

國立東華大學招生考試試題

招生學年度	九十八	招生類別	碩士班
系所班別	資訊工程學系		
科目	作業系統與計算機組織		
注意事項	本考科禁止使用掌上型計算機		

1. (10%) Consider the operation system, implementing time sharing scheduling, and running on the segmentation hardware with demand paging. When a process P1 used up its time quantum, the operation system will change the CPU from P1 to a new process P2. What happen if P2 tries to access a page that was not brought in memory? How does the operation system solve the problem?
2. (5%) What is cascading termination? Why should we need it? (5)
3. (10%) What are the differences between the SCAN disk scheduling, C- SCAN disk scheduling, and LOOK disk scheduling?
4. (5%) What are the differences between the RAID 0+1 and RAID 1+0?
5. (10%) Please describe the procedure of an interrupt-driven I/O cycle.
6. (10%) Consider the following set of process, with the length of the CPU burst time and priority.

Process	Burst Time	Arrival Time
P1	25	0
P2	10	6
P3	12	10
P4	7	13

Draw four Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: FCFS, non-preemptive SJF, preemptive SJF, and preemptive RR (quantum time is 5 milliseconds). What are the average waiting times of each scheduler algorithm?

7. (10%) Show the IEEE 754 binary representation for the decimal floating-point number -9.9 in single precision.
8. (10%) Assume a branch is executed ten times with the following output: (Taken, Untaken, T, T, U, U, T, T, T, T). What is the predict accuracy of the following four branch prediction schemes: branch taken, branch not taken, one-bit dynamic prediction, and two-bit dynamic prediction? Suppose the initial state of both dynamic prediction schemes is branch taken.
9. (10%) Assume an instruction cache miss rate for a program is 2% and a data cache miss rate is 8%. Suppose the frequency of all memory access instructions (load and store) is 25%. If a processor has a CPI of 4 without any memory stalls and the miss penalty is 50 cycles for all misses, determine how much faster a processor would run with a perfect cache that never missed.
10. (10%) What is the average time to read a 512 byte sector for a typical disk rotating at 1200 RPM? The advertised average seek time is 20ms, the transfer rate is 2MB/sec, and the controller overhead is 2ms. Assume that the disk is idle so that there is no waiting time.
11. (10%) Given the following instruction distributions and cycle times for a machine, how much percentage of time is spent on memory access instructions?

Instruction Type	Frequency	CPI
ALU	40%	3
Load	20%	5
Store	10%	4
Branch	30%	3