

所 別：管理技術研究所
學程別：資訊管理學程

組別：甲、丙組

科目：計算機概論

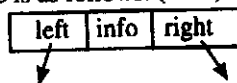
1. Assume that $A=3$, $B=5$, $C=6$, and $D=48$. Compute the following expressions:

(1) $ABC+*CBA-+*$ (5%)

(2) $/+ABCD$ (5%)

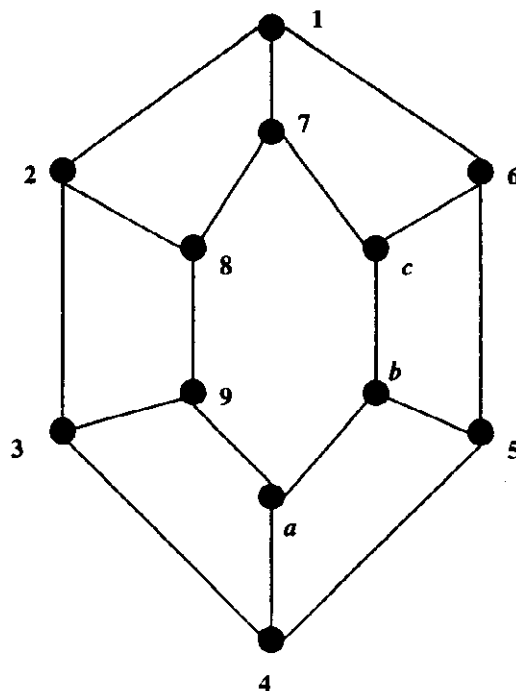
2. For a binary tree T , if the inorder and preorder traversals are $CBDAE$ and $ABCDE$ respectively, what is the original binary tree T ? (10%)

3. Please write a function $count(p)$ to derive the number of nodes of a binary tree which is pointed by pointer p . (Note: $count(p)$ should be a computer program) The node structure of the binary tree is as follows: (10%)



4. Given a simple graph,

- (a) an independent set is a set of vertices such that no two of them are adjacent. The one with the maximum possible number of vertices is called the maximum independent set,
 - (b) a vertex cover is a set of vertices such that every edge is incident to one of the vertices in the set. The one with the minimum number of vertices is called the minimum vertex cover set, and
 - (c) a dominating set is a set of vertices such that every vertex not in this set is adjacent to at least one vertex in this set. The one with the minimum number of vertices is called the minimum domination set.
- (1) Given the following graph, find a maximum independent set, a minimum vertex cover set, and a minimum dominating set. (5% each)



- (2) Given a graph, devise an algorithm to find a maximum independent set. What is the time complexity of your algorithm? (6%)

國立台灣工業技術學院
八十六學年度碩士班招生考試試題

(命題用紙)
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5. IPv6, the next generation Internet Protocol is recently proposed to ultimately replace the current IPv4. Compared to IPv4, IPv6 has the following differences:

- (1) IP address has changed from 32 bits to 128 bits.
- (2) IPv6 header has 8 fields instead of 12 in IPv4.
- (3) A 4 bits priority field and 24 bits flow label field are added in IPv6 header.

With respect to the applications and situations in the current Internet, please explain why the above three modifications are suitable and necessary. (9%)

6. List three functions of an operating system (OS). (12%)

7. List the three most common network topologies. Which topologies need collision-avoidance schemes? (12%)

8. Design an algorithm that, when given an arrangement of the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, rearrange the digits so that the new arrangement represents the next larger value that can be represented by these digits (or report that no such arrangement exists if no rearrangement produces a larger value.) For example, 5647382901 would produce 5647382910. (16%)