

國立臺灣科技大學
九十一學年度碩士班招生考試試題

系所組別：資訊工程系
科目：作業系統

1. Write out three conditions under which a running process will be forced to give up CPU use. (10%)
2. Which of the variables, u, v, w, x, y, and z, in the program below are sharable among the threads created during program execution? (10%)


```

static int u, int v;
main(void) {
    static int w, int x;
    ... //threads creating
    for( ; ; ) {
        static int y, int z;
        ...
    }
}

```
- 3(a). For a real-time operating system, which of the memory management methods, contiguous allocation, paging, segmentation, and demand paging, is most troublesome to use? (5%)
- 3(b). If demand paging is used for memory management on a two-address instruction-set computer, and operands and instruction itself may straddle two pages, how many pages at least a process must be allocated before it can be run? (5%)
- 3(c). With demand-paged memory management, why keeping a pool of free frames (i.e., page buffering) can be used to speed up page replacement? (5%)
4. Suppose that the following processes arrive for execution at the times indicated. Each process will run the listed amount of time. In answering the questions, base all decisions on the information you have at the time the decision must be made.

Process	Arrival Time	Burst Time
P1	0.0	6
P2	0.4	4
P3	0.8	2

- (a) What is the average waiting time for these processes with the FCFS scheduling algorithm? (5%)
- (b) What is the average waiting time for these processes with the preemptive SJF scheduling algorithm? (5%)
- (c) What is the average waiting time for these processes with the Round-Robin scheduling algorithm and time slice, 3? (5%)



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5. Which of the following instructions are privileged? (10%)
- a. Set value of timer
 - b. Read the clock
 - c. Clear memory
 - d. Turn off interrupts
 - e. Switch from user to kernel mode
 - f. Switch from kernel to user mode
 - g. Read from kernel memory.
 - h. Write into kernel memory.
6. Suppose that a disk has 200 cylinders numbered 0 to 199, and the head is at cylinder 53. The disk has a queue of pending requests in the following order: (10%)

98, 183, 37, 122, 14, 124, 65, 67

Starting from the current head position, what is the total distance in cylinders that the disk arm moves to satisfy all of the requests for each of the following disk-scheduling algorithms?

- a. FCFS
 - b. SSTF
 - c. SCAN
 - d. Elevator
7. Order the following in terms of overhead cost: (15%)
- a. timer interrupt service without context switching
 - b. user level thread context switch,
 - c. kernel level thread switch,
 - d. procedure call,
 - e. process context switch,
 - f. page fault
 - g. system call
8. Consider the following program fragments. What are the values that x can take on during the execution of the following threads, assuming x is initialized to 0? (15%)
- Thread 1: { for(i=0;i<10;i++) x=x+2;}
- Thread 2: { for(j=0;j<10;j++) x=x-1; }

