



# Presentation

**Topic:** *Operating Systems*

# What is OS?

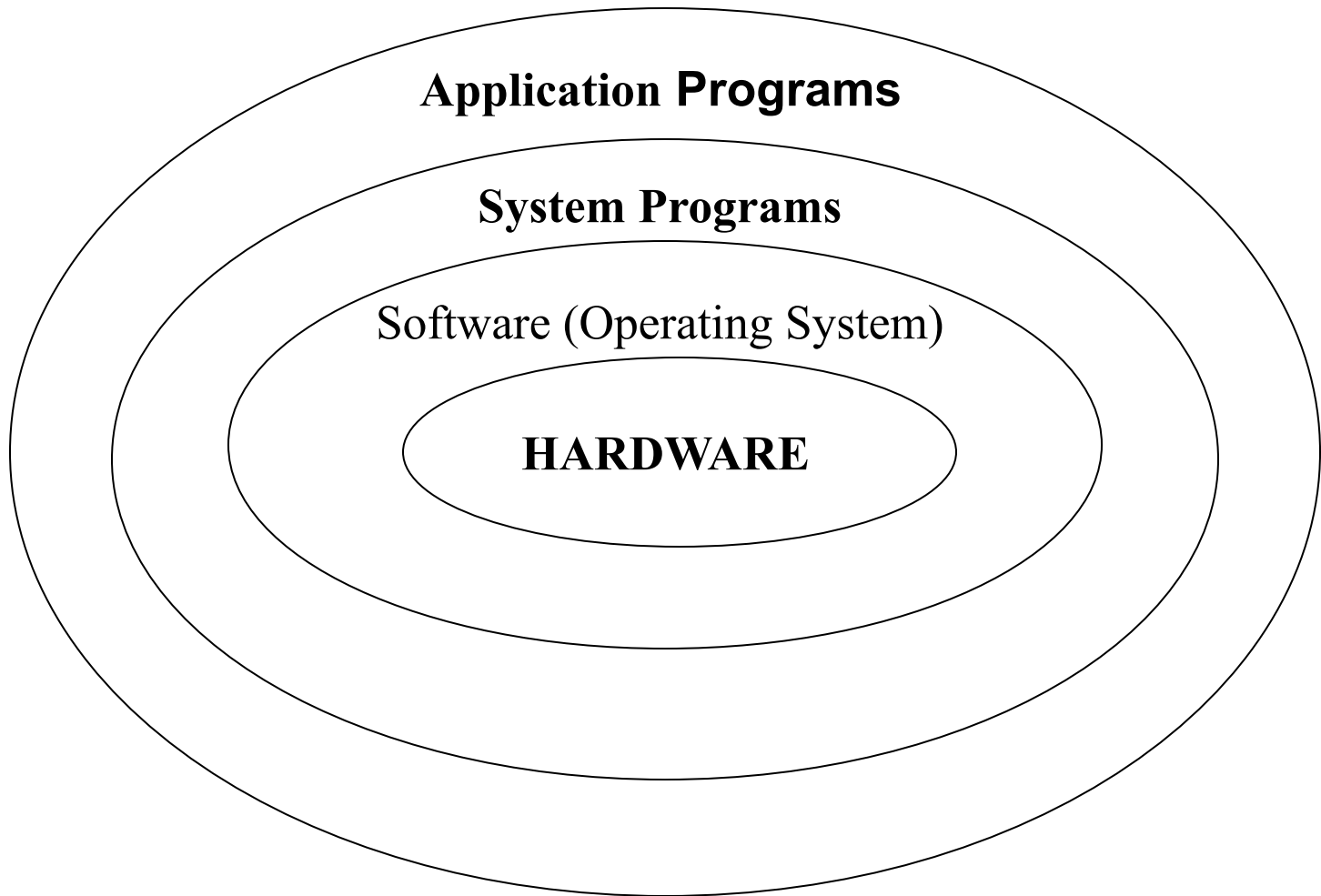
- Operating System is a software, which makes a computer to actually work.
- It is the software that enables all the programs we use.
- The OS organizes and controls the hardware.
- OS acts as an interface between the application programs and the machine hardware.
- Examples: Windows, Linux, Unix and Mac OS, etc.,

# What OS does?

An operating system performs basic tasks such as,

- controlling and allocating memory,
- prioritizing system requests,
- controlling input and output devices,
- facilitating networking and
- managing file systems.

# Structure of Operating System:



# Structure of Operating System

- The structure of OS consists of 4 layers:
  - 1. Hardware**

Hardware consists of CPU, Main memory, I/O Devices, etc,
  - 2. Software (Operating System)**

Software includes process management routines, memory management routines, I/O control routines, file management routines.

# Structure of Operating System

## **3. System programs**

This layer consists of compilers, Assemblers, linker etc.

## **4. Application programs**

This is dependent on users need. Ex. Railway reservation system, Bank database management etc.,

# Evolution of OS:

- The evolution of operating systems went through seven *major phases*.
- Six of them significantly changed the ways in which users accessed computers through the open shop, batch processing, multiprogramming, timesharing, personal computing, and distributed systems.
- In the seventh phase the foundations of concurrent programming were developed and demonstrated in model operating systems.

# Evolution of OS:

<b>Major Phases</b>	<b>Technical Innovations</b>	<b>Operating Systems</b>
Open Shop	<b>The idea of OS</b>	<b>IBM 701 open shop (1954)</b>
Batch Processing	<b>Tape batching, First-in, first-out scheduling.</b>	<b>BKS system (1961)</b>
Multi-programming	<b>Processor multiplexing, Indivisible operations, Demand paging, Input/output spooling, Priority scheduling, Remote job entry</b>	<b>Atlas supervisor (1961), Exec II system (1966)</b>



# Evolution of OS:

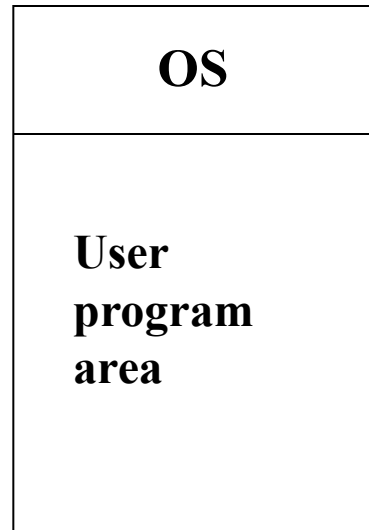
<b>Timesharing</b>	<b>Simultaneous user interaction, On-line file systems</b>	<b>Multics file system (1965), Unix (1974)</b>
<b>Concurrent Programming</b>	<b>Hierarchical systems, Extensible kernels, Parallel programming concepts, Secure parallel languages</b>	<b>RC 4000 system (1969), 13 Venus system (1972), 14 Boss 2 system (1975).</b>
<b>Personal Computing</b>	<b>Graphic user interfaces</b>	<b>OS 6 (1972) Pilot system (1980)</b>
<b>Distributed Systems</b>	<b>Remote servers</b>	<b>WFS file server (1979) Unix United RPC (1982) 24 Amoeba system (1990)</b>

# Batch Processing:

- In Batch processing same type of jobs batch (*BATCH- a set of jobs with similar needs*) together and execute at a time.
- The OS was simple, its major task was to transfer control from one job to the next.
- The job was submitted to the computer operator in form of punch cards. At some later time the output appeared.
- The OS was always resident in memory. (Ref. Fig. next slide)
- Common Input devices were card readers and tape drives.

# Batch Processing :

- Common output devices were line printers, tape drives, and card punches.
- Users did not interact directly with the computer systems, but he prepared a job (comprising of the program, the data, & some control information).



# Multiprogramming:

- Multiprogramming is a technique to execute number of programs simultaneously by a single processor.
- In Multiprogramming, number of processes reside in main memory at a time.
- The OS picks and begins to executes one of the jobs in the main memory.
- If any I/O wait happened in a process, then CPU switches from that job to another job.
- Hence CPU in not idle at any time.

# Multiprogramming :

OS
Job 1
Job 2
Job 3
Job 4
Job 5

- Figure depicts the layout of multiprogramming system.
- The main memory consists of 5 jobs at a time, the CPU executes one by one.

## **Advantages:**

- Efficient memory utilization
- Throughput increases
- CPU is never idle, so performance increases.

# Time Sharing Systems:

- Time sharing, or multitasking, is a logical extension of multiprogramming.
- Multiple jobs are executed by switching the CPU between them.
- In this, the CPU time is shared by different processes, so it is called as “Time sharing Systems”.
- Time slice is defined by the OS, for sharing CPU time between processes.
- Examples: Multics, Unix, etc.,

# Operating Systems functions:

- The main functions of operating systems are:
  1. Program creation
  2. Program execution
  3. Input/Output operations
  4. Error detection
  5. Resource allocation
  6. Accounting
  7. protection

# Types of OS:

Operating System can also be classified as,-

- **Single User Systems**
- **Multi User Systems**



# Single User Systems:

- Provides a platform for only one user at a time.
- They are popularly associated with Desk Top operating system which run on standalone systems where no user accounts are required.
- Example: DOS

# Multi-User Systems:

- Provides regulated access for a number of users by maintaining a database of known users.
- Refers to computer systems that support two or more simultaneous users.
- Another term for *multi-user* is *time sharing*.
- Ex: All mainframes and are multi-user systems.
- Example: Unix