

The background features a gradient from light purple at the top to dark purple at the bottom. A large, semi-transparent purple circle is positioned in the top-left corner, and another smaller, semi-transparent purple circle is in the bottom-right corner.

# Operating Systems

*Understanding the software that manages your computer*

# Learning Objectives

1 Necessity of an operating system

2 Functions of an operating system

3 User interfaces: CLI vs GUI

4 Services provided by operating systems

5 Types of operating systems

6 Utility programs of operating systems

7 Drives, folders, and file management

# Introduction to Operating Systems

A computer consists of three main components:

## HARDWARE

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Physical Components

*Mouse, Keyboard,  
Monitor, CPU*

## FIRMWARE

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Booting Instructions

*Stored in ROM  
(BIOS, Bootstrap)*

## SOFTWARE

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Programs & Instructions

*OS, Applications, Games*

# The Booting Process



Cold Boot: Starting from powered-off state | Warm Boot (Restart): Restarting without powering off

# Functions of an Operating System

An OS acts as an intermediary between users, applications, and hardware:

## Process Management

Manages CPU time for all running programs and tasks

## Memory Management

Allocates and frees RAM for each process efficiently

## Device Management

Controls peripherals via device drivers and controllers

## File Management

Organizes and manages files and folders on storage

## Security Management

User authentication, access control, and malware protection

## Network Management

Manages connections, resource sharing, and remote access

# Types of Operating Systems

## Single User Single Tasking

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*One user, one  
task at a time  
Example: MS-  
DOS*

## Single User Multi Tasking

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*One user,  
multiple tasks  
Example:  
Windows,  
macOS*

## Multi User

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*Many users  
simultaneousl  
y  
Example:  
Unix, Linux  
Server*

## Multi Tasking

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*Multiple  
processes at  
once  
Example:  
Windows 7,  
Ubuntu*

## Real Time

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*Instant  
output, no  
delays  
Example: ATM  
machines*

# User Interfaces: CLI vs GUI

## CLI – Command Line Interface

```
C:\Users\Student> dir
C:\Users\Student> cd Documents
C:\Users\Student\Documents>_
```

- Text-based input via keyboard
- Requires knowledge of commands
- Faster for experienced users
- Common commands: dir, cd, mkdir, del, copy

## GUI – Graphical User Interface



Windows



Icons



Menus



Pointer

- Visual, click-based interaction
- User-friendly for beginners
- Uses mouse, touch, or trackpad
- Examples: Windows, macOS, Ubuntu Desktop

# Utility Programs

## Backup Software

Copy files and backup hard drives

## Disk Scanner

Check errors in hard drive

## Disk Defragmentation

Reorganize files for better efficiency

## File Compression

Compress large files into smaller ones

## Task Manager

Display information about running processes

## Anti-Virus

Identify and eliminate malware

## Clipboard

Temporary storage for cut/copy operations

## Disk Partitioning

Divide a drive into multiple logical drives

## Network Utilities

Analyze and configure network connectivity

# File Systems & Management

## File Structure

**MyDocument.docx**

**File Name:** MyDocument

**Separator:** . (dot)

**Extension:** docx

### Common Extensions:

.docx – Word

.xlsx – Excel

.pptx – PowerPoint

.pdf – PDF

.jpg/.png – Image

.mp3/.mp4 – Media

## File Operations & Shortcuts

Operation	Shortcut	Description
Copy	Ctrl + C	Duplicate – original stays
Cut	Ctrl + X	Move – original removed
Paste	Ctrl + V	Place copied/cut item
Delete	Delete key	Moves to Recycle Bin
Rename	F2	Change file/folder name
Select All	Ctrl + A	Select everything
Undo	Ctrl + Z	Reverse last action

# Proprietary vs Open Source OS

## Proprietary (Paid/Licensed)

### Microsoft Windows

Most popular – Win 7, 8, 10, 11

### Apple macOS

Only on Apple hardware

### Windows Server

For server environments

**Requires paid license to use**

## Open Source (Free)

### Ubuntu

Linux-based, [www.ubuntu.com](http://www.ubuntu.com)

### Android

Google-developed, for mobile

### Hanthona Linux

Linux-based, [www.hanthona.org](http://www.hanthona.org)

**Free to use, modify & distribute**

# Summary



## OS is the Bridge

It connects users, applications, and hardware components



## Two UI Types

CLI (text-based, expert use) and GUI (visual, user-friendly)



## File Management

Files have names and extensions; operations use shortcuts



## 6 Key Functions

Process, Memory, Device, File, Security, Network Management



## Utility Programs

Tools for backup, scanning, defrag, compression, antivirus



## OS Types

Proprietary (paid) vs Open Source (free to use and modify)