OPERATING SYSTEM NOTES
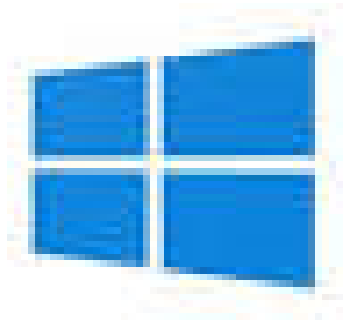
### FOR DMLT & ECG CLASSES

OPERATING SYSTEM

Definition:- An Operating System (OS) is an interface between a computer user and computer hardware. An operating system is a software which performs all the basic tasks like file management, memory management, process management, handling input and output, and controlling peripheral devices such as disk drives and printers.

Example:-Linux Operating System, Windows Operating System, VMS, OS/400, AIX, z/OS, etc.

Functions of an operating System:-

- Memory Management

- Processor Management

- Device Management

- File Management

- Security

- Control over system performance

- Job accounting

- Error detecting aids

- Coordination between other software and users

Conceptual View of Operating System
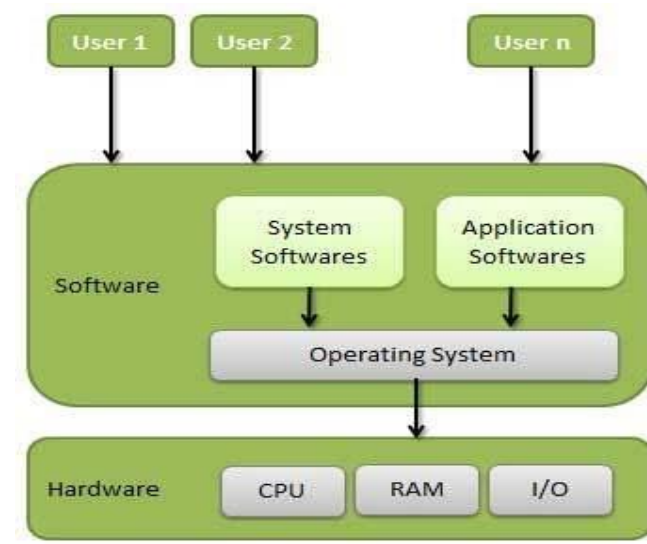
Microsoft Windows:- Microsoft Windows, commonly referred to as Windows, is a group of several proprietary graphical operating system families, all of which are developed and marketed by Microsoft.

Purpose of Microsoft Windows:- Microsoft released the first version of Windows in 1985 as a graphical interface for computers running MS-DOS. Windows made it easier to use computers by providing intuitive menus and buttons in place of requiring text commands to run programs and manage the system.

Versions of windows

Windows provides a graphical user interface (GUI), and support many peripheral devices. In addition to windows operating system for personal computers, Microsoft also offers operating system for servers and personal computers.

1. Windows 1.0- 2.0 (1985-1992). Window 1.0 allowed users to point and click to access the windows. Window 2.0 added icons, keyboard shortcuts and improved graphics.

2. Windows 3.0-3.1 (1990-1994). Support better icons and program manager (Firstversion of "look and feel" screen of Microsoft windows).

3. Windows 95 (August 1995). It runs faster and has ability to automatically delete and configure installed hardware (plug and play).

4. Windows 98 (June 1998). It offers supports for new technology FAT32, AGP, MMX, USB, DVD. It is an active desktop which integrates the web browser (internet Explorer).

5. Windows ME- Millennium Edition (September 2000). Booting is in Dos option.

6. Windows NT 3.1-4.0 (1993-1996). It supports pre-emptive multi tasking. They are Windows NT and Windows NT SERVER.

7.Windows 2000 or W2k. (February 2000). It is an operating system for business desktop and laptop systems to run software applications.

8.Windows XP (October 2001). It has a better look and feel. There are two versions Home and professional.

9.Windows Vista (November 2006). It offered an advancement in reliability, security and ease of deployment.

10.Windows 7 (October 2009). Improved performance and start-up-time and windowmedia centre.

11. Windows 8 (August 2012). It was developed with touch screen use in mind.

12. Windows 10 (2015). Fast start-up, Microsoft edge, Microsoft new browser.

Window Elements

A window is simply a rectangular unit that acts independently from other windows. Windows come in two basic types:
1.Application window,
2. Dialog box.

Border
A border is "a part that forms the outer edge of somethingThe border not only defines where the window is on the desktop, but it can also be used to change the size of most windows. If you point to the border with the mouse, the pointer will change to a double-headed arrow, like so: . If you hold down the mouse button at this time, you can drag the border around and thus alter the size of the window.

Title Bar
A title is "a general or descriptive heading." A heading is "the title, subtitle, or topic that stands at the top or beginning." So, the title bar of the above application window would be: ; or more specifically, , since the control buttons are separate items.

Control Buttons
Control buttons are all the little buttons that are on the title bar but are not actually part of the title. These include:

Control menu: In Windows the button that activates the control menu always looks like this: In Windows 95, the button is a miniature version of the program icon, such as: . In every case, the

button is located at the left hand side of the title bar. Pressing it will give you a menu with several standard window manipulation commands, such as: .

Maximize / Restore Button: In Windows the Maximize Button looks like: . Pressing it will make the window as large as itcam possibly go - usually as large as the screen. The button will then change to the Restore Button: which you can press to change the window back to its previous size. In Windows 95, the Maximize Button looks like: .

Close Button: Windows doesn't have one of these. In Windows 95, it looks like: . Pressing this button is just one way of closing the window, and it's the easiest. But take caution on dialog boxes: when this button is active, it usually has the same effect as pressing the "CANCEL" button, so be sure you don't need to save any changes you made in the dialog box.
.
Help Button: A special addition to some Windows 95 title bars is this button: . If you press it, a question mark will be attached to the mouse pointer. Then when you click on something else in that window, you will see a little box describing the purpose of what you clicked on and/or how to use it:
Resize Handle

Menu Bar
A menu bar is present in nearly every application window directly below the title bar. Each word on the bar is a separate menu. If you click on the word, the corresponding menu will appear, like so:

Popup Menu
Another type of menu is the Popup menu. Unlike other menus, the Popup does not have a menu heading and is not attached to a particular spot on a window. Popup menus are usually activated by clicking the right mouse button on something, and the menu you get will depend on where exactly you clicked. For example, a typical Popup menu for text box would look like this:

Status Bar
Some windows have a status bar to indicate the current state of various parts of the application. This bar is usually located at the bottom of the window, and is a more-or-less solid gray line. For example, the status bar on the bottom of Wordpad looks like this:

File Management

File

A file is a named collection of related information that is recorded on secondary storage such as magnetic disks, magnetic tapes and optical disks. In general, a file is a sequence of bits, bytes, lines or records whose meaning is defined by the files creator and user.

File Structure

A File Structure should be according to a required format that the operating system can understand.

- A file has a certain defined structure according to its type.

- A text file is a sequence of characters organized into lines.

- A source file is a sequence of procedures and functions.

- An object file is a sequence of bytes organized into blocks that are understandable by the machine.

- When operating system defines different file structures, it also contains the code to support these file structure. Unix, MS-DOS support minimum number of file structure.

File Type

File type refers to the ability of the operating system to distinguish different types of file such as text files source files and binary files etc. Many operating systems support many types of files. Operating system like MS-DOS and UNIX have the following types of files −

Ordinary files

- These are the files that contain user information.
- These may have text, databases or executable program.
- The user can apply various operations on such files like add, modify, delete or even remove the entire file.

Directory files

- These files contain list of file names and other information related to these files.

Special files

- These files are also known as device files.

- These files represent physical device like disks, terminals, printers, networks, tape drive etc.

These files are of two types −

- **Character special files** − data is handled character by character as in case of terminals or printers.

- **Block special files** − data is handled in blocks as in the case of disks and tapes.

File Access Mechanisms

File access mechanism refers to the manner in which the records of a file may be accessed. There are several ways to access files −

- Sequential access
- Direct/Random access
- Indexed sequential access

Sequential access

A sequential access is that in which the records are accessed in some sequence, i.e., the information in the file is processed in order, one record after the other. This access method is the most primitive one. Example: Compilers usually access files in this fashion.

Direct/Random access

- Random access file organization provides, accessing the records directly.

- Each record has its own address on the file with by the help of which it can be directly accessed for reading or writing.

- The records need not be in any sequence within the file and they need not be in adjacent locations on the storage medium.

Indexed sequential access

- This mechanism is built up on base of sequential access.
- An index is created for each file which contains pointers to various blocks.
- Index is searched sequentially and its pointer is used to access the file directly.

Space Allocation

Files are allocated disk spaces by operating system. Operating systems deploy following three main ways to allocate disk space to files.

- Contiguous Allocation

- Linked Allocation
- Indexed Allocation

Contiguous Allocation

- Each file occupies a contiguous address space on disk.
- Assigned disk address is in linear order.
- Easy to implement.
- External fragmentation is a major issue with this type of allocation technique.

Linked Allocation

- Each file carries a list of links to disk blocks.
- Directory contains link / pointer to first block of a file.
- No external fragmentation
- Effectively used in sequential access file.
- Inefficient in case of direct access file.

Indexed Allocation

- Provides solutions to problems of contiguous and linked allocation.
- A index block is created having all pointers to files.
- Each file has its own index block which stores the addresses of disk space occupied by the file.
- Directory contains the addresses of index blocks of files.

Clean up and defragment your hard drive in Windows

Your Windows computer will perform more efficiently if you periodically remove unnecessary files from your hard disk and consolidate disk space.

You can use Disk Cleanup and Disk Defragmenter to perform these maintenance tasks.

Disk Cleanup

The Disk Cleanup utility frees up space on your hard disk by finding files you can safely delete. You can decide which files you want to delete.

The method for using the Disk Cleanup utility depends on your version of Windows:

Windows 7

Windows 8

Windows 10

Disk Defragmenter

The Disk Defragmenter utility consolidates files so they occupy space more efficiently. The end result is that files are accessed faster, improving your computer's overall performance.

Defragmenting can take an hour or more, so it's best to do this when you don't need to use your computer.

1. Select **Start**, **All Programs**, **Accessories**, **System Tools**, and **Disk Defragmenter**.
2. Select the hard drive to be defragmented (usually the C drive).
3. Select the **Defragment** or **Defragment disk** button. If a **User Account Control** message appears, select **Yes**.

If you have multiple hard drives, repeat these steps for each drive.

Windows Accessories

**Paint

Microsoft Paint is a simple graphics editing program that is included with Microsoft Windows.

Microsoft Paint can paste any object you put in the clipboard that you take from the Internet, although it will only save in bitmap file format. A nice feature is its ability to locate the pixel position by putting the cursor over the desired position. It can also tell the amount of pixels that an object contains by pointing the cursor to the bottom right of the object. This feature allows users to create objects exactly the size they want them to be.

Microsoft Paint can also reduce the size of an image in two ways. The first is by allowing you to shave off sides of the image. The other is by allowing you to decrease the overall image. Paint will let you select a portion of a picture, too. You can copy it to the clipboard and/or entirely remove it from the original. By opening another Paint application, you can paste that selected image to work

One way to start Paint from the Desktop is as follows. Select **Start** > **Programs** > **Accessories** > **Paint**. The executable file for Paint is pbrush.exe and is located in the Windows directory, usually C:\WINDOWS.

Knowing how to use menu commands is a basic Windows skill. But just in case you're a real beginner, we'll do a quick recap.

Notepad (software)

Features:- Notepad is a common text-only (plain text) editor. The resulting files—typically saved with the .txt extension—have no format tags or styles, making the program suitable for editing system files to use in a DOS environment and, occasionally, source code for later compilation or execution, usually through a command prompt. It is also useful for its negligible use of system resources; making for quick load time and processing time, especially on under-powered hardware. Notepad supports both left-to-right and right-to-left based languages. Unlike WordPad, Notepad does **not** treat newlines in Unix- or Mac-style text files correctly. Notepad offers only the most basic text manipulation functions, such as finding text. Only newer versions of Windows include an updated version of Notepad with a search and replace function. However, it has much less functionality in comparison to full-scale editors.

Notepad also has a simple built-in logging function. Each time a file that starts with .LOG is opened, the program inserts a text timestamp on the last line of the file.[2][3]

Notepad accepts text from the Windows clipboard. When clipboard data with multiple formats is pasted into Notepad, the program only accepts text in the CF_TEXT format.[4] This is useful for stripping embedded font type and style codes from formatted text, such as when copying text from a web page and pasting into an email message or other WYSIWYGtext editor. Formatted text can be temporarily pasted into Notepad, and then immediately copied again in stripped format to paste into the other program.

Notepad can print files, but doesn't print correctly if *Word Wrap* is turned on. Headers, footers, and margins can be set and adjusted when preparing to print a file under *Page Setup*. The date, file name, and other information can be placed in the headers and footers with various codes consisting of an ampersand ('&') followed by a letter..

WordPad

Features[edit]WordPad can format and print text, including fonts, bold, italic, colored, and centered text, etc., but lacks intermediate features such as a spell checker, thesaurus, and the creation of tables. However WordPad can read, render, and save many RTF features that it cannot create such as tables, strikeout, superscript, subscript, "extra" colors, text background colors, numbered lists, right or left indent, quasi-hypertext and URL linking, and various line spacings. Among its advantages are low system-resource usage, simplicity, and speediness. Pasting into or from an HTML document such as from the internet or email typically will

automatically convert most or all of it to RTF (although this is partially browser-dependent). As such, WordPad is well suited for taking notes, writing letters and stories, or for usage in various tablets, PCs, and smart phones. However, WordPad is underpowered for work that relies heavily on graphics or typesetting such as most publishing-industry requirements for rendering final hard copy.

WordPad natively supports the Rich Text Format, though it does not support all the features defined in the RTF/Word 2007 specification. Previous versions of WordPad also supported the "Word for Windows 6.0" format, which is forward compatible with the Microsoft Word format In Windows 95, 98 and Windows 2000, it used Microsoft's RichEdit control, versions 1.0, 2.0 and 3.0 respectively.[1] In Windows XP SP1 and later, it uses RichEdit 4.1,[2] including Windows 7.[3]

WordPad for Windows XP added full Unicode support, enabling WordPad to support multiple languages, but UTF-16/UCS-2 Big Endian is not supported. It can open Microsoft Word (versions 6.0-2003) files[*citation needed*], although it opens newer versions of the .DOC format with incorrect formatting. Also, unlike previous WordPad versions, it cannot save files in the .doc format (only .txt or .rtf).Windows XP Service Pack 2 onwards reduced support for opening .WRI files for security purposes.

Windows XP Tablet PC Edition SP2 and Windows Vista include speech recognition, and therefore dictation into WordPad is possible. In these and later Windows versions, the RichEdit control was added and as a result, WordPad now supports extensible third-party services (such as grammar and spell check) built using the *Text Services Framework*(TSF).[4]

In Windows Vista, support for reading Microsoft Word DOC files was removed because of the incorrect rendering and formatting problems, as well as a Microsoft security bulletin that reported a security vulnerability in opening Word files in WordPad.[5] For viewing older (97-2003) as well as newer (Office Open XML) documents, Microsoft recommendsWord Viewer, which is available for free. Native Office Open XML and ODF support was released in the Windows 7 version of WordPad.[6][7]

Microsoft has updated the user interface for WordPad in Windows 7, giving it an Office 2010-style ribbon that replaces the application menu and toolbars. Other bundled Windows applications such as Paint have had similar interface makeovers.[8]

Recycle Bin

When you delete a file or folder in Windows, it is placed in the Recycle Bin. Items are temporarily stored in the Recycle Bin before they are permanently deleted by the user.

The Recycle Bin is located on the Windows desktop. When it is empty, the icon is an empty recycle bin. If it contains one or more items, the icon changes to a recycle bin with papers in it. You can move items to the Recycle Bin by either dragging them to the Recycle Bin icon or by selecting the items and pressing the Delete key. You may also right-click an item and select "Delete" from the pop-up menu.

You can open the Recycle Bin by double-clicking its icon. This allows you to view the files the Recycle Bin contains, just like a typical folder. However, in the left sidebar of the window, there is a "Recycle Bin Tasks" section that includes the options "Empty the Recycle Bin" and "Restore all items." Since Windows remembers the original location of each item, if you select "Restore all items," the files will each be placed back in their original location. You can also select items individually and restore them back to their previous folders.

Emptying the Recycle Bin

If you select "Empty the Recycle Bin," all the items in the Recycle Bin will be will permanently deleted. If you only want to delete a single item, you can select it, press Delete, then confirm you want to delete it. Deleted items cannot be restored, so you should only empty the Recycle Bin if you are sure you no longer need the files. It is a good idea to empty the Recycle Bin on a regular basis because it frees up disk space for other files.

Recycle or Trash?

The Recycle Bin serves the same purpose as the Trash found on Macintosh computers. While the name is not as simple, it is admittedly, more eco-friendly. It also reflects the idea that when you empty the Recycle Bin, it makes more disk space available, thereby "recycling" the sections of the disk that contained the previous data.

Windows Explorer:-

Microsoft Windows Explorer is a graphical file management utility for the Windows operating system (OS). Windows Explorer was introduced with Windows 95 and later renamed File Explorer. Each time that a computer user accesses a disk or opens a folder containing files, they are using the Windows/File Explorer utility.

The goal of the file management utility is to allow users to conveniently work with the files and directories located on any connected disk. When a file is selected within the Windows/File Explorer interface, users can select from a variety of context-sensitive actions such as renaming,

moving, copying, publishing, emailing, printing or deleting the file. Entire folders can also be opened, explored, shared, copied, cut, pasted, moved or deleted. Files can be searched or dragged and dropped between folders, and folders can be moved into other folders and disk drives as desired.

Windows/File Explorer can present files and folders in several different formats such as thumbnail image arrays, icons, lists and details (including name, size, type, date, time and other information). The choice of display format depends on the user's preferences and the type of content being explored. For example, a folder with an extensive library of image files, videos, or music may be displayed in thumbnail format, while a folder of documents might be better viewed as a detailed list.

The Windows 10 version of File Explorer is divided into three main sections. The top portion of the interface contains a graphical toolbar. This toolbar is divided into three separate tabs. By default, Windows displays the toolbar's Home tab which contains general purpose icons for functions such as Copy, Paste, Move To, Rename and Properties.

The toolbar's share tab contains icons corresponding to options for sharing the selected item with others. Using the icons found on this tab, it is possible to e-mail, print, or fax an item, or even burn it to disk.

The toolbar's View tab can be used to customize File Explorer's appearance. This is where you can find the option to display items using extra large icons, large icons, medium icons, small icons, list, details, tiles, or content. Furthermore, the View tab can be used to either display or hide filename extensions, item checkboxes, and hidden items. Additionally, the View tab contains options for viewing or hiding the navigation pane, the preview pane, and the details pane.

The second of Windows Explorer's three areas is the navigation pane. The navigation pane is displayed along the left side of the interface in a tree like view. It exposes network drives and their folders, libraries (Desktop, Documents, Downloads, Music, Pictures, and Videos). The navigation pane can also contain quick access shortcuts to commonly used folders.

The third area of the Windows Explorer interface displays the files and folders within the currently selected location. From here, a user can navigate the file system, double click on a file to open it, or right click on a file to access a context sensitive menu containing options such as Share, Open With, Send To, or Properties.

The Windows Explorer interface can appear differently depending on what item is currently selected. Clicking on the This PC icon (found in the navigation pane) for example, causes Windows Explorer to display the computer's libraries, devices and drives, and network locations. For each local drive and mapped network drive, File Explorer displays a graphical view of the drive's total capacity and space remaining. This view also replaces the toolbar's Home tab with a Computer tab, which provides options to access media, map network drives, add a network location, open settings, or even uninstall or change programs. Incidentally, the Share tab does not exist when This PC is selected.

The Windows/File Explorer has evolved with Windows operating system versions, and later releases of Windows added advanced functionality. For example, Windows 7 and Windows Server 2008 R2 add support for libraries that aggregate content from various locations like shared folders and network drives. Those OSes also include support for federated search of external databases accessed over the Internet.

Windows Explorer replaced File Manager in versions of Windows prior to Windows 95. In Windows 8 and Windows Server 2012, File Explorer received a revamped toolbar. Unneeded capabilities have also been removed from Windows/File Explorer in successive versions of Windows.

Folders:-

Folders can store and organize different types of applications, files or libraries. Folders can also contain other folders, which in turn could contain other folders or files. Due to the manner in which folders organize and store data within the file system of the storage media, folders are also known as file directories or simply directories.

How to Make Your Own Folder Icons for Windows 7

Each time you create a new folder in Microsoft Windows 7, the operating system displays a generic folder icon. If you want to customize your folders, however, Windows 7 allows you to change the icon that is displayed on your screen. To make a new folder icon, you must create an ICO file. ICO is the standard icon format in Windows and can be created in Microsoft Paint. Depending on your preference, you can create a new icon file from an existing picture on your computer or create a new icon image from scratch.

Create an Icon

Step 1

Open Microsoft Paint, located in the Windows "Accessories" folder.

Step 2

Click the "Paint" tab, select "Open" and import the image you want to use for your icon. If you want to create a new design, use the brushes, color palette and shapes to create a design on the blank canvas.

Step 3

Click the "Paint" tab after you import your image or create your new custom design, highlight the "Save As" option and select "BMP picture."

Step 4

Enter a new name for your image and type ".ico" at the end. Your new file should appear as "youriconname.ico."

Step 5

Select the folder you want to use to store your new icon image, and then click the "Save" button.

<u>Set the Folder Icon</u>

Step 1

Right-click the folder you want to customize with your new icon, and then select the "Properties" option from the context menu.

Step 2

Click the "Customize" tab in the "Properties" window.

Step 3

Click the "Change Icon" button, which is located in the "Folder icons" section at the bottom of the window.

Step 4

Click the "Browse" button and navigate to the folder that contains your new icon image. Select the file and click "Open." A preview of your icon will appear in the "Change Icon" list.

Step 5

Select the icon and click "OK."

Step 6

Click "Apply" in the "Properties" window to set your new folder icon.