國立成功大學

115學年度碩士班招生考試試題

編　號：109

系　所：生物醫學工程學系

科　目：計算機概論

日　期：0203

節　次：第 2 節

注　意：1.不可使用計算機
2.請於答案卷(卡)作答，於試題上作答，不予計分。

(1) (15%) A binary tree has 9 nodes. The preorder and inorder traversals are given below. Please draw the binary tree and list its postorder traversal.

- **Preorder**: M, B, C, A, F, K, D, G, H
- **Inorder**: C, A, B, K, F, D, M, G, H

(2) (15%) Lossless compression is vital for storing genomic data. Encode the string "BANANA_BANDANA" using Huffman Coding. Assume standard Huffman coding rules. To ensure a unique result, please follow these additional rules:

1. When merging nodes, the one with the lower frequency must be the left child. If frequencies are equal, the character with the lower ASCII value (or alphabetical order) goes on the left.
2. Assign '0' to the left branch and '1' to the right branch.

Show the Huffman tree and the resulting binary code for each character including the underscore.

(3) (10%) A hospital network system uses the TCP/IP protocol suite.

- a. Which layer is responsible for routing packets across different networks?
- b. What is the difference between **TCP** and **UDP**? Why might a real-time patient monitoring system prefer UDP for live waveform streaming?

(4) (15%) In an Operating System, explain the difference between "Preemptive" and "Non-preemptive" scheduling. Then, given the following processes with burst times (P1: 10ms, P2: 4ms, P3: 2ms), assume all

processes arrive at time 0, calculate the Average Waiting Time using Shortest Job First (SJF) scheduling (non-preemptive).

(5) (15%) Write a pseudocode algorithm to reverse a Singly Linked List. You should define the structure of the node first.

(6) (10%) Briefly explain the following terms related to Object-Oriented Programming (OOP):

- a. Polymorphism
- b. Constructor vs. Destructor

(7) (20%) As AI models like CNNs are used for medical image diagnosis (e.g., MRI tumor detection), "Overfitting" is a common problem. Explain what Overfitting is and describe two methods to prevent it in the context of training medical AI models.