國立成功大學

110學年度碩士班招生考試試題

編　號：157

系　所：生物醫學工程學系

科　目：計算機概論

日　期：0202

節　次：第 2 節

備　註：不可使用計算機

※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. (4%) A multiprogramming operating system uses paging. The available memory is 60MB divided into 15 frames. The first, second and third program needs 15 MB, 12 MB and 27MB, respectively.

   (a). How many frames are used by three programs?

   (b). What percentage of memory is wasted?

2. (2%) A computer has 128MB (megabytes) of memory and each word is 2 bytes. How many bits are needed to address each single word in memory?

3. (40%) Briefly describe the following terms:

   (a). *Encapsulation* and *Polymorphism* of OOP (Object-Oriented Programming)

   (b). *Divide and Conquer (D&C)* and *Dynamic Programming (DP)* of algorithm design

   (c). *Huffman Coding*

   (d). *Deadlock* and *Starvation* of process manager in Operating System (OS)

   (e). *Heuristic Search*

   (f). *Application Layer* and *Transport Layer* of OSI model

4. (13%) Based on clinical examination, please find a method of Artificial Intelligence (AI) that may be applied for and explain why it can be helpful by an example.

5. (8%) Describe the difference between *Compiler* and *Interpreter* of machine code translation, and which programming language use them.

6. (8%) Using the *Bubble Sort* and *Insertion Sort* algorithms, manually sort the following list in descending order and show your work in each pass, respectively.

   20, 98, 25, 14, 104, 16

7. (15%) Write a program that can calculate the summation of all the prime numbers that are between 1 and 100 with any program language or pseudocode. Please include the necessary comments in the program to explain your procedure.

8. (10%) A palindrome is a string that can be read backwards and forwards with the same results, like "was I saw". Write an algorithm in pseudocode using a stack to test whether a string is a palindrome or not.