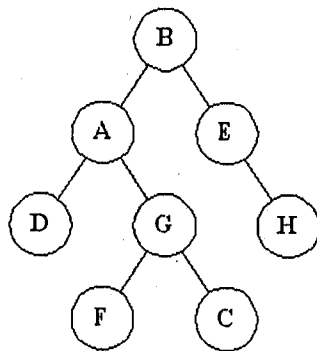1. (a) What is XML? What are the differences between HTML and XML? (4%)

   (b) Suppose that ia[] is a one-dimensional array of 10 integers. What does *(ia + 3) mean? (2%)

   (c) Please explain the concept of **inheritance** in object-oriented programming. (4%)

2. A hierarchical organization of n agents can be represented as a tree, in which nodes denote agents and links denote (direct) supervision. The node at the top of the tree has level 1, and the level of any other node in the tree is one more than the level of its supervisor. Suppose that a C function **randReal()** is given which returns a random real number $x, 0 \leq x \leq 1$.

   (a) Please write a C program that generates a random binary hierarchical organization consisting of 8 agents in form of a binary tree. (Note that the relationships among the agents shall be described.) (15%)

   (b) Please write a C program that generates a random 8-agent 3-level hierarchical organization in form of a tree. (Note that the relationships among the agents shall be described.) (15%)

3. Suppose that a binary tree, generated randomly in Problem 2(a), is given below:

   where A, ..., G are the agents in the organization.

   (a) Please traverse this binary tree in preorder and in postorder. (4%)

   (b) We now define the rank of each agent as the number of subordinates he/she manages. For instance, the ranks of agents B, A, and F are 7, 4, and 0 respectively. Please explain concisely how to render a list of agents with ranks in a non-increasing order. (6%)

4. (a) Please list the TCP/IP 5 layers and show the mappings between TCP/IP layers and the ISO reference model. (5%)

   (b) Please list three major IP classes and explain how each class is defined. (Please show how many bits are used for network number and the IP numbers range of each class.) (3%)

   (c) Suppose that one class C IP address set "193.2.19.x" has been applied for a company to be shared out between four departments, and the subnets are connected by routers and a gateway. Please explain how to set the netmask for each department. (Please list the network number and host number range for each subnet.) (8%)

5. (a) What is metadata? (2%)

   (b) Please describe the difference between the Relation DB and the Object-Oriented DB. (4%)

   (c) If the "student" database has been connected and opened, please write a SQL command to display all fields of the "course" table in "student" DB by searching integer field, "score", whose content is higher then 60. (5%)

6. (a) What is EIS? (2%)

   (b) What is CIO? (2%)

   (c) Please explain GDSS and name two example systems. (4%)

7. (a) Please describe the 7 stages of system development life cycle. (7%)

   (b) Describe the various tasks performed by an analyst during the analysis phase and name the tools associated with each task. (8%)