

178 330 Operating Systems
Midterm Examination
7 January 2009 18:00 – 21:00

Instructions:

1. NO books, sheets, calculators are allowed.
 2. There are 16 questions, 70 marks total, attempts ALL questions.
 3. Do NOT cheat. Any attempts to cheat will result in dismissal from class with an “F” grade.
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1. What is an operating system ? What are purposes of an operating system ? (3 marks)

2. Is it possible to build a computing system without an operating system ? Why ? (3 marks)

3. Explain the following terms (5 marks):

3.1 Batch systems

3.2 Spooling

3.3 Multiprogramming

3.4 Time sharing system

3.5 Degree of multiprogramming

4. What are system calls ? How do they work ? (3 marks)

5. What are advantages and disadvantages of a monolithic kernel compared to a microkernel ? (3 marks)

6. Explain the boot process of x86 architecture (5 marks)

6.1 Hardware boot-up sequence

6.2 First-stage boot loader

6.3 Second-stage boot loader

7. What are interrupts ? How can an operating system handle those interrupts ? (5 marks)

8. There are many types of interrupts, what are they ? What are differences between them ? (5 marks)

9. Explain process states and how could they transit from one to another (5 marks)

10. What is a process context ? How can a context be represented in an operating system ? (3 marks)

11. How could following technologies provide process-level parallelism ? (5 marks)

11.1 Pipelines

11.2 Superscalar

11.3 Intel Hyperthreading

11.4 Multi-core processors

12. What are threads ? What are advantages and disadvantages of threads compared to traditional processes ? (5 marks)

13. What are fibers ? What are advantages and disadvantages of fibers compared to traditional threads ? (5 marks)

14. What are kernel threads and user threads ? What are differences between them ? (5 marks)

15. Which one, between kernel thread and user thread, is faster? Why ? (5 marks)

16. Describe advantages and disadvantages of 1-1, M-1 and M-N thread models (5 marks)