DESIGN AND ANALYSIS OF ALGORITHMS LAB1

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Prims Algorithm:

Code:

```
import java.util.*;
import java.lang.*;
import java.io.*;

class MST {
    private static final int V = 7;
    int minKey(int key[], Boolean mstSet[])
    {
        int min = Integer.MAX_VALUE, min_index = -1;

        for (int v = 0; v < V; v++)
            if (mstSet[v] == false && key[v] < min) {
                min = key[v];
                min_index = v;
            }

        return min_index;
    }
    void printMST(int parent[], int graph[][])
```

```
{
    System.out.println("Edge \tWeight");
    for (int i = 1; i < V; i++)
        System.out.println(parent[i] + " - " + i + "\t" + graph[i][parent[i]]);
}
void primMST(int graph[][])
{
    int parent[] = new int[V];

    int key[] = new int[V];

    Boolean mstSet[] = new Boolean[V];
    for (int i = 0; i < V; i++) {
        key[i] = Integer.MAX_VALUE;
        mstSet[i] = false;
    }

    key[0] = 0;
    parent[0] = -1;

    for (int count = 0; count < V - 1; count++) {
        int u = minKey(key, mstSet);

        mstSet[u] = true;
```

```
        for (int v = 0; v < V; v++)
            if (graph[u][v] != 0 && mstSet[v] == false && graph[u][v] < key[v]) {
                parent[v] = u;
                key[v] = graph[u][v];
            }
        }
        printMST(parent, graph);
    }

    public static void main(String[] args)
    {
        MST t = new MST();
        int graph[][] = new int[][] { { 0, 4, 8, 0, 0, 0, 0},
                                      { 4, 0, 9, 8, 10, 0, 0},
  { 8, 9, 0, 2, 0, 1, 0},
   { 0, 8, 2, 0, 7, 9, 0},
    { 0, 10, 0, 7, 0, 5, 6},
            { 0, 0, 1, 9, 5, 0, 2},
     { 0, 0, 0, 0, 6, 2, 0},};

        t.primMST(graph);
    }
}
```

Output:

```
C:\Users\Personal\Downloads\5th sem>javac MST.java

C:\Users\Personal\Downloads\5th sem>java MST
Edge    Weight
0 - 1   4
0 - 2   8
2 - 3   2
5 - 4   5
2 - 5   1
5 - 6   2

C:\Users\Personal\Downloads\5th sem>
```

Asymptotic Analysis: