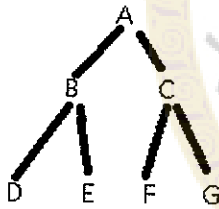


1. (40%, 2 points for each problem) Please define the following terms and explain the content, purpose, and application of each term and give an illustrative example if possible. If possible, define the term in mathematical equation. If it is an acronym, please write the full name. For example:

CD-ROM: Compact Disk-Read Only Memory: the most common type of optical storage medium; data is written in a series of lands and pits on the surface of a disk, which can be read by a laser in a CD-ROM drive; stores approximately 650 MB but cannot be altered.

- (1) OCR (2) MICR: Magnetic Ink Character Recognition (3) IrDA: Infra-Red Data Association (4) VoIP (5) IEEE (6) fire wire (7) network bridge (8) RFID (9) ETC (10) XML (11) Siri (12) fingerprint authentication (13) P (14) NP Complete (15) CSMA/CD (16) LTE: Long Term Evolution (17) CPU (18) RAID (19) SQL (20) SDRAM

2. (12%) (a) Please print the following binary tree in pre-order, in-order, and post-order. (b) Please write a recursive program to print a binary tree in pre-order, in-order, and post-order, respectively.



3. (8%) (a) Please print the previous binary tree in BFS (Breadth-First Search) and DFS (Depth-First Search) orders. (b) Please write a program to search and print a binary tree in BFS and DFS, respectively.

4. (12%) Please explain the differences, advantages, and disadvantages of the following terms: (a) semaphore, (b) test-and-set (c) mutex (d) deadlock (e) race condition (f) P, V operations.

5. (8%) (a) Please draw the step-by-step solution for Tower of Hanoi with three disks. (b) Please write a recursive program to solve and print Tower of Hanoi.

6. (8%) X and Y contain 8 bits.  $\oplus$  means bit-wise exclusive-or.  $\bar{X}$  means 1's complement of X. (a)  $X \oplus X = ?$  (b)  $X \oplus \bar{X} = ?$  (c)  $X \oplus Y \oplus X = ?$  (d)  $X \oplus Y \oplus \bar{X} = ?$

7.(4%) Simplify  $(A+B+C)(\bar{A}+B+C)(\bar{A}+B+\bar{C})$

8.(8%) Draw the back panel of a desk-top computer and explain the names and functions of as many holes, ports, or connectors as you can.

試題隨卷繳回