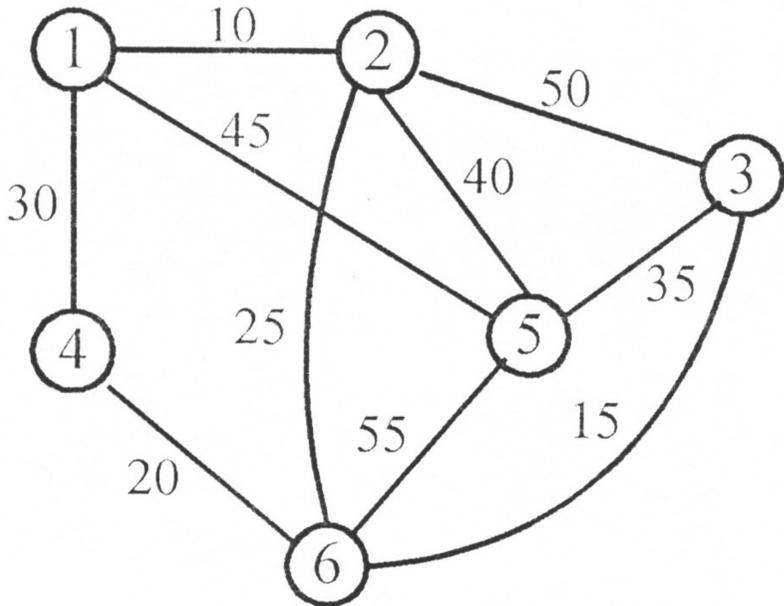


臺中健康暨管理學院

九十二學年度碩士班暨碩士在職專班招生考試試題紙

系 所 別	組 別	考試科目	考試日期	時 間	備 註
資訊科技學系碩士班	--	基礎計算機科學	92.3.30	10:30-12:10	共二頁

7. (10%) Construct the minimal spanning tree of the following graph.



8. (10%) For the following element sequence: 3,8,9,4,6,5,7,11

a) Starting from an empty tree, we insert the above elements one by one. Please show the binary search tree obtained.

b) Do a) again for AVL tree.

9. (8%) Why we need database systems? What's problem if we only use file systems?

10. (8%) What's object oriented programming?

11. (8%) What's computer virus?

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1. (8%) Let M_a and M_b be the arrays given below. What is $M_a M_b$?

$$M_a = \begin{bmatrix} 1 & 0 & 1 \\ 1 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix} \quad M_b = \begin{bmatrix} 1 & 1 & 0 & 0 & 1 \\ 1 & 0 & 1 & 0 & 0 \\ 1 & 1 & 1 & 1 & 1 \end{bmatrix}$$

2. (10%) Prove the following identities.

$$\binom{n}{r} = \binom{n-1}{r} + \binom{n-1}{r-1}$$

3. (10%) If S is a set of n elements, the powerset of S is the set of all possible subsets of S . For example if $S = (a,b,c)$ then $POWERSET(S) = \{(),(a),(b),(c),(a,b),(a,c),(b,c),(a,b,c)\}$. Write a recursive procedure to compute $POWERSET(S)$.

4. (10%) Write an algorithm $LENGTH(X)$ to count the number of nodes in a single linked list P , where P points to the first node in the list. The last node has link field 0.

5. (10%) Let $f(n)=O(T(n))$. Derive $f(n)$ in the simplest formula for the following $T(n)$.

$$T(n) = 2T(n/2) + n; T(c) = c \text{ if } c < 2.$$

6. (8%) What is the postorder traversal of the following binary tree ?

