EECE.4810/EECE.5730: Operating Systems

Spring 2019

Key Questions
CPU Scheduling (Lectures 18-20)

QUESTIONS

1. Explain the role of a preemptive CPU scheduler.
2. What are the possible criteria used in scheduling metrics?
3. Describe the basics, pros, and cons of first-come, first-served (FCFS) scheduling.
4. Describe the basics, pros, and cons of shortest job first (SJF) scheduling.
5. Describe the basics, pros, and cons of shortest time to completion first (STCF) scheduling.
6. Describe the basics, pros, and cons of priority scheduling.
7. Describe the basics, pros, and cons of round robin scheduling.
8. Describe some of the complications involved in scheduling processes on real-time systems.
9. Describe the basics, pros, and cons of earliest deadline first (EDF) scheduling.

EXAMPLES

1. Consider FCFS scheduling for three processes arriving in two different orders:

ORDER 1:

Process	Burst Time
P1	24
P2	3
P3	3

ORDER 2:

Process	Burst Time
P2	3
P3	3
P1	24

In both cases, assume all processes arrive at time 0 and are available to start executing at time 1. Determine the waiting time and turnaround time for each process in each scenario, as well as the average waiting time and turnaround time.

2. Given four processes arriving at time 0 and their burst times, determine the wait time and turnaround time for each process using SJF scheduling, as well as the average of each metric.

Process	Burst time
P1	6
P2	8
P3	7
P4	3

3. Given four processes, their arrival times, and their burst times, determine the schedule, average wait time, and average turnaround times for each process using STCF scheduling.

Process	Arrival Time	Burst Time
P1	0	8
P2	1	4
P3	2	9
P4	3	5

4. Consider the following set of processes, with the length of the CPU-burst time given in milliseconds:

Process	Burst	Time Priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

The processes are assumed to have arrived in the order *P*1, *P*2, *P*3, *P*4, *P*5 all at time 0.

What is the turnaround time (i.e., time of completion) of each process for each of the following four (4) scheduling algorithms: FCFS (First Come First serve), Round Robin (quantum=1), SJF (Shortest Job First), and a non-preemptive priority (smaller priority # implies a higher priority)?

If two processes have the same priority or the same burst time, use arrival order to break ties when using a scheduling algorithm that bases order on those values. (For example, when doing priority scheduling, P1 executes before P3, even though both are priority 3.)

5. Consider the following set of processes, with the length of the CPU-burst time and the arrival time given in milliseconds:

Process	Burst	Priority	Arrival time
P1	10	1	0
P2	3	4	0
P3	7	2	2
P4	1	2	4
P5	5	3	6

What is the turnaround time (i.e., time of completion) of each process for each of the following five scheduling algorithms : FCFS (First Come First serve), SJF (Shortest Job First), STCF (Shortest Time to Completion First), Round Robin (quantum=1), and a non-preemptive priority (a smaller priority number implies a higher priority)?