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Introduction to Operating System



OS
CONCEPTS



TYPES
& FUNCTIONS



FILES
& MANAGEMENT



USERS
& SECURITY

Introduction to Operating System

An Operating System (OS) is system software that acts as an interface between the user and computer hardware. It manages hardware, software, memory, files, and other resources of a computer system.

Examples: Windows, Linux, macOS, Android, iOS and Unix.

Main Functions of Operating System

1. **Process Management:** Manages running programs and CPU scheduling.
2. **Memory Management:** Allocates and deallocates memory to programs.
3. **File Management:** Creates, stores, organizes and deletes files.
4. **Device Management:** Controls input and output devices.
5. **Security Management:** Protects data using passwords and access permissions.
6. **User Interface:** Provides GUI or CLI for user interaction.
7. **Resource Management:** Allocates CPU, memory and other resources.
8. **Error Handling:** Detects and manages system errors.

Types of Operating Systems

Type	Description	Example
Batch OS	Executes jobs in batches without direct user interaction	IBM OS/360 batch processing
Time-Sharing OS	Shares CPU time among multiple users or tasks	Unix
Multiprogramming OS	Keeps multiple programs in memory	OS/360 MVT
Multitasking OS	Runs multiple tasks concurrently	Windows, Linux
Multiprocessing OS	Uses multiple processors or CPU cores	Linux, Windows
Real-Time OS	Responds within specified time limits	QNX, VxWorks
Distributed OS	Manages multiple connected computers as one system	Amoeba

Network OS	Provides network resource-sharing services	Windows Server
Mobile OS	Designed for smartphones and tablets	Android, iOS
Embedded OS	Designed for dedicated devices	FreeRTOS

Components of Operating System

- **Kernel:** Core component that manages hardware and system resources.
- **Shell:** Interface that accepts user commands.
- **File System:** Organizes and manages files and directories.
- **Device Drivers:** Enable communication with hardware devices.
- **System Utilities:** Perform maintenance and management tasks.

User Interfaces

GUI (Graphical User Interface): Uses windows, icons, menus and pointers. Example: Windows desktop.

CLI (Command Line Interface): Uses text-based commands. Example: Bash shell, Windows Command Prompt.

Advantages of Operating System

- Makes computers easy to operate.
- Supports multitasking and resource sharing.
- Provides file and memory management.
- Improves security and system performance.
- Supports hardware and software applications.

Important Terms

Term	Meaning
Bootting	Process of starting a computer and loading the OS
Kernel	Core part of the operating system
Process	Program currently in execution

Thread	Smallest schedulable unit of execution
Deadlock	Situation where processes wait indefinitely for resources
Virtual Memory	Uses secondary storage to extend available memory
Multitasking	Execution of multiple tasks concurrently
Spooling	Queuing jobs for devices such as printers

Examples of Popular Operating Systems

1. Windows (Microsoft)
2. Linux (Open-source OS)
3. macOS (Apple)
4. Android

User Interface

A User Interface (UI) is a medium through which users interact with a computer or operating system. It allows users to open programs, manage files, change settings and perform different tasks.

Examples: Windows Desktop, Linux Desktop and macOS Desktop.

Types of User Interface

1. GUI (Graphical User Interface): Uses icons, windows, menus and mouse pointers. Example: Microsoft Windows.
2. CLI (Command Line Interface): Uses text-based commands to perform tasks. Example: Command Prompt, Terminal.
3. Touch User Interface: Allows users to interact using touch gestures on supported screens.
4. Voice User Interface: Allows users to interact using voice commands.

Main Components of Desktop User Interface

Component	Description
Desktop	Main screen displayed after signing in
Icons	Small graphical symbols representing programs, files or folders
Taskbar	Displays open applications and provides quick access to programs

Start Menu	Provides access to applications, settings and power options
Mouse Pointer	Indicates the current position of the mouse
Windows	Rectangular areas displaying applications or files
Notification Area	Displays system status, network, sound and other notifications
Wallpaper	Background image of the desktop
Recycle Bin	Temporarily stores many deleted files
File Explorer	Helps browse and manage files and folders

Using Mouse and Changing Its Properties

A mouse is a pointing input device used to select, open, drag, and move objects on the computer screen.

Common Mouse Operations:

- Single Click: Select an item.
- Double Click: Open a file or program.
- Right Click: Display a shortcut menu.
- Drag and Drop: Move an item.
- Scroll: Move a page up or down.

Steps to Change Mouse Properties (Windows):

1. Open Settings → Bluetooth & devices → Mouse.
2. Select the primary mouse button (Left or Right).
3. Adjust mouse pointer speed.
4. Change scrolling preferences.
5. Open Additional mouse settings for double-click speed and other options.

Changing System Date and Time

The system date and time display the current date, time, and time zone of the computer.

Steps to Change Date and Time:

1. Open Settings → Time & language → Date & time.

2. Turn off Set time automatically to change the time manually.
3. Click Change under manual date and time settings.
4. Enter the required date and time.
5. Click Change to save.

Note: Correct date and time are important for file timestamps, scheduling, internet security, and software updates.

Changing Display Properties

Display Properties control the appearance of the computer screen, including resolution, brightness, scaling, and orientation.

Steps to Change Display Settings:

1. Right-click an empty area of the Desktop.
2. Select Display settings.
3. Adjust the required options:
 - Resolution: Number of pixels displayed on the screen.
 - Brightness: Screen light intensity (on supported displays).
 - Scale: Size of text, icons, and applications.
 - Orientation: Landscape or Portrait.
4. Confirm the changes if prompted.

To Change Wallpaper: Right-click Desktop → Personalize → Background → Select an image.

To Add or Remove Programs and Features

Installing a Program means adding software to the computer, while Uninstalling a Program means removing installed software.

Steps to Install a Program:

1. Download software from a trusted source or open its installer.
2. Run the setup file.
3. Follow the installation instructions.
4. Click Install and then Finish when completed.

Steps to Uninstall a Program (Windows 11):

1. Open Settings → Apps → Installed apps.
2. Find the required application.
3. Click the three-dot menu next to the application.
4. Select Uninstall.
5. Follow the instructions.

Alternative Method: Control Panel → Programs → Programs and Features → Select Program → Uninstall.

Note: Some built-in Windows applications cannot be uninstalled through normal settings.

Adding, Removing & Sharing Printers

A printer is an output device used to produce hard copies of documents, images, and reports.

A. Steps to Add a Printer

1. Connect the printer using USB or a network connection.
2. Open Settings → Bluetooth & devices → Printers & scanners.
3. Click Add device.
4. Select the printer and follow the instructions.
5. Install the required printer driver if necessary.

B. Steps to Remove a Printer

1. Open Settings → Bluetooth & devices → Printers & scanners.
2. Select the printer.
3. Click Remove.
4. Confirm the action.

C. Steps to Share a Printer

1. Open Settings → Bluetooth & devices → Printers & scanners.
2. Select the printer.
3. Open Printer properties → Sharing.
4. Enable Share this printer.

5. Enter a sharing name and apply the settings.

File and Folder Management

File and Folder Management is the process of creating, organizing, copying, moving, renaming, searching, and deleting files and folders in a computer.

- File: A collection of data stored with a specific name and extension. Example: notes.docx, photo.jpg.
- Folder: A container used to store and organize files and subfolders.
- File Explorer: A Windows application used to manage files, folders, and drives.

Common File and Folder Operations

Operation	Description
Create	Make a new file or folder
Open	Access a file or folder
Copy	Create a duplicate at another location
Move	Transfer a file or folder to another location
Rename	Change the name of a file or folder
Delete	Remove a file or folder
Search	Find a file or folder
Restore	Recover a deleted item from Recycle Bin

Steps to Manage Files and Folders

1. Create Folder: Right-click → New → Folder → Enter name.
2. Rename: Select file/folder → Press F2 → Enter new name.
3. Copy: Select file → Ctrl + C → Open destination → Ctrl + V.
4. Move: Select file → Ctrl + X → Open destination → Ctrl + V.
5. Delete: Select file → Press Delete.

6. Permanent Delete: Select file → Shift + Delete (bypasses Recycle Bin).
7. Search: Open File Explorer → Type the filename in the Search box.

File Extensions

A file extension indicates the type or format of a file.

Extension	File Type
.txt	Text File
.docx	Word Document
.xlsx	Excel Spreadsheet
.pptx	PowerPoint Presentation
.pdf	Portable Document Format
.jpg, .png	Image File
.mp3	Audio File
.mp4	Video File
.exe	Executable File
.zip	Compressed Archive

File Path

A File Path specifies the location of a file or folder on a computer.

Example: C:\Users\Student\Documents\Notes.docx

- C: Drive name
- Users: Folder
- Student: Subfolder
- Documents: Subfolder
- Notes.docx: File name

Recycle Bin

The Recycle Bin temporarily stores many files and folders deleted from local drives in Windows.

- Restore: Returns a deleted item to its original location.
- Empty Recycle Bin: Permanently removes items stored in it.
- Files deleted using Shift + Delete normally bypass the Recycle Bin.

Important Keyboard Shortcuts

Shortcut	Function
Ctrl + C	Copy
Ctrl + X	Cut
Ctrl + V	Paste
Ctrl + A	Select All
Ctrl + Z	Undo
Ctrl + Shift + N	Create New Folder
F2	Rename
Delete	Delete Selected Item
Shift + Delete	Delete Without Recycle Bin
Win + E	Open File Explorer
Alt + Enter	Open Properties