

# Kruskal

## 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}

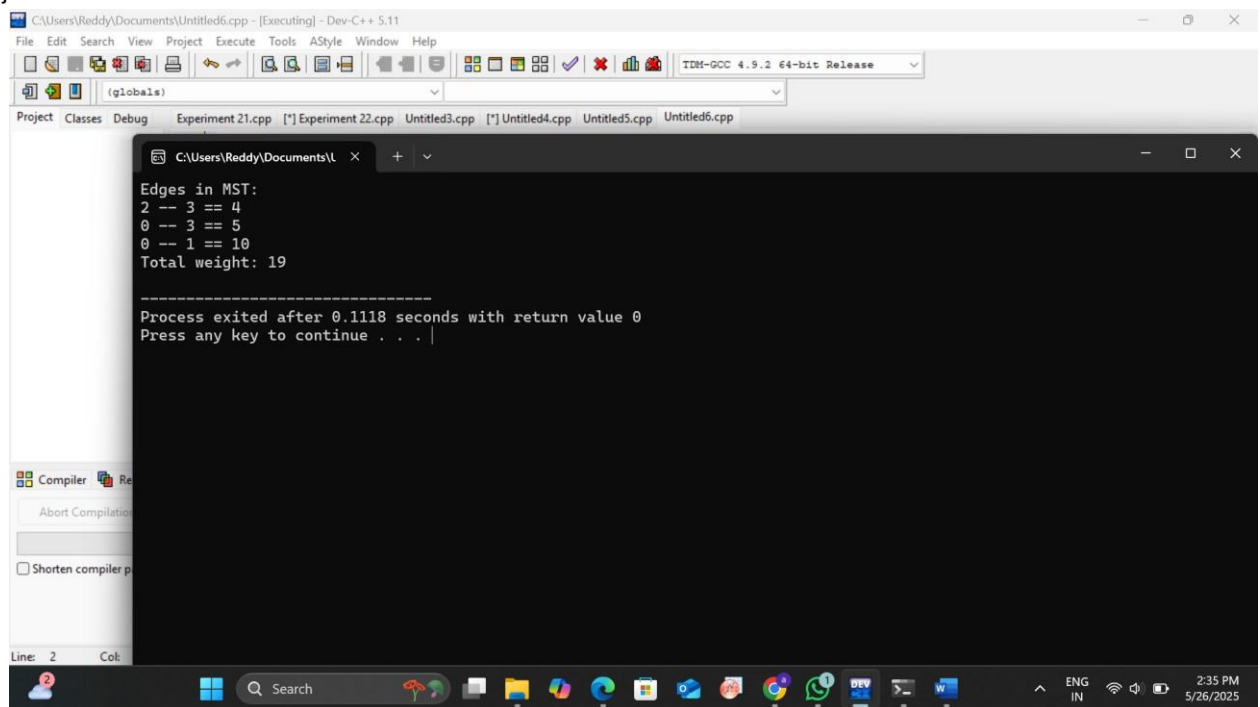
    };

    KruskalMST(edges, V, E);

    return 0;

}

```



The screenshot shows a Windows desktop environment. In the foreground, there is a Dev-C++ IDE window titled "C:\Users\Reddy\Documents\Untitled6.cpp - [Executing] - Dev-C++ 5.11". The IDE window has a menu bar (File, Edit, Search, View, Project, Execute, Tools, AStyle, Window, Help) and a toolbar. The main editor area shows the C++ code for Kruskal's MST algorithm. Below the editor, there is a "Compiler" panel with an "Abort Compilation" button and a "Shorten compiler path" checkbox. In the background, there is a terminal window titled "C:\Users\Reddy\Documents\U" showing the output of the program. The terminal output is as follows:

```

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 . . .

```

The Windows taskbar at the bottom shows the Start button, a search bar, and several application icons. The system tray on the right shows the date and time as "2:35 PM 5/26/2025".

