231501058 CS23231 – D a t a S t r u c t u r e s

**Ex. No.: 13**

**Graph Traversal**

**Date: 31/5/24**

**Write a C prog ram to cre ate a graph and find a minimum spanning tree using prims alg orithm .**

**Algorithm:**

#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) { 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]) { |  |
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parent[v] = u;

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

}

}

}

printMST(parent, graph, vertices);

}

int main() {

int vertices = 5;

int graph[MAX\_VERTICES][MAX\_VERTICES] = {

{0, 2, 0, 6, 0},

{2, 0, 3, 8, 5},

{0, 3, 0, 0, 7},

{6, 8, 0, 0, 9},

{0, 5, 7, 9, 0}

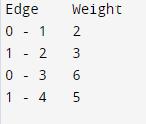
};

primMST(graph, vertices);

return 0;

}

**OUTPUT**



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