BLG312E Computer Operating Systems Homework 2

Submission Deadline: 29 April 2022 23:59

Write and test a C program that implements the described behavior below. In this homework, there will be one process with three threads.

You should submit your source file to Ninova. You need to include comments in your source code.

Description: In a company the human resources (HR) department deals with hiring new employees. In this *department*, there is one *receptionist* and three *interviewers*. When an applicant arrives at the *department*, the *receptionist* registers him/her. After this step, the *receptionist* sends the applicant into the waiting room. Whenever one of the *interviewers* becomes available, he/she calls the first applicant in line and interviews him/her. While the *interviewers* interview the applicants, the *receptionist* continues registering incoming applicants. (Note: Assume that the waiting room has infinite capacity.)

You are required to model this HR *department* as a process with the *interviewers* and the *receptionist* as threads of this process. The *receptionist* needs nr seconds to register each applicant (this time is fixed and is read as a command line argument). Interviewing an applicant takes *ni* seconds for an *interviewer* and *ni* depends on the job position the applicant is applying for.

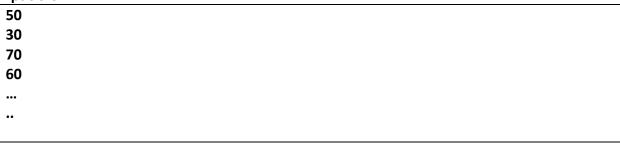
To simulate applicants with different types of position applications, an *interviewer* thread should read the time it will take to interview the current applicant from an input file. (**Hint:** To simulate the waiting times during the registration and interview stages, you can use the "sleep" command.)

Important note:

- For this homework, you are required to model the HR *department* as ONE process with FOUR threads (one *receptionist* thread and three *interviewer* threads).
- Solving the problem with multiple processes and no threads, will NOT get any points.
- Please preserve the order and meaning of the program arguments.
- Please test your program with different input files and make sure to achieve expected results.
- Please check that your program correctly removes all allocated resources (e.g. shared memory locations, semaphores, and any others you have used).
- Any type of plagiarism will not be tolerated.

Input parameters and input file formats: Input files for testing your program must be in the format given below where each line contains the *ni* interviewing times for each applicant. Input file must be in ".txt" file format. Assume that there are 4 applicants with following interviewing times. For example, interviewing time for the first applicant is 50 seconds, for the second one 30 seconds, so on.

Input.txt



Test: Your program will be tested in the form:

./program input.txt nr

Output format: Your program must print the events on the screen in their order of occurrence in the format given below. Assume that nr = 1 seconds in this example.

```
Applicant 1 applied to the receptionist
Applicant 2 applied to the receptionist
Applicant 3 applied to the receptionist
Applicant 4 applied to the receptionist
Applicant 1's registration is done
Interviewer 1 started interview with Applicant 1
Applicant 2's registration is done
Applicant 3's registration is done
Interviewer 3 started interview with Applicant 2
Interviewer 2 started interview with Applicant 3
Applicant 4's registration is done
Interviewer 3 finished interview with Applicant 2
Interviewer 3 started interview with Applicant 4
Interviewer 1 finished interview with Applicant 1
Interviewer 2 finished interview with Applicant 3
Interviewer 3 finished interview with Applicant 4
All applicants have interviewed successfully.
```