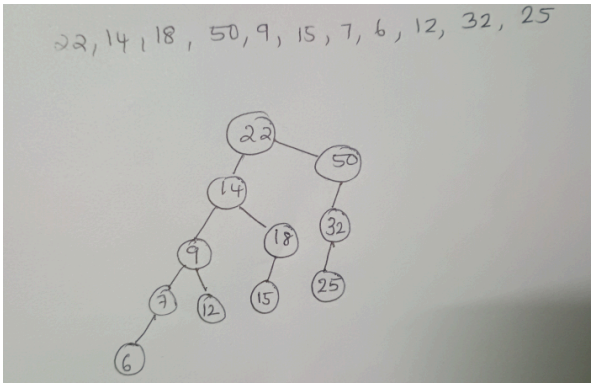
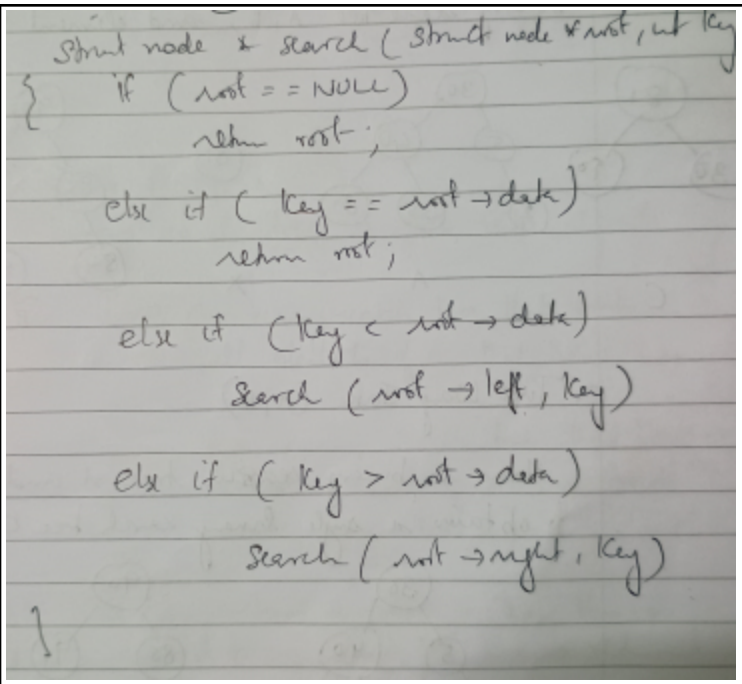
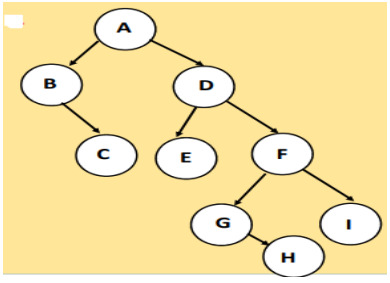
Sub:	DATA STRUCTURES AND APPLICATIONS					Sub Code:	BCS304
Date:		Duration:	**90 minutes**	Max Marks:	**50**	Sem/Sec: III A,B,C	

Scheme and Solutions

1	a	Construct a binary search tree for the given values 14, 15, 7, 9, 18, 3, 5, 16, 20. Write the C function for the inorder, preorder and postorder traversal and apply the same. **Answer:** **Construction of BST-4M(step wise)**  **Search an item in the BST-2M**



	b	Explain winner tree and looser tree with suitable examples. **Answer:** **Winner Tree Explanation with example-2M** **Looser Tree Explanation with example-2M**
2	a	Construct a binary tree by using the following in-order and pre-order traversal. In-order: BCAEDGHFI Pre-order: ABCDEFGHI Also perform the post order traversal of the tree. **Answer:** **Construction of Binary Tree-3M** 

Postorder-1M CBEHGIFDA

b

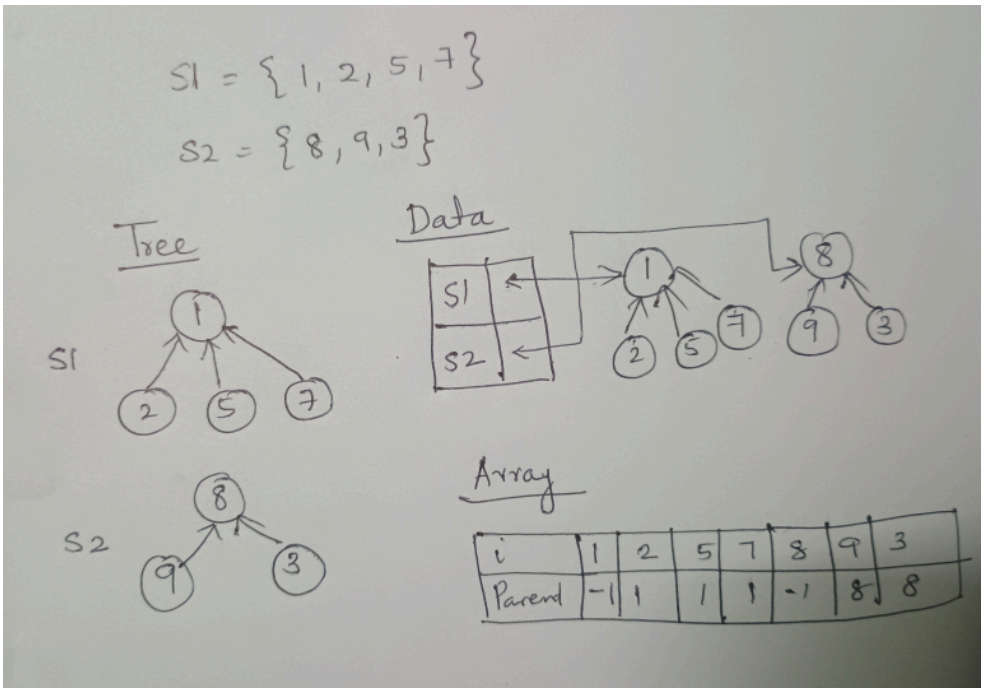
Demonstrate the tree, data, and array representation for the disjoint sets,

S1= {1,2,5,7}

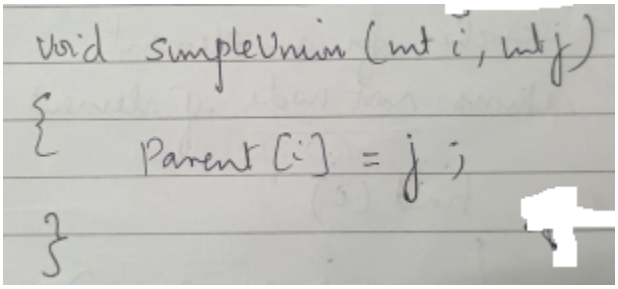
S2= {8,9,3}. Also write algorithm for simple union () and simple find().

Answer:

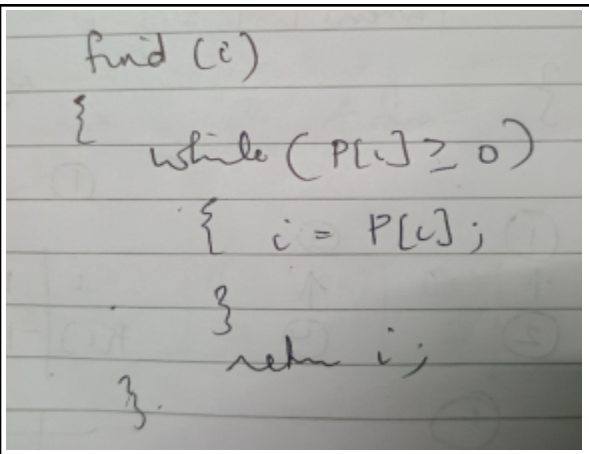
Representation of tree, data, array -1M,2M,1M

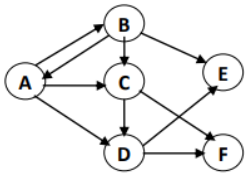


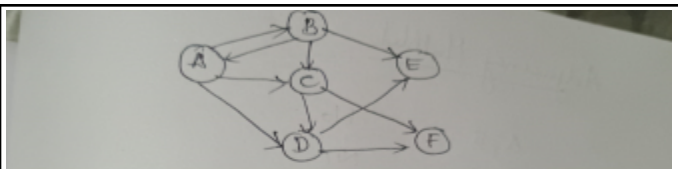
simple union()- 1M



simple find()- 1M



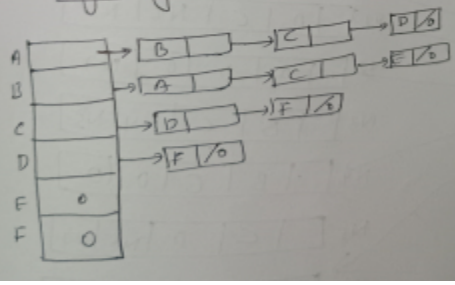
3	a	Define Graph. For the given graph,show all the three representations of the graph.  **Answer:** **Representation of graph** **Adjacency Matrix 1M** **Adjacency List 2M** **Adjacency Multilist 2M**



Adjacency Matrix

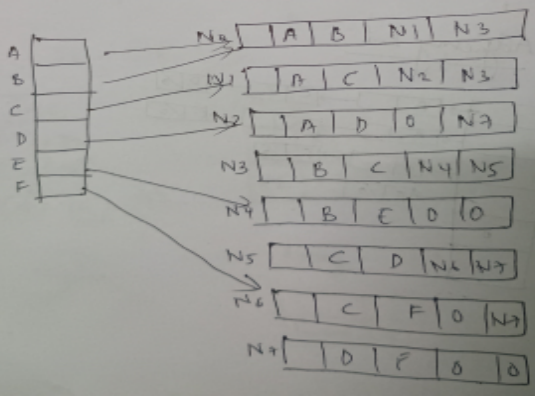
	A	B	C	D	E	F
A	0	1	1	1	0	0
B	1	0	1	0	1	0
C	0	0	0	1	0	1
D	0	0	0	0	0	1
E	0	0	0	0	0	0
F	0	0	0	0	0	0

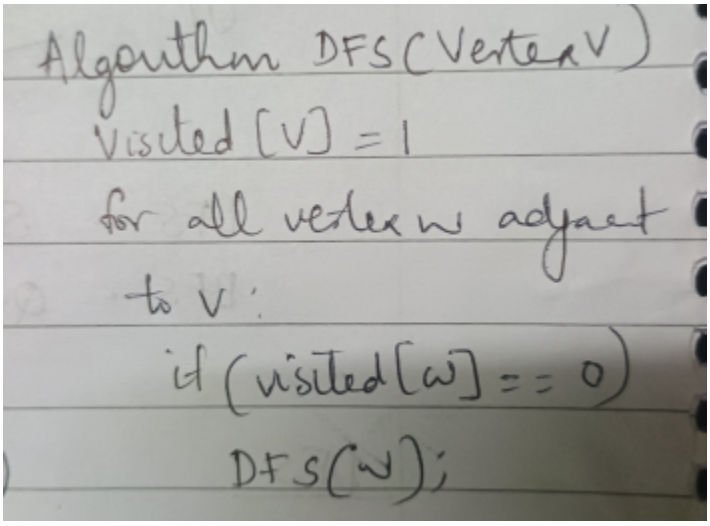
Adjacency List

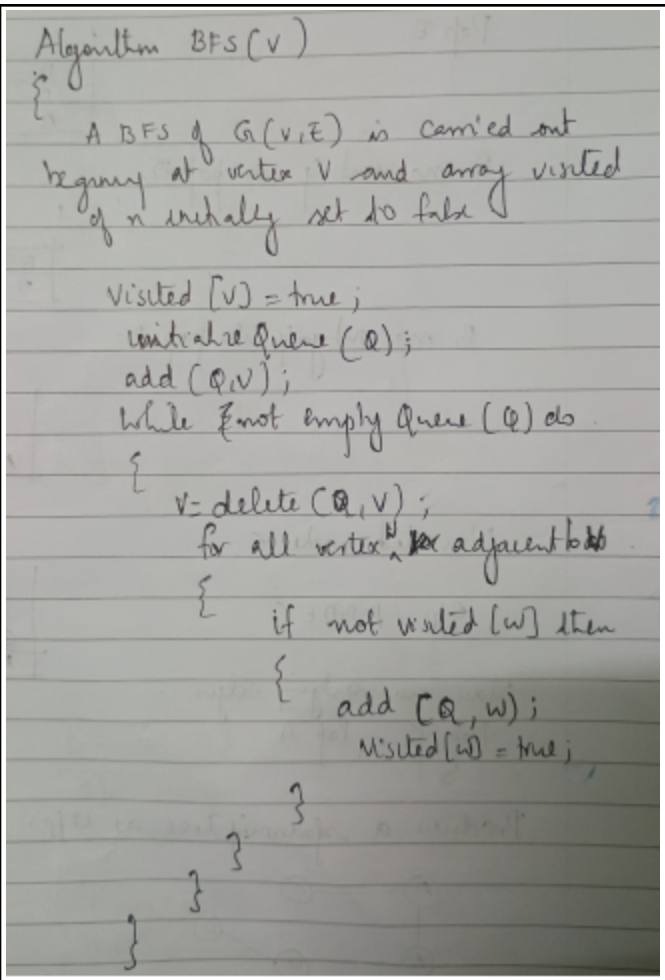


Adjacency Multilist

A, B — N0
A, C — N1
A, D — N2
B, A — N3
B, C — N4
B, E — N5
C, D — N6
C, F — N7
D, F



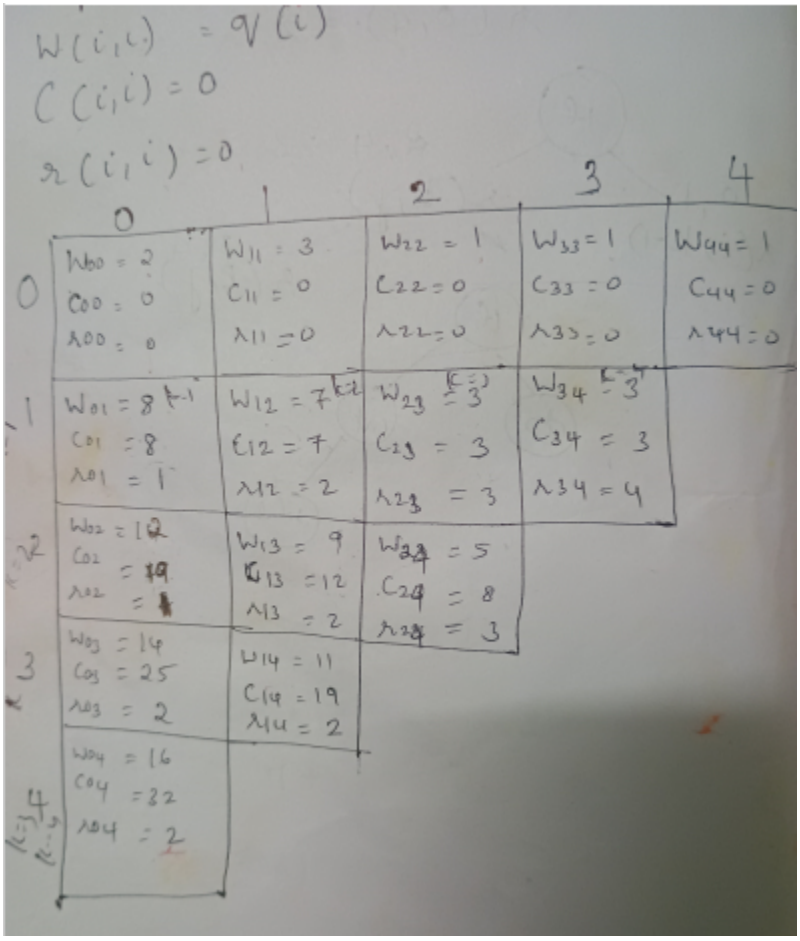
	b	What are the methods used for traversing a graph? Explain any one with example and write C function for the same. **Answer:** **Methods for Traversing –- 1M** **DFS (Depth First Search) BFS (Breadth First Search)** **Algorithm for DFS or BFS 2M** 

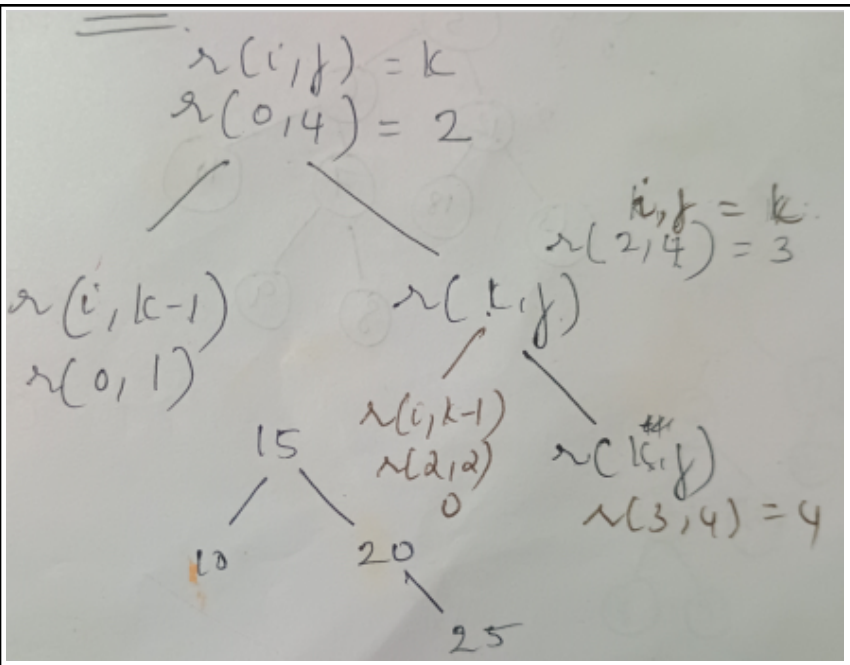


Example 2M

4	a	Given a hash table with 10 slots. The hash function is h(k)=k mod 10. The collision is overcome by chaining. The following keys are inserted in the order. 5,28,19,15,20,33,12,17,10. Develop the corresponding hash table. **Answer:**
	b	Explain the following by taking suitable examples, a) Linear Probing b) Quadratic Probing c) Folding Method **Answer:** **Linear Probing technique with example-2M** **Quadratic Probing technique with example-2M**

		Folding technique with example- 2M
5	a	Explain dynamic hashing using directories with the help of an example. **Answer:** **Dynamic hashing using Directories 2M** -elements: **16,4,6,22,24,10,31,7,9,20,26.** Bucket Size: **3** 16- 10000 4- 00100 6- 00110 22- 10110 24- 11000 10- 01010 31- 11111 7- 00111 9- 01001 20- 10100 26- 11010
	b	Differentiate between height biased and weight biased leftist tree with examples. **Answer:**

		Height biased leftist tree 2.5M **Weight biased leftist tree 2.5M**
6	a	What is the need for an optimal BST. Find the optimal BST for n=4, Keys are 10,15,20, 25. p1, p2, p3, p4 =3,3,1,1 q0, q1, q2, q3, q4 =2,3,1,1,1 **Answer:** **Need for BST-2M** **Problem-8M** 


r(i,j) = k
r(0,4) = 2
i,j = k
r(2,4) = 3
r(i,k-1)
r(0,1)
r(k,j)
r(i,k-1)
r(2,2)
0
r(k,j)
r(3,4) = 4
15
10
20
25