

計算機概論

教師：王凡

授課時間：每週三 15:30—17:20

電機二館 102

課程代號：901 10110

民國壹百零肆年春季班

期末考

姓名：

系所年級：

學號：

考試中，請勿參閱資料。

1. Please draw a sequence diagram representing the interaction that would ensue when a browser sends an SQL command to a database server and then the server rejects the request due to heavy workload. (10pts/10)

2. Please provide two examples of the Pareto Principle in computer program development/management? (10pts/20)

3. Please write down an algorithm that inserts an integer k to a sorted linked list of the following structure:

```
struct iLinkType {  
    int key;  
    struct iLinkType *next;  
};
```

The linked list is pointed to by a global pointer $klist$. Attribute $next$ of the last element of the linked list, if any, is $NULL$. After the insertion, the linked list should remain sorted. (10pts/30)

4. Please write down an algorithm that prints out the k largest elements in an integer array where k is an input parameter. (10pts/40)

5. Please design the schema of a relational database for NTUEE's course selection system. The schema must contain tables for courses, for students, and for course instructors. Please make sure that the schema does support the answer to problem 6 in the following. (10pts/50)

6. Please write down the SQL command for your solution schema to problem 5 to list the names of all junior students that have taken a course taught by Professor Farn Wang in the last two years. (10pts/60)

7. In computer graphics, what is the effect of light reflection and refraction when viewing an animated swimming fish (in the water) from above the water? (10pts/70)

8. What is human intelligence ? (5pts/75)

9. Consider the following two sentences:

Mary is John's younger sister.

John is Mary's elder brother.

What are the syntax structures of the two sentences? Please write down representations for the semantics of the two sentences so that we can deduce that their meanings are the same? (10pts/85)

10. Please give an example of the NP-complete problems. Please explain why it is very time-consuming to solve the problem. (5pts/90)

11. Please show why some Boolean functions of natural numbers are not implementable with programming languages like C, C++, and Java. Specifically, a Boolean Function of natural numbers maps non-negative integers to true or false. A natural number can be represented as a sequence of 0 or 1 bits that terminates with a special symbol, say #. (10pts/100)