Lecture-2
BDu

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History of operating systems :

First generation (1945 - 1955)
- vaccum tubes, plug boards

Second generation (1955 - 1965)
- transistors and batch systems → no direct interaction (punch cards) user gives to operators

Third generation (1965 - 1980)
- ICs and multiprogramming → organizes jobs.
more than one program resides in memory at the same time

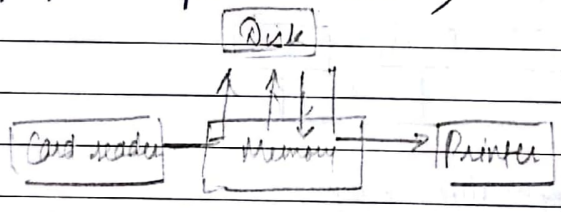
Fourth generation (1980 - present)
- PCs

Long turnaround time
• Low CPU util
• I/O & CPU can't overlap

Batch systems (1960s)

- No direct interaction. User gives punch cards to operators
- Long CPU turnaround
  - Low CPU utilization
  - I/O and CPU can't overlap

solution to speed up I/O : Spooling (~~Simt~~ Simultaneous peripheral operation online)

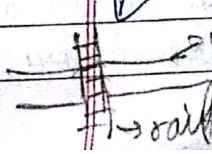


* Spooling puts data of various I/O jobs in buffer.
(part of disk)
* Allows overlap - by introducing job pool for both I/O and computational jobs.

Time-sharing OSes

Multiprogrammed batch system - Max processor use
Time sharing system - Min response time
↓ provides fast switching

Multitasking - single user system & single processor → fast switching
Multiprogramming - Multi-user and single processor
Multiprocessor - Multiple users and multiple processors.



Distributed OS

- Multiple central processors to serve multiple real-time applications.
- Processing jobs are distributed among processors.
- Referred to as loosely coupled systems. Processors may vary in size and function.
- Processors are known as sites, nodes, etc.

Network OS

- Runs on a server. ~~and~~ .
- Allows shared file and I/O among multiple computers on a network.
- Windows Server, Mac OS etc.

Advantages -

- Centralized servers are highly stable
- Security is server managed.
- New technologies are easily integrated.
- Remote access.

Disadvantages -

- Dependency of centralized location.
- Costly.
- Requires regular maintenance and updates

Peer-to-peer connection - All nodes are independent having server (network) OS.
Client-server connection - One server having network OS and others don't need.

Real time OS

- data processing system which should have much lesser response time than online processing.
- well defined rigid time constraints.
- Used for scientific experiments, medical systems, weapon systems.

Multiprocessor system - Multiple processors run parallelly.

Advantages -

- Increased throughput
- Economy of scale - utilizes I/O effectively
- Increased reliability. - not dependent on any single processor.

Types -

- Symmetric multiprocessor system
  Each processor runs a copy of the OS and these copies connect with each other.
- Asymmetric multiprocessor system.
  Each processor is assigned a specific task. A master processor controls the system. Other processors either look to the master for instructions or have some predefined job.

OS works as a resource allocator.