

Assignment no 1 :-

Types of Operating System

1) Batch Operating System

- Batch operating system doesn't interact with computer directly.
- There is an operator which takes similar jobs having the same requirement and group them into batches.
- It is the responsibility of operator to sort jobs with similar needs.
- OS is used where there is a large number of users or where there are many tasks to be run in a short period of time.
- They are efficient because they allow multiple jobs to be processed together, rather than one at a time, which can save time & resources.

2) Multiprogramming Operating System

Advantages :-

- easy to manage large work repeatedly in batch system.
- The idle time for the batch system is very less.
- Multiple user can share batch systems.

Disadvantages :-

- It is sometimes costly.
- Batch System are hard to debug.
- Other jobs will have to wait for an unknown time if any job fails.
- Multiprogramming Operating System.
 - It is a extension to batch processing where CPU is always kept busy.
 - Each process needs two types of system time: CPU time and I/O time.
 - In a multiprogramming, when a process does its I/O, the CPU can start the execution of other processes.
 - Therefore, multiprogramming improves efficiency of system.

Advantages :-

- Reduced the response time.
- Resources are utilized smoothly.
- improves CPU utilization.
- Short-time jobs are done quickly.

Disadvantages :-

- Highly complicated.
- If it has a large number of jobs, then long-term jobs will require a long wait.

- Multiprocessing Operating System
- In multiprocessing, parallel computing is achieved.
- There are more than one processor present in system which can execute more than one process at the same time.
- This will increase the throughput of system.
- Multiple CPU's are interconnected so that a job can be divided among them for faster execution.
- When a job finishes, results from all CPU's are collected and compiled to give final output.
- Job need to share main memory and they may also share other system resources among themselves.
- Multiple CPUs can also be used to run multiple jobs simultaneously.

Advantages :-

- Due to multiprocessing system, OS increases reliability.
- Increased throughput.
- Relatively cheaper than single-processor systems.

Disadvantages :-

- becomes complex as it takes care of multiple CPU's at the same time.

Multi-tasking Operating System.

- Multi-tasking OS is a logical extension of multiprogramming system that allows numerous applications to run simultaneously.
- Multitasking in an OS enables a user to execute multiple computer tasks at the same time.
- Processes that hold common processing resources, such as a CPU, are known as many tasks.

Advantages :-

- manage several users
- Any program does not need a long wait time to perform its tasks because of virtual memory
- provides multiple users more flexibility.
- Secured memory

Disadvantages :-

- CPU heat up.
- System may run applications slowly

Time sharing operating system:

Each task is given some time to execute so that all the tasks work smoothly.

Each user gets the time of CPU as they use a single system.

These systems are also known as multitasking systems.

The task can be from a single user or different users also.

The time that each task gets to execute is called quantum.

After this time interval it is over & switches over to next task.

Advantages :-

Each task gets an equal opportunity.

Fewer chance of duplication of software.

CPU idle time can be reduced.

Disadvantages :-

Reliability problem.

Data communication problem
have to take care of security & Integrity of user program & data.

Real time Operating System.

- In OS, each job carries a certain deadline within which the job is supposed to be completed, otherwise the huge loss will be there, or even if the result is produced, it will be completely useless.
- This OS is used when there are time requirements that are very strict.
- The time interval required to process & respond to inputs, is called response time.
- And response time is very small.

Advantages :-

- Maximum utilization of devices and system.
- The time assigned for shifting tasks is very less.
- Focus on running applications and less importance to applications which are in queue.

Disadvantages :-

- The algorithms are very complex & difficult for designer.
- Sometimes system resources are not so good & they are expensive as well.

Distributed Operating System.

- Various autonomous interconnected computers communicate with each other using a shared communication network.
- These system's processes differ in size & function.
- major benefit of working with these types of OS is that it is always possible that one user can access the files or software which are not actually present on his system

Advantages:-

- Failure of one will not affect the other network communication.
- Load on host computer reduces.
- Systems are easily scalable
- increases data exchange speed

Disadvantages:-

- Failure of main network will stop the entire communication.
- Expensive
- Software is highly complex & not understood well.

Embedded Operating System

- Embedded OS is a computer operating system designed for use in embedded computer systems.
- These OS are designed to be small, resource efficiently, dependable and reduce many features that aren't required by specialized application.
- has limited features

Advantages :-

- Small in size
- Faster to load.
- easy to manage
- better stability
- higher reliability
- low power consumption
- helps to increase product quality.

Disadvantages :-

- isn't easy to maintain
- troubleshooting is harder.
- limited resources for memory.
- hardware is limited