

Scheduling Queue

Job Queue: A process when enters a system is put into a *job queue*.

Ready Queue: The process residing in the main memory and ready for execution is put into *ready queue*.

Device Queue: The process waiting for a particular I/O device is put in the *device queue*.

Scheduler

Long Term Scheduler: Also known as *job scheduler* selects process from disk and puts into the main memory.

Short Term Scheduler: Also known as *CPU Scheduler* selects process from memory and allocates a CPU to it.

Medium-Term Scheduler: It is used to remove a process and reduce the degree of multi-programing . Later it can be re-introduced from point where it was left .This is known as *Swapping*.

Priority Scheduling Round Robin Scheduling

Each process has a *priority*. There is a fixed *time quantum*.

CPU allocated to the process with higher priority. Ready queue is treated as *circular queue* and CPU is allocated to the First process for specific time quantum.

Problem: *Starvation* of low priority. **Problem:** If time quantum too large, algorithm works as FCFS.

Solution: *Aging*.

It can be *preemptive* or *non-preemptive*. It is *preemptive*.

Multilevel Queue Multilevel Feedback Queue

Ready queue is divided into: *Foreground (interactive) process* and *Background (batch) process*. Allows the process from one queue to move to the next queue.

Foreground implements *Round Robin Scheduling* and **Background** implements *FCFS*. Here processes are separated according to their CPU burst.

Scheduling Criteria

1. CPU Utilization: It should be *maximum*. 40% minimum- 90% maximum.

2. Throughput: Number of processes completed per unit time is called *throughput*. It should be *minimum*.

3. Turnaround Time: The interval from time of submission of process to time of completion, *Turnaround Time = period spent waiting + waiting in ready queue + execution time + I/O interrupt time*. It should be *minimum*.

4. Waiting Time: The time for which the process has to wait in the ready queue is *waiting time*. It should be *minimum*.

5. Response Time: Time taken to respond to a process is a *response time*. It should be *minimum*.

SCHEDULING ALGORITHM

Scheduling Algorithm decides which process should the CPU be allocated to.

There are *six scheduling algorithms*.

First Come First Serve Shortest Job First

The process that requests for the CPU first, gets the access first.

Each process has the length of the next CPU burst.

FIFO queue is used in handling the process.

The process with smallest next CPU burst gets access to the process.

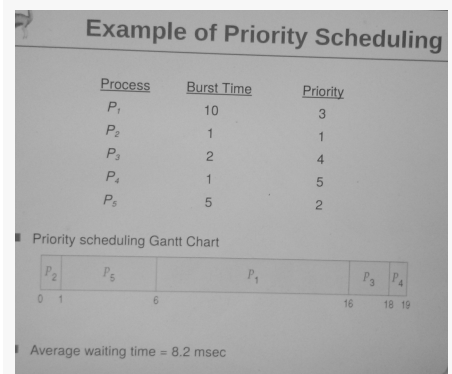
Long waiting time for the next process.

Comparitively less waiting time for the next process.

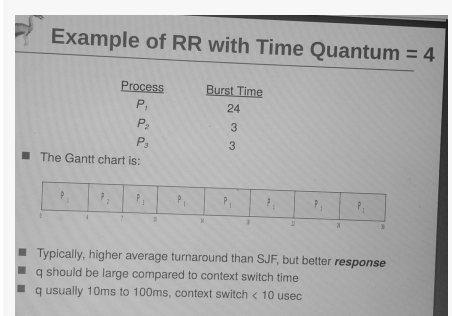
It is a *non-preemptive* algorithm.

It can be *preemptive* or *non-preemptive*.

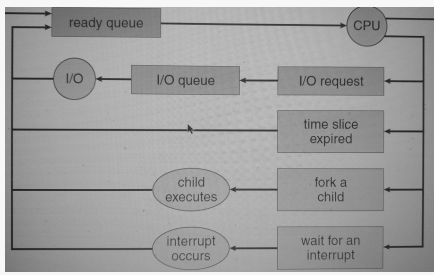
Priority Scheduling Diagram



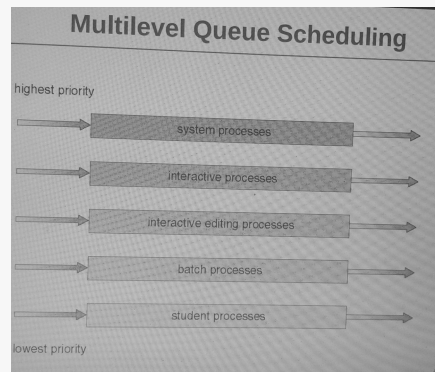
Round Robin Diagram



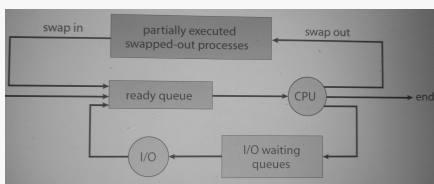
Scheduling Queue Diagram



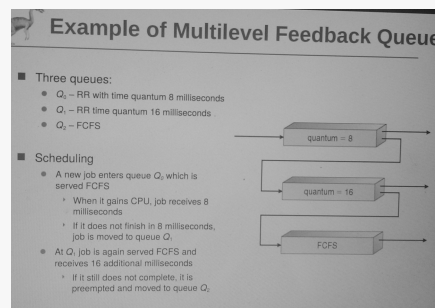
Multilevel Queue Scheduling Diagram



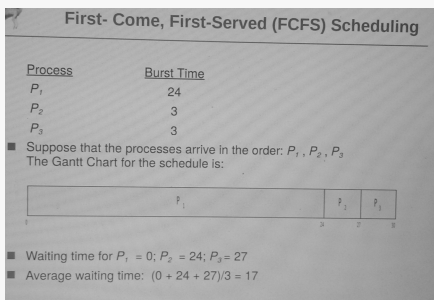
Medim-Term Scheduling Diagram



Multilevel Feedback Queue Diagram



First Come First Serve (FCFS) Diagram



Shortest Job First (SJF) Diagram

