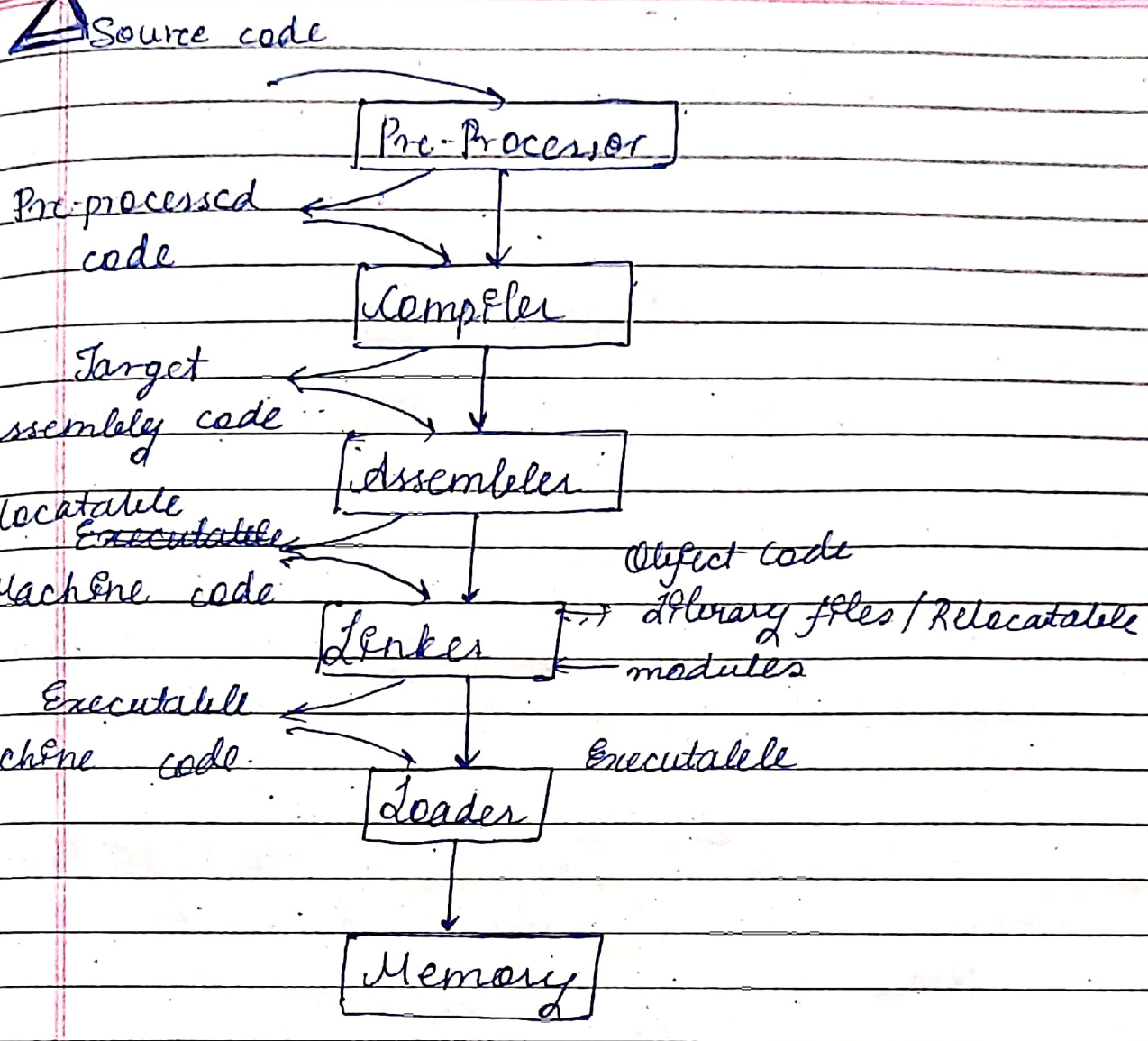
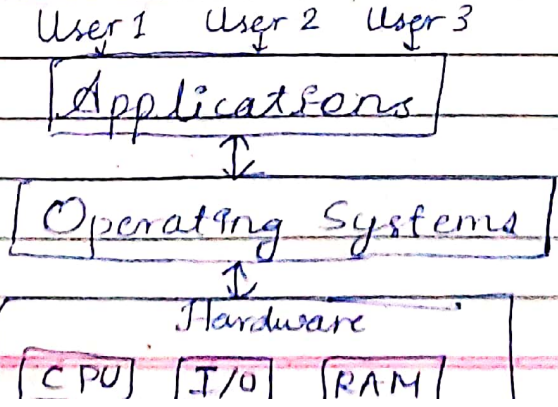
OPERATING SYSTEMS



Context Switching:

Operating System:

It works as a interface b/w user & hardware



→ Primary Goal

→ Convenience (Windows)

→ Throughput : No. of tasks executed per unit time (Linux)

Functionalities of OS

→ Resource Manager:

Used in Parallel processing where multiple users are trying to access one device

→ Process Management:
How execute a process on CPU. It's called as CPU scheduling, managing & executing multiple processes

→ Storage Management (HD)
Managing the data to be stored on HD. File system

→ Memory Management (RAM) → Allocation & deallocation of RAM

→ Security
Also provides security b/w processes

Types of Operating Systems

1) Batch

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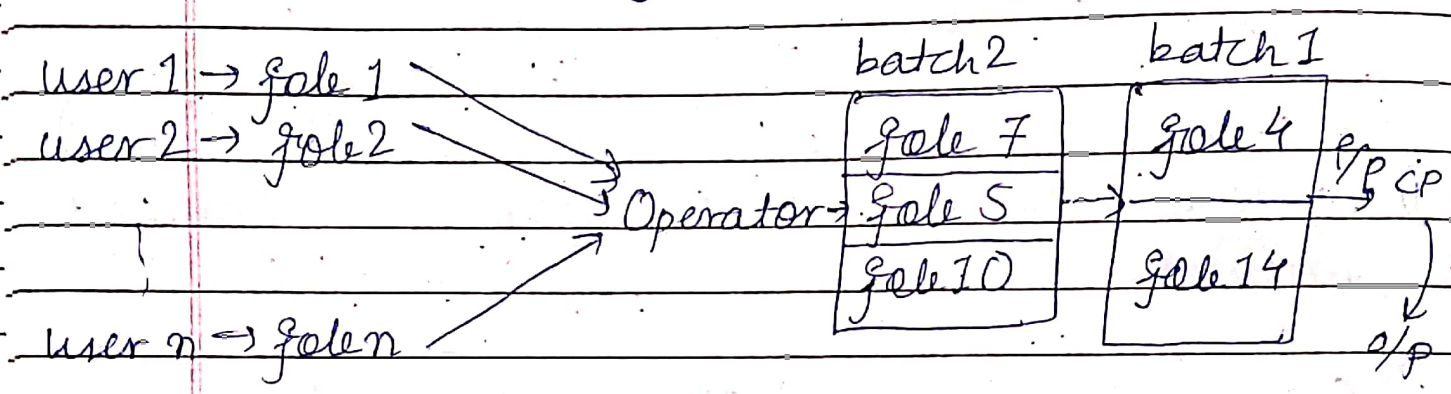
2) Multi-programmed
3) Multi-Tasking
4) Real time OS
5) Distributed
6) Clustered
7) Embedded

Types of OS

1) Batch processing OS



1) Jobs with similar needs are batched together & executed through the processor as a group.
2) Operator sorts the jobs as a deck of punch cards in a ~~batch~~ batch with similar needs. E.g. FORTRAN, batch, COBOL batch
3) first jobs → batch (with same req.) → CPU

Advantages: 1) In batch jobs execute one after another saving time for activities like loading ~~computer~~ compiler
2) During a batch execution, no manual intervention is needed.

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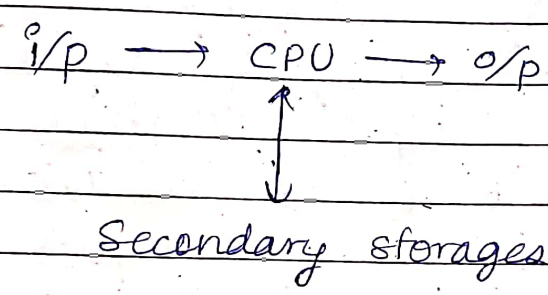
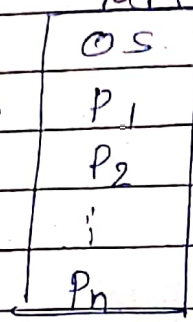
Disadvantage: 1) Memory limitation
2) Interaction of i/p & o/p devices directly with CPU.
3) CPU remains idle during loading & unloading
4) Non-premption
5) Spooling (Simultaneous peripheral devices)



Advantage:
1) Inc: the system performance
2) Resolve the problem of speed mismatch of diff. devices.
3) I/O of one job is overlapped with computation of other jobs.
4) Spooling use the disk as a huge buffer.

Spooling	Buffering
→ Uses HD as a large spool. (spool is a temporary storage area in HD)	Uses limited memory space in RAM called buffer (buffer is a temporary storage area in RAM)

Multiprogramming OS



1) Multiprogramming means more than 1 process in main memory & ready to execute.
2) Process generally require CPU time & I/O time. So if current process perform I/O or any other task which doesn't require CPU then instead of sitting idle, CPU makes context switch & pick some other process. & this idea will continue.
3) CPU never remains idle unless there is no process ready to execute or at the time of a context switch.

Advantage	Disadvantage
1) High CPU utilization	1) Difficult Scheduling
2) less waiting time, response time etc.	2) Main memory management is req.
3) May be executed to multiple users.	3) Memory fragmentation
4) Nowadays useful when load is more	4) Paging non-contiguous memory allocation
5) Users assume that CPU is simultaneously working on multiple programs	

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Multi-tasking OS

→ Multi-tasking is multi-programming with time-sharing
→ Only one CPU but switches fast" process so quickly that it gives illusion that all executing at same time.
→ The task in multi-tasking may refer to multiple threads of same program
→ Main idea is multi-tasking & executing multiple process together.

Real-Time OS - It is used in environment where a large number of events mostly external to system must be accept accepted & processed in a short time within certain deadlines. The time interval for req^d to process & response to i/p is very small.

Hard RTOS : Guarantees critical time to be completed ~~to~~ within a range of time.

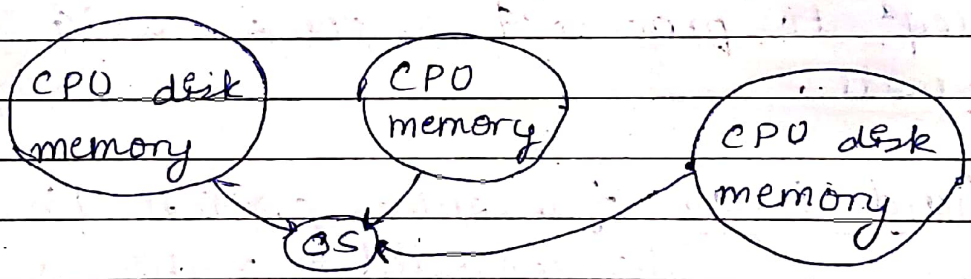
Soft RTOS : Provides some relaxation in time.

Advantages : 1) Max^m utilization of devices & system
2) Better task shifting
3) Error free systems

Disadvantages:
1) Limited tasks
2) Complex algorithms
3) Use heavy system resources

5) Distributed OS:
→ It uses multiple central processors to serve multiple real time application & users.
→ Data processing jobs are distributed among processors accordingly.

Processors communicate with each other thro various communication lines (such as high speed buses or telephone lines). These are referred to as loosely coupled systems or distributed systems.



Advantages:
~~Father~~ 1) Failure of one network connection doesn't affect other.
2) Delay in data processing reduces.

Disadvantages
1) Failure of main network will stop entire communication.