

## Experiment 25

### Code:

```
#include <stdio.h>

#include <stdlib.h>

struct Edge {
    int src, dest, weight;
};

struct Subset {
    int parent;
    int rank;
};

int compare(const void* a, const void* b) {
    return ((struct Edge*)a)->weight - ((struct Edge*)b)->weight;
}

int find(struct Subset subsets[], int i) {
    if (subsets[i].parent != i)
        subsets[i].parent = find(subsets, subsets[i].parent);
    return subsets[i].parent;
}

void Union(struct Subset subsets[], int x, int y) {
    int xroot = find(subsets, x);
    int yroot = find(subsets, y);
    if (subsets[xroot].rank < subsets[yroot].rank)
        subsets[xroot].parent = yroot;
    else if (subsets[xroot].rank > subsets[yroot].rank)
        subsets[yroot].parent = xroot;
    else {
        subsets[yroot].parent = xroot;
        subsets[xroot].rank++;
    }
}
```

```

    }
}

void KruskalMST(struct Edge edges[], int V, int E) {
    struct Edge result[V]; // Store MST

    int e = 0;

    int i = 0;

    qsort(edges, E, sizeof(edges[0]), compare);

    struct Subset* subsets = (struct Subset*) malloc(V * sizeof(struct Subset));

    for (int v = 0; v < V; v++) {
        subsets[v].parent = v;
        subsets[v].rank = 0;
    }

    while (e < V - 1 && i < E) {
        struct Edge next = edges[i++];

        int x = find(subsets, next.src);
        int y = find(subsets, next.dest);

        if (x != y) {
            result[e++] = next;
            Union(subsets, x, y);
        }
    }

    printf("Edges in MST:\n");

    int totalWeight = 0;

    for (i = 0; i < e; i++) {
        printf("%d -- %d == %d\n", result[i].src, result[i].dest, result[i].weight);
        totalWeight += result[i].weight;
    }

    printf("Total weight: %d\n", totalWeight);

    free(subsets);
}

```

```

}

int main() {

    int V = 4;

    int E = 5;

    struct Edge edges[] = {

        {0, 1, 10},

        {0, 2, 6},

        {0, 3, 5},

        {1, 3, 15},

        {2, 3, 4}

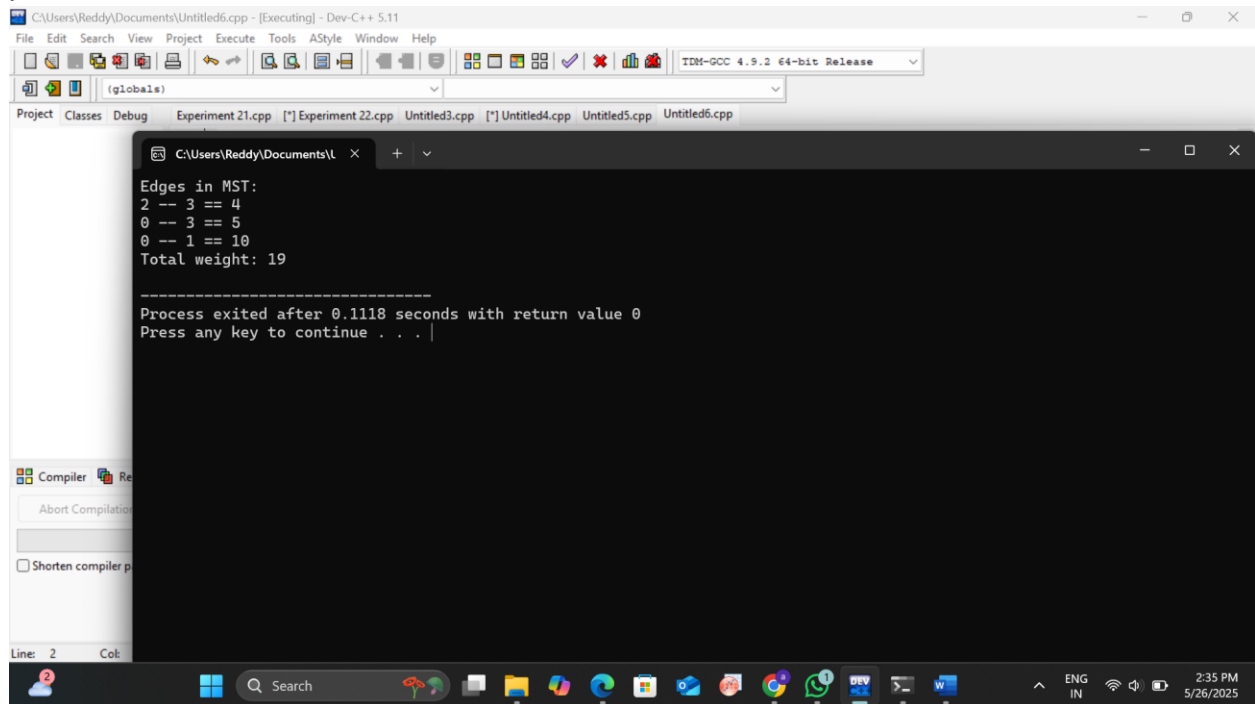
    };

    KruskalMST(edges, V, E);

    return 0;

}

```



The screenshot shows the Dev-C++ IDE with the following details:

- Title Bar:** C:\Users\Reddy\Documents\Untitled6.cpp - [Executing] - Dev-C++ 5.11
- Menu Bar:** File, Edit, Search, View, Project, Execute, Tools, AStyle, Window, Help
- Toolbar:** Includes icons for file operations, compilation, and execution. The compiler is set to TDM-GCC 4.9.2 64-bit Release.
- Project Explorer:** Shows a project named 'globals' with files: Experiment 21.cpp, Experiment 22.cpp, Untitled3.cpp, Untitled4.cpp, Untitled5.cpp, and Untitled6.cpp.
- Editor:** Displays the C++ code for Kruskal's MST algorithm.
- Compiler Output:**

```

Edges in MST:
2 -- 3 == 4
0 -- 3 == 5
0 -- 1 == 10
Total weight: 19

=====
Process exited after 0.1118 seconds with return value 0
Press any key to continue . . .

```
- Compiler Panel:** Shows 'Compiler' and 'Run' buttons, along with 'Abort Compilation' and 'Shorten compiler path' options.
- Status Bar:** Line: 2, Col: 1.
- Taskbar:** Windows taskbar at the bottom with search, task view, and various application icons. System clock shows 2:35 PM on 5/26/2025.

