



Computer Fundamentals & Programming

Operating System

Operating Systems

1. Operating Systems
2. Types of Operating System
3. Major Functions
4. User Interface
5. Examples of Operating System



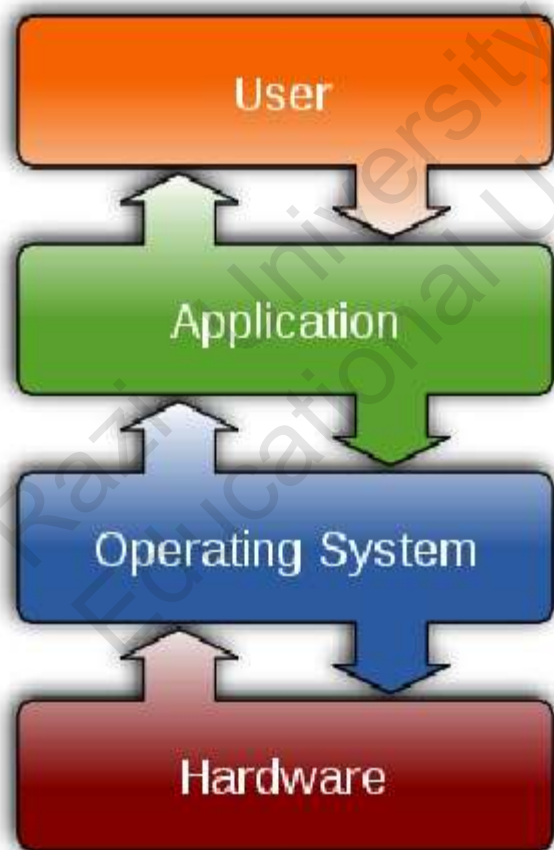
Operating Systems

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- The operating system is the most important program that runs on a computer.
- Operating system is an interface between computer and user.
- It is responsible for the management and coordination of activities and the sharing of the resources of the computer.

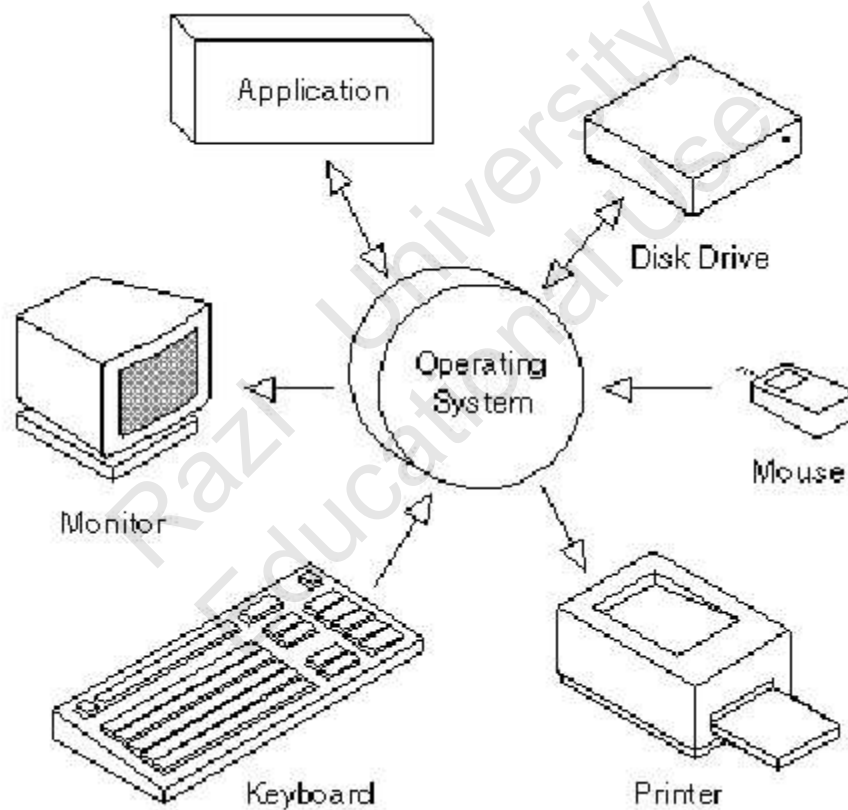
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Types of Operating System

- Real-time
- Multi-user vs. Single-user
- Multi-tasking vs. Single-tasking
- Distributed
- Embedded

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Types of Operating System

Real-Time

- A real-time operating system is a multitasking operating system that aims at executing real-time applications.
- Responds to input instantly.

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Types of Operating System

Multi-user vs. Single user

- A multi-user operating system allows multiple users to access a computer system concurrently.
- Time-sharing system can be classified as multi-user systems as they enable a multiple user access to a computer through the sharing of time.
- Single-user operating systems, as opposed to a multi-user operating system, are usable by a single user at a time.

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Types of Operating System

Multi-tasking vs. Single-tasking

- When a single program is allowed to run at a time, the system is grouped under a single-tasking system
- While in case the operating system allows the execution of multiple tasks at one time, it is classified as a multi-tasking operating system.

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Types of Operating System

Distributed

- A distributed operating system manages a group of independent computers and makes them appear to be a single computer.
- The development of networked computers that could be linked and communicate with each other, gave rise to distributed computing.

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Types of Operating System

Embedded

- Embedded operating systems are designed to be used in embedded computer systems.
- They are designed to operate on small machines like PDAs with less autonomy.
- They are able to operate with a limited number of resources.

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Major Functions of Operating System

- Resource management
- Data management
- Job management
- Standard means of communication between User and Computer

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Major Functions of Operating System

Resource Management

- The resource management function of an OS allocates computer resources such as CPU time, main memory, secondary storage, and input and output devices for use.

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Major Functions of Operating System

Data Management

- The data management functions of an OS govern the input and output of data and their location, storage, and retrieval.
- It also is responsible for storing and retrieving information on disk drives and for the organization of that information on the drive.

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Major Functions of Operating System

Job Management

- The job management function of an OS prepares, schedules, controls, and monitors jobs submitted for execution to ensure the most efficient processing.
- A job is a collection of one or more related programs and their data.

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Major Functions of Operating System

Standard Means of Communication between User and Computer

- The OS also establishes a standard means of communication between users and their computer systems.
- It does this by providing a user interface and a standard set of commands that control the hardware.

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User Interface

- A program that controls a display for the user (usually on a computer monitor) and that allows the user to interact with the system) .
- The user interface allows the user to communicate with the operating system.

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User Interface

- The user interface provides means of:
 - **Input** - allowing the users to manipulate a system
 - **Output** - allowing the system to indicate the effects of the users' manipulation.

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Types of User Interface

- Command line interface
- Graphical user interface

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Types of User Interface

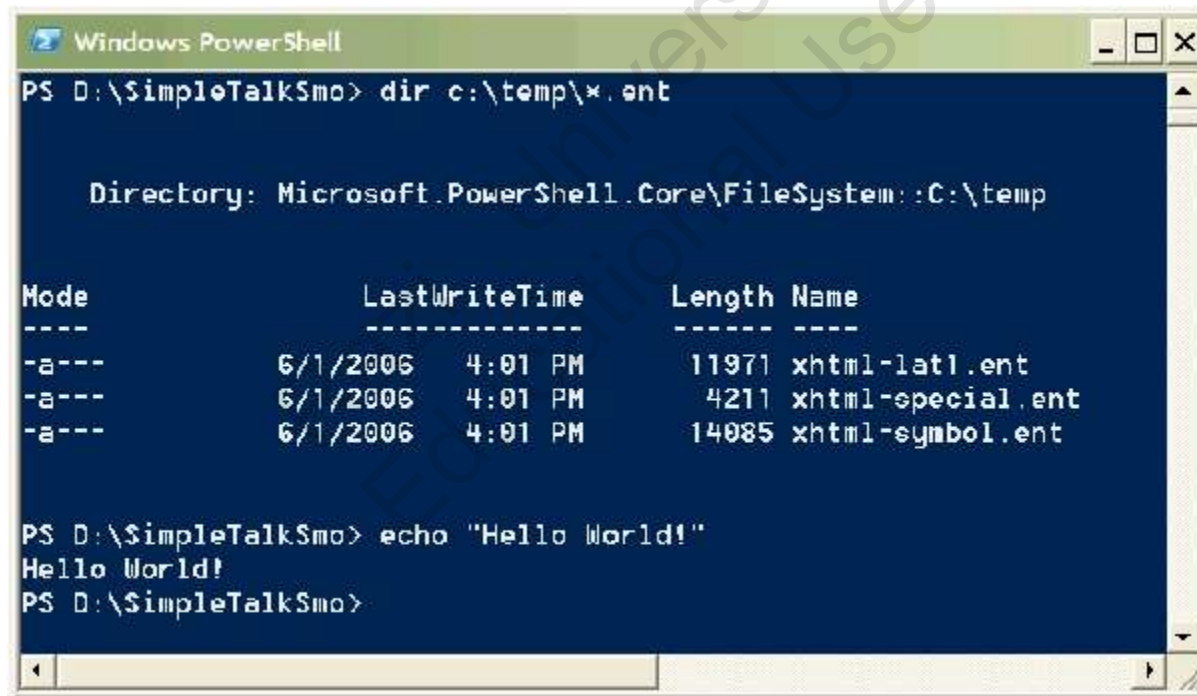
Command Line Interface (CLI)

- A **command-line interface** is a mechanism for interacting with a computer operating system or software by typing commands to perform specific tasks.
- This method of instructing a computer to perform a given task is referred to as "entering" a command.
- Accept input via keyboard only.
- Not suitable for beginners.

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Types of User Interface

Command Line Interface (CLI)



A screenshot of a Windows PowerShell window. The title bar reads "Windows PowerShell". The prompt is "PS D:\SimpleTalkSmo>". The user has entered the command "dir c:\temp*.ent". The output shows the directory listing for "Microsoft.PowerShell.Core\FileSystem::C:\temp". The listing includes three files: "xhtml-lat1.ent" (11971 bytes), "xhtml-special.ent" (4211 bytes), and "xhtml-symbol.ent" (14085 bytes). The user then enters the command "echo 'Hello World!'", and the output is "Hello World!". The prompt returns to "PS D:\SimpleTalkSmo>".

```
Windows PowerShell
PS D:\SimpleTalkSmo> dir c:\temp\*.ent

Directory: Microsoft.PowerShell.Core\FileSystem::C:\temp

Mode                LastWriteTime         Length Name
----                -
-a---             6/1/2006   4:01 PM      11971 xhtml-lat1.ent
-a---             6/1/2006   4:01 PM       4211 xhtml-special.ent
-a---             6/1/2006   4:01 PM     14085 xhtml-symbol.ent

PS D:\SimpleTalkSmo> echo "Hello World!"
Hello World!
PS D:\SimpleTalkSmo>
```

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Types of User Interface

Command Line Interface (CLI)

- Examples of command:

Command	Description
DIR	To display list of files or folder
COPY	To copy file or folder
MD	To make new folder
CLS	To clear screen
Quit	To quit

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Types of User Interface

Graphical User Interface (GUI)

- Is a type of user interface which allows people to interact with computer with images rather than text commands.
- Accept input via keyboard and pointing devices.
- Easy to learn.

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Types of User Interface

Elements of Graphical User Interface

- Pointer
- Icons
- Desktop
- Windows
- Menus

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Types of User Interface

Pointer

- A symbol that appears on the display screen and that you move to select objects and commands.
- Usually, the pointer appears as a small angled arrow.



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Types of User Interface

Icons

- Small pictures that represent commands, files, or windows.



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Types of User Interface

Desktop

- The area on the display screen where icons are grouped is often referred to as the desktop because the icons are intended to represent real objects on a real desktop.

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Types of User Interface

Desktop



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Types of User Interface

Windows

- Used to divide the screen into different areas.
- In each window, you can run a different program or display a different file.

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Types of User Interface

Windows



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Types of User Interface

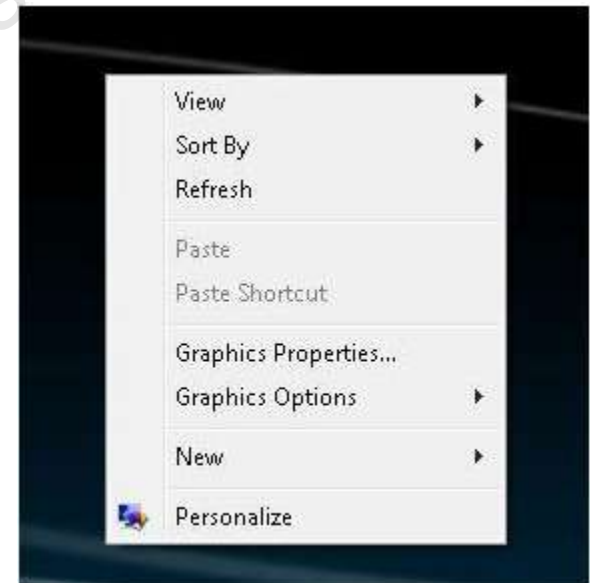
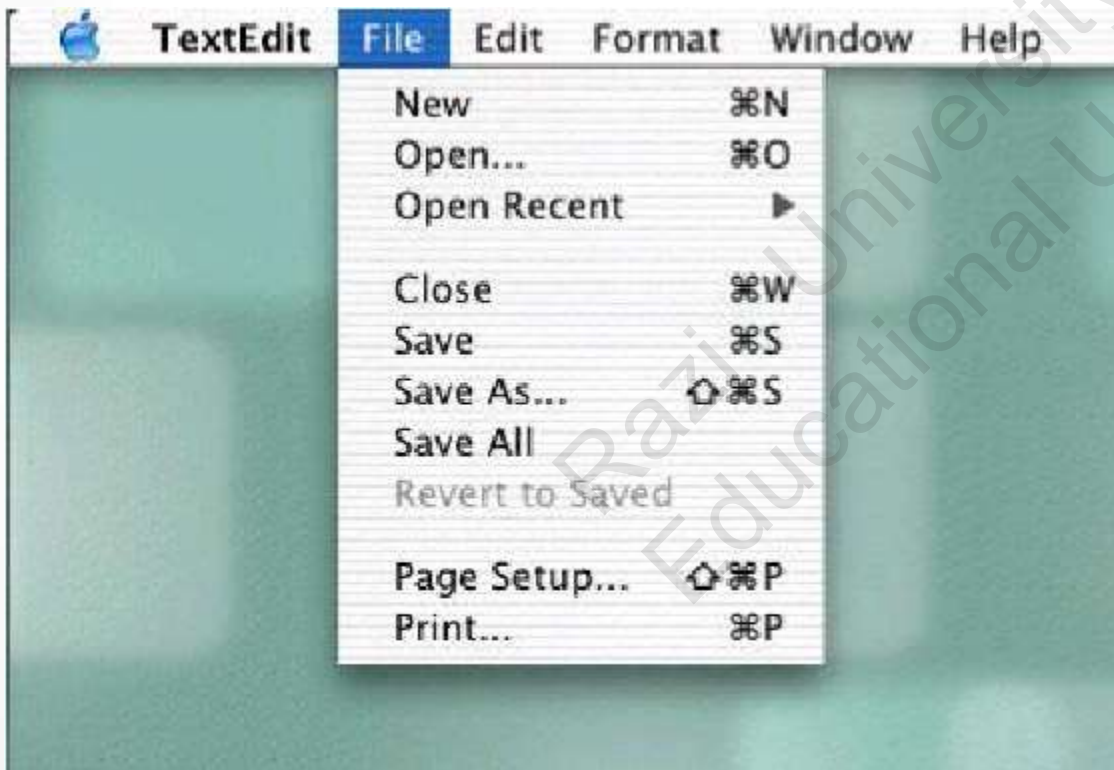
Menus

- Most graphical user interfaces let you execute commands by selecting a choice from a menu.
- Two types of menu:
 - Pull-down menu
 - Pop-up menu

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Types of User Interface

Menus



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Types of User Interface

	CLI	GUI
Ease	Because of the memorization and familiarity needed to operate a command line interface, new users have a difficult time navigating and operating a command line interface.	Although new users may have a difficult time learning to use the mouse and all GUI features, most users pick up this interface much easier when compared to a command line interface.
Control	Users have much more control of their file system and operating system in a command line interface. For example, users can copy a specific file from one location to another with a one-line command.	Although a GUI offers plenty of control of a file system and operating system, the more advanced tasks may still need a command line.

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Types of User Interface

	CLI	GUI
Multitasking	Although many command line environments are capable of multitasking, they do not offer the same ease and ability to view multiple things at once on one screen.	GUI users have windows that enable a user to view, control, and manipulate multiple things at once and is much faster to navigate when compared with a command line.
Speed	Command line users only need to use their keyboards to navigate a command line interface and often only need to execute a few lines to perform a task.	A GUI may be easier to use because of the mouse. However, using a mouse and keyboard to navigate and control your operating system for many things is going to be much slower than someone who is working in a command line.

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Examples of Operating System

- MS-DOS
- Windows
- Mac OS
- Linux
- Solaris
- Android

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Microsoft DOS

- DOS stands for **Disk Operating System**.
- Developed by Microsoft Inc.
- Using command line interface.
- It does not support multiple users and multitasking.
- First version: MS-DOS 1.0 (1981)
- Final version: MS-DOS 7.0 (1995)



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Microsoft DOS

```
Microsoft(R) Windows DOS
(C)Copyright Microsoft Corp 1990-2001.

C:\>mem

        655360 bytes total conventional memory
        655360 bytes available to MS-DOS
        578352 largest executable program size

        4194304 bytes total EMS memory
        4194304 bytes free EMS memory

        19922944 bytes total contiguous extended memory
           0 bytes available contiguous extended memory
        15580160 bytes available XMS memory
           MS-DOS resident in High Memory Area

C:\>
```

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Windows

- Produced by Microsoft, Inc.
- Using graphical user interface.
- Support multitasking and multiuser.
- First version: Windows 1.0 (1985)
- Latest version: Windows 10



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Windows



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Mac OS

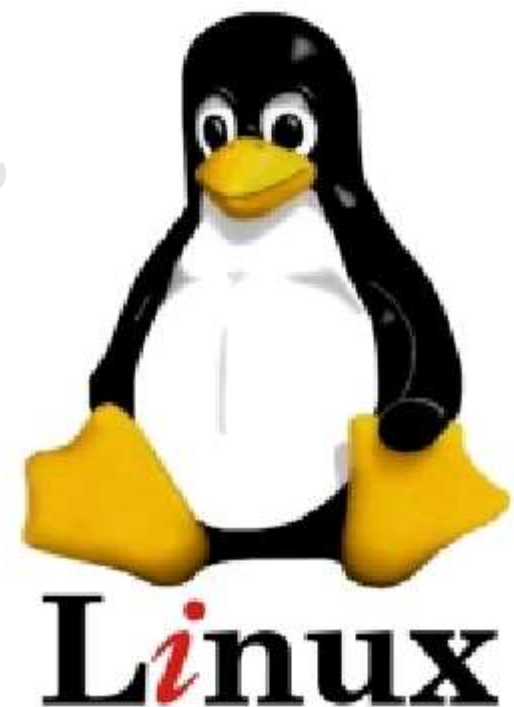
- The official name of the Macintosh operating system.
- Created by Apple Inc.
- Operating System for Apple Macintosh computer.
- First version: Mac System 1 (1984)
- Latest version: Mac OS 10.12



Operating Systems

Linux

- A freely-distributable open source operating system that runs on a number of hardware platforms.
- Linux has become an extremely popular alternative to proprietary operating systems.
- First version: Linux (1992)
- Latest version: Linux 4.9.5



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Linux



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Android

- **Android** is a Linux-based operating system for mobile devices such as smartphones and tablet computers
- It is developed by the Open Handset Alliance, led by Google, and other companies
- First version: Android 1.0 (2008)
- Latest version: Android 6



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Android



Operating Systems

Solaris

- **Solaris** is a Unix operating system originally developed by Sun Microsystems
- Solaris can be installed from physical media or a network for use on a desktop or server
- Used on server and workstation
- First version: Solaris 1 (1991)
- Latest version: SunOS 11.3



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Solaris

