長庚大學九十六學年度第二學期 電機所博士班資工領域資格考試

科目:作業系統

1. (10%) What are the differences between user-level threads and kernel-level threads? Under what circumstances is one type better than the other?

2. (15%) In process synchronization, please write a correct algorithm to solve the Readers-Writers problem.

3. (15%) 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.

4. (15%) What is the cause of thrashing? How does the system detect thrashing ? Once it detects thrashing, what can the system do to eliminate this problem ?

5. (10 %) Assume we have a demand-paged memory. The page table is held in registers. It takes 8 milliseconds to service a page fault if an empty page is available or if the replaced page is not modified and 20 milliseconds if the replaced page is modified. Memory access time is 100 nanoseconds. Assume that the page to be replaced has 70% probabilities that has been modified (i.e., become dirty page). What is the maximum acceptable page-fault rate for an effective access time of no more than 200 nanoseconds?

6. (15%) Suppose that a disk drive has 5000 cylinders, numbered from 0 to 4999. The drive is currently serving a request at cylinder 143, and the previous request was at cylinder 125. The queue of pending requests, in FIFO order, is 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130. Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests, for each of the following disk scheduling algorithms? (a) FCFS (b) SSTF (c) SCAN (d) LOOK (e) C-SCAN

7. (10%) In system and network security, please explain the meaning of "stack and buffer overflow"? How to solve this problem?

8. (10%) What is the difference between computation migration and process migration? Which is easier to implement, and why?