

### Home Work Assignments on Process Scheduling

1. State true or false :

- i. The Round Robin schedule behaves as First Come First Serve schedule for small time quantum.
- ii. If a process uses up its allocated time slot, a timer interrupt occurs and the process is placed in a blocked queue.
- iii. An operating system uses a clock timer to make process scheduling decisions. Increasing the frequency of this clock interrupt decreases the amount of time taken to run your program.

2. What scheduling policy will you use for each of the following cases? Explain your reasons for choosing them.

- a. The processes arrive at large time intervals:
- b. The system's efficiency is measured by the percentage of jobs completed.
- c. All the processes take almost equal amounts of time to complete.

3. In which of the following operations, the scheduler is not called into play?

- a. Process requests for I/O.
- b. Process finishes execution.
- c. Process finishes its time allotted.
- d. All of the above

4. What are the factors that need to be considered to determine the degree of multiprogramming in a system?

5. What happens if the time allocated in a Round Robin Scheduling is very large? And what happens if the time allocated is very low?

6. A Shortest Job First algorithm may lead to starvation where a process with large execution time is made to wait for indefinitely long times. Suggest a modification to the SJF that overcomes this problem.

7. If the waiting time for a process is  $p$  and there are  $n$  processes in the memory then the CPU utilization is given by,  
a.  $p/n$                       b.  $p^n$  ( $p$  raised to  $n$ )                      c.  $1-p^n$                       d.  $n-(p^n)$

8. Suppose a new process in a system arrives at an average of six processes per minute and each such process requires an average of 8 seconds of service time. Estimate the fraction of time the CPU is busy in a system with a single processor.

9. A CPU scheduling algorithm determines an order for the execution of its scheduled processes. Given  $n$  processes to be scheduled on one processor, how many possible different schedules are there? Give a formula in terms of  $n$ .

10. Consider the following preemptive priority-scheduling algorithm based on dynamically changing priorities. Larger priority numbers imply higher priority. When a process is waiting for the CPU (in the ready queue but not running), its priority changes at a rate  $X$  when it is running, its priority changes at a rate  $Y$ . All processes are given a priority of 0 when they enter the ready queue. The parameters and can be set to give many different scheduling algorithms. What is the algorithm that results from  $Y > X > 0$ ?

- a. LIFO                      b. FCFS                      c. Round Robin                      d. None of the above

11. Consider the following table of arrival time and burst time of three processes P0, P1 and P2. The pre-emptive shortest job first algorithm is used. Scheduling is carried out only at arrival or completion of processes. What is the average waiting time of the three processes

Process	Arrival Time	Burst Time
P0	0ms	9ms
P1	1ms	4ms
P2	2ms	9ms

12. A program contains a single loop that executes 50 times. The loop contains a computation that lasts 50 msec followed by an I/O operation that consumes 200 msec. This program is executed in a time-sharing system with 9 other identical programs. All programs start their execution at the same time. The scheduling overhead of the OS is 3 msec. Compute the response time in the first and the subsequent iterations  
(a) The time slice is 50 mses                      (b) The time slice is 20 msec