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M.Sc. (IT) (Second Semester)
EXAMINATION, MAY-JUNE, 2022
Paper Second
DATA STRUCTURE
(202)

Time : Three Hours] [Maximum Marks:100

Note: Attempt all sections as directed.

Section-A

(Objective/Multiple Choice Questions)

(1 mark each)

Note- Attempt all questions.

Choose the correct answer:

1. How can we describe an array in the best possible way?

   (A) The Array shows a hierarchical structure

   (B) Arrays are immutable

   (C) Container that stores the elements of similar types

   (D) The array is not a data structure

P.T.O.

2. Which of the following principle does Queue use?

   (A) LIFO principle

   (B) FIFO principle

   (C) Linear tree

   (D) Ordered array

3. Which data structure allows deleting data elements from front and inserting at rear?

   (A) Stacks

   (B) Queues

   (C) Deques

   (D) Binary Search tree

4. Which of the following data structure is non-linear type?

   (A) Strings

   (B) Lists

   (C) Stacks

   (D) None of above

5. Which is linear data structure?

   (A) Strings

   (B) Lists

   (C) Queues

   (D) All of the above

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6. A binary tree where every node has either zero or two children in called

   (A) Complete binary tree

   (B) Binary search tree

   (C) Extended binary tree

   (D) None of above

7. Which of the following sorting algorithm is of divide and conquer type?

   (A) Bubble sort

   (B) Insertion sort

   (C) Quick sort

   (D) All of above

8. Which of the following is an application stack?

   (A) Finding factorial

   (B) Tower of Hanoi

   (C) Infix to postfix conversion

   (D) All of the above

9. A linear collection of data elements where the linear node is given by means of Pointer is called?

   (A) Linked list

   (B) Node list

   (C) Primitive list

   (D) None

10. In general, the index of the first element in an array is

    (A) 0

    (B) -1

    (C) 2

    (D) 1

11. Process of removing an element from stack is called-

    (A) Create

    (B) Push

    (C) Evaluation

    (D) Pop

12. Circular Queue is also known as-

    (A) Ring Buffer

    (B) Square Buffer

    (C) Rectangle Buffer

    (D) Curve Buffer

13. The number of external nodes in a full binary tree with 'n' internal nodes is

    (A) n

    (B) n + 1

    (C) 2n

    (D) 2n + 1

14. Which of the following statement about binary tree is correct?

    (A) Every binary tree is either complete or full

    (B) Every complete binary tree is also a full binary tree

    (C) Every full binary tree is also a complete binary tree

    (D) A binary tree cannot be both complete and full

15. A complete graph can have

    (A) n^2 spanning trees

    (B) $n^{(n-2)}$ spanning trees

    (C) $n^{(n+1)}$ spanning trees

    (D) n^n spanning tree

16. Which of the following algorithm is not stable?

    (A) Bubble Sort

    (B) Quick Sort

    (C) Merge Sort

    (D) Insertion Sort

17. Sorting is not possible by using which of the following methods?

    (A) Insertion

    (B) Selection

    (C) Deletion

    (D) Exchange

18. In Algorithm comments begins with

    (A) /*

    (B) /

    (C) */

    (D) //

19. A technique for direct search is

    (A) Binary search

    (B) Linear search

    (C) Tree search

    (D) Hashing

20. Which of the following is false about a doubly linked list?

    (A) We can navigate in both the directions

    (B) It requires more space than a singly linked list

    (C) The insertion and deletion of a node take a bit longer

    (D) None of the above

Section- B

(Very Short Answer Type Questions)

(2 marks each)

Note:- Attempt all questions in 2-3 sentences-

1. What is multidimensional array?

2. What do you mean by list?

3. What is space complexity?

4. What are tree?

5. What is the LIFO and FIFO principle?

6. What is Stack?

7. What is binary heap?

8. Describe Hash table.

9. What is minimum spanning tree?

10. Describe an algorithm.

Section C

(Short Answer Type Questions)

(3 marks each)

Note : Attempt all questions using less than 75 words.

1. What is the primary advantage of linked list?

2. How do you insert a new item in a binary search tree?

3. Differentiate linear from a non-linear data structure.

4. What are Infix, prefix and postfix notations?

5. What are the applications of Queue?

6. Explain B-tree giving an example.

7. Explain the Adjacency list.

8. What is Selection Sort Algorithm?

9. Describe shortest Path Algorithm.

10. What are the advantages of the heap over a stack?

Section D

(Long Answer Type Questions)

(6 marks each)

Note:- Attempt all questions using 150 words.

1. What is bubble sort? Explain with the help of example. Write algorithm for bubble sort.

2. What is Pointer array? What is the purpose of using pointer array?

3. How do you traverse a graph?

4. Write the functions for following operations on linked list.

   (i) Insert

   (ii) Delete

   (iii) Modify

5. Explain different collision resolution techniques.