RAMA UNIVERSITY

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FACULTY OF AGRICULTURAL SCIENCES & ALLIED INDUSTRIES

MultiProgramming

Multiprogramming is a rudimentary form of parallel processing in which several programs are run at the same time on a uniprocessor. Since there is only one processor, there can be no true simultaneous execution of different programs. Instead, the operating system executes part of one program, then part of another, and so on. To the user it appears that all programs are executing at the same time.

One of the most important aspects of an Operating System is to multi program. In a computer system, there are multiple processes waiting to be executed, i.e. they are waiting when the CPU will be allocated to them and they begin their execution. These processes are also known as jobs. Now the main memory is too small to accommodate all of these processes or jobs into it. Thus, these processes are initially kept in an area called job pool. This job pool consists of all those processes awaiting allocation of main memory and CPU.

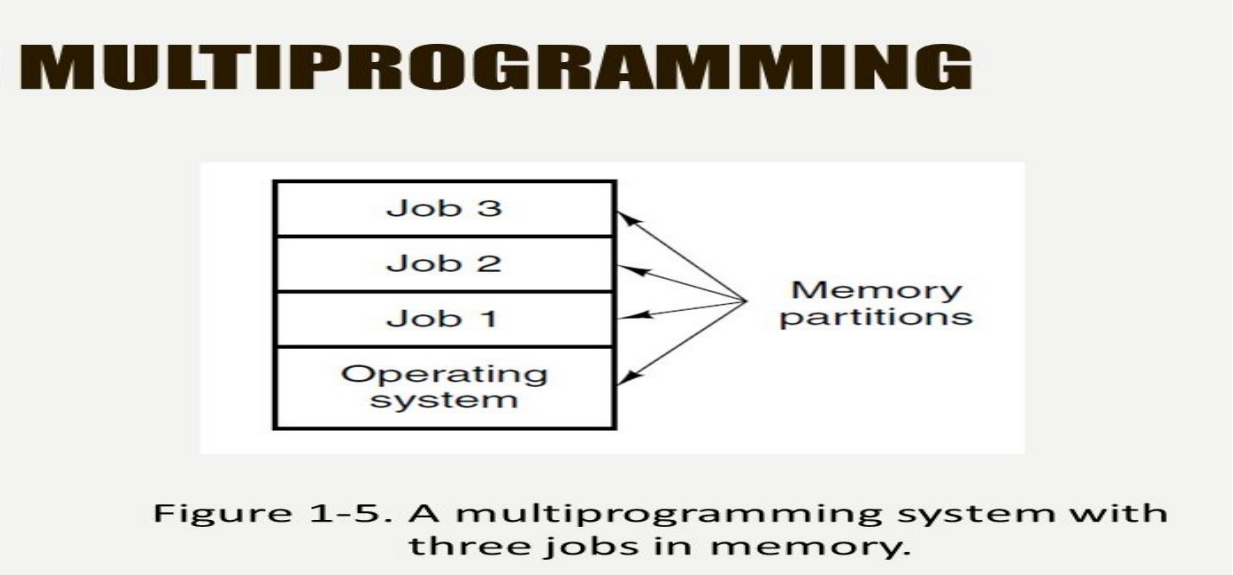
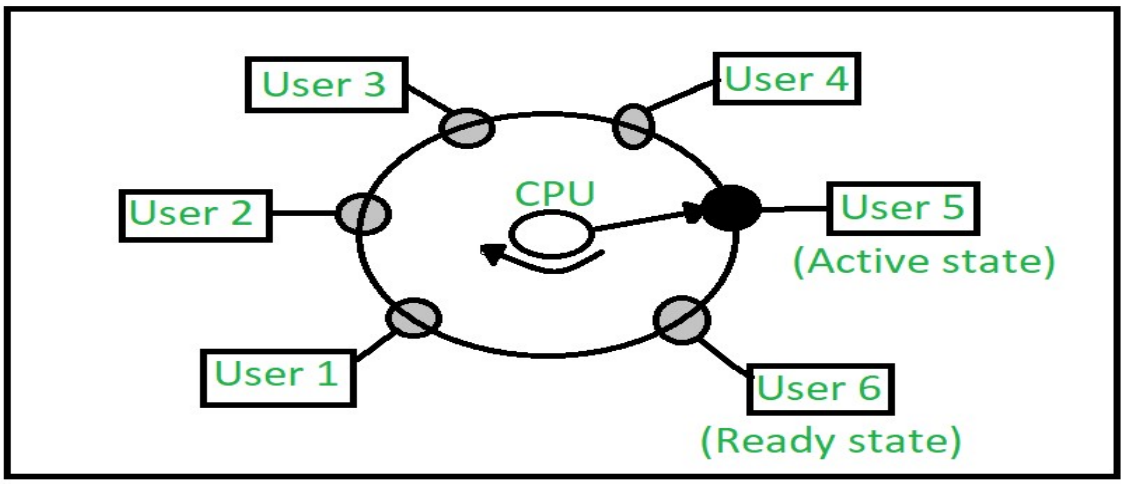


Figure 1-5. A multiprogramming system with three jobs in memory.

Time Sharing Operating System

Multiprogrammed, batched systems provided an environment where various system resources were used effectively, but it did not provide for user interaction with computer systems. Time sharing is a logical extension of multiprogramming. The CPU performs many tasks by switches are so frequent that the user can interact with each program while it is running.

A time shared operating system allows multiple users to share computers simultaneously. Each action or order at a time the shared system becomes smaller, so only a little CPU time is required for each user. As the system rapidly switches from one user to another, each user is given the impression that the entire computer system is dedicated to its use, although it is being shared among multiple users.



above figure the user 5 is **active state** but user 1, user 2, user 3, and user 4 are in **waiting state** whereas user 6 is in **ready state.**

1. **Active State –** The user's program is under the control of CPU. Only one program is available in this state.
2. **Ready State –** The user program is ready to execute but it is waiting for its turn to get the CPU. More than one user can be in ready state at a time.
3. **Waiting State –** The user's program is waiting for some input/output operation. More than one user can be in a waiting state at a time.

Requirements of Time Sharing Operating System :

Alarm clock mechanisms to send an interrupt signal to the CPU after every time slice. Memory Protection mechanism to prevent one job's instructions and data from interfering with other jobs.

Advantages:

1. Each task gets an equal opportunity.
2. Less chances of duplication of software.
3. CPU idle time can be reduced.

Disadvantages:

1. Reliability problem.
2. One must have to take of security and integrity of user programs and data.

3. Data communication problem.