College of Computer Studies

DEPARTMENT OF
SOFTWARE TECHNOLOGY

CSOPESY

Project 2 – Synchronization Problems

Major Details

Groupings:	At most 2 members in a group
Deadline:	June 14, 2022 (Monday) 12:00 NN
Percentage:	15%
Submission guidelines:	Submit the `zip` file to AnimoSpace
Filename format:	`CSOPESY-Project2-<Section>-Group<#>.zip`

Deliverables

`Zip` file containing:

- Program source codes – `py` files

Specifications

This programming exercise will assess your understanding of process synchronization. For uniformity and consistency, the project should be implemented in Python.

Consider the following synchronization problem:

Suppose that you are tasked to create a solution that will manage the number of people inside a fitting room of a department store. Here are some constraints:

- There are only `n` slots inside the fitting room of a department store. Thus, there can only be at most `n` persons inside the fitting room at a time.
- There cannot be a mix of `blue` and `green` in the fitting room at the same time. Thus, there can only be at most `n` `blue` threads or at most `n` `green` threads inside the fitting room at a time.
- The solution should not result in deadlock.
- The solution should not result in starvation. For example, `blue` threads cannot forever be blocked from entering the fitting room if there are `green` threads lining up to enter as well.

Task: Coordinate between `blue` and `green` threads.

Input

The program accepts 3 inputs from the user.

- n – the number of slots inside the fitting room
- b – number of blue threads
- g – number of green threads

Output

The output of the program should include the following:

- When a blue thread is the first to enter an empty fitting room, the thread should print the string "Blue only."
- When a green thread is the first to enter an empty fitting room, the thread should print the string "Green only."
- When a thread enters the fitting room, the thread should print its thread ID and its color (i.e., blue or green).
- When a thread is the last to exit the fitting room, the thread should print the string "Empty fitting room."

Required Program Interaction

There should be minimal program interaction. The program will just ask the user to input the values for n, b, and g.

Working With Groupmates

For this project, you are encouraged to work in groups of at most 2 members. Make sure that each member of the group has approximately the same amount of contribution for the project. Problems with groupmates must be discussed internally within the group, and if needed, with the lecturer.

Deliverables

Submit a zip file containing the source code files via AnimoSpace. Do not include any executable file in your zip file submission.

Academic Honesty Policy

Honesty policy applies. Please take note that you are NOT allowed to borrow and/or copy-and-paste – in full or in part – any existing related program code or solutions from the internet or other sources (such as printed materials like books, or source codes by other people that are not online). You should develop your own codes and solutions from scratch by yourselves.

The student handbook states that (Sec. 5.2.4.2):

“Faculty members have the right to demand the presentation of a student’s ID, to give a grade of 0.0, and to deny admission to class of any student caught cheating under Sec. 5.3.1.1 to Sec. 5.3.1.1.6. The student should immediately be informed of his/her grade and barred from further attending his/her classes.”

The student handbook also states that (Sec. 10.3):

A student caught cheating, as defined in Sec. 5.3.1.1., shall be penalized with a grade of 0.0 in the requirement or in the course, at the discretion of the faculty member, without prejudice to an administrative sanction. In cases of alleged cheating, the faculty member should report the incident to the Student Discipline Formation Office (SDFO).

RUBRIC FOR GRADING

Criteria	Ratings				Points
Input	**COMPLETE** **5 pts** The program properly accepts all input values.		**NO MARKS** **0 pt** The program fails to properly accept at least one input value. Or there are extra input values being asked from the user.		5 pts
Capacity	**COMPLETE** **20 pts** The program allows at most n threads per type inside the fitting room at a time.	**INCOMPLETE** **12 pts** The program allows more than n threads per type inside the fitting room at a time.	**INCOMPLETE** **4 pts** The program allows at most n threads regardless of type inside the fitting room at a time.	**NO MARKS** **0 pt** The program allows more than n threads regardless of type inside the fitting room at a time.	20 pts
Starvation	**COMPLETE** **10 pts** The solution does not result in starvation.		**NO MARKS** **0 pt** The solution may result in starvation.		10 pts
Display	**COMPLETE** **15 pts** The program displays all necessary outputs correctly (when first to enter, thread ID, when last to exit).	**INCOMPLETE** **10 pts** The program displays at least 2 necessary outputs correctly (when first to enter, or thread ID, or when last to exit).	**INCOMPLETE** **5 pts** The program displays at least 1 necessary output correctly (when first to enter, or thread ID, or when last to exit).	**NO MARKS** **0 pt** The program does not display any correct output at all.	15 pts
				Total points:	50