PROGRAM:

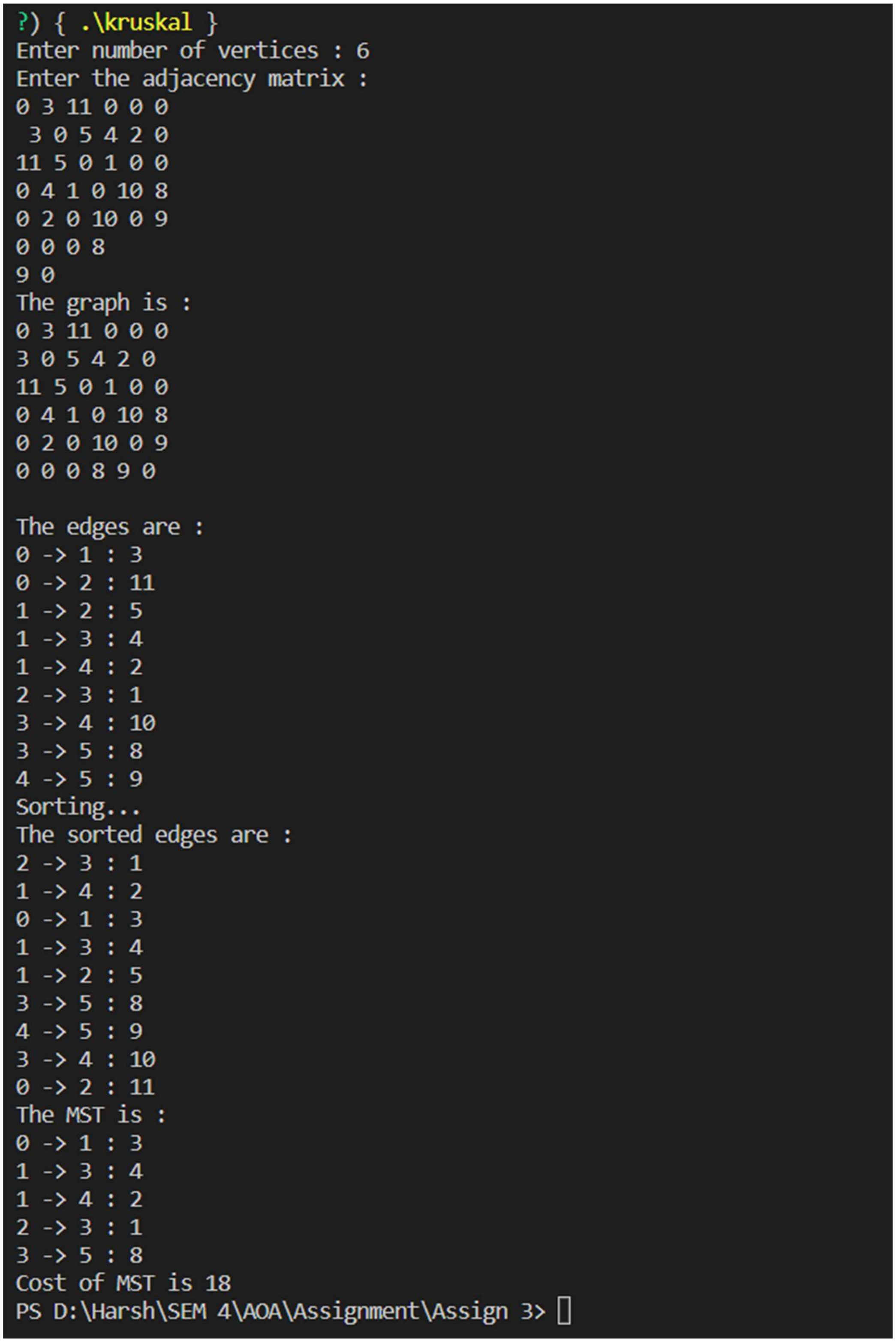
```
#include <stdio.h>

void swapint(int*, int*);
void makeset(int), unionp(int, int);
int findset(int);
void link(int, int);
int parent[100], rank[100] = {};

int main() {
    int mst[100][100] = {};
    int adj[100][100];
    int edges[100][3];
    int v = 0, e = 0;
    printf("Enter number of vertices : ");
    scanf("%d", &v);
    printf("Enter the adjacency matrix : \n");
    for(int i = 0; i < v; i++) {
        for(int j = 0; j < v; j++) {
            scanf("%d", &adj[i][j]);
        }
    }
    printf("The graph is : \n");
    for(int i = 0; i < v; i++) {
        for(int j = 0; j < v; j++) {
            printf("%d ", adj[i][j]);
        }
        printf("\n");
    }
```

```c
printf("\nThe edges are : \n");
for(int i = 0; i < v; i++) {
    for(int j = i; j < v; j++) {
        if(adj[i][j] != 0) {
            printf("%d -> %d : %d\n", i, j, adj[i][j]);
            edges[e][0] = i;
            edges[e][1] = j;
            edges[e][2] = adj[i][j];
            e++;
        }
    }
}

printf("Sorting...");
for(int i = 0; i < e; i++) {
    for(int j = 0; j < e-i-1; j++) {
        if(edges[j][2] > edges[j+1][2]) {
            swapint(&edges[j][0], &edges[j+1][0]);
            swapint(&edges[j][1], &edges[j+1][1]);
            swapint(&edges[j][2], &edges[j+1][2]);
        }
    }
}

printf("\nThe sorted edges are : \n");
for(int i = 0; i < e; i++) {
    printf("%d -> %d : %d\n", edges[i][0], edges[i][1], edges[i][2]);
}
```

```
    for(int i = 0; i < v; i++) {
        makeset(i);
    }

    for(int i = 0; i < e; i++) {
        if(findset(edges[i][0]) != findset(edges[i][1])) {
            mst[edges[i][0]][edges[i][1]] = edges[i][2];
            unionp(edges[i][0], edges[i][1]);
        }
    }

    int cost = 0;
    printf("The MST is : \n");
    for(int i = 0; i < v; i++) {
        for(int j = i; j < v; j++) {
            if(mst[i][j] != 0) {
                printf("%d -> %d : %d\n", i, j, mst[i][j]);
                cost += mst[i][j];
            }
        }
    }
    printf("Cost of MST is %d\n", cost);

    return 0;
}

void makeset(int x) {
    parent[x] = x;
    rank[x] = 0;
}

int findset(int x) {
    if(parent[x] != x) {
        parent[x] = findset(parent[x]);
    }
    return parent[x];
}

void unionp(int x, int y) {
    link(findset(x), findset(y));
}

void link(int a, int b) {
    if(rank[a] > rank[b]) {
        parent[b] = a;
    }
    else {
        parent[a] = b;
        if(rank[a] == rank[b])
            rank[b]++;
    }
}

void swapint(int* a, int *b) {
    int temp = *a;
    *a = *b;
    *b = temp;
```

}

OUTPUT:



```
?) { .\kruskal }
Enter number of vertices : 6
Enter the adjacency matrix :
0 3 11 0 0 0
 3 0 5 4 2 0
11 5 0 1 0 0
0 4 1 0 10 8
0 2 0 10 0 9
0 0 0 8
9 0
The graph is :
0 3 11 0 0 0
3 0 5 4 2 0
11 5 0 1 0 0
0 4 1 0 10 8
0 2 0 10 0 9
0 0 0 8 9 0

The edges are :
0 -> 1 : 3
0 -> 2 : 11
1 -> 2 : 5
1 -> 3 : 4
1 -> 4 : 2
2 -> 3 : 1
3 -> 4 : 10
3 -> 5 : 8
4 -> 5 : 9
Sorting...
The sorted edges are :
2 -> 3 : 1
1 -> 4 : 2
0 -> 1 : 3
1 -> 3 : 4
1 -> 2 : 5
3 -> 5 : 8
4 -> 5 : 9
3 -> 4 : 10
0 -> 2 : 11
The MST is :
0 -> 1 : 3
1 -> 3 : 4
1 -> 4 : 2
2 -> 3 : 1
3 -> 5 : 8
Cost of MST is 18
PS D:\Harsh\SEM 4\AOA\Assignment\Assign 3> 
```