B.com 6th Semester
Information Technology
Unit – 2

Process and process management :

A process is a program in execution. An integral part of any modern-day operating system (OS). The OS must allocate resources to processes, enable processes to share and exchange information, protect the resources of each process from other processes and enable synchronization among processes. To meet these requirements, the OS must maintain a data structure for each process, which describes the state and resource ownership of that process, and which enables the OS to exert control over each process.

A process can be in any of the following states:

- **New**: The new process is created when a specific program calls from secondary memory/ hard disk to primary memory/ RAM.
- **Ready**: In a ready state, the process should be loaded into the primary memory, which is ready for execution.
- **Waiting**: The process is waiting for the allocation of CPU time and other resources for execution.
- **Executing**: The process is an execution state.
- **Blocked**: It is a time interval when a process is waiting for an event like I/O operations to complete.
- **Suspended**: Suspended state defines the time when a process is ready for execution but has not been placed in the ready queue by OS.
- **Terminated**: Terminated state specifies the time when a process is terminated

The procedure of process management :

1.**Interrupts** are of three types :

- **Hardware Interrupts** are generated by hardware devices to signal that they need some attention from the OS. They may have just received some data (e.g., keystrokes on the keyboard or an data on the ethernet card); or they have just completed a task which the operating system previous requested, such as transfering data between the hard drive and memory.
- **Software Interrupts** are generated by programs when they want to request a system call to be performed by the operating system.
- **Traps** are generated by the CPU itself to indicate that some error or condition occured for which assistance from the operating system is needed.

2. Scheduler are of two types :

- High level scheduling is **when a computer system chooses which jobs, tasks or requests to process**. In this model, tasks or requests are prioritized and scheduled to complete based

on the maximum amount of work or tasks the system can handle at once. ... High level scheduling is also sometimes called “long-term scheduling”.

- Low level scheduling is **when a system actually assigns a processor to a task that is ready to be worked on**. In other words, in low level scheduling, a system assigns a specific component or internal processor to a specific task based on priority level, required bandwidth and available bandwidth.

Process Scheduling :

The process scheduling is the activity of the process manager that handles the removal of the running process from the CPU and the selection of another process on the basis of a particular strategy. Process scheduling is an essential part of a Multiprogramming operating systems.

Objectives of process Scheduling

- Be Fair
- Maximize throughout
- Maximize number of users receiving acceptable response times
- Be predictable
- Balance resource use
- Avoid indefinite postponement
- Enforce Priorities
- Give preference to processes holding key resources
- Give better service to processes that have desirable behaviors patterns
- Degrade gracefully under heavy loads

Different levels of scheduling

High Level Scheduling : High level scheduling is when a computer system chooses which jobs, tasks or requests to process. In this model, tasks or requests are prioritized and scheduled to complete based on the maximum amount of work or tasks the system can handle at once. Tasks for which the system does not have enough bandwidth to address are scheduled for later when other tasks are completed and free up the required bandwidth for the specific tasks. High level scheduling is also sometimes called "long-term scheduling.”

Low Level Scheduling : Low level scheduling is when a system actually assigns a processor to a task that is ready to be worked on. In other words, in low level scheduling, a system assigns a specific component o internal processor to a specific task based on priority level, required bandwidth and available bandwidth. Low level scheduling determines which tasks will be addressed and in what order. These tasks have already been approved to be worked on, so low level scheduling is more detail oriented than other levels.

Medium Level Scheduling : Medium level scheduling does not apply to all operating systems. It determines whether some tasks or requests should be temporarily placed in a system's secondary memory and removed from the main memory until the main memory has sufficient bandwidth to address the task or request. Medium level scheduling will then place the task or item back into the system's main memory to address at the appropriate time.