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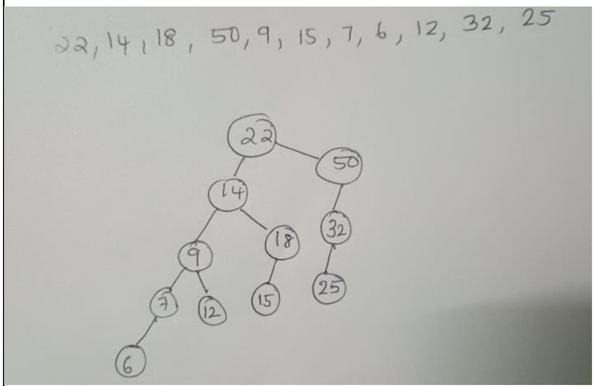
Sub:	**DATA STRUCTURES AND APPLICATIONS**				Sub Code:	**BCS304**
Date:		Duration:	**90 minutes**	Max Marks:	**50**	Sem/Sec: III A,B,C

<u>Scheme and Solutions</u>

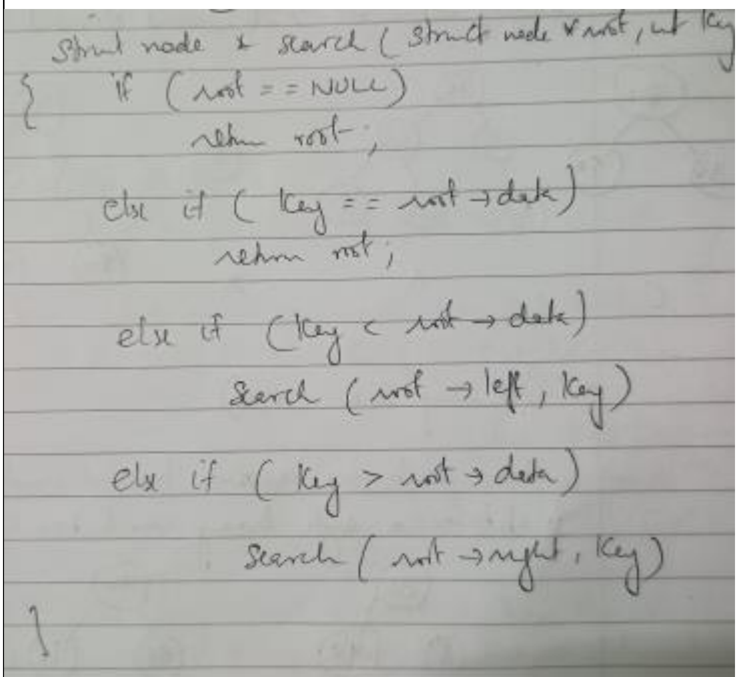
1 a Construct a binary search tree for the inputs 22, 14, 18, 50, 9, 15, 7, 6, 12, 32, 25 also write a function in C to search an item in the BST.

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.

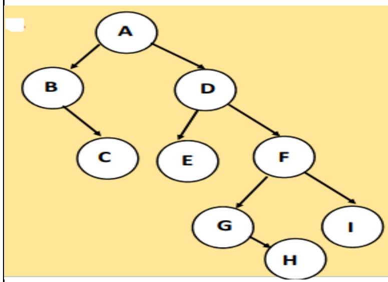
In-order: BCAEDGHFI

Pre-order: ABCDEFGHI

Also perform the post order traversal of the tree.

Answer:

Construction of Binary Tree-3M



Postorder-1M CBEHGIFDA

b

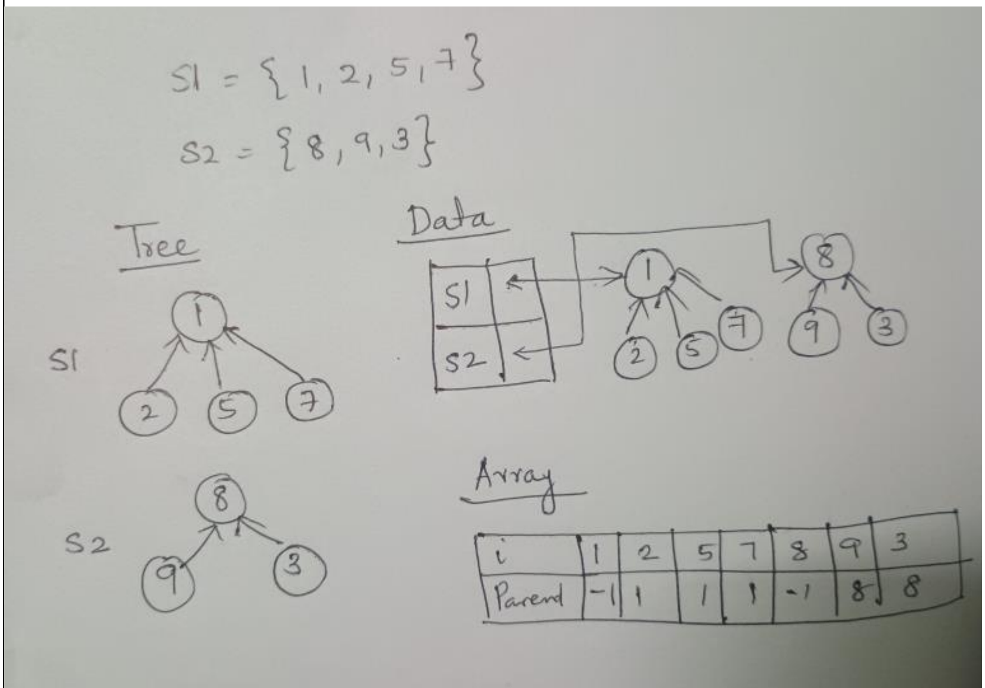
Demonstrate the tree, data, and array representation for the disjoint sets,

S1= {1,2,5,7}

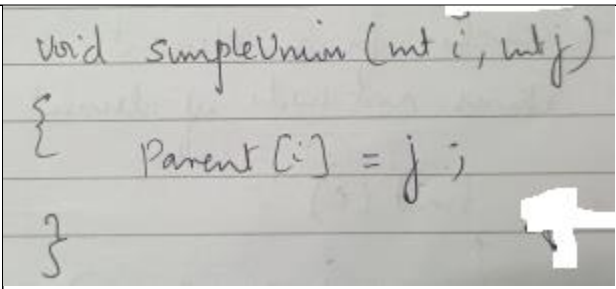
S2= {8,9,3}. Also write algorithm for simple union () and simple find().

Answer:

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

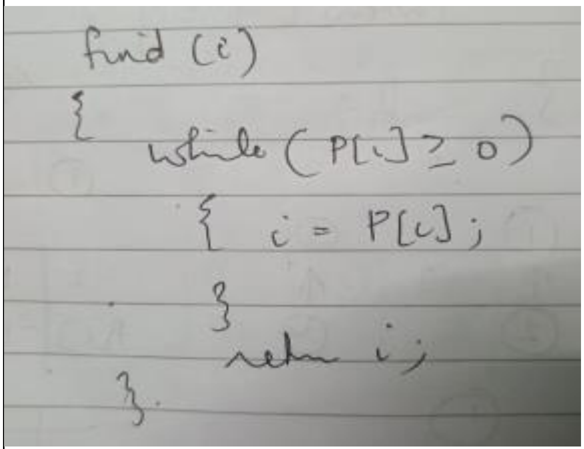


simple union()- 1M



```
void simpleUnion (int i, int j)
{
    Parent [i] = j ;
}
```

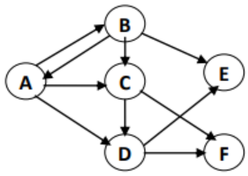
simple find()- 1M



```
find (i)
{
    while ( P[i] ≥ 0 )
    { i = P[i] ;
    }
    return i ;
}.
```

3 a

Define Graph. For the given graph,show all the three representations of the graph.



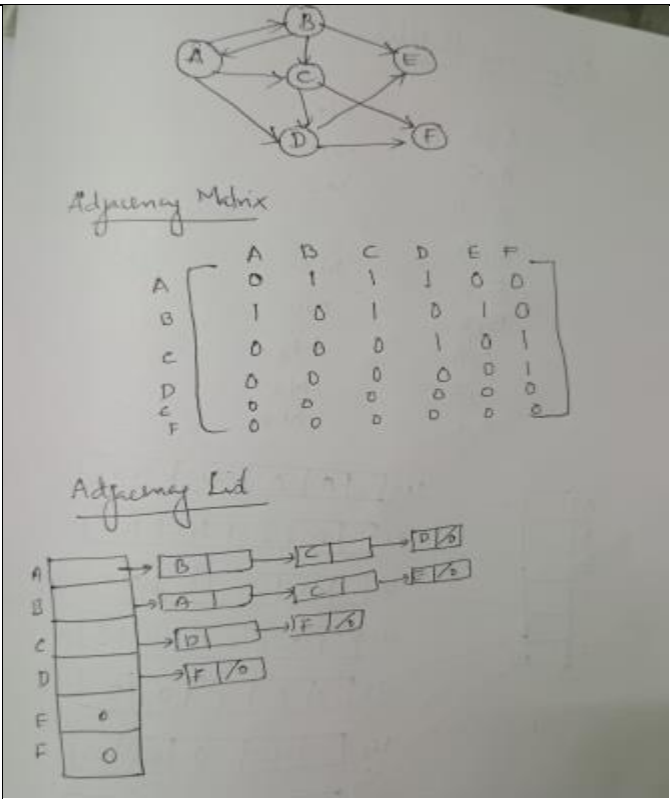
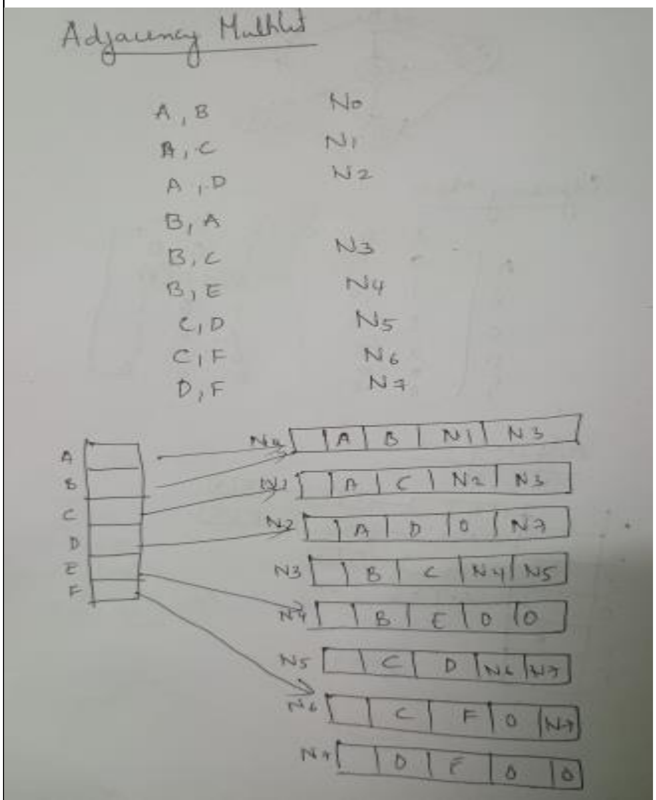
Answer:

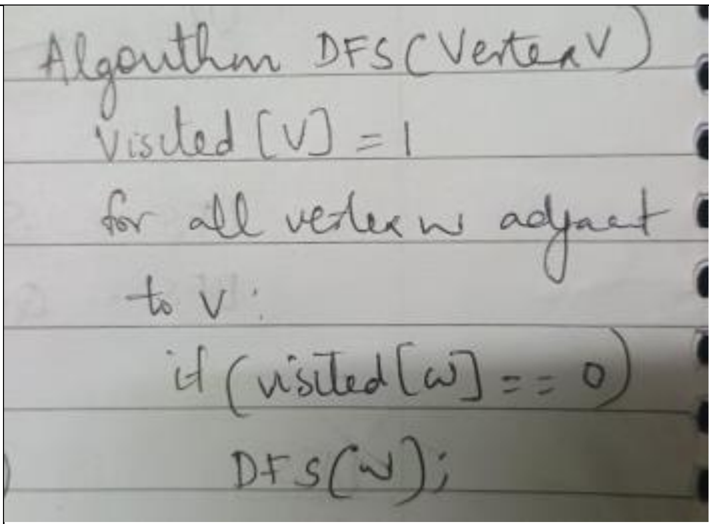
Representation of graph

Adjacency Matrix 1M

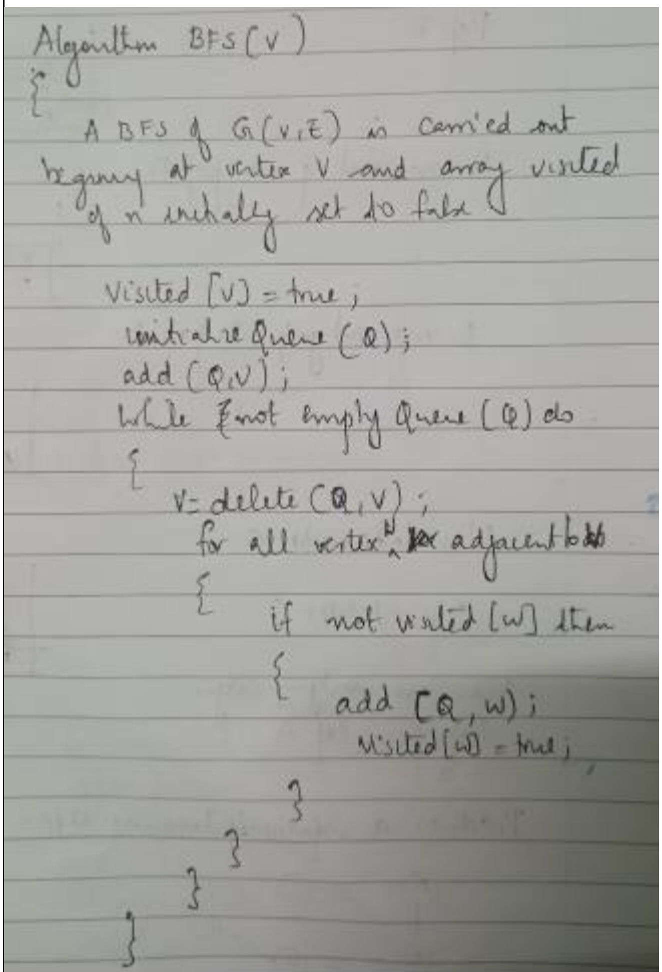
Adjacency List 2M

Adjacency Multilist 2M

		 
	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**



```
Algorithm DFS(VertexV)
Visited [V] = 1
for all vertex w adjacent
 to V :
   if (visited[w] == 0)
     DFS(w);
```



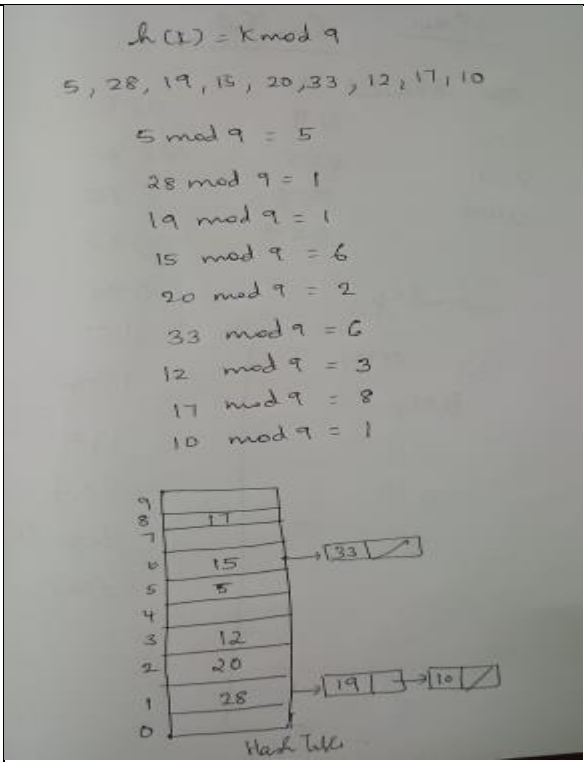
```
Algorithm BFS(V)
{
  A BFS of G(V,E) is carried out
beginning at vertex V and array visited
of n initially set to false

    Visited [V] = true;
     initialize Queue (Q);
     add (Q,V);
     While {not empty Queue (Q) do
     {
        V = delete (Q,V);
          for all vertex w adjacent to V
          {
              if not visited [w] then
              {
                 add (Q, w);
                  visited [w] = true;
              }
          }
      }
}
```

Example 2M

4 a Given a hash table with 9 slots. The hash function is h(k)=k mod 9.
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:

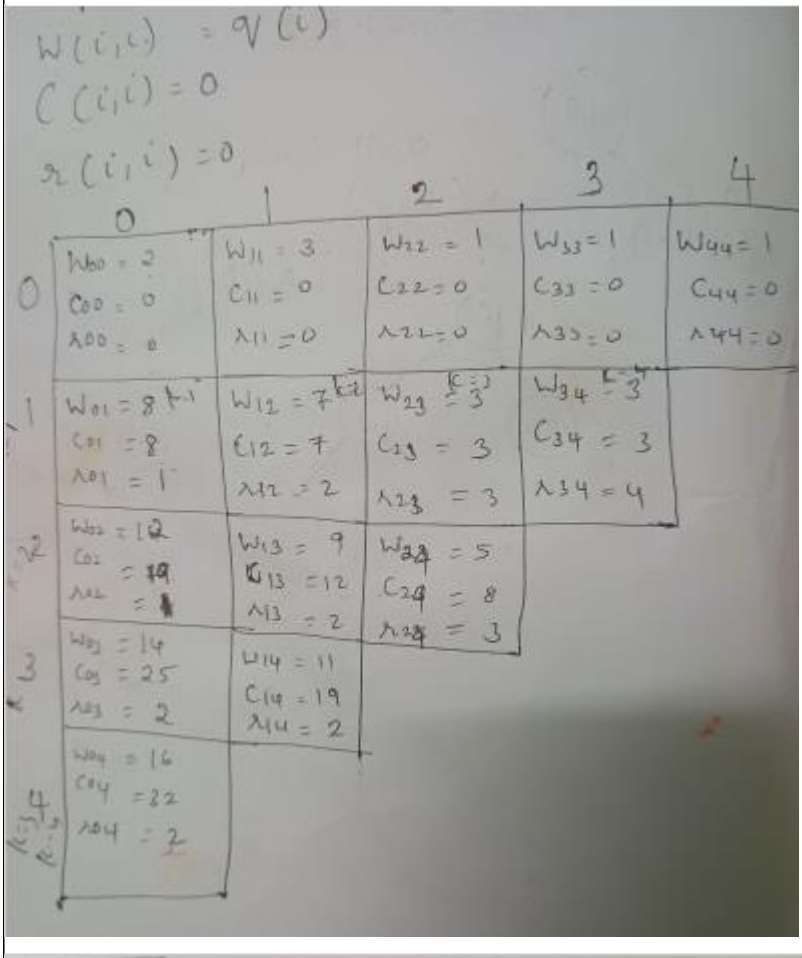
		
	b	Explain the following by taking suitable examples, a) Linear Probing b) Quadratic Probing c) Folding Method **Answer:** **Linear Probing technique with example-2M** **Quadratic Probing technique with example-2M** **Folding technique with example- 2M**
5	a	Explain dynamic hashing using directories with the help of an example. **Answer:** **Dynamic hashing using Directories 2M** -Importance of directory and buckets -Increasing depth of the directory. **Example 3M**
	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

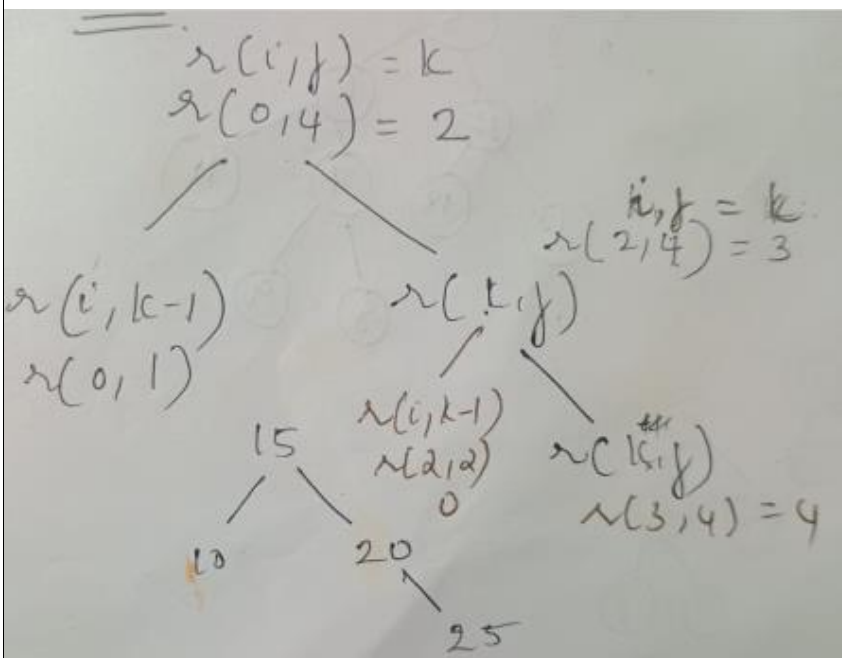
q0, q1, q2, q3, q4 =2,3,1,1,1

Answer:

Need for BST-2M

Problem-8M





CI **CCI** **HOD**

--All the Best--