

國立臺北護理學院九十七學年度碩士班招生
資 訊 管 理 系 碩 士 班
資 料 結 構 試 題

注 意	1. 請用 <u>中文</u> 或 <u>英文</u> 作答。 2. 請依題號次序於 <u>答案卷</u> 上作答。
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1. Let $T(n)$ denote the execution time needed for processing n records.
- (A) Solve $T(n)$, given that $T(1) = 1$ and for all $n > 1$, $T(n) = T(n-1) + n$ (10%)
- (B) Express $T(n)$ using big-O notation (5%)
2. The in-order sequence of a binary tree is:
- BECDAFIGH**
- and the post-order sequence of the same binary tree is:
- CEDBIFHGA**
- (A) Draw a binary tree defined by such a pair of sequences. (15%)
- (B) Does that pair of sequences uniquely define a binary tree? (5%)
- (C) What is the preorder sequence of this binary tree? (5%)
3. Design a hashing algorithm by using the division method to store 7 records with key values 257, 123, 312, 678, 231, 359, and 586. Size of the hash table should be reasonable (based on current data size 7). Write down the result after storing these 7 records by using your algorithm. (20%)
4. (A) Write a recursive function to compute the greatest common divisor (GCD) of two positive integers. (10%)
- (B) Write a non-recursive function to compute the GCD of two positive integers. (10%)

5. Use the abstract data type of graphs to represent friendships among groups of people. Each vertex corresponds to a person, and an undirected edge that linking two vertices represents the friendship between these two vertices (persons). Given the following friendships:

Alan is a friend of John, Kevin and Victor

John and Victor are also friends

Kevin is a friend of Bob and Tom

Eric and Henry are friends

Henry is a friend of Victor

- (A) Draw the graph that represents exactly the friendships listed above. (10%)
- (B) Suppose that all the people mentioned in the list of friendships were friends with one another. How many friendships (edges) would there be? (5%)
- (C) Suppose each person has his ID number shown in Table 1. Replace each person's name in the graph with his ID number. Write down the adjacency matrix which represents the graph. (5%)

Table 1 Each person's ID number

name	Alan	John	Kevin	Victor	Bob	Tom	Eric	Henry
ID	1	2	3	4	5	6	7	8