

# **FAST**

**National University of Computer and  
Emerging Sciences Peshawar**

**Lecture # 01**

**DEPARTMENT OF COMPUTER SCIENCE**

# **Operating System**

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# Software

- ❖ A software or computer software essentially a type of programs which enable the users to perform some particular specific task or actually used to operate their computer.
- ❖ A software plays a key role of a mediator between the user and the computer hardware. In the absence of software, a user essentially can't perform any task on a computer.
- ❖ A **software product development company** is the one which develops software for the users.



# Types of Software

Generally, there are two main classifications of software, which are namely:

1. System Software
2. Application Software.



# 1. System Software

- ❖ In case of a system software, it helps the user as well as the hardware to function and even interact with each other easily.
- ❖ Essentially, it is a software which is used to manage the behavior of the computer hardware in order to offer basic functionalities which are needed by the user.
- ❖ In simpler word, it can be said that system software is essentially an intermediary or even a middle layer between the user as well as the hardware.

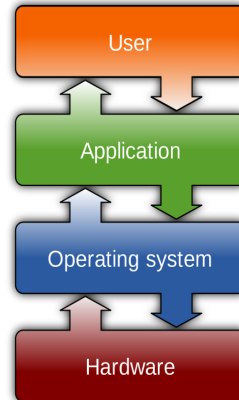


# Types of System Software

- i) Operating System
- ii) Device Drivers
- iii) Firmware
- iv) Utility

## i) Operating System

- ❖ An **operating system** is a program that acts as an interface between the software and the computer hardware.
- ❖ An operating system is system software that manages computer hardware, software resources, and provides common services for computer programs.





## i) Operating System...

1. MS Windows
2. macOS
3. Linux
4. iOS
5. Android
6. CentOS
7. Ubuntu
8. Unix etc.





## ii) Device Drivers

- ❖ This type of software controls particular hardware which is essentially attached to the system.
- ❖ Different hardware devices which require a driver to connect to a system easily consist of displays, printers, sound cards, hard disks, keyboard, and mouse.
- ❖ Few of the examples of such drivers are:



## ii) Device Drivers ...

- ❖ BIOS Driver
- ❖ Motherboard Drivers
- ❖ Display Drivers
- ❖ ROM Drivers
- ❖ Printer Drivers
- ❖ USB Drivers
- ❖ Sound Card Driver
- ❖ VGA Drivers etc.



### iii) Firmware

- ❖ It is actually a permanent software which is embedded in the system's read-only memory. It is essentially a set of instructions which are permanently stored onto the hardware device.
- ❖ It offers vital information regarding how a particular device interacts with different other hardware.
- ❖ Some of the examples of firmware are:
  - Computer Peripherals
  - Embedded Systems
  - BIOS etc.



## iv) Utility

- ❖ These software are designed to assist in analysing, as well as optimizing, along with configuring and maintaining a given computer system. It provides support to the computer infrastructure.
- ❖ Software like disk cleanup and management tools, anti-viruses, defragmenters, compression tools etc. are all utility software.
- ❖ Some of its examples are:



## iv) Utility

1. Norton
2. Antivirus
3. McAfee Antivirus
4. WinRAR WinZip
5. Piriform CCleaner
6. Windows File Explorer etc.



## 2) Application Software

They are also popularly known as end-user programs or even productivity programs which assist the user in completing various tasks like conducting online research, making notes, designing graphics, maintaining accounts, carrying out calculations or even playing computer games.

These software are often developed through custom software development, based on the requirements of the users. There is a variety of application software.

Some of them are:



# Types of Application Software

- i. Word Processors
- ii. Database Software
- iii. Multimedia Software
- iv. Web Browsers



## i. Word Processors

Such applications are meant for documentation. It also assists in storing as well as formatting and even printing of the documents. Key examples of such software are:

1. MS Word
2. Apple iWork-Pages
3. Corel WordPerfect
4. Google Docs





## ii. Database Software

It is used to create as well as manage a database and also known as Database Management System or in short, DBMS. Such software assists in the data organization. Some of the examples of DBMS are:

1. MS Access
2. FileMaker
3. dBase
4. Clipper
5. MySQL
6. FoxPro



### iii. Multimedia Software

This is a software which is able to play, create as well as record images, audio or even video files.

These software are utilized for animation, video editing, graphics as well as image editing.

1. Adobe Photoshop
2. VLC Media Player
3. Windows Media Player
4. Windows Movie Maker



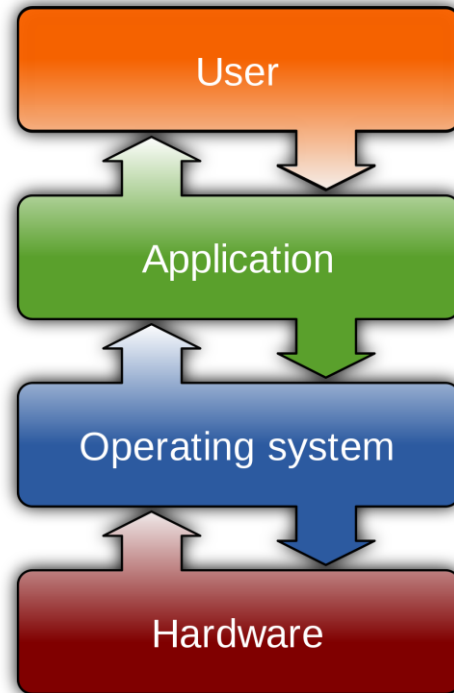
## iv. Web Browsers

These software are utilized to browse the internet. Web browsers assist the users in locating as well as retrieving data well across the web.

Some of the key examples of them are:

1. Google Chrome
2. Mozilla Firefox
3. Internet Explorer
4. Opera
5. UC Browser
6. Safari

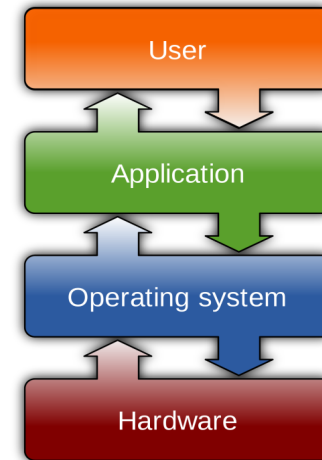
# What is an Operating System?...



# Hardware

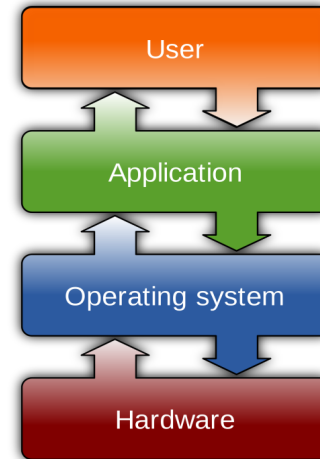
Hardware means RAM, processor, keyboard, mouse and input , output devices etc.

Operating system is installed on Hardware.



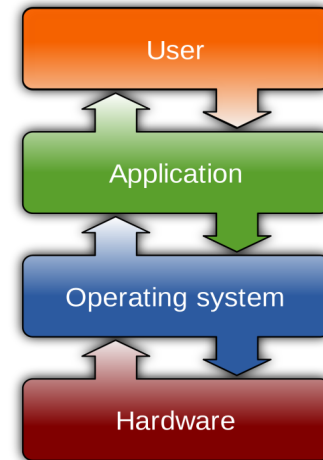
# Operating System

Operating system is installed on hardware.



# Applications

Applications are installed on Operating System.





# User

Users use the Applications.

User may be human as well computer.

Users do communication with applications.

**E.g.** user play game or user uses browsers like google chrome or Mozilla fire fox etc.

Here both game and browser are applications.

Applications run on Operating systems, if operating is installed in computer then you can run applications otherwise not.





# Operating System

It is not possible to use application software without Operating system.

You install application on OS and then users uses these applications.

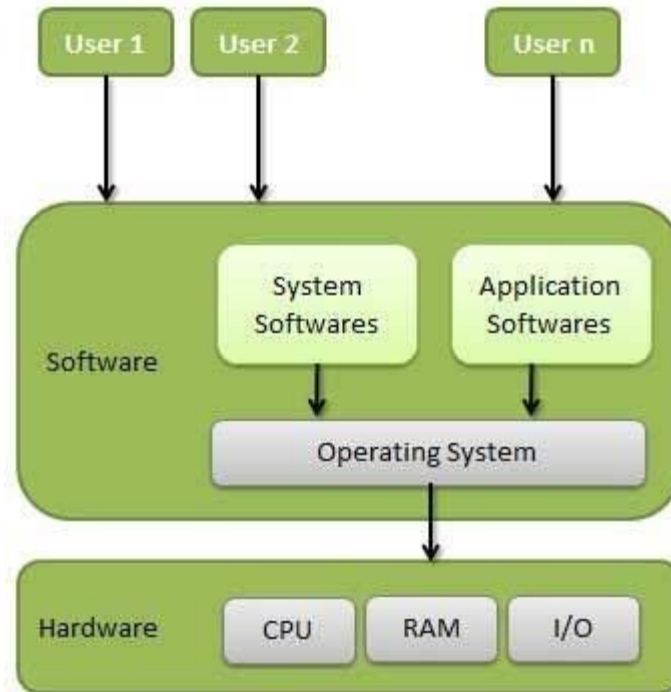
The purpose of OS is to take work from hardware. Your cannot run applications on hardware.



# Operating System...

**Note:** Your applications uses OS to communicate with hardware.  
Application and user can never directly communicate with hardware. It has to go to operating system layer.

# Operating System...





# Operating System...

Operating system is layer between user and hardware.



# What is an Operating System?

- ❖ A program (software) that acts as an intermediary between a user of a computer and the computer hardware
- ❖ **Operating system goals:**
  - Execute user programs and make solving user problems easier.
  - Make the computer system convenient (easy) to use.
  - Use the computer hardware in an efficient manner (number of process and services are far more than number of processors available). Operating system uses these processor more efficiently without waiting for it.



# What is an Operating System?

## Example

- If you have 50 GB game and total size of RAM is 8 GB how it can be occupied and run this RAM. So this is the work of OS to utilize less hardware more efficiently.
- To use hardware more as much as possible.



# Computer System Structure

Computer system can be divided into four components:

❖ **Hardware** – provides basic computing resources

- CPU, memory, I/O devices

❖ **Operating system**

- Controls and coordinates use of hardware among various applications and users

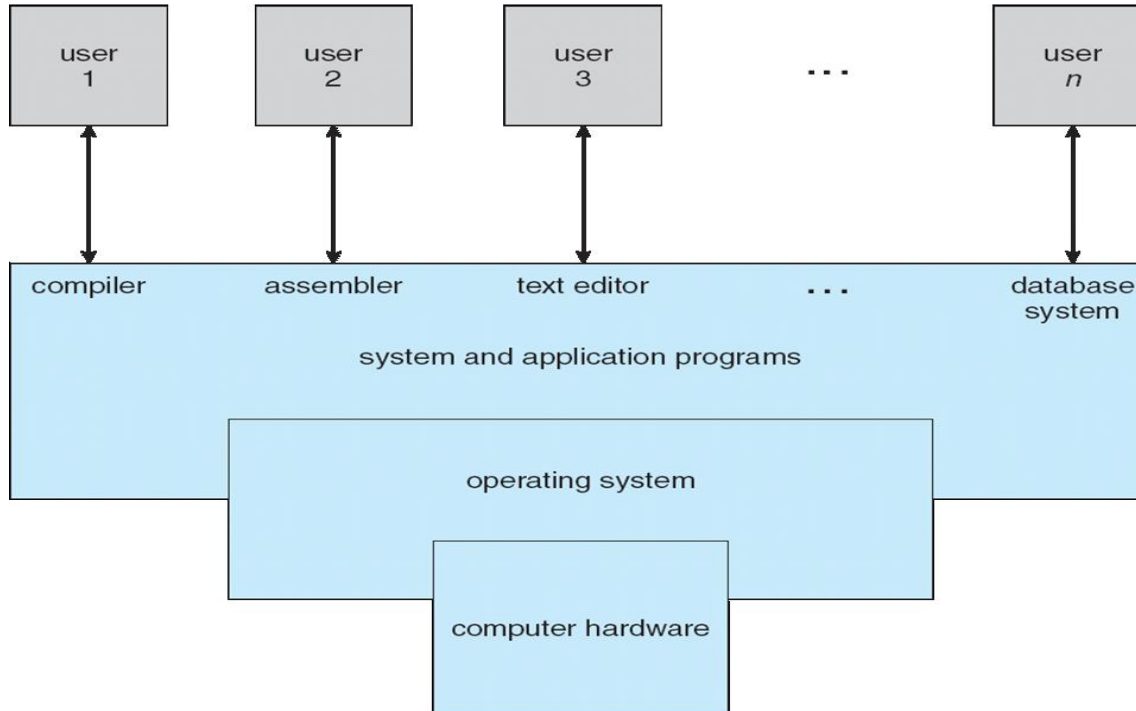


# Computer System Structure

- ❖ **Application programs** – define the ways in which the system resources are used to solve the computing problems of the users
  - Word processors, compilers, web browsers, database systems, video games
- ❖ **Users**
  - People, machines, other computers.



# Computer System Structure...





# What Operating Systems Do

- ❖ Depends on the point of view
- ❖ **Users want convenience, ease of use and good performance**
  - Don't care about **resource utilization**
  - If asked from users for some users windows (window 7, window 8 and window 10) is easy for some users Linux is easy varies from user to user.
  - For naive user ease of use and good performance is required.
  - Linux and Raspbian OS is not easy to use.



# What Operating Systems Do

- ❖ But shared computer such as **mainframe** or **minicomputer** must keep all users happy (Advanced Users).
- ❖ Users of dedicate systems such as **workstations** have dedicated resources but frequently use shared resources from **servers** (Intermediate Users).
- (Cloud computing → if you are not able to run something on your computer then you may take run it on servers on cloud).
- Server can be accessed from different places by multiple users at the same time.



# What Operating Systems Do...

- ❖ Handheld computers are resource poor, optimized for usability and battery life. In these computers main focus is on usability and battery life.
- ❖ Some computers have little or no user interface, such as embedded computers in devices and automobiles.
- ❖ **Eg.** Arduino, Node MCU ESP8266, routers and switches.



# Operating System Definition

## ❖ OS is a **resource allocator**

- Manages all resources.
- Decides between conflicting requests for efficient and fair resource use.

## ❖ OS is a **control program**

- Controls execution of programs to prevent errors and improper use of the computer.

# Reference



<https://yourstory.com/mystory/what-software-types-examples>

# THANK YOU

