1.1 Where do a huge majority, possibly as high as 95 percent, of hackers reside?
   a. Turkey, China, Romania, or Brazil.
   b. In the G8 countries.
   c. In South America.
   d. Russia, India, Germany, or Argentina.

1.2 The U.S. agencies dedicated to eliminating fraud resulting from phishing and crimeware are:
   b. The Group of Eight, VeriSign, and NameProtect.
   d. The High-Tech Crime Network, Anti-Phishing Working Group, and Internet Research Lab.

1.3 Digital signatures or digital certificates:
   a. are used to validate the sender and time stamp of the transaction so it cannot be later claimed that the transaction was unauthorized or invalid.
   b. have been compromised by phishers and spammers.
   c. provide complete confidence that the transactions are secure.
   d. a and b

1.4 A botnet is:
   a. a collection of a few hundred hijacked Internet computers that have been set up to forward traffic, including spam and viruses, to other computers on the Internet.
   b. a piece of software code that inserts itself into a host or operating system to launch DOS attacks.
   c. a piece of code in a worm that spreads rapidly and exploits some known vulnerability.
   d. a coordinated network of computers that can scan for and compromise other computers and launch DOS attacks.

1.5 ___________ is a collaborative online encyclopedia that volunteers primarily write.
   a. YouTube
   b. Flickr
   c. Web 2.0
   d. Wikipedia
1.6 The search war between Google and Yahoo! and other search engines is about:
   a. page rankings.
   b. link popularity.
   c. banner ads.
   d. Internet advertising dollars.

2. (a) For Class A addresses in IPv4, what is the default classful mask? (2%)

   (b) The NCTU DNS IP address is 140.113.1.1. What IP address class is it and how many hosts can it have for each IP in this class? (4%)

3. Use variable-length subnet mask (VLSM) to allocate the IP for the following diagram. A class C address of 192.168.10.0/24 has been allocated. Taipei, Hsin-Chu, and Tai-Chung have a WAN connection to NCTU. Taipei requires 60 hosts. NCTU requires 28 hosts. Hsin-Chu and Tai-Chung each require 12 hosts.

   To calculate VLSM subnets and the respective hosts allocate the largest requirements from the address range. Please write your approaches step by step. (10%)

4. 當大型主機(Mainframe)上的系統要轉換成主從式架構時，可能會發生哪些風險？(5%)
5. (5 points) Consider a procedure for printing the data in a binary tree below:

```
procedure print_tree(Tree t) {
    if (t is not empty) {
        print_tree(left child of t)
        print the data content of t's root node
        print_tree(right child of t)
    }
}
```

Which tree(s) below would be printed in alphabetical order by the procedure?
(multiple choices)

```
(1)    A
     B   C
    D E

(2) C
    B  D
   A E

(3) C   A
     B  D
    E

(4) B
    A  D
   C E
```

6. (8 points) A homogeneous array with 4 rows and 3 columns is stored in row major order starting at address 15 (base ten). If each entry in the array requires only one memory cell, (a) what is the address of the entry in the third row and second column, and (b) what is the address of the same entry if the array is stored using column major order?

7. (10 points) Write a procedure in pseudo code (similar to print_tree() in Problem 1) that prints the data in a homogeneous array a from positions i to j. If i or j are out-of-bound, or i > j, the procedure should print an error message without printing any data. Use the following notations for array access:
   - a[i] – the i-th item of array a (assume array indices start at 0)
   - a.length – the length of array a

The procedure skeleton is given below:

```
procedure print_array(Array a, Integer i, Integer j) {
    some tests
    while (some test) {
        print some data
    }
}
```
8. (10 points) Consider the following link list with head pointer head:

```
head → A next → B next → C NIL
```

To delete the second item of the linked list, the following steps are performed in order:

- del = head.next
- head.next = del.next
- release the memory allocated for the item at del

Similarly, to insert a new item between the first item and the second item, the steps to perform look like:

- new = new linked list item allocated from memory
- new.data = D
- ...

(a) Complete the missing steps.
(b) Change the same singly-linked list into a doubly-linked list (you need to draw a diagram to illustrate the doubly-linked list), and, as in (a), show the steps needed to insert a new item between the first item and the second item.

9. (a) Write a sub-program, in any programming language, that can “ADD” a data element to a data structure of STACK. (12%)
(b) Write a sub-program, in any programming language, that can “REMOVE” a data element from a data structure of STACK. (12%)

Explain the method that is used, respectively, in implementing the above two sub-programs. (10%)