

ECE 325 - Iterative Methods

Practical Assignment 9 (Due Date: 22/11/2021 - 23:59)

Examination Date: 23/11/2021

Report and Executables: Your **report** and **source code** should be sent via email to the Teaching Assistant (cmakri07@ucy.ac.cy) the day before the assignment examination date and must include a cover page with the names of all students in the group and **a statement that this is your own work together**. You should also list all other students that have helped you in completing the lab assigned as well as any references that you have used (e.g., websites where you found any information). In your report, include only the pseudocode, **not the actual code**, with any comments and description you may want to add, as well as typical scenarios that you use to test your programs. Email Subject **MUST** be: **ECE325_Assignment9_TeamX** (Replace X with the number of your team). You can use Java, C or C++, but you are **NOT ALLOWED** to use any ready structures or algorithms such as “sort”. Make sure that your code runs before submitting.

Write a code to read an **undirected** graph $G=(V,E)$ from a text file of the form:

ECE325_graph.txt

```
n
m
n1a n1b w1
n2a n2b w2
...
nma nmb wm
```

The first line (n) denotes the number of nodes.

The second line (m) denotes the number of edges.

Each of the next m lines ($n_{ma} \ n_{mb} \ w_m$) denote an **undirected** edge between the nodes with IDs: n_{ma} and n_{mb} with weight w_m .

All values will be integers, such that:

$$\begin{aligned} n_{ma} &\in [0, n) \\ n_{mb} &\in [0, n) \\ n, m, w_m &> 0 \end{aligned}$$

(An example can be found on **ECE325_undirected_graph.txt** , but your program should work with any undirected graph file).

Using the above code, implement the following programs for finding the Minimum Spanning Tree (MST):

1. [50%] Prim's algorithm starting from node 0.
2. [50%] Kruskal's algorithm.

Your output should print the edges that constitute the MST, and next to them their cost in parentheses, as well as the total cost of the MST. Your output should look like this for ECE325_undirected_graph.txt (the order of edges doesn't matter):

```
MST(18):  1 - 2 (2)
          0 - 1 (4)
          0 - 3 (6)
          0 - 4 (6)
```