

國立交通大學 100 學年度碩士班考試入學試題

科目名稱：資料結構與網際網路概論 (5122)

考試日期：100 年 2 月 17 日 第 3 節

系所班別：資訊管理研究所

組別：資管所甲組

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【不可使用計算機】*作答前請先核對試題、答案卷(試卷)與准考證上之所組別與考試科目是否相符!!

問答題：

1. Describe client/server architecture, including fat and thin clients, client/server tiers, and middleware. (8%)
2. What are the top 2 most popular websites in the world?(4%) Please explain why they can attract so many visitors.(4%)
3. What is war driving? List at least two reasons why someone would war drive. (6%)
4. Why is there so much interest in Electronic Commerce via social communities?(4%)
In addition, how can a social network facilitate viral marketing? (4%)
5. Describe the advantages of RFID over a regular bar code in light of supply chain management. (4%)
6. Please explain the following terminology: (16%)
 - a) Software as a Service (SaaS)
 - b) Social Engineering
 - c) Cryptology
 - d) Data Modulation
7. a) Key management is an integral part of any ciphers. What are those key functions of key management? (8%)
b) Describe Diffie-Hellman key exchange in detail. (5%) Why is this protocol so important to modern cryptology. (4%)
8. (7%) Let $G = (V, E)$ be an undirected graph. A node cover for G is a set C such that each edge of G has at least one of its endpoints in C . Show that if $G(V, E)$ has a node cover of size at most K (i.e. this node cover has at most K nodes) and G 's degree is at most d , then $|V| \leq K(d+1)$.
9. (10%) Construct an algorithm to determine whether there are three arbitrary points in the set $S = \{(x_1, y_1), (x_2, y_2), \dots, (x_n, y_n)\}$ are collinear. Analyze the time complexity of your algorithm.
P.S.: Three points are said to be collinear if they lie on a single straight line. For example, $(1,1), (2,2), (3,3)$ lie on the line $y=x$.

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10. (16%) A linked list is defined as follows:

```
class NODE
{
    private:
        int data;
        NODE *link;
        NODE(int data, NODE* link)
            {this->data = data;
             this->link = link;}
};
class LIST
{
    private:
        NODE* first;
}
```

, where NODE denotes an element of the linked list and the *first point to the first element of the linked list.”

A. Explain why the following code is not a good way to delete the second element from the list:

```
NODE* TempNode = first->link;
delete TempNode;
first ->link= first->link->link;
```

B. Write down the member function count() that counts the number of elements in the list.

C. Write a member function LIST::Delete(y,n) that delete the n-th y from the linked list and return an exception when n-th y is not in the list.

For example: If the link list is (1,2,3,1), the link list will become (1,2,3) after calling Delete(1,2).

D. Let “Z” be a LIST object. Estimate the asymptotic complexity of the following codes:

```
for (int i = 0; i < Z.count()*Z.count(); i++)
    {j=j+1;}
```