**SCHEDULERS**

A process migrates between various scheduling queues throughout its lifetime. The O.S. must select, for scheduling purposes, processes from these queues in some fashion.

The selection process is carried out by an appropriate scheduler.

1. **LONG TERM SCHEDULER**

It is also called job scheduler. Selects processes from pool and loads them into memory for execution. Its primary objective is to provide balancing of jobs such as I/O bound and processor bound. It also controls the degree of multi-programming. If the degree of multi-programming is stable, then the average rate of process creation must be equal to the average despatcher rate of processes leaving the system.

Time sharing Operating System have no long term scheduler. When a process changes from new to ready, there is use of long term scheduler.

1. **SHORT TERM SCHEDULER**

It is called as CPU scheduler. Its main objective is to increase the system performance in accordance with the chosen set of criteria. It is the change of ready state to running state of process. It selects a process among the processes that are ready to execute and allocates CPU to one of them. They are also known as dispatchers that make the decisions of which process to execute first. They are faster than long term schedulers.

DEGREE OF MULTI-PROGRAMMING

It is the number of processes in memory. It is controlled by long-term scheduler. If the degree of multi-programming is stable, then the average rate of process creation must be equal to the average despatcher rate of process leaving the system.

INPUT/ OUTPUT BOUND PROCESS

It is one that spends more of its time doing input output. Than it spends doing computations.

CPU BOUND PROCESS

It generates I/O requests infrequently, using more of its time doing computations.

DIFFERENCE

The difference between two schedulers lie in frequency of execution. The short term scheduler must select a new process for the CPU frequently. A process may execute for only a few milli-seconds before waiting for an I/O request.

The Long-Term scheduler executes much less frequently; minutes may separate the creation of one new process and the next.

1. **MEDIUM TER SCHEDULER**

It is part of swapping. It removes the processes from the memory. It reduces the degree of multi-programming.

To remove the process from memory and make space for other processes, the suspended process is moved to secondary storage. This process is called **SWAPPING**. Swapping is necessary to improve process mix.

**PROCESS MIX** is the mixture of I/O bound and CPU bound processes. If all the processes are I/O bound, the ready queue will always be empty and short term scheduler have little to do. If all the processes are CPU bound the I/O waiting queue will always be empty, devices will go unused, and again the system will be unbalanced.

**CONTEXT SWITCH**

* It is the mechanism to store and restore the state or context of a CPU in Process Control Block (PCB) so that a process execution can be resumed from the same point at a later time.
* It is an essential part of a multi Operating System.
* Context Switch include the value of CPU register, the process state and memory management information.
* Context Switch time is pure overhead, because the system does no useful work while switching.
* Its speed ranges from 1 to 1000 micro seconds.
* Context Switch time is highly dependent on hardware support.

When the process is switched, following information is stored for later use:

1. Program counter
2. Scheduling information
3. Base and limit register value
4. Currently used register
5. Changed state
6. Input/ output (I/O) state information
7. Accounting information