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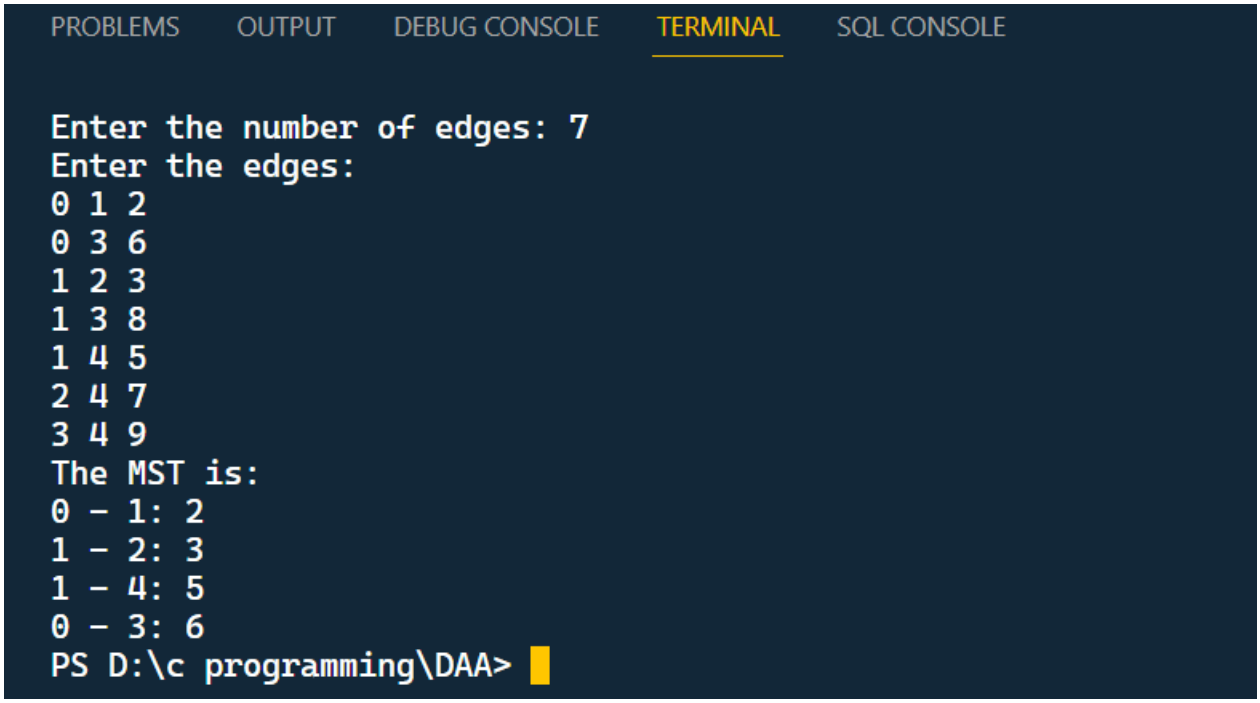
BRANCH:	Computer engineering
BATCH:	A
SUBJECT:	DAA
EXPT NO:	6
AIM:	Experiment based on graph Algorithms (Prims Algorithm)
ALGORITHM	The working of Prim's algorithm can be described by using the following steps: Step 1: Determine an arbitrary vertex as the starting vertex of the MST. Step 2: Follow steps 3 to 5 till there are vertices that are not included in the MST (known as fringe vertex). Step 3: Find edges connecting any tree vertex with the fringe vertices. Step 4: Find the minimum among these edges. Step 5: Add the chosen edge to the MST if it does not form any cycle. Step 6: Return the MST and exit

PROGRAM:	`#include <stdio.h>`
	`#include <stdlib.h>`
	`#include <stdbool.h>`
	`#include <limits.h>`
	
	`#define MAX_VERTICES 100`
	`#define INF INT_MAX`
	
	`typedef struct {`
	`  int u, v, weight;`
	`} Edge;`

```c
int parent[MAX_VERTICES];
Edge edges[MAX_VERTICES];
int num_edges = 0;

int find(int v) {
    if (parent[v] != v) {
        parent[v] = find(parent[v]);
    }
    return parent[v];
}

void union_sets(int u, int v) {
    parent[find(u)] = find(v);
}

int compare_edges(const void* a, const void* b) {
    Edge* e1 = (Edge*)a;
    Edge* e2 = (Edge*)b;
    return e1->weight - e2->weight;
}

void mst(int n, int m, Edge* edges) {
    for (int i = 0; i < n; i++) {
        parent[i] = i;
    }
    qsort(edges, m, sizeof(Edge), compare_edges);
    for (int i = 0; i < m && num_edges < n - 1; i++) {
        int u = edges[i].u;
        int v = edges[i].v;
        if (find(u) != find(v)) {
            union_sets(u, v);
            edges[num_edges++] = edges[i];
        }
    }
}

int main() {
    int n, m;
    printf("Enter the number of vertices: ");
    scanf("%d", &n);
    printf("Enter the number of edges: ");
    scanf("%d", &m);
    printf("Enter the edges:\n");
    for (int i = 0; i < m; i++) {
```

```
        scanf("%d%d%d", &edges[i].u, &edges[i].v,
&edges[i].weight);
    }
    mst(n, m, edges);
    printf("The MST is:\n");
    for (int i = 0; i < num_edges; i++) {
        printf("%d - %d: %d\n", edges[i].u, edges[i].v,
edges[i].weight);
    }
    return 0;
}
```

RESULT:



CONCLUSION: Through this experiment, I learnt the concept of prims algorithm and how we can use prims algorithm to find the minimum spanning tree of any graph. Also, I learnt how I can implement this algorithm in C language