Algorithms on Graphs

Module 2

Task 4

Minimum Spanning Tree

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Task

Develop a program that searches for a MST of a given weighted graph. You should implement one of the two algorithms.

- Kruskal's algorithm. For implementing Union-Find data structure you will get 3 additional points.
- Prim's algorithm with std::priority_queue data structure.

The complete implementation of this task gives you 15 pts.

Task: input

Input file (text format):

- The 1st line: names of vertices, separated by spaces.

E.g.: `A B C D E F`

- Other lines contain edges *and their weights*. Each line describes one edge as two incident vertices together with the edge's weight, separated by space. Weights are fixed point decimal numbers; they should be represented with float numeric values.

E.g., line

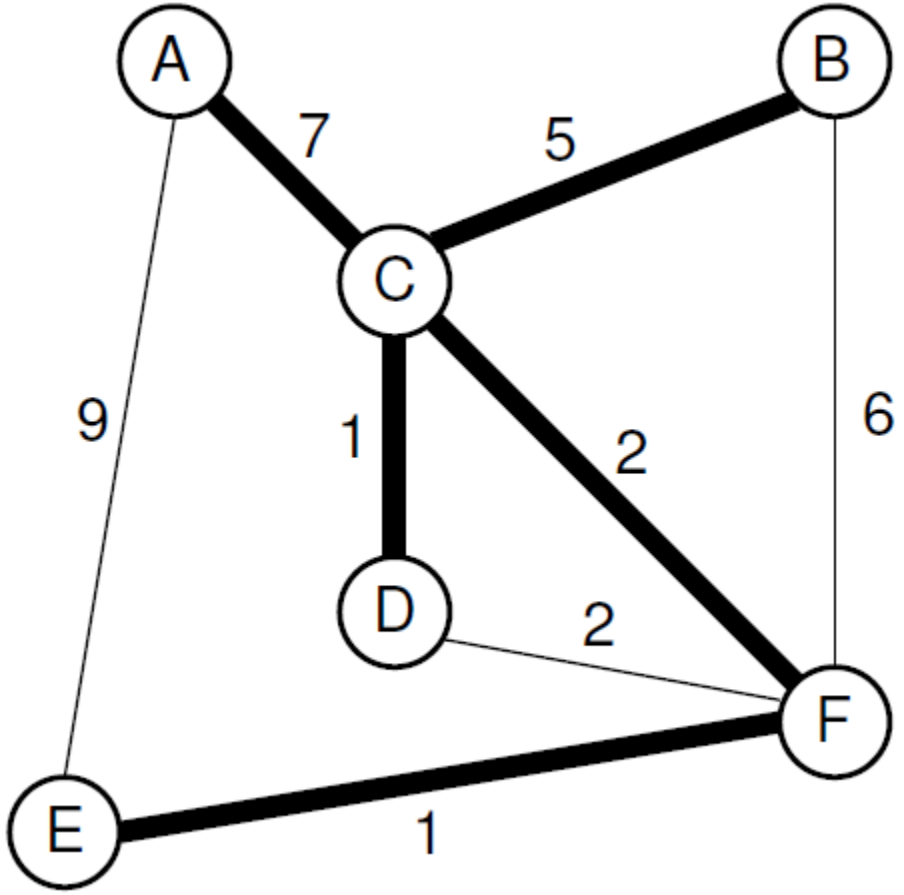
```
B C 5
```

represents edge (B,C) which has weight 5.

Task: input

Sample input:

```
A B C D E F
A C 7
A E 9
B C 5
B F 6
C D 1
C F 2
D F 2
E F 1
```



Task: output

Output file (text format):

For a graph with *n* vertices the output file should contain *n* lines.

The first line represents the total weight of the MST and the other lines represent edges of the MST:

```
16
A C
C D
B C
C F
F E
```