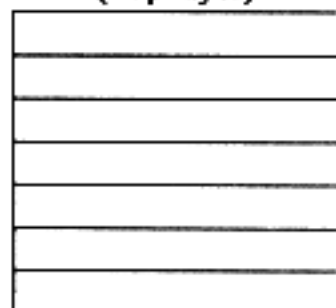


1. (5%) What is Linux? What are the characteristics of Linux?
2. (2%) With which file format(s) will the file(s) not be functioning properly on the Linux platform if transported (via some ftp software) from Windows NT?
(a) pdf (b) asp (c) dvi (d) ps
3. (4%) Please describe the functionalities of a proxy server?
4. (4%) What is ADSL?
5. (7%) What are the seven layers of the OSI reference model?

(Top layer)



(Bottom layer)

6. There are four personal computers (PCs) on the local network with IP addresses listed below.

Personal Computer	IP Address
A	140.116.33.8
B	140.116.33.10
C	140.116.33.5
D	140.116.33.7

- a. (3%) What is the necessary subnet mask to divide these four PCs into two subsets: one for A and B, and the other for C and D?
- b. (8%) Suppose there is another subnet to be formed which includes the PCs of IP addresses from 140.116.33.16 to 140.116.33.31. How would you reconfigure the current IP addresses and the submask?
7. (5%) Suppose the C function `rand()` returns a pseudorandom integer in the range 0 to `RAND_MAX` (the maximum integer value). Please use this function to generate a random number x , $0 \leq x < 1$.
8. (12%) Binary coding is a procedure which represents an integer by a string of bits. (See the following table.) If we define the binary distance between two strings as the number of different bit positions. Clearly, two integers that are close may not be close in their binary representation. (For example, the binary distance between 1 and 2 is two, while the distance between 2 and 3 is one.) Gray coding, on the other hand, takes into account the binary distance such that two integers which are close are also close in their binary representation, as illustrated in the right column of the table. Please write a C program which converts an integer to its binary form by using Gray coding presentation where three bits are assumed.

Integer	Binary	Gray
0	000	000
1	001	001
2	010	011
3	011	010
4	100	110
5	101	111
6	110	101
7	111	100

(背面仍有題目,請繼續作答)

9. (15%) Using either one of C, C++, JAVA, BASIC, or PASCAL language to code a program that meets the requirement specified below:
- The program can convert a prefix string to a postfix string
 - In the string you are going to deal with, no parenthesis is to be used and only operands and operators presented.
 - You need to write a main program to call the sub-program above.
 - You can test your program via converting $- +ABC$ to $AB+C$.
 - Please make any assumption if necessary.

10. This is another programming problem.

- (10%) You are required to use either one of C, C++, JAVA, BASIC, or PASCAL language to code a recursive program and a non-recursive program. Each of the two programs returns the number of nodes in a binary tree.
- (5%) Please modify your recursive program so that it can return the height of the binary tree.

11. (20%) This is a design problem and you are required to design a simple information system for processing the students' registration for NCKU. Assuming that you are a system analyst/designer, you are called to design a student registration system. After careful examination and evaluation, you have got the following information:

There are three parties of people participating the registration: professors, students, and the secretary. The professors need to know who the students are, where to teach, and when to teach. The students need to know who the professors are, where to take the class, and when to take the class. The secretary, of course, makes the course table that would tell the professors when and where to teach what course. Also, the secretary will give the students a course list that tells the students where and when to take what course. However, the secretary cannot do the above job if the professors do not provide the courses to be offered in this semester and the students do not select the courses beforehand.

To answer the following questions, please make any reasonable assumption if you need:

- (5%) Please design any possible output and its media.
- (5%) Please design any possible input and its media.
- (10%) Please design the tables and keys needed if the relational database system is used.