Exercise 4. Answer Sheet

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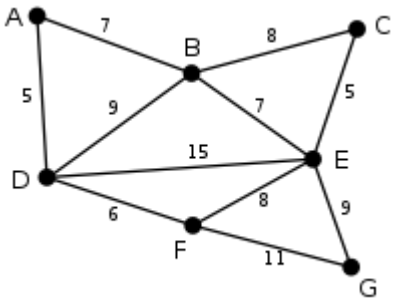
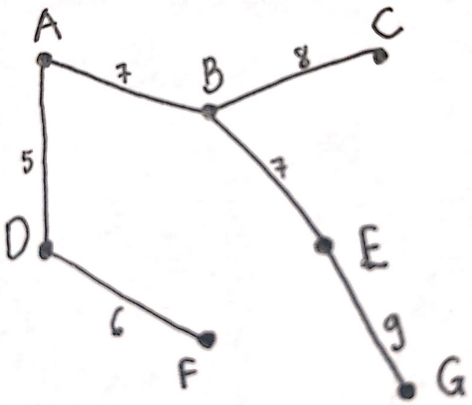
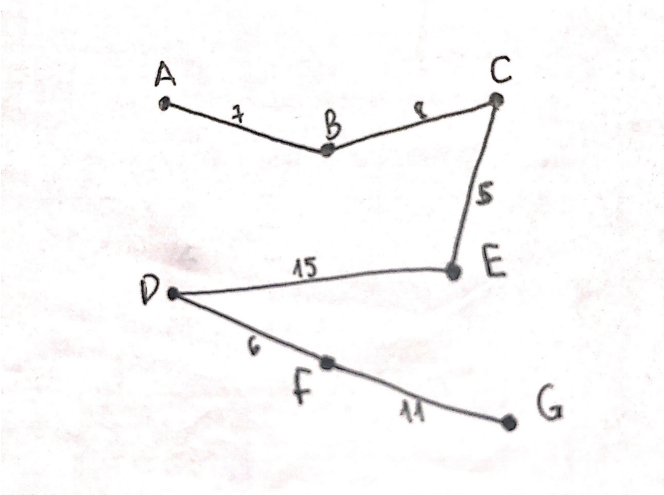
Problem 1. (*50 points*) Consider the following graph and assume node A as a root.



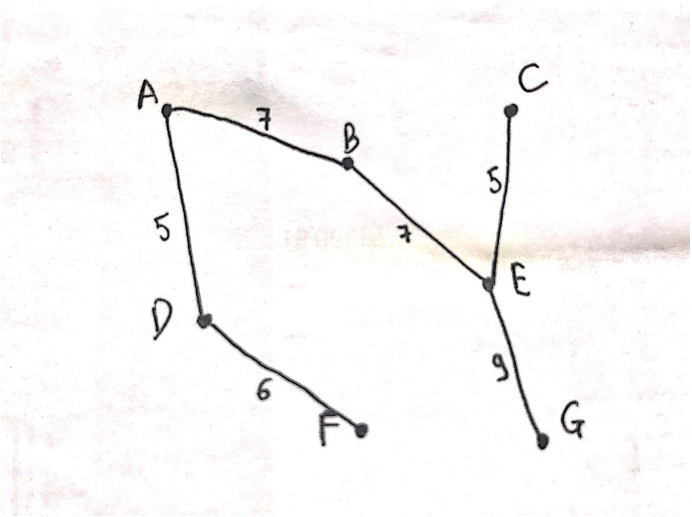
a) Draw a spanning tree obtained by using the Breadth Fist Search (BFS) algorithm.



b) Draw a spanning tree obtained by using the Depth First Search (DFS) algorithm.



c) Draw the minimum spanning tree obtained by the Prim's algorithm.



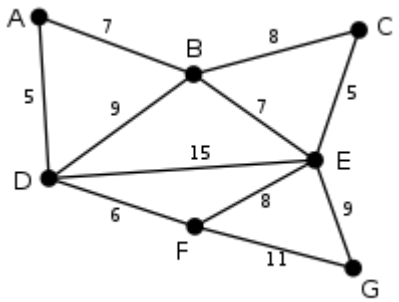
Problem 2. *(50 points)* Write a program implementing Kruskal's algorithm. Upload your source code. Show your input graph and the obtained MST in the space below.

The input graph is the same graph in the exercise 1

Because of the indexes in C++ programming language start from 0 therefore we consider the vertices of the graph : A is equal to 0, B is equal to 1, C is equal to 2, D is equal to 3, E is equal to 4, F is equal to 5, G is equal to 6.

The output will be the edges which will be added to the MST following the Kruskal algorithm and the total cost of the MST.

The graph we have :

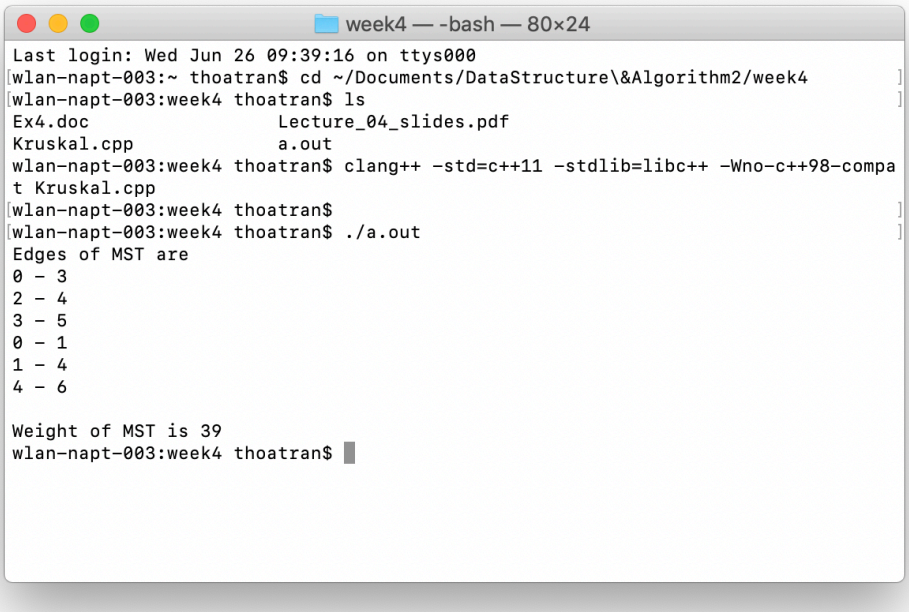


To implement and run the program, we change the directory to the directory we saved the Kruskal.cpp file and run the following command lines:

(Just for Mac OS)

```
clang++ -std=c++11 -stdlib=libc++ -Wno-c++98-compat Kruskal.cpp
./a.out
```

For the above graph, the output will be:



We can see that the MST we have by using Kruskal algorithm is the same to the MST using Prim algorithm.