# INFO 72220 Lab 5 – Linux Semaphore

Due Date: November 30, 2020

Submission Format:

* 1 C programs

In the class we have learned that Linux offers its general-purpose semaphore object that can be used either as a counting semaphore or a mutex semaphore. We also have discussed in week 6 that the global variable-related race condition in multi-thread programming environment can be prevented by using either pthread mutex or by the Linux general-purpose semaphore. In this lab, you will learn the interchangeability of the two method by modifying your assignment 4 solution to incorporate the Linux semaphore in place of the pthread\_mutex wherever applicable.

**Requirements**

* Examine into one of your team members’ assignment 4 solution, and locate the code sections where you’ve deployed the pthread\_mutex to protect the output integer through which the Subject can post the data to its Observers.
* Remove the use of pthread\_mutex, and replace it with the Linux semaphore (semaphore.h). Think about whether you need a counting semaphore or a mutex semaphore.
* Modify the program so that it remains race condition-free, functions the same way as before, but now deploying the general-purpose Linux semaphore, and supports **multi-observer, single-writer operations** as we have discussed in class.

**Requirement-based Marking Scheme (30 marks in total)**

* Correct creation of the Linux semaphore(s) **(3 marks)**
* Correct semaphore usage in Subject **(5 marks)**
* Correct semaphore usage in all four Observers **(5 marks)**
* Supports multi-reader, single-writer implementations **(10 marks)**
* The program behaviour remains identical and free of race condition after modification **(2 marks)**
* All codes are well documented and structured **(5 marks)**
* Your program **MUST** compile without syntax error in order to receive any marks. The professor will not spend time figuring out how to get your program compiled properly. (as a result, a compilable partial solution is much better than a uncompilable full solution)