

國立高雄大學 101 學年度研究所碩士班招生考試試題

科目：計算機概論
考試時間：100 分鐘

系所：資訊管理學系(乙組)
本科原始成績：100 分

是否使用計算機：否

I. Please **Explain** and **Compare** the difference of following pairs of computer terminologies (30%)

1. Data Mining and Data Fusion
2. Objective-C and C++
3. Multithreading and Pipelining
4. Honeypot and HoneyNet
5. DSL and ADSL
6. Wi-Fi and WiMax

II. Database normalization is a very important task in the design of a relational database management system. What is the meaning of database normalization? Please may you use a **Real Database Example** to explain the concept of **1NF**, **2NF**, **3NF** and **BCNF**. (15%)

III. **Siri** is a new application that announced with iPhone 4S mobile phone. What is the main technique that used in Siri? Please explain the technique in detail. (10%)

IV. What is a **HUB**? What is a **Switch**? What is a **Router**? Please use the concept of computer networks to explain the differences. (15%)

V. **Programming (30%)**

1. Please write a program to transform matrix A to matrix B. (You can use C or C++ or Java as the programming language) (15%)

$$A = \begin{bmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & 7 & 8 \\ 9 & 10 & 11 & 12 \\ 13 & 14 & 15 & 16 \end{bmatrix}$$

$$B = \begin{bmatrix} 1 & 5 & 9 & 13 \\ 2 & 6 & 10 & 14 \\ 3 & 7 & 11 & 15 \\ 4 & 8 & 12 & 16 \end{bmatrix}$$

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2. If you have N one-dollar coins and would like to change the coins to fifty-dollar coin, ten-dollar coin, five-dollar coin and one-dollar coin. The goal of this problem is expecting to have the minimum number of coins after exchanging. (15 %)
- Please design an algorithm based on greedy method to solve the problem
 - Please prove it is the optimal algorithm and compute the time complexity.