

ASSIGNMENT 1 (5%)

CS330 - 001 INTRODUCTION TO OPERATING SYSTEMS • WINTER SEMESTER 2020

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AVAILABLE ON: January 9th, 2020

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Please answer the following questions in complete sentences. Your answer to each question should be about 150 words. (60 marks; 5 marks each)

1. Define the concepts interrupt and trap, and explain the purpose of an interrupt vector.
 2. How does a computer system with von Neumann architecture execute an instruction?
 3. What role do device controllers and device drivers play in a computer system?
 4. Why do clustered systems provide what is considered high-availability service?
 5. Describe an operating system's two modes of operation.
 6. Define cache, and explain cache coherency.
 7. Describe why direct memory access (DMA) is considered an efficient mechanism for performing I/O.
 8. Describe why multicore processing is more efficient than placing each processor on its own chip.
 9. Describe the relationship between an API, the system-call interface, and the operating system.
 10. Describe some requirements and goals to consider when designing an operating system.
 11. Explain why a modular kernel may be the best of the current operating system design techniques.
 12. Distinguish between virtualization and simulation.
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Please answer the following questions in about 1-2 pages each.

1. Draw a typical computer organization figure that includes the main components of von Neumann architecture. Identify each component, and explain its function and interaction relative to other components. **(15 marks)**
2. Define *system call*, and list the main types of system calls. Elaborate on how a system call interacts with a standard C library and hardware under a dual-mode operating system environment. **(10 marks)**
3. Describe the overall structure of virtual machines, and compare VMware and JVM. **(15 marks)**