

淡江大學 98 學年度碩士班招生考試試題

176-

系別：資訊工程學系

科目：資 訊 概 論

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1. Given the adjacency matrix of a directed graph, please answer the following questions.

- (1) Draw the graph for the adjacency list. (5%)
- (2) Find the topological order for the directed graph. (15%)

	a	b	c	d	e	f	g
a	0	1	0	1	1	0	0
b	0	0	1	0	0	0	0
c	0	0	0	0	0	1	0
d	0	0	0	0	0	1	0
e	0	0	0	1	0	0	0
f	0	0	0	0	0	0	0
g	0	0	0	0	0	1	0

- 2. Given  $A[1..10, 1..20, 1..10]$  as a  $10 \times 20 \times 10$  array that is stored in row-major way. Suppose that each element in  $A$  occupies 2 bytes. If the address of  $A[1, 19, 2]$  is  $1000_{16}$ , please find the address of  $A[5, 5, 5]$ . (10%)
- 3. Let  $(u, v)$  be a minimum-weight edge in a weighted graph  $G$ . Show that  $(u, v)$  belongs to some minimum spanning tree of  $G$ . (20%)
- 4. Consider the IEEE standards for floating point representations. The bit pattern  $(10111100110000000000000000000000)_2$  is stored in Excess\_127 format. Show the value in decimal. (10%)
- 5. Two integers  $A = (00011000)_2$  and  $B = (11101111)_2$  are stored in two's complement format. Show how  $B$  is subtracted from  $A$  (5%).
- 6. Is the following relation in first normal form (1NF)? If not, change the table to make it pass 1NF criteria. (15%)

A	B	C	D
1	70	65	14
2	25, 32, 71	24	12, 18
3	32	6, 11	18

本試題雙面印製

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7. Consider the CBC mode of DES. If there is an error in a block of the transmitted ciphertext, how many plaintext blocks are affected? Explain your answer. (10%)

8. Multiple-choice questions (10%)

(1) The \_\_\_\_\_ layer of the TCP/IP protocol suite provides services for end users.

- a. Data-link            b. Transport            c. Application            d. Physical

(2) \_\_\_\_\_ is a protocol for accessing and transferring documents on the WWW.

- a. FTP            b. SMTP            c. TELNET            d. HTTP

(3) The \_\_\_\_\_ level of the three-level DBMS architecture defines the logical view of the data

- a. External            b. Conceptual            c. Internal            d. Physical

(4) The complexity of a problem is  $O(\log_{10}n)$  and the computer executes 1 million instructions per second. How long does it take to run the program if the number operations is 10,000?

- a. 1 microsecond    b. 2 microseconds    c. 3 microseconds    d. 4 microseconds

(5) Which physical topology uses a hub or switch?

- a. Bus            b. Ring            c. Star            d. all of the above.