

CS2106 Assignment 3

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Exercise 1 - Basic readers-writers problem

- Most of the solution is described in lecture 6
 - But you ensure that `reader_count/writer_count` variable reflects the correct number of readers/writers that successfully acquired the lock
- Multiple readers should be allowed to acquire the lock simultaneously
- For exercise 1, your solution is allowed to let writers starve (e.g. if readers keep acquiring the lock)

Exercise 1 - Basic readers-writers problem

- There is a comment in the lab question that says that it is sufficient to use `pthread_mutex` imported with the `pthread` library.
- This comment shouldn't be here, as the expected solution uses semaphores too (though it might still be possible to solve it using mutexes only if we already know the number of readers at initialisation time)

Exercise 2 - No-starvation readers-writers

- The solution is mentioned briefly in tutorial 5
- Need to avoid writer starvation when there are many readers wanting to acquire the lock
 - Once a writer attempts to acquire the lock, no more readers should be allowed to acquire the lock before the writer

Exercise 3 - Roundabout simulation

- Each car is executed on a different thread, and you need to determine when each car should move forward to the next segment
 - You are writing the function to decide what each car should do
- You should ensure that there will not be deadlocks!
 - What if every entry has many cars waiting to enter the roundabout...
- You may declare additional global variables in ex3.c
- Look at the dining philosophers problem for inspiration

Bonus exercise

Everything required in exercise 3, and:

- A car already in the roundabout should have higher priority than a car that is waiting to enter

General notes

- When grading, we will discard all your changes to `exX_runner.c`
- You may modify anything in `exX.c` and the header file containing the struct definition

For exercise 2 demo

- Run your code with 5 readers, 5 writers, 50 read count, 50 write count
- Try again with more readers and writers
- Answer any other questions that I might ask