ASSIGNMENT 2 (5%)

CS330 - 001 INTRODUCTION TO OPERATING SYSTEMS • WINTER SEMESTER 2020

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AVAILABLE ON: January 14th, 2020

DUE DATE: February 27th, 2020

Please answer the following questions in complete sentences. Your answer to each question should be about 150 words. (100 marks total)

1. Define *short-term scheduler* and *long-term scheduler*, and explain the main differences between them. **(6 marks)**
2. Explain the concept of a context switch. **(6 marks)**
3. Explain the terms *at most once* and *exactly once*, and indicate how these terms relate to remote procedure calls. **(6 marks)**
4. Identify and briefly explain each of the four major categories of benefits of multithreaded programming. **(6 marks)**
5. Briefly describe the benefits and challenges for multithreaded programming that are presented by multicore systems. **(8 marks)**
6. Define *coarse-grained multithreading* and *fine-grained multithreading*, and explain their differences. **(6 marks)**
7. Explain process starvation and how aging can be used to prevent it. **(6 marks)**
8. How does the dispatcher determine the order of thread execution in Windows? **(6 marks)**
9. Define *critical section*, and explain two general approaches for handling critical sections in operating systems. **(8 marks)**
10. Describe the dining-philosophers problem, and explain how it relates to operating systems. **(6 marks)**
11. Define the *two-phase locking* protocol. **(6 marks)**
12. Describe how an adaptive mutex functions. **(6 marks)**

13. Describe a scenario in which the use of a reader-writer lock is more appropriate than using another synchronization tool, such as a semaphore. **(6 marks)**
14. What is the difference between deadlock *prevention* and deadlock *avoidance*? **(6 marks)**
15. Describe a *wait-for graph*, and explain how it detects deadlock. **(6 marks)**
16. Describe how a safe state ensures that deadlock will be avoided. **(6 marks)**