Operating Systems
CMPT 424

–Lab 5

Goals	**Implementing a scheduler and context switches** This approximately one-hour active learning exercise will you help you make progress on the practical aspects of developing your operating system and help prepare you for the mid-term exam.
Instructions	1. You will soon have three user programs in memory all at once and a PCB structure that facilitates keeping track of them. This is a good time to begin thinking about your CPU scheduler. Read up on the topic in the resources below. 2. Remember that context switches are software interrupts and as such are treated as systems calls. 3. Add the *i*Project 3 functional requirements as Issues in GitHub as element of an "*i*Project 3" milestone. 4. Read chapter 5.3.4 in the 8th edition of our text. Actually, read all of chapter 5.
Questions	1. A problem exactly like this will be on the exam.

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

Process	Burst Time	Priority
P_1	10	3
P_2	1	1
P_3	2	3
P_4	1	4
P_5	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.

   a. Draw four Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: FCFS, SJF, nonpreemptive priority (a smaller priority number implies a higher priority), and RR (quantum = 1).

   b. What is the turnaround time of each process for each of the scheduling algorithms in part a?

   c. What is the waiting time of each process for each of these scheduling algorithms?

   d. Which of the algorithms results in the minimum average waiting time (over all processes)?

Resources	• Chapter 3 in https://gustavus.edu/+max/os-book/ • Chapter 7 in http://pages.cs.wisc.edu/%7Eremzi/OSTEP/ • http://jimweller.com/jim-weller/jim/java_proc_sched/
Grading	Your work on this lab will contribute to your grade for the mid-term exam and *i*Project3.
Submitting	Commit your work to your **private** GitHub account in an appropriately-named folder. Make sure to tag your commit messages with the Issue number they address.