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Class: SY B2

Assignment 4

Aim: For any application find Single source shortest path using Dijkstra's algorithm

Code:

```
class Dijkstra{
    int V=9;
    void shortestPath(int graph[][], int src){
        int dist[]=new int[V];
        boolean incSet[]=new boolean[V];
        for(int i=0;i<V;i++){
            dist[i]=1000000;
            incSet[i]=false;
        }
        dist[src]=0;

        for (int j = 0; j < V-1; j++) {
            int u=minD(dist, incSet);
            incSet[u]=true;
            for(int k=0;k<V;k++){
                if(graph[u][k]!=0 && incSet[k]==false ){
                    if(dist[u]+graph[u][k]<dist[k]){
                        dist[k]=dist[u]+graph[u][k];
                    }
                }
            }
        }

        print_Sol(dist);
    }

    private int minD(int[] dist, boolean[] incSet) {
        int min=1000000;
        int min_index=-1;
        for(int i=0;i<V;i++){
            if(incSet[i]==false && dist[i]<=min){
                min=dist[i];
            }
        }
        return min_index;
    }
}
```

```

        min_index=i;
    }
}
return min_index;
}

void print_Sol(int dist[])
{
    System.out.println("Vertex \t\t Distance from Source");
    for (int i = 0; i < V; i++)
        System.out.println(i + " \t\t " + dist[i]);
}
}

public class Main {
    public static void main(String[] args) {
        int graph[][]=new int[][]{
            { 0, 6, 0, 0, 0, 0, 0, 7, 0 },
            { 6, 0, 5, 0, 0, 0, 0, 13, 0 },
            { 0, 5, 0, 3, 0, 1, 0, 0, 2 },
            { 0, 0, 3, 0, 2, 17, 0, 0, 0 },
            { 0, 0, 0, 2, 0, 10, 0, 0, 0 },
            { 0, 0, 1, 17, 10, 0, 2, 0, 0 },
            { 0, 0, 0, 0, 0, 2, 0, 1, 7 },
            { 7, 13, 0, 0, 0, 0, 1, 0, 11 },
            { 0, 0, 2, 0, 0, 0, 7, 11, 0 }
        };
        Dijkstra dj=new Dijkstra();
        dj.shortestPath(graph, 0);
    }
}

```

Output:

```

Vertex      Distance from Source
0           0
1           6
2          11
3          14
4          16
5          10
6           8
7           7
8          13

...Program finished with exit code 0
Press ENTER to exit console.

```

Conclusion: Thus, we successfully found Single source shortest path using Dijkstra's algorithm