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B.Tech. DEGREE EXAMINATION, NOVEMBER 2019

First to Eighth Semester

15CS252J – DATA STRUCTURES AND ALGORITHMS

(For the candidates admitted during the academic year 2015-2016 to 2017-2018)

Note:

- (i) **Part - A** should be answered in OMR sheet within first 45 minutes and OMR sheet should be handed over to hall invigilator at the end of 45th minute.
- (ii) **Part - B** and **Part - C** should be answered in answer booklet.

Time: Three Hours

Max. Marks: 100

PART – A (20 × 1 = 20 Marks)

Answer ALL Questions

- If TOP = NULL then the stack is

(A) Empty	(B) Full
(C) Contain some data	(D) ?
- Which among the following is a LIFO data structure?

(A) Queue	(B) Linked list
(C) Stack	(D) Graph
- In a queue, insertions can take place only at _____

(A) Rear	(B) Top
(C) Front	(D) Bottom
- _____ refers to a situation where one wants to delete data from a data structure that is empty.

(A) Compaction	(B) Free storage
(C) Underflow	(D) Overflow
- If the array is already sorted, which of these algorithm will exhibit the best performance

(A) Quicksort	(B) Merge sort
(C) Insertion sort	(D) Heap sort
- A tree used to represent arithmetic expression is called _____

(A) Threaded	(B) Expression
(C) Red black	(D) Game
- In _____ the problem of sorting a set is reduced to the problem of sorting two smaller sets.

(A) Bubble sort	(B) Heap sort
(C) Insertion sort	(D) Quick sort
- _____ algorithm does not divide the list.

(A) Binary search	(B) Merge sort
(C) Linear search	(D) Quick sort

9. _____ Graph is called, if there is a path between any two of its nodes.
 (A) Complete (B) Connected
 (C) Balanced (D) Binary
10. In _____ notation, the operator symbol is placed before its two operands.
 (A) Polish (B) Prefix
 (C) Postfix (D) Exponential
11. The most suitable data structure in tree construction is _____.
 (A) Linked list (B) Array
 (C) Stack (D) Queue
12. B trees are called as _____.
 (A) Very deep and narrow (B) Very deep and very wide
 (C) Very wide and shallow (D) Cannot say
13. A _____ is a data structure used for the storage of records.
 (A) Hash table (B) Tree
 (C) Graph (D) Stack
14. _____ graphs are directed graphs with no cycles.
 (A) Directed acyclic (B) Bi-connected
 (C) Binary (D) Complete
15. M should be a _____ in the hash function.
 (A) Composite number (B) Prime number
 (C) Odd number (D) Even number
16. A connected graph without any cycles is called a _____.
 (A) Tree (B) Threaded
 (C) Weighted (D) Balanced
17. _____ is the technique used in the quick sort algorithm.
 (A) Dynamic programming (B) Back tracking
 (C) Greedy method (D) Divide and conquer
18. The data structure is represented as _____ in the memory.
 (A) Abstract data type (B) Recursive
 (C) Storage structure (D) File structure
19. _____ represents that a data structure is empty.
 (A) Under flow (B) Over flow
 (C) Free storage (D) Compaction
20. An algorithm is
 (A) A loosely written code to make final code (B) A step by step procedure to solve problem
 (C) A piece of code to be executed (D) A language to perform a task

PART – B (5 × 4 = 20 Marks)

Answer ANY FIVE Questions

21. Illustrate on arrays and its types.
22. Write the algorithm to perform an insertion at the end of singly linked list.
23. Analyse the time complexity of insertion sort.
24. State the notations used to analyze the time complexity of an algorithm.
25. Compare linear search and binary search.
26. Write the advantage and disadvantages of AVL tree.
27. What is the need of greedy algorithms?

PART – C (5 × 12 = 60 Marks)

Answer ALL Questions

28. a. Write about the various operations of stacks with algorithms.

(OR)

- b. Elaborate on insertion and deletion of a node at the front and middle into a singly linked list.

29. a. Describe the three types of tree traversals in detail.

(OR)

- b. Explain about insertion sort algorithm in detail. Analyse its time complexity.

30. a. Discuss about separate chaining in detail with an example.

(OR)

- b. Explain with examples, how insertion and deletion is performed in AVL tree.

31. a. Explain about the topological sort with suitable example.

(OR)

- b. Write breadth first traversal algorithm and explain with an example.

32. a. Write the divide and conquer algorithm for matrix addition and subtraction with example.

(OR)

- b. What is recursion? Write and explain the recursive algorithm for Fibonacci series.

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