# Ex 13: Prims Algorithm

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PROGRAM:

```c
#include <stdio.h>

#include <limits.h>

#define MAX_VERTICES 100

int minKey(int key[], int mstSet[], int vertices) {

    int min = INT_MAX, minIndex;


    for (int v = 0; v < vertices; v++) {

        if (!mstSet[v] && key[v] < min) {

            min = key[v];

            minIndex = v;

        }

    }


    return minIndex;

}

void printMST(int parent[], int graph[MAX_VERTICES][MAX_VERTICES], int vertices) {

    printf("Edge \tWeight\n");

    for (int i = 1; i < vertices; i++) {

        printf("%d - %d \t%d\n", parent[i], i, graph[i][parent[i]]);

    }

}

void primMST(int graph[MAX_VERTICES][MAX_VERTICES], int vertices) {
```

```c
    int parent[MAX_VERTICES];

    int key[MAX_VERTICES];

    int mstSet[MAX_VERTICES];

    for (int i = 0; i < vertices; i++) {

        key[i] = INT_MAX;

        mstSet[i] = 0;

    }

    key[0] = 0;

    parent[0] = -1;

    for (int count = 0; count < vertices - 1; count++) {

        int u = minKey(key, mstSet, vertices);

        mstSet[u] = 1;

        for (int v = 0; v < vertices; v++) {

            if (graph[u][v] && !mstSet[v] && graph[u][v] < key[v]) {

                parent[v] = u;

                key[v] = graph[u][v];

            }

        }

    }

    printMST(parent, graph, vertices);

}


int main() {

    int vertices;

    printf("Input the number of vertices: ");

    scanf("%d", &vertices);
```

```c
    if (vertices <= 0 || vertices > MAX_VERTICES) {

        printf("Invalid number of vertices. Exiting...\n");

        return 1;

    }


    int graph[MAX_VERTICES][MAX_VERTICES];

    printf("Input the adjacency matrix for the graph:\n");

    for (int i = 0; i < vertices; i++) {

        for (int j = 0; j < vertices; j++) {

            scanf("%d", &graph[i][j]);

        }

    }

    primMST(graph, vertices);


    return 0;

}
```

OUTPUT:

```
aiml231501129@cselab:~$ gcc ex13.c
aiml231501129@cselab:~$ ./a.out
Input the number of vertices: 2
Input the adjacency matrix for the graph:
0 0
1 0
Edge    Weight
0 - 1   1
aiml231501129@cselab:~$
```