COS Questions – Lecture 3

Operating System Concepts (Tenth Edition)

Synchronization

6.1 What is a race condition? Give an example of a situation where one can occur.

6.2 What is a critical section?

6.3 What is atomic access? What are atomic operations and atomic variables?

6.4 What is the difference between a binary semaphore and counting semaphore?

6.5 What is the difference between a mutex and semaphore?

6.6 What is a conditional variable? How can it be used together with a mutex?

6.7 What is a deadlock?

6.8 Write a C++ program that creates two threads, each of which atomically increment the same (global) variable every 100 ms. Print the variable each time it is incremented. How might the print log look if no synchronization is used?

Hints: `<thread>`, `<chrono>`, `<mutex>` or `<atomic>`

6.9 Try creating a deadlock in your program.