Experiment NO:8 Find Minimum Cost Spanning Tree of a given connected undirected graph using **Kruskal'salgorithm.** Use Union-Find algorithms in your program

```
import java.util.*;
public class kruskals {

	int find(int m,int parent[])
	{
		int p=m;
		while(parent[p]!=0)
		 p=parent[p];
		return p;
	}
	void union(int i,int j, int parent[])
	{
		if(i<j)
			parent[i]=j;
		else
			parent[j]=i;

	}
	void kk(int cost[][],int n)
	{
		int i,j,k=1,u=0,v=0,sum=0,min,a,b;
		int parent[]= new int[10];
		for(i=1;i<=n;i++)
			parent[i]=0;

		while(k<=n-1)
		{
			min=999;
			for(i=1;i<=n;i++)
			{
				for(j=1;j<=n;j++)
				{
					if(min>cost[i][j]&&i!=j)
					{
						min=cost[i][j];
						u=i;
						v=j;
					}
				}
			}
		a=find(u,parent);
		b=find(v,parent);
			if(a!=b)
			{
				union(a,b,parent);
				System.out.println("("+u+","+v+")"+"=" +cost[u][v]);
				sum=sum+cost[u][v];
			k++;
					}
				cost[u][v]=cost[v][u]=999;
				}
		System.out.println("the minimum cost is "+sum);
			}

	public static void main(String[] args) {
		int cost[][]= new int [10][10];
```

```
            int i,j;
            Scanner sc = new Scanner(System.in);
            System.out.println("enter the number of vertices");
            int n= sc.nextInt();
            System.out.println("enter the  cost matrix  put 999 where there is
no edge");
            for(i=1;i<=n;i++)
            {
                  for(j=1;j<=n;j++)
                        cost[i][j]=sc.nextInt();
            }
            System.out.println("the cost matrix is ");
            for(i=1;i<=n;i++)
            {
                  for(j=1;j<=n;j++)
                        System.out.print(cost[i][j] +"\t");
                  System.out.println();

            }
            kruskals k = new kruskals();
            k.kk(cost,n);
                        }

}
/*

enter the number of vertices

5
enter the  cost matrix  put 999 where there is  no edge
0 5 15 10 999
5 0 999 25 30
15 999 0 20 999
10 25 20 0 35
999 30 999 35 0
the cost matrix is
0      5      15     10     999
5      0      999    25     30
15     999    0      20     999
10     25     20     0      35
999    30     999    35     0
The edges are:
(1,2)=5
(1,4)=10
(1,3)=15
(2,5)=30
the minimum cost is 60
*/
```