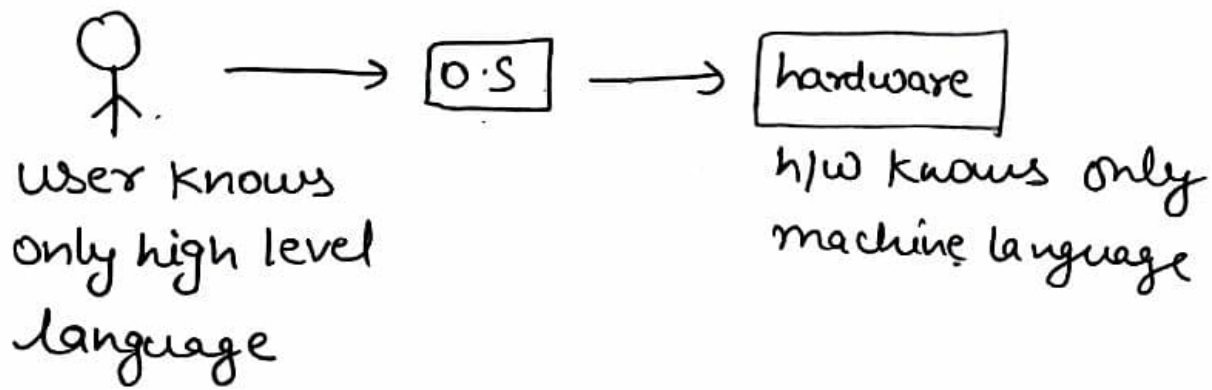


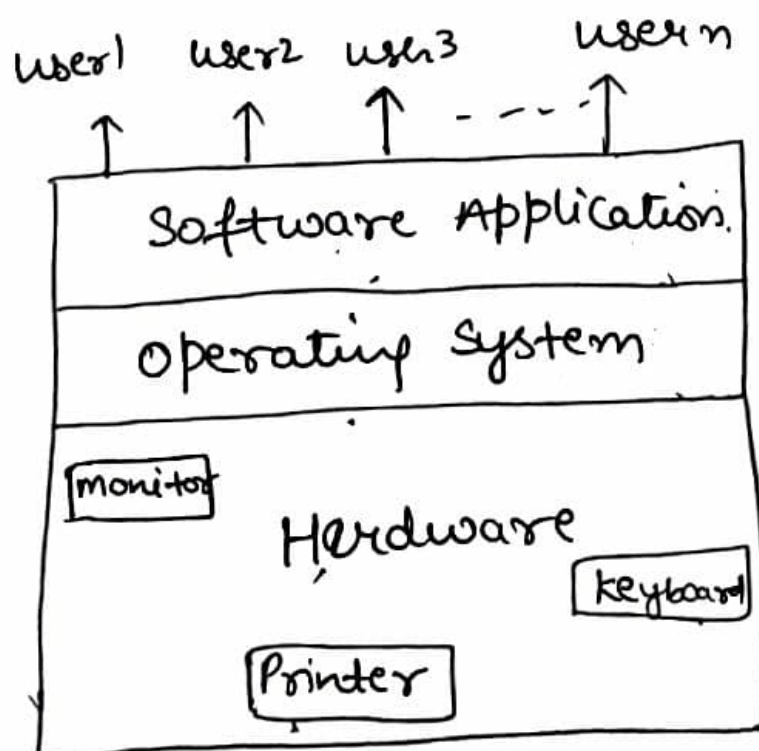
# Operating System



## Operating System Definition

operating system is an intermediate between the user and the hardware.

Software application such as word, ms excel or any user application can't communicate directly with the hardware. So, we need a software interface between them, and that interface is an O.S.



## Example

```
Void main()  
{  
    printf("helloworld");  
}
```

In this above user application, we are printing helloworld on the monitor. So, printf interact with the monitor.

printf calls write() System call in order to communicate with the monitor.

System call → is a request made by the user program to the Operating System in order to get any kind of service.

→ Some important functions of O.S

- ① Memory Management
- ② Process Management
- ③ File Management
- ④ Device Management
- ⑤ Security

and Many more.....

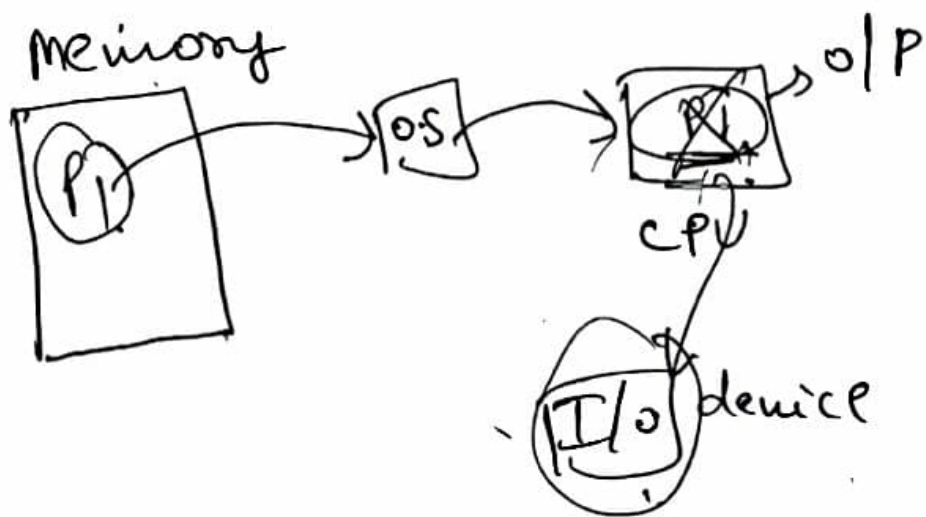
# Goals of Operating System

Primary goal → convenient / user friendly

Secondary goal → efficiency

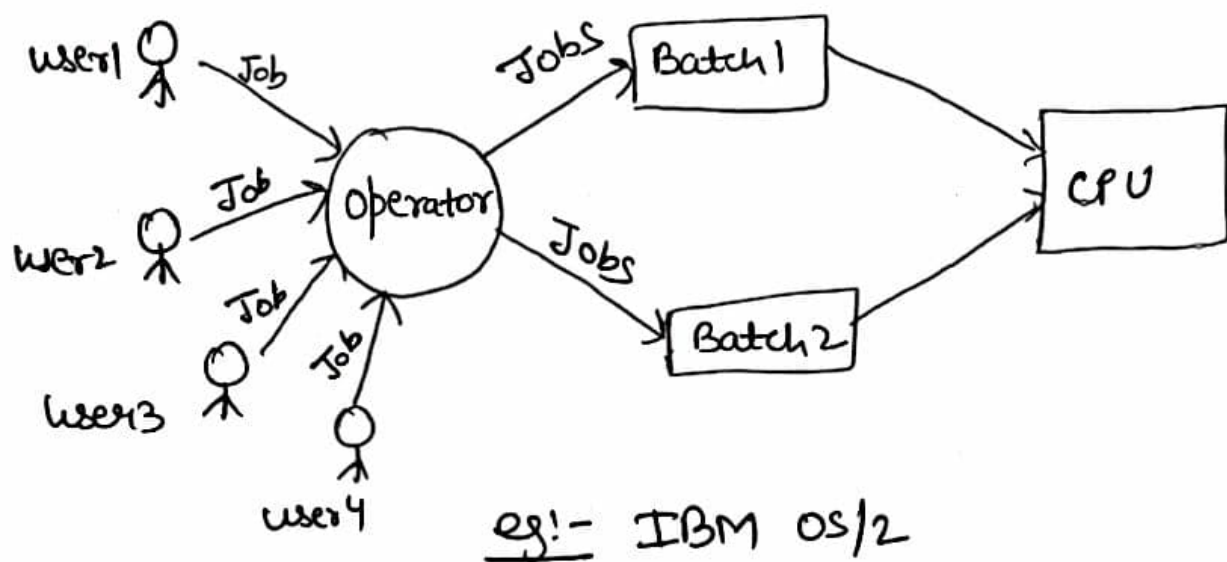
## Functions of Operating System

- ① Memory Management
- ② Process Management
- ③ I/O Device Management
- ④ File Management
- ⑤ Network Management
- ⑥ Security and Protection



# Types of operating system

## ① Batch operating system



In Batch operating system, similar kinds of jobs are grouped together in a batch and loaded in the main memory. The responsibility of the O.S is to ~~ex~~ execute each job in a batch. Every job requires two times

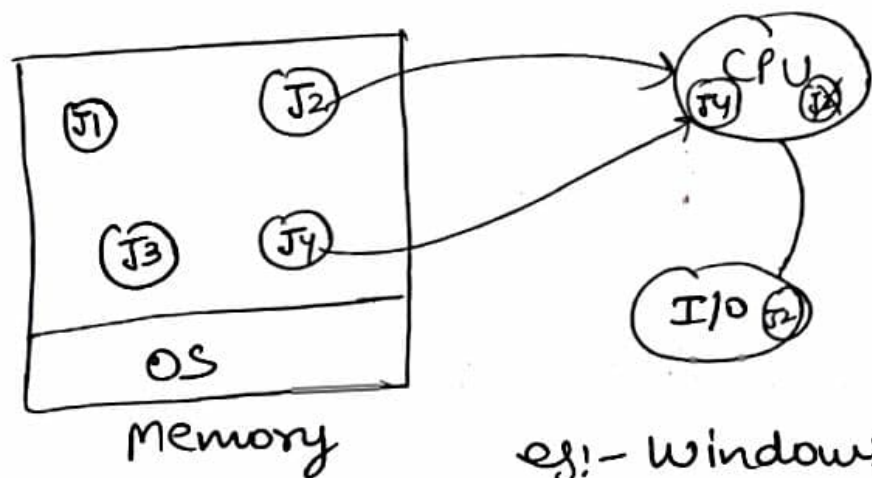
- ① CPU time
- ② I/O time to execute completely.

When the job is in CPU and in between it requires I/O operation, it will leave the CPU. During this time, the other jobs can't use the CPU. And CPU becomes idle. The job if computed completely then



decrease.

## ② Multiprogramming operating system



Multiprogramming means multiple jobs are loaded in main memory.

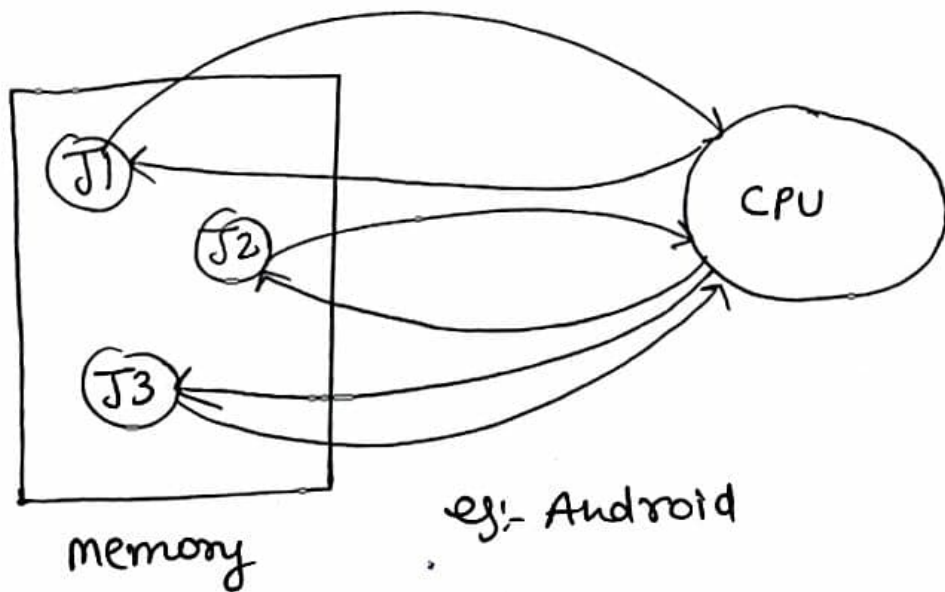
eg:- windows, UNIX, LINUX

In Multiprogramming operating system, Multiple jobs are loaded in memory. But in this, if ~~one~~ in between any job is in CPU and requires I/O operation, it will leave CPU and move to I/O, And at that time any other job which is in main memory can use the CPU. So, in this type CPU will not become Idle.

advantage — CPU utilization and throughput will increase.

## Multitasking operating system

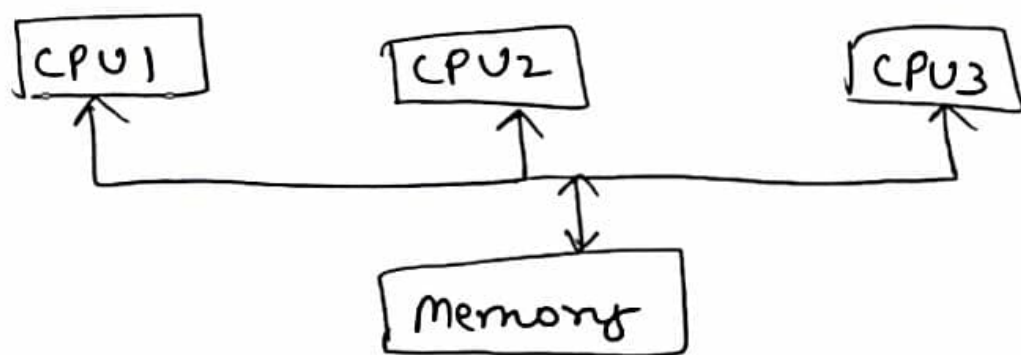
Multitasking is an extension of Multiprogramming.



In Multitasking operating system, ~~the~~ job will be executed in time sharing mode.

For eg! we want a particular job to execute for only 2secs. Now, if J1 is in CPU, it will be in CPU for only 2secs, then after that it will leave CPU and J2 will be inside CPU for 2secs, then again J1 will use CPU for 2secs and so on. This switching is known as Context Switching. and this is fast that we had an illusion that multiple jobs are executing at the same time.

## ④ Multiprocessor operating System



eg:- UNIX

Multiprocessor means multiple CPUs.

This is also called Parallel System.

In Multiprocessor System, all the CPUs are connected to a common memory.

This is used when we have a large no. of jobs to be executed.

Advantage — this O.S is more reliable because if any one CPU will fail, the System will still run with the help of remaining CPU's.



## Real time Operating system

The System which are time bounded are called as real time O.S.

time bound means there should not be any delay while executing the job.

Real time O.S is of two types

↙  
Hard real time O.S

eg:- Satellite system,  
missile system.

In this, even a minor delay lead to a major loss.

↘  
Soft real time O.S

eg:- Banking sector,  
railway system.

minor delay is accepted but not a ~~no~~ major delay.

## ⑥ Embedded operating system

This is a type of operating system that is embedded and specifically configured for a certain hardware configuration.

This is mostly used in Microwave, washing Machine etc.

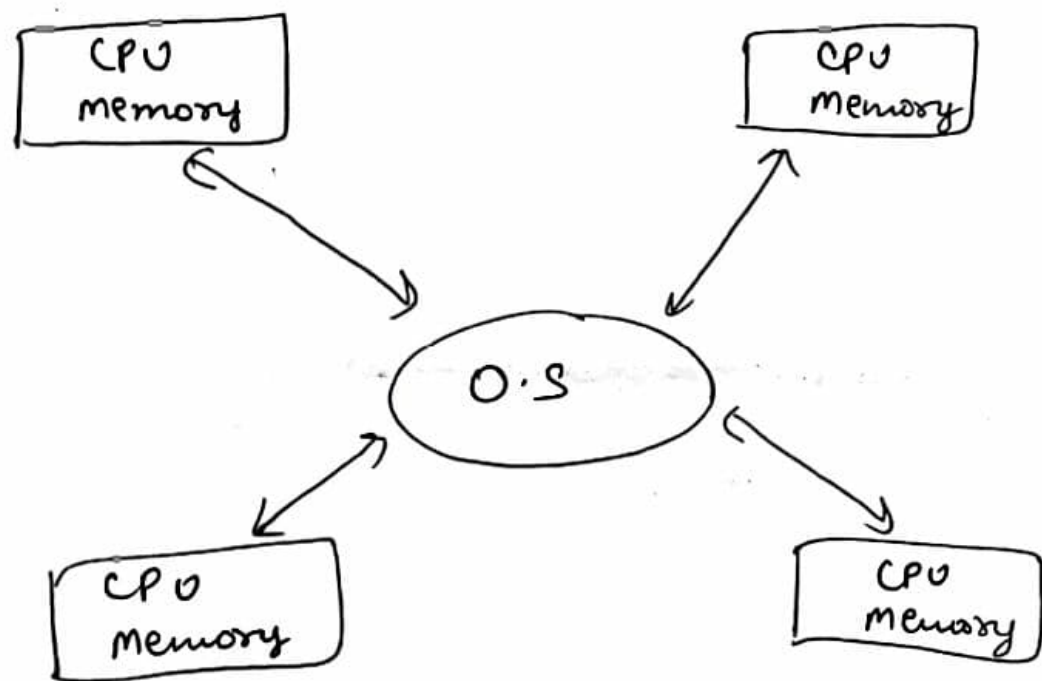


## Distributed Operating System

In this, distributed applications are running on multiple computers linked by communications.

It is a collection of independent computers interconnected by a network. ~~on a single~~

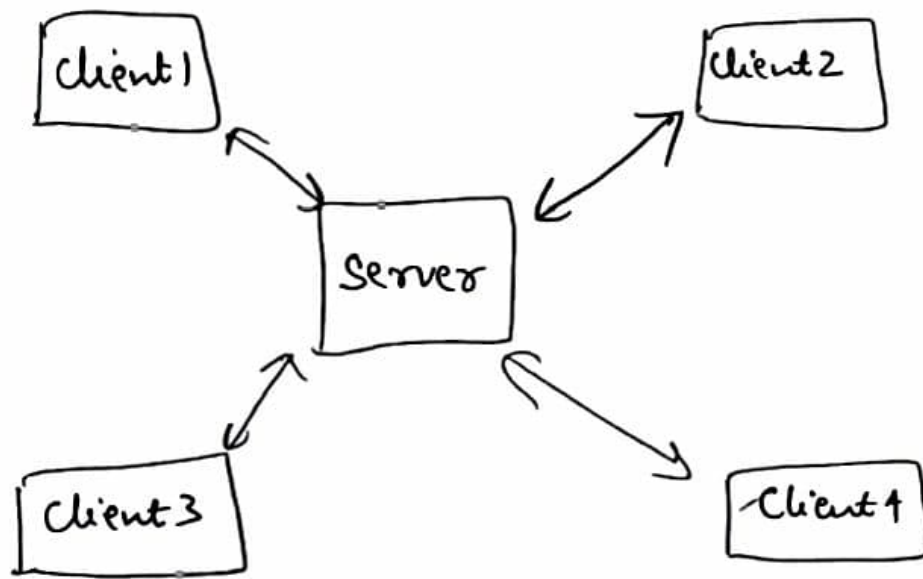
~~On telephone, ~~on~~ network.~~



Advantage - It is possible that one user can access the files or software which are not present on his system but on some other system.

eg:- Locus etc.

## Network operating system



eg:- Microsoft windows Server 2003, 2008  
UNIX, LINUX etc.

In Network O.S, system runs on a Server and provides the capability to manage data, user, groups, security etc.. This type of O.S ~~provides~~ allows printers, files, and other applications.