CSC1014/CSC1016: OPERATING SYSTEM
GROUP PROJECT
PROCESS MANAGEMENT
CPU SCHEDULING
DUE DATE: 14/5/2020

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

Process	Burst
P1	10
P2	4
P3	8
P4	4
P5	7

The processes are assumed to have arrived in the order **P1< P2 < P3< P4< P5**.

A. FCFS Scheduling:

(i) Draw Gantt chart that illustrates the execution of these processes using FCFS scheduling algorithm.
(ii) What is the **turnaround** and **average waiting time** in part (i)?
(iv) If the processes execution change to **P2< P3 < P4< P5< P1**, what is the **turnaround** and **average waiting time**?
(iv) If the processes execution change to **P3< P1 < P5< P4< P2**, what is the **turnaround** and **average waiting time**?
(v) Explain the optimal execution sequence from **P1< P2 < P3< P4< P5** , **P2< P3 < P4< P5< P1** and **P3< P1 < P5< P4< P2**

B. SJF Scheduling:

(i) Draw Gantt chart that illustrates the execution of these processes using SJF scheduling algorithm.
(ii) What is the **turnaround** and **average waiting time** in part (i)?
(iii) Explain the optimal execution sequence from **P1< P2 < P3< P4< P5** , **P2< P3 < P4< P5< P1** and **P3< P1 < P5< P4< P2**
(iv) If the processes (**P1, P2, P3, P4, P5**) arrival time (0, 1, 2, 3, 4); Draw Gantt chart that illustrates the execution of these processes using SJF scheduling algorithm. What is the **turnaround** and **average waiting time** in this part.

C. Priority Scheduling:

If the processes (**P1, P2, P3, P4, P5**) priority (3, 1, 3, 4, 2); Draw Gantt chart that illustrates the execution of these processes using Priority scheduling algorithm. What is the **turnaround** and **average waiting time** in this part.

D. Round Robin (RR) Scheduling:

(i) Draw Gantt chart that illustrates the execution of these processes using RR scheduling algorithm, where quantum = 2

(ii) What is the **turnaround** and **average waiting time** in part (i)?

E. In this problem which of the algorithm(s) in A(ii), B(ii), C(i) and D(ii) results the optimal CPU scheduling?

F. Which of the following scheduling algorithm(s) could result in starvation and why?

(a) First-come, first-served
(b) Shortest job first
(c) Round robin and
(d) Priority

2. Consider a single-CPU system with only CPU-bound tasks and assume CPU scheduling is always non-preemptive. Also assume each task's runtime is known in advance, no two tasks have the same runtime, and that all tasks are ready at system start. Show that shortest-job-first (SJF) scheduling is the sole optimal scheduling order in terms of mean task turnaround time (where turnaround time is defined as the elapsed time from when the task enters the system to the moment the task finishes)