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42 (2) DSTC

2021

(Held in 2022)

**DATA STRUCTURES THROUGH
C LANGUAGE**

Paper : 2.1

Full Marks : 70

Time : Three hours

***The figures in the margin indicate
full marks for the questions.***

Answer any seven questions.

- ✓ 1. What are the basic differences between array and linked list ? What is doubly linked list ? How does it differ from singly linked list ? Write a program to create and display a singly linked list. 2+2+2+4=10

2. Write a program to read a 3×3 matrix and find the sums of row-elements and column elements. 10

Contd.

3. Write the difference between stack and queue. Write a program to implement stack with push and pop operations. Also check for overflow and underflow. $2+6+2=10$

4. What is graph? Explain path, cycle and degree of a graph. What are indegree and outdegree? Write a structure to represent a graph. $2+2+2+4=10$

5. What is sorting? Write a program to implement bubble sort or insertion sort. $2+8=10$

6. What is postfix and infix expression? Convert the following postfix expression into infix and evaluate it $2+8=10$

4, 5, +, 3, 6, *, -, 3, 2, ^, +, 8, 2, 1, 3, *, -, 5, 7, *, +

7. Write a program to implement linear search or binary search. 10

8. Write short notes on : **(any four)** $2\frac{1}{2} \times 4 = 10$

(i) Abstract data type

(ii) Polish Notation ✓

- (iii) Application of data structure
 - (iv) AVL tree
 - (v) Spanning tree.
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42 (2) DSTL

2022
(Held in 2023)

**DATA STRUCTURE THROUGH C
LANGUAGE**

Paper : P6

Full Marks : 70

Time : Three hours

***The figures in the margin indicate
full marks for the questions.***

Answer any seven questions.

1. What are the basic differences between array and linked list ? Write a program to store data and display them by using either array or linked list. 3+7=10
2. Write a program to multiply two matrices. 10
3. Write the differences between stack and queue. Write a program to create a stack and do the operations — read and display. 3+7=10

Contd.

4. Write a program to create a linked list and display the elements in reverse order. 10

5. What is graph ? Write a structure to represent a graph. Explain the indegree and outdegree with an example of graph.

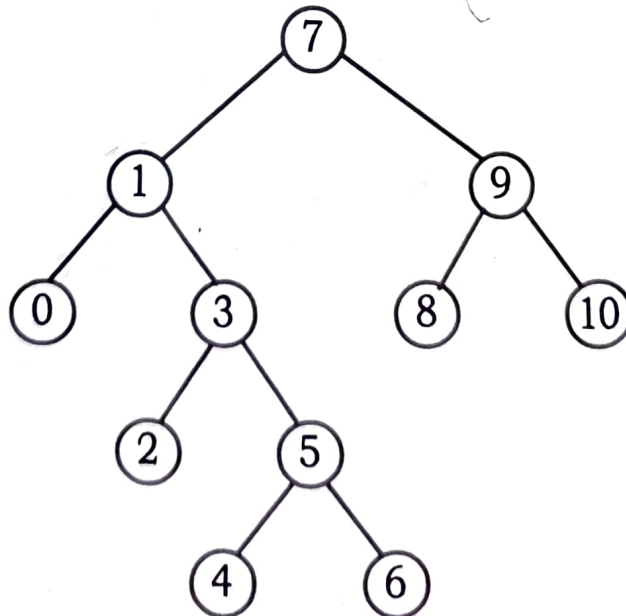
2+4+4=10

6. What is sorting ? Write a program to implement bubble sort with a suitable example.

2+8=10

7. What is binary tree ? Write the recursive algorithm to traverse a binary tree in inorder, preorder and postorder. Traverse the following binary tree in inorder, preorder and postorder :

2+4+4=10



8. Write the algorithm for binary search. What are the main differences between linear search and binary search ? 6+4=10

9. (i) Convert the following expression to postfix notation : 5

$$A + ((B + C) + (D + E) * F) / G$$

- (ii) Evaluate the following postfix expression : 5

$$4, 5, 4, 2, \wedge, +, *, 2, 2, \wedge, 9, 3, /, *, -$$

10. Write short notes on : **(any four)**

$$2\frac{1}{2} \times 4 = 10$$

- (i) Queue data structure
 - (ii) Doubly-linked list
 - (iii) Directed and undirected graph
 - (iv) Searching techniques
 - (v) Stack overflow and underflow
 - (vi) Hashing technique
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