LAB ASSIGNMENT NO.: 03

Title:

Write a Java program (using OOP features) to implement following scheduling algorithms: FCFS,SJF (Preemptive), Priority (Non-Preemptive) and Round Robin (Preemptive).

Objectives :

- To understand OS & SCHEDULLING Concepts
- To implement Scheduling FCFS, SJF, RR & Priority algorithms
- To study about Scheduling and scheduler

Problem Statement :

Write a Java program (using OOP features) to implement following scheduling algorithms: FCFS,SJF, Priority and Round Robin .

Outcomes:

After completion of this assignment students will be able to:

- Knowledge Scheduling policies
- Compare different scheduling algorithms

Theory Concepts:

CPU Scheduling:

• CPU scheduling refers to a set of policies and mechanisms built into the operating systems that govern the order in which the work to be done by a computer system is completed.

• Scheduler is an OS module that selects the next job to be admitted into the system and next process to run.

Scheduling

Scheduling is defined as the process that governs the order in which the work is to be done. Scheduling is done in the areas where more no. of jobs or works are to be performed. Then it requires some plan i.e. scheduling that means how the jobs are to be performed i.e. order. CPU scheduling is best example of scheduling.

Necessity of scheduling

• Scheduling is required when no. of jobs are to be performed by CPU.

• Scheduling provides mechanism to give order to each work to be done.

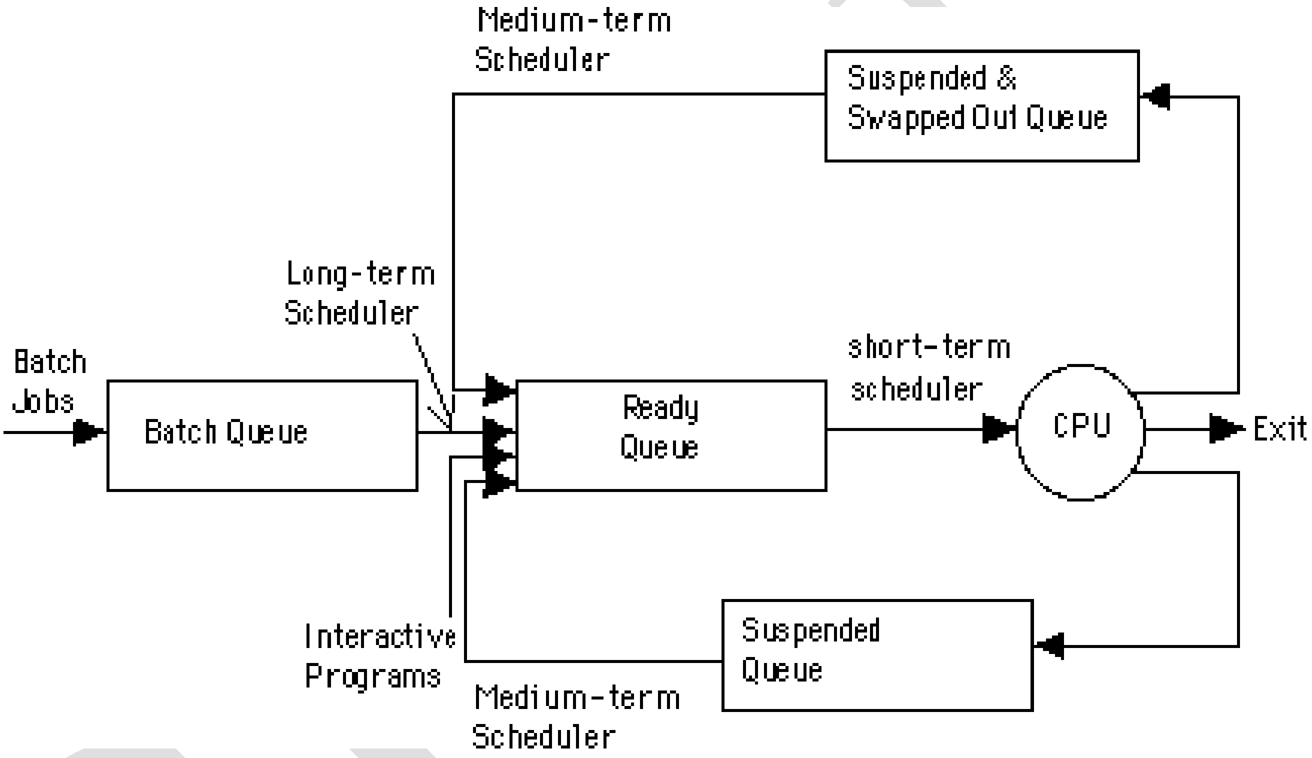
• Primary objective of scheduling is to optimize system performance.

• Scheduling provides the ease to CPU to execute the processes in efficient manner.

Types of schedulers

In general, there are three different types of schedulers which may co-exist in a complex operatingsystem.

- Long term scheduler
- Medium term scheduler
- Short term scheduler.



You Have to Write This all ans by yourself

- Difference Between Long term scheduler, Medium term scheduler& Short term scheduler?
- Scheduling Criteria?
- Difference Between Non-preemptive Scheduling & Preemptive Scheduling?
- Short Note on Types of scheduling Algorithms(with Example)
  - FCFS(First Come First Serve)
  - SJF(Short Job First)
  - Priority scheduling

- Round Robin Scheduling algorithm

2. **Algorithms(procedure) :**

FCFS :

Step 1: Start the process

Step 2: Accept the number of processes in the ready Queue

Step 3: For each process in the ready Q, assign the process id and accept the CPU burst time

Step 4: Set the waiting of the first process as ‘0’ and its burst time as its turn around time

Step 5: for each process in the Ready Q calculate

Waiting time for process(n)= waiting time of process (n-1) + Burst time of process(n-1)

Turn around time for Process(n)= waiting time of Process(n)+ Burst time for process(n)

Average waiting time = Total waiting Time / Number of process

Average Turnaround time = Total Turnaround Time / Number of process

Step 7: Stop the process

SJF :

Step 1: Start the process

Step 2: Accept the number of processes in the ready Queue

Step 3: For each process in the ready Q, assign the process id and accept the CPU burst time

Step 4: Start the Ready Q according the shortest Burst time by sorting according to lowest to highest burst time.

Step 5: Set the waiting time of the first process as ‘0’ and its turnaround time as its burst time.

Step 6: For each process in the ready queue, calculate

(a) Waiting time for process(n)= waiting time of process (n-1) + Burst time of process(n-1)

(b) Turn around time for Process(n)= waiting time of Process(n)+ Burst time for process(n)

(c) Average waiting time = Total waiting Time / Number of process

(d) Average Turnaround time = Total Turnaround Time / Number of process

Step 7: Stop the process

RR :

Step 1: Start the process

Step 2: Accept the number of processes in the ready Queue and time quantum (or) time slice Step 3: For each process in the ready Q, assign the process id and accept the CPU burst time Step 4: Calculate the no. of time slices for each process where

No. of time slice for process(n) = burst time process(n)/time slice

Step 5: If the burst time is less than the time slice then the no. of time slices =1.

Step 6: Consider the ready queue is a circular Q, calculate

(a) Waiting time for process(n) = waiting time of process(n-1)+ burst time of process(n-1) + the time difference in getting the CPU from process(n-1)

(b) Turn around time for process(n) = waiting time of process(n) + burst time of process(n)+ the time difference in getting CPU from process(n).

(e) Average waiting time = Total waiting Time / Number of process

(f) Average Turnaround time = Total Turnaround Time / Number of process

Step 7: Stop the process.

Priority Scheduling :

Step 1: Start the process

Step 2: Accept the number of processes in the ready Queue

Step 3: For each process in the ready Q, assign the process id and accept the CPU burst time, priority

Step 4: Start the Ready Q according the priority by sorting according to lowest to highest burst time and process.

Step 5: Set the waiting time of the first process as ‘0’ and its turnaround time as its burst time.

Step 6: For each process in the ready queue, calculate

Waiting time for process(n)= waiting time of process (n-1) + Burst time of process(n-1)

Turn around time for Process(n)= waiting time of Process(n)+ Burst time for process(n)

Average waiting time = Total waiting Time / Number of process

Average Turnaround time = Total Turnaround Time / Number of process

Step 7: Stop the process

Flowchart :

Note: you should draw flowchart as per algorithm/procedure as above

Conclusion:

Hence we have studied that-

- CPU scheduling concepts like context switching, types of schedulers, different timing parameter like waiting time, turnaround time, burst time, etc.
- Different CPU scheduling algorithms like FIFO, SJF,Etc.
- FIFO is the simplest for implementation but produces large waiting times and reduces system performance.
- SJF allows the process having shortest burst time to exec