國立交通大學試題紙

九十八學年度第一次
博士班資格考

科目：作業系統(A)　　日期：99 年 1 月 28 日　第 1 頁 共 1 頁

請"✓"明　✓不可看書　可看書

* 請將答案依題號順序寫入答案卷

答題時字跡需工整，否則不予計分。Write your answers legibly; otherwise you will get zero score.

1. [5 points] List and explain all of the states that a process may be in, and draw and explain a process state transition diagram.

2. [10 points] List and explain all the context information about a process and all the context information about a thread. What are the differences between them?

3. [10 points] Use relevant Pthreads API functions to write a correct multi-threaded program that creates two threads and each thread increments the value of a shared variable x by 1 in each iteration of its endless while loop. This program must use the mutual exclusion mechanism to ensure the data consistency when updating the value of the shared variable x.

4. [10 points] Write and explain the implementation code for the wait() and signal() operations of a counting semaphore.

5. [5 points] Explain what a resource-allocation graph is. How to decide whether or not the system is in a deadlocked state given its current resource-allocation graph?

6. [10 points] Explain the internal mechanism of the memory-mapped file, how it is used in a program, and its advantages over traditional file usages.

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科目：作業系統(B)　　日期：99 年 1 月 28 日　第 1 頁 共 1 頁

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答題時字跡需工整，否則不予計分。Write your answers legibly; otherwise you will get zero score.

1. [10 points] Please introduce the purposes and operations of open() and close() in local and remote file access.

2. [10 points] Please explain how the I/O subsystem, device driver and disk controller accomplish a read() request in local file access.

3. [7 points] Unix inode structure consists of direct indexed, and single to triple indirect indexed blocks. Please discuss the advantages and disadvantages of this method for file allocation.

4. [10 points] Please explain how to apply a time stamping method for serializability (concurrent transactions) in a distributed environment without a centralized site.

5. [8 points] Suppose that a disk drive has 200 cylinders (0~199). The last two requests are at cylinder 86 and 99 (from 86 to 99). What are the total distances (movement in cylinders) of the disk arm with the following methods: a. FCFS, b. SSTF, c. SCAN, d. C-LOOK.
   The requests in FIFO orders are: 66, 183, 58, 103, 19.

6. [5 points] Please briefly introduce RAID 5 and its strength and weakness.