

# 國立交通大學試題紙

科目：作業系統 (A)

日期：98 年 7 月 23 日 第 1 頁 共 2 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] What are the differences between a mandatory and an advisory lock? What are the difference between a shard lock and an exclusive lock?
2. [10 points] The UNIX file system uses the following consistency semantics: “(1) Writes to an open file by a user are visible immediately to other users that have this file open. (2) Allow users to share the pointer of the current location into the file (thus, the advancing of the pointer by one user affects all sharing users).” What are the implications of supporting these semantics for shared access for those files that are stored on remote file systems.
3. [10 points] The NFS protocol provides a set of RPC primitives for remote file operations. However, this set does not include open() and close() primitives that are used in UNIX file systems. Explain the reasons for adopting this design and explain the advantages and disadvantages of this design.
4. [10 points] In the file system, we want to be able to convert a logical block number into an old-style disk address that consists of a cylinder number, a track number within that cylinder, and a sector number within that track. However, in practice, it is difficult to perform this translation for two reasons. Explain the two reasons.
5. [5 points] We can employ several principles to improve the efficiency of I/O. Give at least five principles.
6. [10 points] What is an election algorithm for? Explain how the bully algorithm works in details.

科目：作業系統(B)

日期：98 年 7 月 23 日 第 2 頁 共 2 頁

7-15 題請書寫於 B 答案卷上

7. [5 points] Describe the functionalities of i) a short-term scheduler and ii) a midterm scheduler, and iii) a long-term scheduler. Which one is invoked at the highest frequency? The lowest frequency?
8. [5 points] WINE (Windows Emulator) can make a Win-32 application run in Linux. Explain how WINE does this.
9. [5 points] When a process's state can change from waiting to ready?
10. [5 points] A student is writing his own multithreaded FTP server. He found that his server is entirely blocked when a server thread awaits commands from the client. Give a possible explanation to this phenomenon.
11. [5 points] Why the multi-level feedback queue scheduling algorithm favors IO-bound processes (give them high priorities)?
12. [5 points] An adaptive mutex lock disables CPU interrupts when all processes related to this lock is in the same CPU. Otherwise, the mutex lock performs test-and-set. Explain the rationale of this design.
13. [5 points] Consider a system in which each type of resource has only one instance. What is the necessary and sufficient condition that the system is free from deadlocks? Justify your answer.
14. [10 points] Consider a virtual-memory system using a two-level paging scheme. The page directory consists of 4096 entries. The logical address has 32 bits, and the largest amount of addressable physical memory is 1G bytes. The frame size is 4K bytes. Calculate how many "bits" are there in i) the frame size ii) a frame number iii) a page number iv) displacement into a 2<sup>nd</sup>-level page table v) the size of a 2<sup>nd</sup>-level page table.
15. [5 points] Prove that LRU page replacement algorithm cannot suffer from Belady's anomaly.