

大同大學 九十二 學年度研究所碩士班入學考試試題

考試科目: 計算機概論

所別: 資訊經營研究所

第 1/2 頁

註: 本次考試 不可以參考自己的書籍及筆記; 不可以使用字典; 不可以使用計算器。

1. What is a "machine cycle" of a computer? You must describe each operation. (5%)
2. Please describe the difference of following OS: single user, multitasking, and multiprocessing. (9%)
3. If you want a 1024*768 with 24-bit color display then how many MB of video RAM should have at least. (3%)
4. Explain following terms: (12%)
(a) CSMA/CD (b) ADSL (c) X.25 (d) 3G
5. The time for a processor to execute a program is given by the following formula:

Execution time = instruction count * CPI * clock cycle time

where CPI is the cycle per instruction. Now suppose a processor supports three classes of instructions: A, B, and C. Their CPIs are 1, 2, and 3, respectively. Suppose further that there are two different computers both using the processor as their CPU. When two benchmark programs are executed on these two computers, we obtain the following data:

Computers	Instruction executed (in millions)					
	Program 1			Program 2		
	A	B	C	A	B	C
1	5	1	1	10	2	2
2	10	1	1	5	3	3

Assume that both computers run a 800-MHz clock. Summarize the performance of each of these two computers using an arithmetic mean. Which machine runs fast? (8%)

6. Consider the following recurrence equation. Please show that $T(n) = ?$ (5%)

$$T(n) = \begin{cases} 1 & \text{if } n = 1 \\ 2T(n-1) & \text{otherwise} \end{cases}$$

7. Answer following questions:

(a) Define a 2-3-4 tree. (3%)

(b) In what case a 2-3-4 tree has the minimum height? (5%)

(c) And what is the height of that 2-3-4 tree with the minimum height? (5%)

(d) For the input {10, 5, 2, 4, 6, 8, 7, 3}, insert the items with this set of keys, in the order into an initially empty 2-3-4 tree. (10%)

<背面繼續>

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8. Please write the “target address” and the “value loaded into register A” of the following machine instructions. Assume (B) = 002000, (PC) = 003000, (X) = 000A, and the related memory location showed in Figure 1. (15%)

(a) 0310B000 (b) 010100 (c) 022100 (d) 034900 (e) 03A0F6

	.
002900	010101
	.
003100	006600
	.
006600	001234
	.
00B000	002100
	.

Figure 1

9. Suppose that our system uses demand paging. The program to be considered consists of six pages, numbered 0 through 5. Page 4 is automatically loaded when we start running the program. Other pages are loaded (as they are referenced) by the page fault mechanism. Our program is allowed a maximum of three pages in memory at any time. Suppose that as the program executes, it references its pages in the following order: 4, 3, 5, 4, 1, 5, 5, 5, 4, 3, 5, 1.
- (a) Given this sequence of page references, show what pages would be in memory after each of the references. Assume that the First In – First Out (FIFO) scheme is used to decide which page (if any) to remove from memory when a page occurs. (10%)
- (b) Given this sequence of page references, show what pages would be in memory after each of the references. Assume that the Least Recently Used (LRU) scheme is used to decide which page (if any) to remove from memory when a page fault occurs. (10%)