

Operating Systems

CMPT 424

-Lab 5

Goals	Implementing a scheduler and context switches This approximately one-hour active learning exercise will help you make progress on the practical aspects of developing your operating system.																		
Instructions	<ol style="list-style-type: none">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 before you begin developing the code.2. Remember that context switches are software interrupts and as such are treated as systems calls.3. Add the new features as specified in your Issues and <i>iProject 3</i>.4. Test.5. Read chapter 5.3.4 in our text. Actually, read all of chapter 5, it will be on the exam.																		
Questions	<ol style="list-style-type: none">1. A problem exactly like this will be on the exam. <p>Consider the following set of processes, with the length of the CPU burst given in milliseconds:</p><table border="1"><thead><tr><th>Process</th><th>Burst Time</th><th>Priority</th></tr></thead><tbody><tr><td>P_1</td><td>10</td><td>3</td></tr><tr><td>P_2</td><td>1</td><td>1</td></tr><tr><td>P_3</td><td>2</td><td>3</td></tr><tr><td>P_4</td><td>1</td><td>4</td></tr><tr><td>P_5</td><td>5</td><td>2</td></tr></tbody></table><p>The processes are assumed to have arrived in the order P_1, P_2, P_3, P_4, P_5, all at time 0.</p><ol style="list-style-type: none">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)?	Process	Burst Time	Priority	P_1	10	3	P_2	1	1	P_3	2	3	P_4	1	4	P_5	5	2
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P_1	10	3																	
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Resources	<ul style="list-style-type: none">• 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>iProject3</i> .																		
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.																		