Paper Code(s): CIC-209
Paper: Data Structures

Q.1)

a. Write any four applications of data structure.

b. Sketch the diagram of circular queue.

c. State the following terms: 1. Ancestor 2.Height of Degree

d. Show the memory representation of Stack using array with the help of a diagram.

e. Define Abstract Data Type.

f. Convert the following infix expression to its postfix form using stack A + B – C*D/E + F.

g. Describe given two types of graphs: Directed and undirected graph.

Q.2)

a. Explain the working of the Radix Sort Method with an example.

b. Write an algorithm to delete an intermediate node from a Singly Linked List.

c. Explain stack overflow and underflow conditions with examples.

d. Differentiate between tree and graph w.r.t. any 4 parameters.

Q.3)

a. Implement C Program for performing following operations on Array : Insertion, Display.

b. Convert the following infix expression to its prefix form using stack A + B – C*D/E + F. Show diagrammatically each step of conversion. 22317 2

c. Sort the following numbers in ascending order using Insertion sort. Given Numbers : 348, 14, 614, 5381, 47 and Write the output after each iteration .

d. For the following directed graph : i) Give adjacency matrix representation. ii) Give adjacency list representation.

Q.4)

a. Diffrentiate between Binary Search and Sequential Search.

b. Construct the binary search tree using following elements: 35,15,40,7,10,100,28,82,53,25,3. Show diagrammatically each step of construction of BST.

c. Create a Singly Linked List using data fields 10, 20, 30, 40, 50 and show procedure step-bystep with the help of diagram from start to end.

d. Show the effect of INSERT and DELETE operations on to the Linear queue of size 10. The Linear queue sequentially contains 10, 20, 30, 40, and 50 where 10 is at front of the queue.

Show diagrammatically the effect of - 1. INSERT (12) 2. INSERT (34) 3. DELETE 4. INSERT (56)

e. Create a Singly Linked List using data fields 10, 20, 30, 40, 50 and show procedure step-by- step with the help of diagram from start to end.

Q.5)

a. Show the effect of PUSH and POP operation on to the stack of size 10. The stack contains 10, 20, 22, 26, 28, and 30, with 30 being at top of the stack. Show diagrammatically the effect of1.PUSH 46 2.PUSH 48 3.POP 3 4.POP 5.POP Sketch the final structure of Stack after performing the above said operations.Sketch the final structure of Stack after performing the above said operations.

b. From the given tree complete six answers :

1. Degree of tree :

2. Degree of node 3 :

3. Level of node 5 :

4. Indegree of node 3 :

5. Outdegree of node 3 :

6. Height of tree :

c. Write an algorithm to count number of nodes in singly linked list.

Q.6)

a. Sort the following numbers in ascending order using Bubble sort. Given Numbers : 348, 14, 614, 5381, 47 and Write the output after each iteration

b. Evaluate the following prefix expression : - * + 4 3 2 5 Show diagrammatically each step of evaluation using stack.

c. Create a Singly Linked List using data fields 10, 20, 30, 40, 50. Search a node 40 from the SLL and show procedure step-by-step with the help of diagram from start to end.