CSE306: Spring 2020

OSP2: An Operating System Project

Project 1 – Thread Management

Out: February 20
Due: March 10

What to do. Implement the *Threads* module of OSP2.

NOTE: You must use Java 8 or else your project will not link with OSP-2!!!

The project files are found on Blackboard in the Assignments section. Details of what you are supposed to do are in the OSP2 manual, Chapter 4. The only additional requirement is that the dispatcher should schedule threads using the following multi-queue strategy:

- The Ready Queue consists of three sub-queues: Q1, Q2, and Q3. Within each sub-queue, threads are scheduled in a round-robin fashion with time slice of 80 clock ticks, but threads may get demoted from a higher-level queue (i.e., Q1, Q2) to a lower-level queue (i.e., Q2, Q3) according to the following rules:

  - If a thread in Q1 gets dispatched for the 4th time then it is demoted to Q2 after it is preempted.

  - If a thread in Q2 gets dispatched for the 8th time, it is demoted to Q3 after it is preempted.

  - Threads in Q3 stay there until termination.

- The scheduler decides which queue to service next according to the following strategy that is based on cycles of 6 invocations each:

  - In each cycle, the scheduler services Q1 on invocations 1, 2, and 3; Q2 on invocations 4 and 5; and Q3 on invocation 6. Then the cycle repeats.

  - If the scheduler is invoked to serve some queue Qk and that queue is empty, the queue misses its remaining turns (in the current cycle) and switches to $Qk + 1$. If Qk is Q3, it means the entire ready queue is empty and the scheduler has nothing to do in the current invocation.

Your objective in this project is to get your implementation to run under OSP2 without errors and warnings with the parameter file in the `Misc` subdirectory.

Important note on the Git repository. You **must** use Git to maintain your project files **and** you must make frequent commits to your repository. The Git repository must be in *Github classroom*. Follow this link to create a repository in this course's classroom:

```
https://classroom.github.com/a/obiREhAM
```

After a few clicks you will get a repository named `cse306-project-1-`*YourGuthubId*. The repository will automatically become private and you must **not** attempt to share it.

We will be checking your repository and your commit logs to make sure that substantial activity has been taking place over a period of time. **If there are less than 3 nontrivial commits, significant penalty will be applied**.

We recommend that you read a brief Git tutorial to learn the concepts, but avoid using command line tools to work with the repository, to save yourself from costly mistakes. Pick a nice graphical tool like GitKraken, SmartGit, TortoiseGit, or SourceTree (GitKraken and SmartGit work on all platforms, are commercial, but free for academic use; TortoiseGit is Windows only; SourceTree is Windows+Mac). Otherwise, chances are that you will make mistakes that will waste your time and may affect your grade. (Messing up your git repository is not an excuse.)

Your code must be well-structured, documented, properly indented, and there must be **no compilation warnings or errors**. These factors will be taken into account in grading.

How to submit. Zip-up your main branch and submit the zip file via **Blackboard**. Github has a button for generating such zip files: *Clone or download>Download ZIP*. Normally, the zip file will have a top folder with a name like `cse306-project-1-`*YourGuthubId*`-master`, but if not then make sure that your submitted zip file has a top folder with such a name (-master is dispensable, but the rest is not). **Submission is through the Blackboard only.** Make sure your Github version is the same as Blackboard. If the two disagree, penalty will apply.

This project is to be done **individually**. **Each** source file **must** include

- your name (as in Solar)

- student Id

- the following pledge:
  I pledge my honor that all parts of this project were done by me individually, without collaboration with anyone, and without consulting any external sources that provide full or partial solutions to a similar project.
  I understand that breaking this pledge will result in an "F" for the entire course.

Failure to include either of these items will require a re-submission and cause significant penalty.

GOOD LUCK!