Register Number: ……..

B.E. DEGREE EXAMONATIONS: APRIL/MAY 2010

Second Semester

U07CS201: DATA STRUCTURES

(Common to B.E - Computer Science and Engineering & B.Tech-Information Technology)

Time: Three hours **Maximum Marks: 100**

Answer All Questions:-

PART A (10 x 1 = 10 Marks)

1. _____ Strategy in problem solving where it takes a solution of a computer problem from a vague outline to a preciously defined algorithm and program implementation.
   a) Divide and Conquer b) Binary Doubling c) Top down Design d) Bottom up Design
2. A small change in _____ organization can have an influence on the algorithm.
   a) Data b) Sequential c) Logical d) Data structure
3. Which type of linked list will have the last cell keeps a pointer to the first
   a) Singly b) Doubly c) Circular d) Cursor
4. Polynomial arithmetic can be performed by
   a) Stack b) Queue c) Linked list d) Cursor
5. In binary tree, all the nodes not have more than _____ children.
   a) One b) Two c) Three d) Zero
6. Primary clustering means
   a) Key hashes into the cluster require several attempts b) Table size requires more
   c) Keys stored in single attempt d) Table size will be minimum
7. The sorting in which the priority queue concept is implemented
   a) Bubble sort b) Insertion sort c) Shell sort d) Heap sort
8. The average running time of quick sort is
   a) O(N) b) $O(N^2)$ c) O(N log N) d) O(log N)
9. A directed graph is acyclic if it has
   a) No cycles` b) More cycles c) One cycle d) One loop
10. STACK follows which Mechanism
    a) LIFO b) FIFO c) both a and b d) none of the above

PART B (10 x 2 = 20 Marks)

11. What is an Abstract Data Type (ADT)?

12. Write the notation used to specify the time complexity of an algorithm.

13. Define a linked list and mention any two operations that are performed on a list.

14. List few applications of stack.

15. What is a complete binary tree? Give an example.

16. Give a simple hash function where the input keys are integers.

17. Which is the best way of choosing the pivot element in quick sort?

18. Merge sort is better than insertion sort. Why?

19. Define a graph. How it differs from a tree?

20. Define the minimum spanning tree? Name any two algorithms used to find MST.

PART C (5 x 14 = 70 Marks)

21. (a) Discuss briefly the steps involved in top down design.

(OR)

(b) Explain the various techniques of program verification.

22. (a) What is Stack ADT. Give any one implementation of stack and explain the data structures and routines for operations.

(OR)

(b) Write routines to insert and delete nodes from the singly linked list with examples.

23. (a) (i) What is meant by collision resolution in hashing? Explain in detail any one Strategy for dealing with it. (10)

(ii) Show the results of inserting 2, 1, 4, 5, 9 into an empty AVL tree. (4)

(OR)

(b) Explain with suitable examples the basic heap operations and write algorithms for the same.

24. (a) (i) Explain Merge sort with an example. (7)

(ii) Explain with example, about the insertion sort. (7)

(OR)

(b) Write ADT operations for the Heap sort and also simulate the algorithm with an example. What is the time complexity?

25. (a) (i) Write an algorithm to find the minimum cost spanning tree of an undirected weighted graph. (7)

(ii) Discuss and write the program to perform topological sorting. (7)

(OR)

(b) Write suitable ADT operation for shortest path algorithm. Show the simulation of shortest path with an example graph.

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