

Operating System

- Software that controls the overall operations of computer system.
- An operating system acts a mediator between user and computer hardware. It provides interface to computer user and platform to other programs.
- **Function of OS**
 - Memory Management
 - Processor Management
 - Device Management
 - File Management
 - Security
 - Control over system performance
 - Job accounting
 - Error detecting aids
 - Coordination between other software and users

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Types of OS

- **Types of OS(Based on Interface):**
 - CLI (Command Line Interface): Work with commands, e.g. DOS
 - GUI (Graphical User Interface): Windows with graphic and symbols, e.g. Windows
- **Types (Based on User):**
 - Single User: one user can work at a time, e.g. DOS, Windows
 - Multiuser: more than one user can work at a time, e.g. Unix, Linux
- **Types (Based on operation)**
 - Single Task: Only one task (program) can be run at a time, e.g. DOS
 - Multitask: More than one program can run at a time, e.g. Windows

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Some other types of OS

- **Embedded OS:**
 - Operating system that is self contained in the device and resident in ROM. Used in ATM, Traffic Lights etc.
- **Networking OS**
 - Multi user, time sharing and multiprogramming operating system
 - Used for server computer to control computers in computer network.
 - For e.g. UNIX, Novel, Windows NT, Windows 2000/2003/2005/2008/2012 Server etc
- **Real-time OS:**
 - Responds to input instantly.

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Some Terms related to OS

- **Multiprogramming**
 - One or multiple programs can be loaded into its **main memory**
 - Only one program is capable to execute and other programs wait for getting their turn.
- **Multitasking**
 - More than one task execute simultaneously on a single processor machine.
 - More than one task/program/job/process can reside into the same CPU at one time

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Some Terms related to OS

- **Multiprocessing**
 - Execute more than one process simultaneously on a multi processor machine.
 - Computer uses more than one CPU at a time.
- **Multithreading**
 - Execute the different parts of a program called threads at the same time.
 - Threads are the light weight processes which are independent part of a process or program.

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MS DOS

- DOS stands for Disk Operating System.
- Associated with the disk operations

Rules for Naming File in DOS

- Primary name cannot have more than 8 characters.
- Extension should have 3 characters.
- 0-9, a-z are valid characters for file name.
- \ / : * ? < > | are invalid characters for file name.
- File name is not case sensitive.
- Dollar (\$), exclamation point (!), hash (#), percentage (%), ampersand (&), underscore(_), caret(^), tilde(~), at sign (@), braces {}, hyphen (-), single quotation mark (') and parenthesis (()) are allowed in file name.

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FILE TYPES

- **Data file:** Collection of data that is used by computer program.
- **Program file:** Collection of instructions to perform specific task by computer
- **Information file:** collection of information produced by computer as output which can be used by user for future reference.
- **System file:** Special program files needed to start or boot computer. They are:
 - **MSDOS.SYS:** It controls and provides OS interface
 - **COMMAND.COM:** It interprets the user command. It stores the commands needed to perform different tasks.
 - **IO.SYS:** It controls the input and output

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Some Terminologies

- **Batch processing**
 - Execution of a series of programs ("jobs") on a computer without manual intervention.
 - Extension of batch file is '.bat'
- **Batch File**
 - An executable file containing a series of DOS
- **Autoexec.bat**
 - It is a special batch file containing instructions that DOS executes when user starts the system.

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Some Terminologies

- **Bootstrap loader**
 - Also known as a boot program or bootstrap loader,
 - **Special operating system software** that loads into the working memory of a computer after start-up
- **Config.sys**
 - The Config.sys is the main configuration file used by OS/2, MS-DOS
 - Loads programs into the memory and sets up the memory management of the system
- **Himem.sys**
 - Driver file first included with MS-DOS 5.0 and included with Windows up to Windows 98 that manages extended memory

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Some Terminologies

- **Directory**
 - Directory is the location or space where we store files.
- **Volume Label:**
 - Volume Label is the name of any disk, to identify it.
- **Booting**
 - Starting computer.
 - It is the process of initiating an automated routine that clears the memory, load operating system and prepares the computer for use.
 - POST (Power On Self Test) runs in boot-startup process.

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DOS Commands

- **Internal DOS commands:**
 - Commands stored in system memory
 - Loaded from command.com when computer starts
- **External DOS commands:**
 - Commands which works with the external files
 - Not loaded when computer starts
- **CLS :** to clear the screen: C:\> CLS ↵
- **EXIT:** to exit from DOS environment
- **DIR:** to display files and folders: C:\> DIR ↵

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DIR Attributes

- **/P:** pause after screenful information
- **/W:** lists files in wide format
- **/S:** displays sub directories also
- **/A:** displays file/directories with specified attribute
 - DIR/AD → directories only, DIR/AH → hidden files
 - DIR/AS → system file
- **/O:** displays files/folders in sorted order
 - DIR/O:N → by name, DIR/O:S → size
 - DIR/O:D → by date/time, DIR/O:E → by extension

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Internal Commands contd.

- **COPY CON:** to create a file
C:\>COPY CON [name of file with extension]
[Press 'Ctrl+Z' or 'F6' to save]
- **TYPE:** to display the text of file
C:\> TYPE [file name] ↵
- **DEL/ERASE:** to delete files
C:\> DEL [file name] ↵

Delete command attributes

- **/P:** prompts for confirmation
- **/R:** sends file to Recycle Bin
- **/S:** deletes file in current or sub directory

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Internal Commands contd.

- **REN:** to rename a file
C:\> REN [old name] [new name] ↵
- **MD/MKDIR:** to create a directory(folder)
C:\> MD [folder name] ↵
- **CD/CHDIR:** to change the directory / to enter into a folder
C:\> CD [folder name] ↵
- **CD..:** to come out of current directory
C:\> CD.. ↵
- **CD\:** to come to root directory
- **RD:** to remove empty directory
C:\>RD [name of directory] ↵

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Internal Commands contd.

- **COPY:** to copy files to another location
C:\> COPY [source/file] [destination] ↵
- **MOVE:** to move file to another location
C:\> MOVE [source/file] [destination] ↵
- **TIME:** Displays current system time
C:\> TIME ↵
- **DATE:** to displays current system time
C:\> DATE ↵
- **VOL:** Displays volume label of current drive
- **START:** Runs a program or opens any file in current directory
- **VER:** Displays version of current DOS

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Internal Commands contd.

- **ECHO:** Repeats typed text back to the screen
- **COLOR:** Changes foreground (text) and backgroud color of DOS screen
- **PROMPT:** Changes the system prompt
 - \$1: Blank \$t: current time
 - \$d: current date \$v: version
 - \$g:> (greater than) \$l: < (less than)
 - \$p\$g: original prompt

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Wild Cards

Wild Cards are the characters which represent other characters in file name.

- a. Asterisk (*): represents one or many characters
- b. Question mark(?): represents only one character

1. To display files and folder starting with letter 'a': C:\> DIR a*.* ↵
2. To display files starting with 'p' and having only 3 characters
C:\> DIR p??.* ↵
3. To display files with extension txt: C:\> DIR*.txt ↵

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External Commands

- **EDIT:** to edit file: C:\> EDIT [file name] ↵
- **DEFRAG:** to defragment the volume (drive):
C:\> Defrag [drive name] ↵
- **CHKDSK:** to check the drive C:\> CHKDSK [drive name] ↵
- **SCANDISK:** Checks and fixes the error in hard disk drives
- **TREE:** Displays the folder and subfolders in tree structure:
C:\> TREE ↵
- **DELTREE:** Deletes a directory and all the subdirectories and files in it
- **LABEL:** Creates, Changes or deletes the volume label of disk drive

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External Commands

- **SYS:** Copies hidden system files
- **ATTRIB:** Sets or removes attribute to specified file
 - r: read only attribute
 - s: system attribute
 - h: hide attribute
 - a: archive attribute[+ to set and – to remove attribute]
e.g. To make file hidden
C:\> ATTRIB +h [filename] ↵

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External Commands

- **FDISK:** to create or delete partition of hard disk
- **FORMAT:** to format the drive or Creates/Recreates track/sectors
C:\> FORMAT [drive name] ↵
- **SHUTDOWN:** to shutdown computer
C:\> shutdown –s (shutdown)
C:\> shutdown –r (restart)
C:\> shutdown –s –t 120 (shutdown after 120 sec)
- **DISKCOMP:** Compares the content of a floppy disk with another floppy disk
- **DISKCOPY:** Copies content of one floppy disk to another
- **XCOPY:** Copies a file or files to another location

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External Commands

- **BACKUP:** Keeps backup of file
- **RESTORE:** Restores data from backup
- **UNDELETE:** Restores deleted data
- **DOSKEY:** Recalls previously entered command
C:\>DOSKEY/History ↵ → displays all the command entered
- **MORE:** Displays output one screen at a time.
- **MEM:** Gives memory information including used and free memory

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Windows

- GUI Based single user multitasking operating system developed by Microsoft
- First Windows: Window 1.0 (1985-1992)
- Latest Windows: Windows 11 (2021)

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Some Terminologies in Windows

- **Folder:** Location where files are stored
- **Briefcase:** A special folder that supports a simple two-way file synchronization between itself and another folder.
- **Compress:** Process to minimize the size of folder
- **Desktop:**
 - First screen displayed on screen after computer is booted.
- **Taskbar:**
 - Long horizontal bar at the bottom of desktop which contains opened files, folders and programs
- **System Tray:**
 - Lies at the right side of the taskbar which displays date, time and other utilities. Also known as notification area

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Some Terminologies in Windows

- **Start button:**
 - Button to start program.
 - It provides access to application, accessories, documents, system tools etc.
- **Recycle Bin:**
 - Holds the items deleted from computer.

[Press 'Shift+Delete' to delete file permanently without sending to Recycle Bin]
- **Window:**
 - Framed area on the desktop within which a program executes and display information

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Some Terminologies in Windows

Types of window:

1. Application window/ Parent window:

- Window of executable program.
- Can be opened, closed, resized and moved around the desktop.
- The title bar appears on the top of the application window.
- A program has only one application window.
- Press 'Alt+F4' to close application window.

2. Document window/ Child window:

- Appears inside the application window.
- A document window is the area where we work.
- An application can have more than one document window.
- Press 'Ctrl+W' to close document window

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Some Terminologies in Windows

• Dialog Box:

- A rectangular box that appears temporarily to inform a user about some message (error message, warning etc.)

• Button

- Any graphical control element that provides the user a simple way to trigger an event

• Checkbox:

- Widgets that permit the user to make multiple selections from a number of different options (binary choices), also called tickbox

• Radio button

- A graphical control element that allows the user to choose only one of a predefined set of options, also known option button

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Some Terminologies in Windows

- **List Box**
 - A graphical control element that allows the user to select one or more items from a list contained within multiple line list
- **Textbox**
 - A GUI control element that accepts text from user
- **Combo Box**
 - Combination of list box and text box
- **Spin Button (Spinner)**
 - A graphical control element with which a user may adjust a value by either clicking on an up or down arrow
- **Tab**
 - Tab is a graphical control element that allows multiple documents or panels to be contained within a single window

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Control Panel Elements and options

- **Control Panel**
 - A component of Microsoft Windows that provides the ability to view and change system settings
 - Start > Run > Control
- **Keyboards**
 - **Options:** Character repeat rate, Cursor blinking rate
- **Mouse**
 - **Options:** Double-click Speed, Pointer options, Cursor style, Switch primary and secondary button
- **Display**
 - **Options:** desktop wallpaper, screen saver and appearance of computer

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Control Panel Elements and options

- **Regional and Language Settings**
 - Options: Language Settings, Unicode Setting
- **Folder Options**
 - Options: show/hide hidden files, show/hide system files and file extensions
- **Fonts:** Displays all installed fonts
- **Task Scheduler:** Adds programs in schedule to run in specific date/time
- **User Account:** Allows you to sign in to your computer

Types of user account

- Administrator: Having full access to all computer settings
- Standard: Normal Account with limited access
- Standard with family safety: Account with parental control

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Important Run Commands

- Disk Management: diskmgmt.msc
- Display Propertie: desk.cpl
- Disk Partition Manager: diskpart
- Registry Editor: regedit
- Group Policy Editor: gpedit.msc
- Diagnostic Tool: Dxdiag
- System Configuration Utility: msconfig
- Calculator: calc
- Command Prompt: cmd
- Character Map: charmap
- Computer Management: compmgmt.msc
- Date and Time Properties: timedate.cpl
- Device Management: devmgmt.msc
- Event Viewer: eventvwr

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- Ctrl + A: Select All
- Ctrl + C: Copy
- Ctrl + X: Cut
- Ctrl + V: Paste
- Ctrl + Z: Undo
- Shift + Del: Permanent Delete
- Alt + Enter: View Properties
- F1: Help and Support
- F2: Rename
- F3: Search for file/folders
- Alt + Tab: Switch between windows
- F1: Help and Support
- F2: Rename
- F3: Search for file/folders
- Alt + Tab: Switch between windows
- Alt + F4: Close Active window
- Ctrl + W: Close Active window
- Ctrl + ESC: Start Menu
- Ctrl + Shift + Esc: Task Manager
- Windows Key + R : Run
- Windows Key + L : Lock computer
- Windows Key + D: Show Desktop
- Windows Key + E: Windows Explorer
- Windows Key + U : Utility Manager

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- **Standby**
 - Energy-saving mode, uses very little power
- **Hibernate**
 - Saves workspace and turns off computer
- **Sleep**
 - Initially in standby
 - Goes to hibernate mode when power is less

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Linux Operating System

- Linux is an open source operating system (OS)
- **Components of Linux**
 - **Kernel** - Core part of Linux.responsible for all major activities
 - **System Library** - Special functions, that are used to implement the functionality of the operating system.
 - **System Utility** - System Utility programs are responsible to do specialized, individual level tasks.
 - **Shell**: Interface between the user and the kernel, It takes commands from the user and executes the kernel's functions

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Linux Operating System

- File Access Mechanism: Sequential access, Direct/Random access, Indexed sequential access
- **Kernel Mode vs User Mode**
 - Kernel components runs in a special privileged mode called kernel mode with full access to all resources of the computer.
 - User programs and other system programs works in User Mode which has no access to system hardwares and kernel code.

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