

**Operating System Concepts**  
**Final Exam**

Instructor: Farn Wang

Class hours: 9:10-12:00 Tuesday

Room: BL 103

Course Nr. 901 49000

Fall 2013

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Student name:

Student ID:

1. Please explain the critical section problem. (5pts/5)

2. Please explain the conditions for solving the critical section problem. (5pts/10)



5. Please explain the Bakery algorithm for the general solution to the critical section problem.  
(10pts/30)

6. Please explain the concept of serializability of schedules in data-base transaction operations. (5pts/35)

7. Please explain the issues in selecting victims for breaking deadlocks. (5pts/40)

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8. Please explain the Banker's algorithm for deadlock avoidance. (10pts/50)

9. What is the advantage of segmentation memory management systems over paged memory management systems. (5pts/55)

10. Please explain the situation for logical address translation to physical addresses at the following moment.

10(a) compile time ? (3pts/58)

10(b) loading time ? (3pts/61)

10(c) linking time ? (3pts/64)

10(d) execution time ? (3pts/67)

11. Assume a system has a TLB hit ratio of 99%. It requires 10 nanoseconds to access the TLB, and 95 nanoseconds to access main memory. What is the effective memory access time in nanoseconds for this system? (3pts/70)

12. Suppose we are using a 2-level paging memory management system with page size of 512 bytes and outer page table of 64 entries. Please answer the outer page number, inner page number, and page offset of logical address 0x9AEFA (in hexadecimal) in this paging system. (5pts/75)

13. Please explain LRU in page replacement algorithm. (5pts/80)

14. Please explain how logical address translation is performed in a segmentation memory management system. Please draw the hardware diagram for this translation. (10pts/90)



15. Please explain why virtual memory technology works in practice. (5pts/95)

16. Please explain why the COPY-ON-WRITE technique works for the performance of virtual memory systems ? (5pts/100)