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|------|------|-----|-----|---|----|------|
| 考試時間 | 月 | 日上午 | 下午第 | 節 | 份數 | 任課教師 |
| | (星期) | 晚間 | | | | |

國立臺灣科技大學

102 學年度第 2 學期

博七列考試命題用紙

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考試科目: *Operating System*

- 研究所
 大學部
 工程在職進修

博七列
考試
命題用紙

1. Most software applications that run on modern computers are multithreaded.
 - (a) Context-switching time between two threads of a process is much less than between two different processes. What is the chief reason? (7%)
 - (b) The benefits of multithreaded programming can be broken down into four major categories. Which categories of benefits cannot be obtained by user-level threads? Why? (8%)

2. For process synchronization, the system calls, wait() and signal(), are usually provided by an operating system (OS). However, these system calls must be executed atomically within the OS. Give a method for implementing these system calls on a multiprocessor computer system in order to ensure these system calls are atomically executed. (10%)

3. The techniques of virtual memory can be used to treat the file I/O operations as routine memory accesses. This approach, known as memory-mapped files, allows a part of the virtual address space to be logically associated with a file. What advantage and function can be obtained by mapping a file into a memory array? (10%)

4. Kernels provide many services related to I/O. Several services, I/O scheduling, buffering, caching, and spooling, are provided by the kernel's I/O subsystem.
 - (a) What are I/O scheduling and spooling? (8%)
 - (b) To cope with speed mismatch between two hardware devices, the scheme, double buffering, is usually adopted. What is double buffering? You may give an example to explain it. (7%)

5. (1) What is deadlock? What are the four necessary conditions for deadlock?(5%)
 (2) How does it differ from starvation?(5%)

6. Consider a system consisting of four resources of the same type that are shared by three processes, each of which needs at most two resources. Show that the system is deadlock-free.(10%)

7. (1)What is the difference between thread and process?(5%)
 (2)Why do threads have much shorter context switching time?(5%)

8. List four job scheduling methodologies and explain how each of them works.(10%)

9. Compare local and global page replacement. What are the advantages of each?(10%)