

# 靜宜大學 97 學年度碩士班招生考試試題

系所：資訊傳播工程系碩士班 科目：計算機概論

共 2 頁

## I. Multiple-Choice Questions (4% for each question)

1. Which of the following statements are true for TCP protocol?  
(1) TCP provides a reliable communication service.  
(2) TCP is classified as a connection oriented service.  
(3) The minimum length of a TCP header is 30 bytes.  
(4) TCP provides a process-to-process data delivery.
2. Based on the OSI model, data encryption is done in \_\_\_\_\_.  
(1) Application layer. (2) Presentation layer. (3) Session layer.  
(4) Network layer.
3. SSL is used to  
(1) provide QoS service. (2) provide privacy protection.  
(3) provide reliable communication. (4) increase the compression rate.
4. If Bob wants to send a message to Alice so that only Alice can read it, Bob should encrypt the message by using  
(1) Bob's public key. (2) Bob's private key.  
(3) Alice's public key. (4) Alice's private key.
5. A(n) \_\_\_\_\_ is a small Java program that can be downloaded and executed as part of a displayed Web page.  
(1) application (2) applet (3) servlet (4) middleware
6. In object-oriented terminology, the characteristics of an object are defined by its \_\_\_\_\_.  
(1) attributes (2) services (3) methods (4) interfaces
7. The maximum number of nodes of a  $k$ -ary tree with height  $h$  is equal to \_\_\_\_\_, assuming the level of the root is 0.  
(1)  $(k^{h+1}-1)/(k-1)$  (2)  $k^{h+1}$  (3)  $kh$  (4)  $h^{k+1}$
8. Which of the following statements are not true for heaps?  
(1) A heap must be a full binary tree.  
(2) The height of a heap with  $n$  nodes is  $\lceil \log_2 n \rceil$ .  
(3) The maximum value in a min-heap is located at the left-most leaf.  
(4) The minimum value in a max-heap is located at the root.
9. Traversing a binary search tree by using \_\_\_\_\_ can generate a sorted list of the data in the tree.  
(1) level order (2) preorder (3) inorder (4) postorder
10. To implement the Breadth-first search on graphs, a \_\_\_\_\_ is required.  
(1) stack (2) queue (3) priority queue (4) heap
11. The ASCII code for character A is  $(65)_{10}$ . Then the ASCII code for L is  
(1)  $(1001100)_2$  (2)  $(4C)_{16}$  (3)  $(115)_8$  (4)  $(76)_{10}$
12. Let  $A = (01011010)_2$ . Let  $A_1$  and  $A_2$  be the one's complement and the two's complement of  $A$ , respectively. Then  
(1)  $A_2 = A_1 + 1$  (2)  $A_2 = (10100101)_2$   
(3)  $A_1 = (10100110)_2$  (4)  $A_2 = A_1 - 1$
13. What is the total number of comparisons for the merge sort with 32 elements?  
(1) 200 (2) 190 (3) 180 (4) 160
14. Suppose that a program runs in 100 seconds on a computer, with multiply operations responsible for 80 seconds of this time. How much do you have to improve the speed of multiplication if you are asked to run this program four times faster?  
(1) 14 (2) 15 (3) 16 (4) 17 times faster
15. UML stands for  
(1) universal markup language. (2) usual modeling language.  
(3) usual markup language. (4) unified modeling language.

# 靜宜大學 97 學年度碩士班招生考試試題

系所：資訊傳播工程系碩士班 科目：計算機概論

共 2 頁

16. Let  $f(n)$  and  $g(n)$  be two functions of  $n$ .
  - (1) If  $f(n) = 0.01n^2 + n + 1, f(n) = O(n^2)$ .
  - (2) If  $f(n) = 100000n^3 - n, f(n) = \Omega(n)$ .
  - (3) If  $f(n) = O(n^2)$  and  $g(n) = O(n), f(n) / g(n) = O(n)$ .
  - (4) If  $f(n) = O(n^2)$  and  $g(n) = \Omega(n), f(n) / g(n) = \Omega(n)$ .
17. Which of the following problems are not NP-hard?
  - (1) Sorting problem (2) Minimum spanning tree problem
  - (3) Traveling salesman problem (4) Matrix multiplication problem
18. If we have an algorithm  $A$  with  $O(n)$  time for solving problem  $P$ ,
  - (1) the average complexity of  $A$  is  $O(n)$ .
  - (2) the worst complexity of  $A$  is  $O(n)$ .
  - (3) the best algorithm for solving problem  $P$  needs at most  $O(n)$  time.
  - (4) the best algorithm for solving problem  $P$  needs at least  $\Omega(n)$  time.
19. Suppose we are given a system with main-memory of three pages. A program  $P$  has page references 6, 8, 3, 8, 6, 0, 3, 6, 3, 5, 3, 6 on the system. For this sequence, the LRU page-replacement would produce \_\_\_\_\_ page faults for  $P$ .
  - (1) 2 (2) 4 (3) 6 (4) 8
20. A finite state machine  $M = (S, I, f, s_0, F)$  consists of a finite set  $S$  of states, a finite input alphabet  $I$ , a transition function  $f: S \times I \rightarrow S$  that assigns a next state to every pair of state and input, an initial state  $s_0$ , and a subset  $F$  of  $S$  consisting of final states. A string  $x$  is said to be accepted by the machine  $M = (S, I, f, s_0, F)$  if it takes the initial state  $s_0$  to a final state. Consider a finite state machine  $A = (S, I, f, s_0, F)$  where  $S = \{s_0, s_1, s_2\}, I = \{a, b\}, F = \{s_0\}$  and the function  $f$  is given as follows.

State	Input	
	$a$	$b$
$s_0$	$s_0$	$s_1$
$s_1$	$s_1$	$s_2$
$s_2$	$s_2$	$s_0$

- (1) Machine  $A$  accepts string  $abbabb$ .
- (2) Machine  $A$  accepts string  $ababb$ .
- (3) Machine  $A$  accepts string  $abbabab$ .
- (4) Machine  $A$  accepts string  $aaa$ .

- II. Sort the following list of integers into ascending order, from left to right, by using the bubble sort and quick sort, respectively. You only need to show the sequence resulting from the first phase. (10%)  
78, 20, 45, 83, 27, 8, 3, 51, 11, 67
- III. Consider the tree given at Fig. 1.
  - (A) Show the results of the preorder traversal and post-order traversal, respectively. (8%)
  - (B) Convert the tree into its corresponding binary tree. (2%)

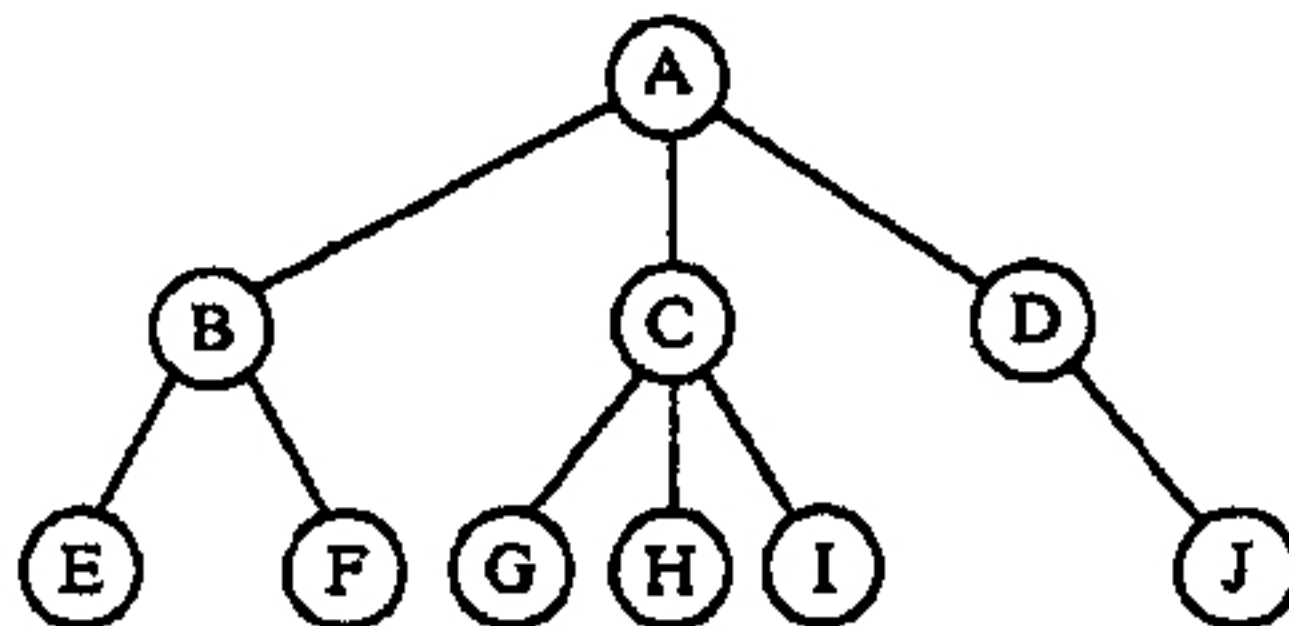


Fig. 1