Operating Systems

CMPT 424

Lab 010

Goals

Implementing a scheduler and context switches

This active learning exercise will you help you make progress on the practical aspects of developing *i*Project 2 system and help prepare you for the mid-term exam.

Instructions

1. We have been simulating CPU scheduling and 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 how this all comes together. Read up on the topic in our text and 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 mid-term 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 the Max Hailperin OS book linked on our site
- Chapter 7 in http://pages.cs.wisc.edu/%7Eremzi/OSTEP/

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.