

### Tutorial #3 [CO2]

1. What are different types of scheduling are there? Also explain each.
2. Explain about each scheduling parameter: CPU Utilization, Throughput, Turnaround Time, Waiting Time, Load Average, and Response Time.
3. Which scheduling policy is most suitable for time-shared operating systems?
4. Consider a set of  $n$  tasks with known runtimes  $r_1, r_2, \dots, r_n$  to be run on a uniprocessor machine. Which processor scheduling algorithms will result in the maximum throughput?
5. Consider three CPU-intensive processes, which require 10, 20 and 30 time units and arrive at times 0, 2 and 6, respectively. How many context switches are needed if the operating system implements a shortest remaining time first scheduling algorithm? Do not count the context switches at time zero and at the end.
6. Consider the following set of processes, with the arrival times and the CPU burst times given in milliseconds.

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Process Arrival-Time Burst-Time		
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P1	0	5
P2	1	3
P3	2	3
P4	4	1
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What is the average turnaround time for these processes with the preemptive shortest remaining processing time first (SROT) algorithm?

7. Consider three processes (process id 0, 1, 2 respectively) with compute time bursts 2, 4 and 8 time units. All processes arrive at time zero. Consider the longest remaining time first (LRTF) scheduling algorithm. In LRTF ties are broken by giving priority to the process with the lowest process id. What will be the average turn around time.
8. Consider three processes, all arriving at time zero, with total execution time of 10, 20 and 30 units, respectively. Each process spends the first 20% of execution time doing I/O, the next 70% of time doing computation, and the last 10% of time doing I/O again. The operating system uses a shortest remaining compute time first scheduling algorithm and schedules a new process either when the running process gets blocked on I/O or when the running process finishes its compute burst. Assume that all I/O operations can be overlapped as much as possible. For what percentage of time does the CPU remain idle?
9. Consider a system which has a CPU bound process, which requires the burst time of 40 seconds. The multilevel Feed Back Queue scheduling algorithm is used and the queue time quantum '2' seconds and in each level it is incremented by '5' seconds. Then how many times the process will be interrupted and on which queue the process will terminate the execution?
10. Explain about Dispatcher, short term scheduler, long term scheduler, ready queue, context switch with respect to processes in memory.