- **ROM** (read only memory): it is another part of the main but with a very small capacity. It keeps instructions, which make the computer work when turning it on. It is not volatile. The computer cannot write on it. ROM is used to store critical programs that all computers need, such as the program that boots (starts) the computer. The BIOS (basic input/output system) , built in software that determines what the computer can do without accessing any additional software, is usually found on a ROM chip. The last instruction that BIOS executes is to look for an operating system and install it.

Read Only Memory (ROM) BIOS

The Read Only Memory - Basic Input/ Output System (ROM BIOS) is a group of integrated circuits responsible for starting the computer, checking

the RAM and loading the operating system. This occurs only when the computer is first turned on or each time you have to restart (reboot) the computer. This is the type of memory commonly found in calculators or printers as it reads the information entered and processes it during the time it resides in the memory. When the information is complete, it clears itself and waits for the next entry. It does not perform any tasks other than to read the information and process it based on the device where it resides. For example, when you send a document to print, the printer will read the document and process it for printing. When the printing is complete, the printer stops processing until another print job is received.

The Secondary Storage Systems

Storage systems are required to store software programs and information to keep permanent records of the work done before quitting the software program or turning off the power. When you are working on the computer, the memory (RAM) area holds your current work and the currently active software program. RAM is only temporary. All information is discarded when you turn off the computer's power. Therefore, you must save your work permanently to a storage device

1- **Floppy Disk Drive**
2- **Hard Disk Drives**
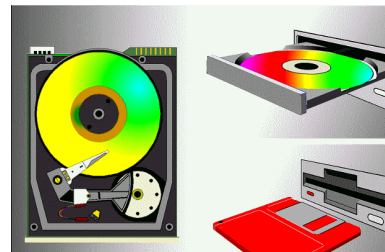
Hard Disk

Computers use (hard drive) as their primary storage for both data and programs.

Many software programs must be installed onto a hard disk before you can actually use them. The hard disk drive is similar in design to the floppy disk drive, but stores and retrieves for more information than a floppy, and at much faster speeds. The hard drive is usually permanently fixed inside the computer. There are many manufacturers of hard drives, and each model stores a different amount of information. The storage capacity of hard drives is increasing all the time. .

3- **CD Drives**

The CD-ROM (Compact Disk Read Only Memory) or CD drive, the information is burned and is retrieved with a laser beam. The average storage capacity of a CD is around 650Mb for data. The information on the CD is read-only because the plastic surface can only be burned once (i.e., Read Only Memory). CD Writers: the type of CD drive that comes with newer systems is a CD Writer, or commonly referred to as a burner. This type of drive looks and acts like a regular CD-ROM drive, but has the ability to record information onto a blank CD. The technology for this advanced in recent years, now giving you the capability of being able to write several times to a CD.

4- **DVD Drives** (Digital versatile Disk)

A DVD drive is basically a CD drive that can read digital versatile/video disc formatted CDs. DVDs can store information from 4.7Gb to 17+Gb with rapid access speeds. The average movie is generally no more than 4.7Gb in size.

5- **Flash or Memory Cards**

Flash or memory cards are used generally with digital cameras or digital video cameras to increase the number of pictures or video taken on that device. These cards or sticks come in a variety of sizes; the larger the storage capacity, the higher the price. A flash device plug into a universal serial bus (USB) port. In flash is memory that can be erased and rewriting . Flash can hold up to several gigabytes and fast portable

Part 4: OUTPUT UNIT

Output: Components that provide the results of the processing to humans. The monitor is the primary output device; other examples include printers and speakers. It accept electrical signals from the CPU and converts them into new form.

1. Printers.

2. Monitors.

3- plotters

4- speakers

5- removable media

Peripherals

In general, Peripherals are the devices that allow inputting of data to a computer and outputting of information from a computer as   scanner, camera,….

Scanner: take a picture of a document and then allow users to save this as file. Any text that is scanned will be in a picture format and uneditable.

SOFTWARE:

Software (logical component) is a collection of programs, instruction, data, and information.

PROGRAM: A sequence of instruction describing how to perform a certain task.

INSTRACTIONS: are commands which covers the transfer of information within the computer as well as between the computer and its input and output devices specify the arithmetic and logic operations to be performed.

Kinds of Software

1- Programming language: a set of words, rules, used by a programmer to input his instructions to the computer to do a special task. The types of programming language as follows:

a) **Machine language**: it is written in 1,0. It is difficult a language, which does not need any translator.

b) **Assembly language**: depends on using some of the symbols like: MUL for multiply and SUB for subtract and so on. It is easier than machine language. A translator is needed and it is called assembler.

c) **High level language**: uses statements that one can understand. It needs translators. It can be used very easily to solve complex problem. Examples FORTRAN, PASCAL, C++, JAVA,….

2- Compiler and Interpreters: programs that translate the source code into the object code in (1,0).

3- Application Software: it is the software used by users like word processing, spreadsheets, databases, E-mail programs, multimedia programs and so on.

4- System Software Operating System: it is the software, which is used by the computer or operates a computer system such as operating system (Windows). The operating system holds all the instructions that make the computer work starting the computer, displaying on the monitor, saving and loading files, using secondary memory managing application software. Operating system allow you communicate with your computer.

Functions of operating system

- Booting up (Booting process): The term reboot means to restart the computer. **A warm boot** is restarting the computer without turning it off, a selection that is offered when one elects to start turning off the computer. Warm boots are often used when a computer freezes.

It erases information in RAM, which often eliminates memory conflicts that may have caused the problem. These conflicts can be caused by different programs trying to store data in the same location. **A cold boot** is starting the computer when the power is completely off. Avoid cold boots if you can, because the jolt of electricity received each time the computer is turned on may shorten its life span.

- User interface.
- Task and resources management.
- Monitoring
- Files management
- System security

Kinds of Operating System

- ➢ Multitasking: to execute multitasking (muti job)in the same time as print the document and draw the shape.
- ➢ Multiprocessing: the computer has multiprocessor (CPU) to share the jobs.
- ➢ Time sharing: multiuser shared the time. Each user assign duration of time to run the job.
- ➢ Network: specific computer called a server, which saves all files and document so that other computers (clients) can use them at the same time.
- ➢ Real time: in medicine domain. Input, processing and output at the same time.

Viruses

Software programs, which are written with the intention of causing inconvenience and disruption or serious damage in a computer system. Files on floppies can spread viruses, across a network or via E-mail and the internet.

Protecting from viruses

It is important to keep anti-virus software up to date. If there is not any up to date anti-viruses software installed into your computer, then you should follow these guidelines:
1. Avoid using floppy disk from unknown source.
2. Installing software that check for viruses before enter the system anti virus software: it can detect and remove viruses found on the computer and it can automatically check floppy disks and E-mail attachment).
3. Use only original software (registered software).
4. Never open an E-mail attachment unless it is from reliable source.
5. Keep regular back up, **Back up**: means taking copies of your data and programs that is stored on your computer on the floppy disk or other storage media.

Microsoft Windows 10

The Windows 10 Layout

1. **Desktop Shortcuts:** Shortcuts to files, folders, and the Recycle Bin.
2. **Taskbar**: Like in previous versions of Windows, the taskbar provides access to the Start Menu, shortcuts to programs, as well as volume and date/ time control.
3. **Start Button**: Found on the bottom left of your screen, the Start button allows you to Access computer programs and configuration options such as Windows Settings.
4. **Windows Search**: Allows you to search for programs, folders, and files.
5. **Task View**: Provides you access to a task switcher tool as well as a virtual Desktop.
6. **File Explorer**: Formerly known as Windows Explorer, File Explorer is a file manager application that allows you to access files and folders on the computer.
7. **Taskbar Programs**: Provides quick access to open or pinned programs.
8. **Volume Adjustment**: Allows you to adjust the volume.
9. **Date/Time:** Access the Date / Time options.

Accessing Windows Settings

The Windows Settings application allows you to view and make changes to computer settings and provides access to tools such as uninstalling applications, power setting options, viewing hard drive space, and accessing the Ease of Access Center.

1. Click the **Start** button.
2. Click the **Settings** icon.
3. You will be taken to the Windows Settings application as follows:

   a. **System:** Access system settings.

   b. **Devices:** Add and manage external devices such as printers.

   c. **Network & Internet:** Manage network and internet settings.

   d. **Personalization:** Personalize your desktop by changing your desktop appearance, apply themes and change the lock screen.

   e. **Accounts:** View information about your user account on the computer.

   f. **Time & language:** View/manage your time zone and language options.

   g. **Ease of Access:** View and manage computer accessibility options.

   h. **Privacy:** View computer privacy options.

   i. **Update & security:** View windows update status and backup/recovery options. It is important to note that Windows Updates.
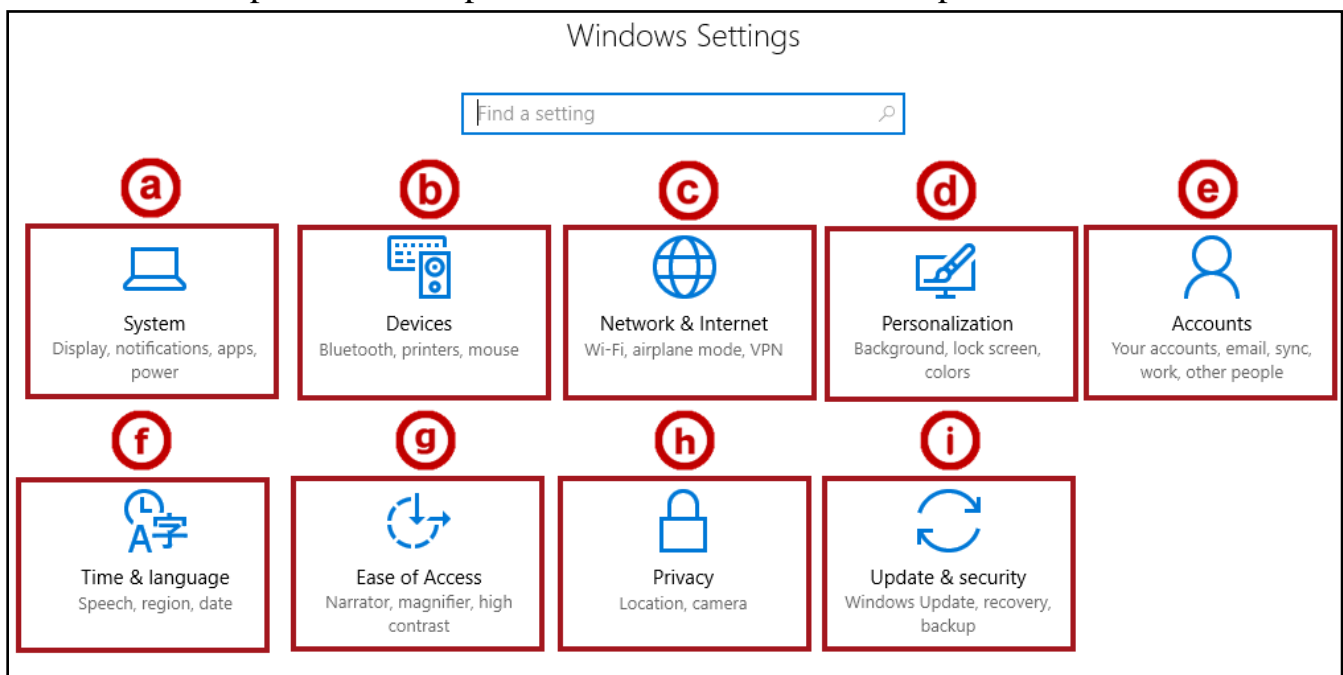
Task Bar Components

Task bar: almost the task bar is located at the bottom of your screen when you first start windows, contains the start button. This displays the various programs and files you are currently using. To switch between windows, just click the button for the window you want.

1. In the left side, displays Start button.
2. In the middle, displays the various programs and files you are currently using. Also in the middle, displays the quick launch, the quick launch contains icons for some program. The programs run by click on it.
3. In the right side, displays notification area, the notification area includes Date / Time, language, sound icons and it includes the system icons as clock, network, speaker, action center and power.

Occasionally, an icon in the notification area will display a small window (called a notification) to notify you about something. For example, after adding a new hardware device to your computer appeared the message.
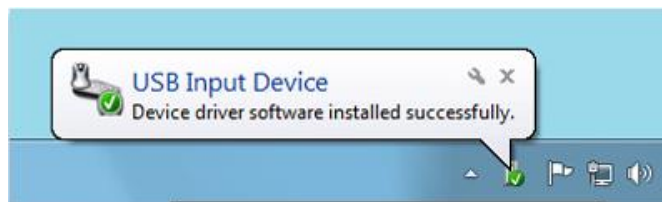
Notification area displays a message after new hardware is installed

Start button: It is a very important part of Windows because it give you access to a large part or number of Windows components. A small arrowhead to the right of a menu item leads to a further sub-menu when you move the cursor over it Click the start button once with the left mouse button in order to display the left menu, when you select a menu item, the computer performs an action.

To open the Start menu, click the Start button in the lower-left corner of screen, or press on the Windows key in keyboard.

Start menu contains pinned items list, in this list appeared programs displayed above the separator line are always available for you to click to start them. Also, it contains most frequently used programs list, in this list appeared programs displayed below the separator line Programs are added to this list when you use them. As well as it contains search box to allow finding the original location of programs, folder and files in computer.

Turn off the computer as follows:

Shut down options: When quitting window and shutting down your computer by press on start button and appears a menu with options as follows:

- **Shut down**: closes all open programs, shuts down windows and the turn off your computer.
- **Restart**: closes all open programs, shut down windows and then starts windows again.
- **Sleep** (Stand by): keep your session in memory and puts the computer in a low-power state so that you can quickly resume working.

All Programs: When clicking on it, a list of the programs is installed on your computer will appear. When clicking on the any program require will open it.
To preview opened files:
 Point on mouse at a program icon in the taskbar that has open files. you'll see a small preview of the program. To open a program or file, click on icon, you will see a full-screen preview.
If you want to temporarily preview for desktop by put the cursor on the rectangle at the right end of the taskbar called Show desktop, then desktop windows reappeared.

Icon: The Icons are visual symbols which represent programs, files, folders and device such as a hard disk or flash memory….

Searching for Programs and Files from the Start Menu

You may quickly access programs, files and/or folders from your Start Menu. The following explains how to do so:

1. Click the **Start** button.
2. Print the name of the program, file, or folder that you wish to open.
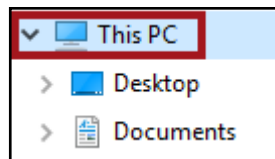3. Your search results will appear. Click the program, file, or folder that you wish to open.

Searching for Files from File Explorer

You may also search for files and folders from File Explorer as follows:

1. Click the **File Explorer** icon, located on the Windows Taskbar.

2. The File Explorer will appear. Click This PC to search for files located on your PC.

3. In Search This PC, print the name of the file or folder that you wish to find.
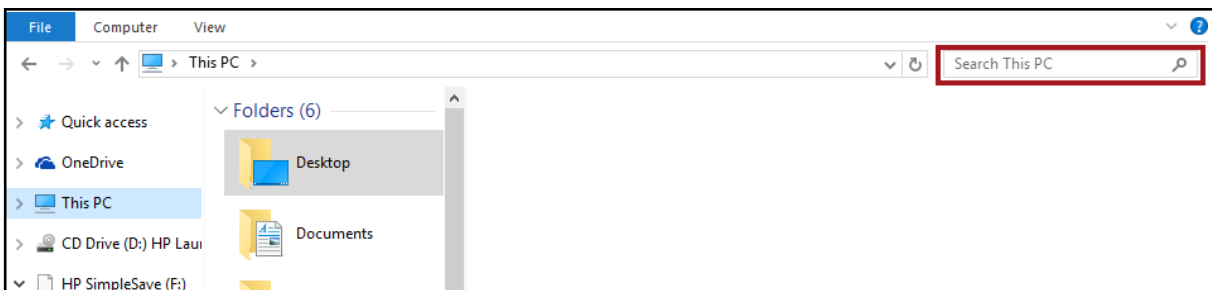
Major System Information

To get to know the basic information of the system through **Right click on the Computer icon**, select **Properties.** Appeared to us version of windows installed on your computer. Type of processor and memory (RAM). Size. Registration information.

Methods for Opening the Windows

1. Double click by left button of mouse on window's icon.
2. Single click on window's icon and select Enter key from keyboard.
3. Right click on window's icon and select Open in list by left button.

Note: when opening any window, the name of window appeared in task bar.

Methods for Closing the Windows

1. Click to close button
2. Right click on name of window in task bar and select close by left click.
3. Select two keys F4 & Alt from keyboard together.

Title Bar

   The line (bar) displayed in top of the Window referred. In the left of title bar, we notice the name of icon or program that opening. In the right of title bar, we notice three icons as below:

a- Minimize button:

   A windows from the desktop can be temporarily removed by minimize it. Click the Minimize button to temporarily close a window. Then put it to a button on the taskbar.

b- Maximize button:

   When a window is too small to display all of its contents, it can be enlarged or maximized in order to fill the screen size, Click on the maximize button . When a window is maximized, the maximize button becomes the Restore button. Click the Restore button in order to return the window to its previous size.

c- Close button:

   To close a window completely, click the Close button.

Reposition and Resizing a Window

When to reposition a window on the desktop in order to see more than one window at a time or see some thing the window is covering up. To move a window, drag the title bar. Place the top of the pointer on the title bar. Hold down the mouse button and drag. When the mouse button is released, the window assumes its new position.

In order to change the size of a window, the pointer needs to be moved to the window border. When the pointer change shape ↔ ↕ drag the border to enlarge, reduce, or change the shape of the window.

Files and Folders

File: is an item that contains information such as text, images, music or program. On your computer, files are represented with icons; each type of file had specific icon.

Folder: is a container you can use to store files and other folders in. A folder within a folder is usually called a subfolder. You can create any number of subfolders, and each can hold any number of files and additional subfolders.
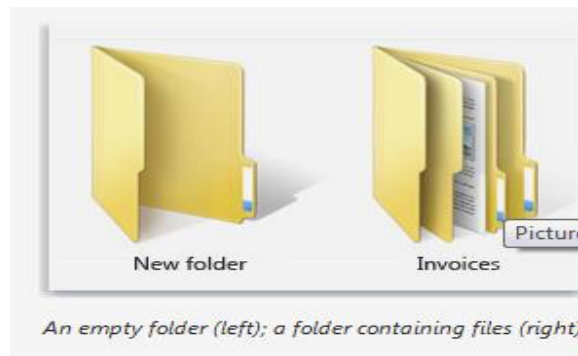
An empty folder (left); a folder containing files (right)

Create a File

The most common way to create new files is by using a program. For example, you can create a text document in a word-processing program. . For example, create a file. The name of file is Mosul, while the type of file is document.

Create a New Folder

1. Right click in any empty area in the window. Select **New** option and Folder option in the list.
2. New folder highlighted appeared.
3. Print the name and click in any empty area in the window.

Selecting Multiple Files/ Folders

1- To select a single object click on it once.

2- To select several objects anywhere in a window, hold down the **Ctrl** key while you click on them in turn.

3- When to select several objects in one line (contiguous), hold down the **Shift key with arrows** while you click on them in turn, or click the first item, press and hold down the Shift key, and then click the last item, or drag the mouse pointer to create a selection around the outside of all the items that you want to include.

4- To select all of the files or folders in a window, then click **Ctrl A**.

5- To clear a selection, click in a **blank area** of the window.

The benefit of selecting multiple files/ folders to perform many common tasks, such as copying, deleting, renaming, printing and compressing.

Rename a Folder/ File

Right click on folder and Choose Rename. The name of the folder is highlighted. Print the new name, and then press Enter. Press Enter key.

Rename Several Files

You can also rename several files at one time, which is useful for grouping related items. To do this:
- Select the files →click Rename
- Type one name and then each of the files will be saved with the a new name and a different sequential number at the end (for example, Renamed File (2), Renamed File (3) and so on).

Copying Files/ Folders

Right click on folder and Choose **Copy(Ctrl C)**.
Open the folder disk where you want to copy the file or folder to it.
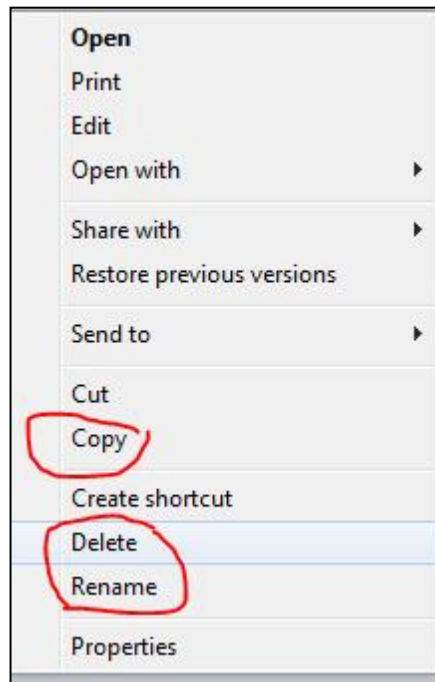Right click and Choose **Paste**.

Moving Files/ Folders

Right click on folder and Choose **Cut (Ctrl X)**.
Open the folder disk where you want to copy the file or folder to it.
Right click and Choose **Paste**.

If you copy or cut the item then the item stored in **clipboard** (temporarily)**.** The clipboard is part of main memory.

Copying Files/ Folders to Flash Memory

1. Put flash memory in universal serial bus (USB) port in computer and double click on flash icon.
2. Right click on file or folder you want to copy.
3. Choose from list **Send to**.
4. Select specific symbol of flash icon.

Delete File or Folder
Methods for Deleting

1. Select the file or folder you want to delete. Press the delete button in keyboard.
2. Drag and drop the file or folder you want to delete in Recycle Bin.
3. Right click on the file or folder you want to delete, and select Delete option from the list.
   Message appeared to confirm deleting or no. the file or folder move to recycle bin.

When select the file or folder, click on **Shift & Delete** to permanently delete.

Retrieve File or Folder

Any file or folder move to recycle bin, you can retrieve it by the following:

1. **Open the Recycle Bin icon**, right click on the deleting file and select **Restore** option.
2. **Open the Recycle Bin icon**, select the deleting files and select (**restore the selected item**) in **Recycle Bin Tools**.

Note: to retrieve all items in the recycle bin by **Open the Recycle Bin icon** and select (restore all items) option in **Recycle Bin Tools**.

Emptying the Recycle Bin

1. **Open the Recycle Bin icon**, and select (**Empty Recycle Bin**) in **Recycle Bin Tools**.
2. **Open the Recycle Bin**, **Right click in empty area in recycle bin window** and select **Empty Recycle Bin**.
3. **Right click on Recycle Bin icon** and select **Empty Recycle Bin** option.
4. **Open Recycle Bin**, select item/s and select **Delete** key.

Window ask by message appear "are you sure ----" to confirm that you want to delete the contents of the bin.

Creating a Shortcut Icon

  A shortcut provides quick and easy access to files or programs you use most often.

To Create a Shortcut do following:

1- **Right Click on the item,** such as a file, program, folder for which you want to create a shortcut.

2- **Select send to (Desk top Create Shortcut).**

For example can you create shortcut for Microsoft office word program by start → all program → Microsoft office → Microsoft office Word →Right Click on Microsoft office Word → send to → Desktop (create shortcut).

Microsoft Office
Word 2003 (2)

Arrange Files/ Folders

To change display of icons by:

Right Click on the empty area, menu appears as follows:

Click by **Name** in order to sort in alphabetical order.

Click by **Type.** Type of item.

 Size: from high size to low size.

 **Modified**. in order to sort by history of item.

Themes

A desktop theme is a predefined set of icons, fonts, colors, sounds and the background and screen saver pictures and other window elements.

We can change the background by:

Right click on the any empty area in the Desktop → click **Personalize →** then appeared windows contain **Background, Lock screen**,….

1- **Background:** to select the image.

2- **Choose a fit Picture location** to assign picture position as fill the screen, fit, stretch, tile, or center.

3- **Browse:** to select special image.
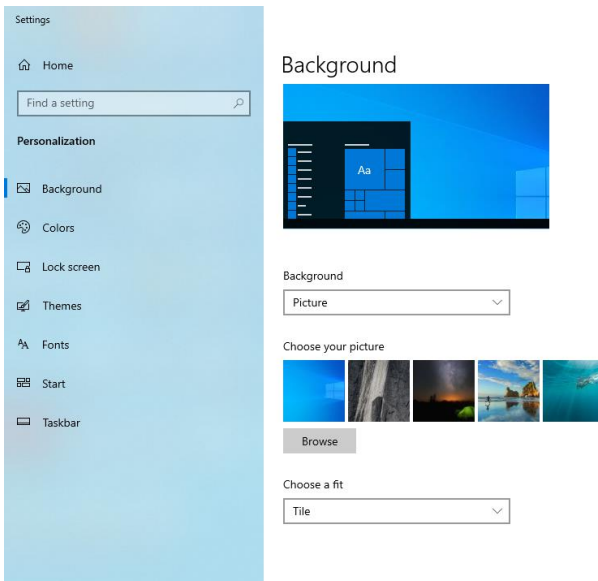
Screen Saver

Screen saver replaces the display on the screen with an animated graphic after a set time interval when the computer is unattended.

Right click on the any empty area in the Desktop → click **Personalize** → Lock screen → Screen saver setting.
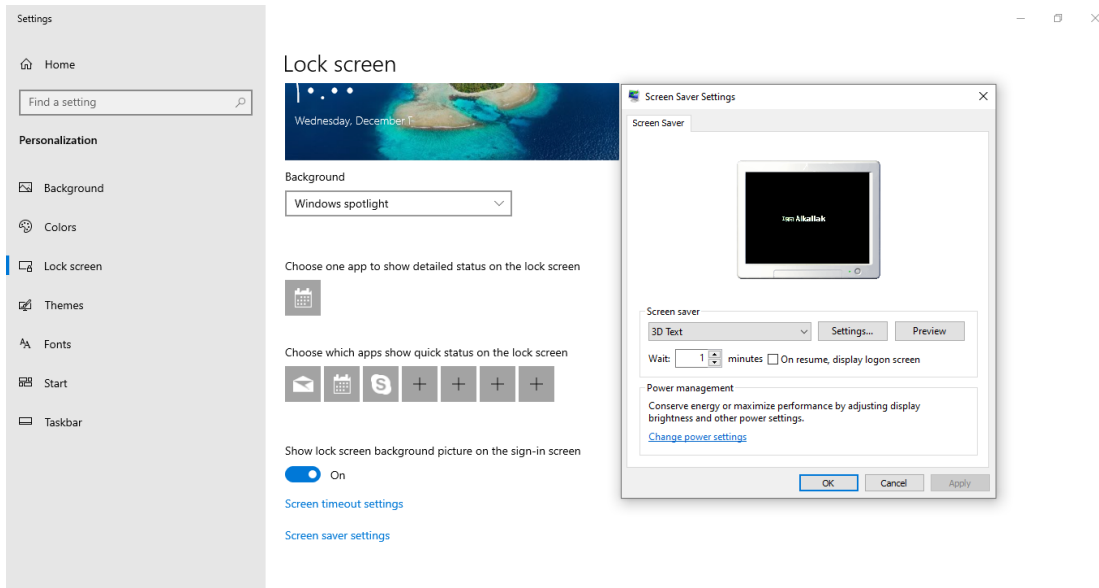
Date and Time

To change your computer's date by:
Open Control Penal.
Click on Clock, Languages and Region.
Set the time and date.
Change date and time icon and Ok.