1. Perform the following operations on disjoint set:

a. Make-set

b. Union

c. Find-set

2. Perform the Union by-element\_value (weight) operations on 10 elements (0-9, each initially in their own set). Draw the forest of trees that result U(1,5); U(3,7);U(1,4);U(5,7); U(0,8); U(6,9);U(3,9).

3. Perform union-by-rank for disjoint sets.

4. Perform path compression in tree-based disjoint sets. Verify using Find-set operation.

5. Find out the number of connected component in a given undirected graph and display their representative. You are free to choose representative in a given set. Vertices are numbered from 1 to V.

**Input: (T,** |**Vi**|**, Adji)**

2

10

0 1 1 0 0 0 0 0 0 0

1 0 1 0 0 0 0 0 0 0

1 1 0 1 0 0 0 0 0 0

0 0 1 0 0 0 0 0 0 0

0 0 0 0 0 1 1 0 0 0

0 0 0 0 1 0 1 0 0 0

0 0 0 0 1 1 0 0 0 0

0 0 0 0 0 0 0 0 1 0

0 0 0 0 0 0 0 1 0 0

0 0 0 0 0 0 0 0 0 0

10

0 1 1 0 0 0 0 0 0 0

1 0 1 0 0 0 0 0 0 0

1 1 0 1 0 0 0 0 0 0

0 0 1 0 0 0 0 0 0 0

0 0 0 0 0 1 1 0 0 0

0 0 0 0 1 0 1 1 0 0

0 0 0 0 1 1 0 0 1 0

0 0 0 0 0 1 0 0 1 0

0 0 0 0 0 0 1 1 0 0

0 0 0 0 0 0 0 0 0 0

**Output:**

4

1 5 8 10

3

1 5 10

6. Check whether given graph is connected or not using disjoint sets.

**Input: (T,** |**Vi**|**, Adji)**

2

6

0 1 1 1 0 0

1 0 1 0 1 0

1 1 1 1 0 0

0 1 0 1 0 0

0 0 0 0 0 0

6

0 1 1 1 0 0

1 0 1 0 1 1

1 1 1 1 0 0

0 1 0 1 0 0

0 1 0 0 0 1

**Output:**

Disconnected

Connected