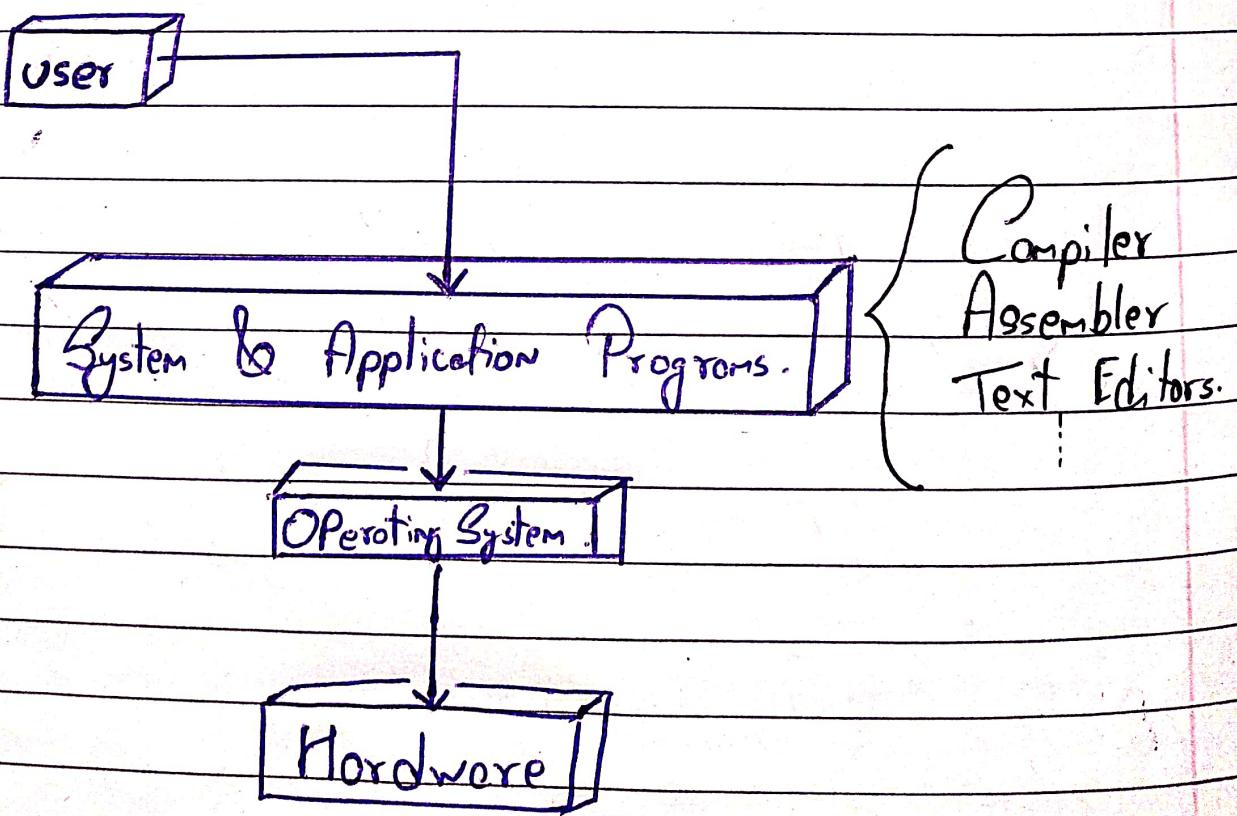


Operating System

- OS acts as an intermediary b/w user & hardware.
- OS is an Resource allocator who controls & coordinate the use of system resource among various application program.
- OS decides the priority & also known as Resource manager.
- OS provides a platform in which other applications can be installed, It also provides an environment on which programs can be executed.



e.g.

Ubuntu, Mac, Windows,
Android, iOS, Linux,
Tizen, Debian, Chrome.

Goals & Functions.

- Primary goals { Convenience / user friendly }
- Secondary goals { Efficiency / Reliability / Maintainability }

Functions;

- Process Management :- Involves handling the creation, scheduling, & termination of processes, which are executing programs.
- Memory Management :- Manages allocation & deallocation of physical & virtual memory spaces to various programs.
- I/O Device management :- Handles I/O operations of peripheral devices like disks, keyboards, permissions, & networking, including buffering & caching.

- **File Management :** Manages files on storage devices, including their information, naming, permission, & hierarchy.
 - **Network Management :** Manages network protocols & functions, establishing network connections & enabling the OS to establish connections & transfer data.
- Security & Protection :** Ensures system protection against unauthorized access & other security threats through authentication, authorization & encryption.

Classification of OS.

Earlier computers were not interactive.
Users have to prepare job.

Job consists of 3 parts.

Program, Control Information, Input data.

Only one job is provided at a time & then computer processes it & generates the output.

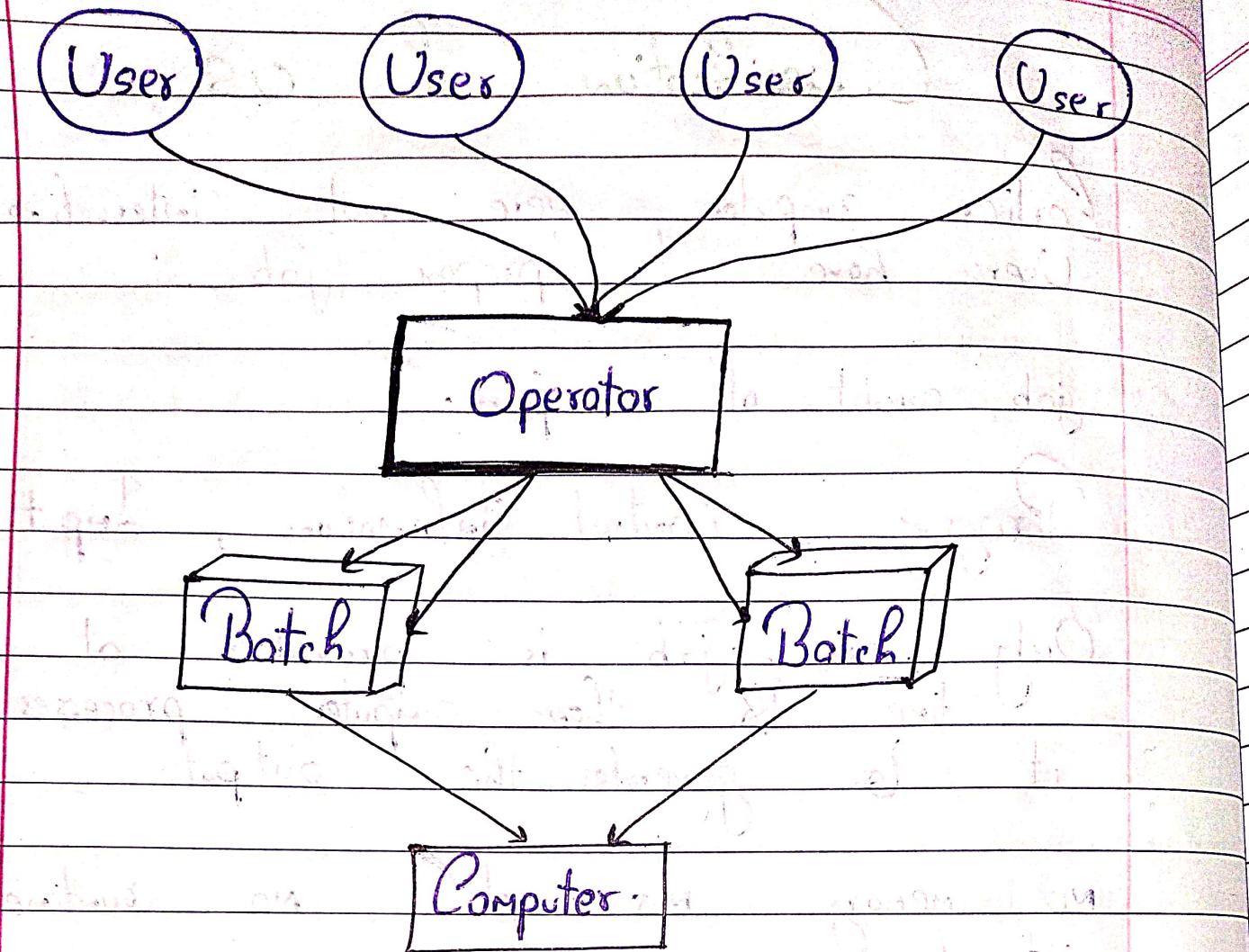
No memory was used, no runtime interaction.

Punch cards or tape drivers are some examples, they are very slow.

Batch operating system.

To speed up the processing we started to create a batch of similar jobs & were run together through processor as batch.

In some system grouping is done by operator while in some it is done by Batch monitor.

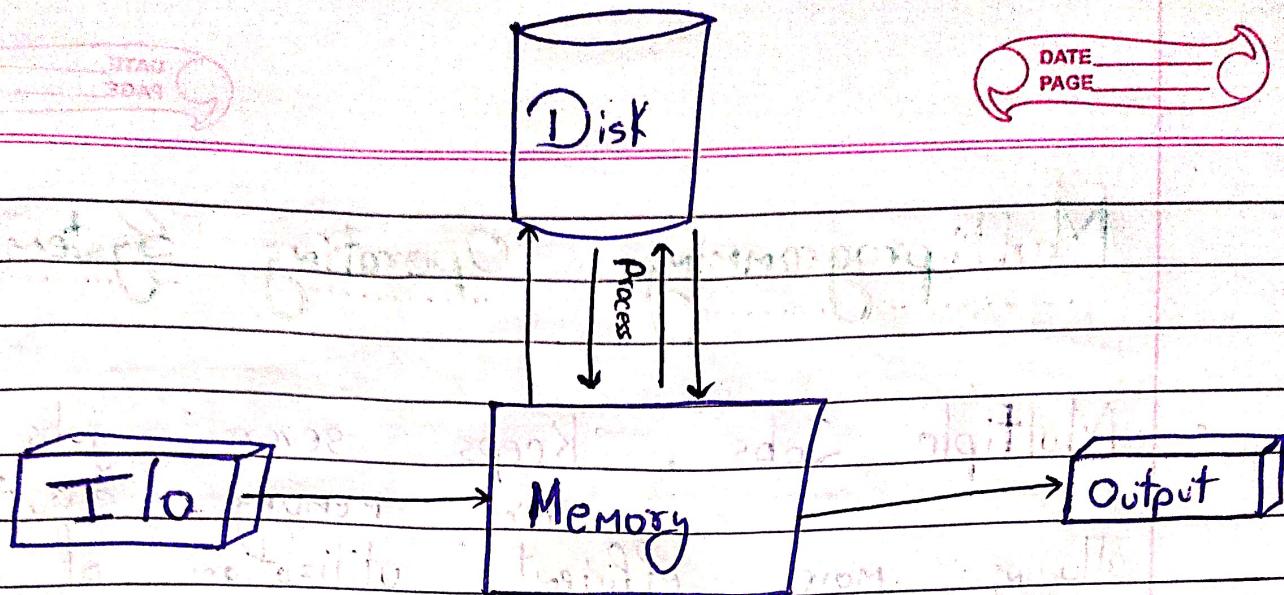


Here the devices becomes a little speedier but the problem is overall processing is very slow.

Spooling: Simultaneous peripheral operations on line.

In a computer, I/O devices are very slow compared to the performance of rest of program system.

Spooling is a process in which data is temporarily held in memory by device or program.



The speed mismatch b/w Memory & CPU is removed.

In this when the input is stored in Disk then the CPU can work freely & not depend on I/O device.

The most common e.g. is in printer spooling, document files are stored in memory then when the printer is ready it fetches the data & prints it.

Ever had mouse or keyboard freeze briefly?

We often click around to test if it's working. When it unfreezes, all those stored clicks execute rapidly due to device's spool.

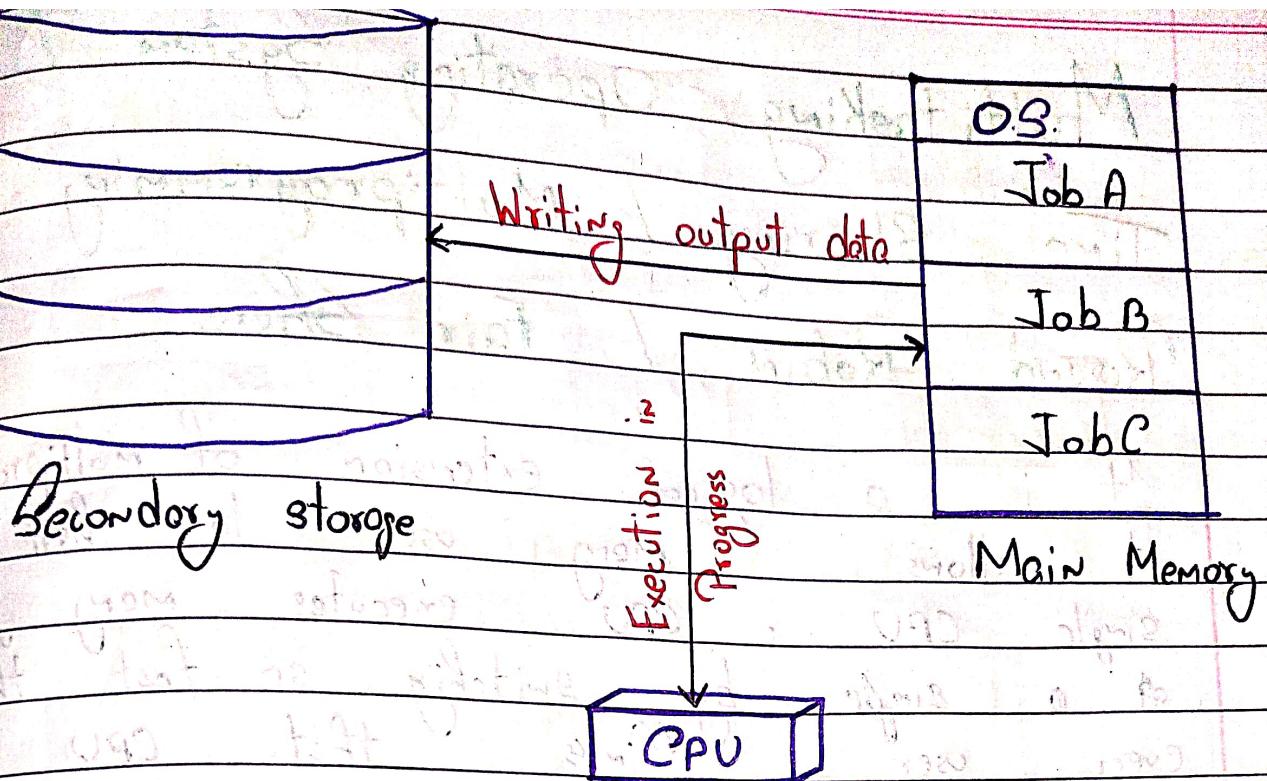
Multi programming in Operating System.

- Multiple Jobs, Keeps several jobs in main memory simultaneously allowing more efficient utilization of CPU.
- Job Execution, The OS picks b begins to execute one of the jobs in memory
- Waiting Jobs, Eventually, if a job such as I/O operation to complete.

PROCESSOR will not wait for ANYONE. in MULTIPROGRAMMING.

but in non-multi.. CPU sits idle waiting for some job to be completed.

In multiprogrammed, OS switches to another executes another job if the current job needs to wait, utilizing the CPU effectively.



Conclusion, CPU is never idle as long as that at least one job needs to be executed, leading to better utilization of resource.

Advantages.

- High CPU utilization
- Less waiting time
- Multi-Task Handling.
- Shared CPU Time.

Disadvantages.

- Complex Scheduling
- Complex memory management.