CS 211 Data Structures and Algorithms Lab
July -- December, 2018
Assignment 9
Total Marks: 10
Due on 27th October

The objective of this assignment is to implement Kruskal's algorithm to find a Minimum Spanning Tree (MST) of a connected undirected graph with edge-weights.

Inputs

Your program should accept an input file as command-line argument. A typical execution of your program will be ./a.out sample.graph.

The input file represents a connected undirected graph with integer weights on edges. Every node (vertex) in the graph is uniquely labelled with a non-negative integer. Every line in the input file is of the form *x y w*, which represents an edge between node *x* and node *y*, where the weight of the edge is *w*. No edge is repeated in the input file.

Task

Implement Kruskal's algorithm to find a minimum spanning tree of the given connected, weighted, and undirected graph. It is recommended that you use disjoint-set forest data structure with union by rank and path compression heuristics. But a simpler implementation of the algorithm will also be accepted with full credits.

Output

Your program should create a file named 'mst.txt'. Every line in the output file should be of the form *x y w*, which represents an edge *xy* with weight *w* in the minimum spanning tree.

Submission and Evaluation

- The program you submit should output a file named 'mst.txt' when run.
- There should be only one main file and it should be named as main.<extension>, where the extension depends on the language you choose (You must use either C or C++).
- Test well before submission. We have some hidden inputs with us to test your program. The mark you obtain is purely based on whether your program correctly gives outputs for the hidden inputs.
- Submit your code as a .zip file (even if there is only one file) where the name of the zip file is your roll number**.** It is important that you follow the input/output conventions exactly (including the naming scheme) as we may be doing an automated evaluation.
- **Penalty for not following the naming conventions is 5% of the marks obtained.**

- This assignment is due on 27th October. Penalty for late submission is 5% per week; i.e., if you submit on 29th October, you will get only 95% of the mark you deserve otherwise.
- Follow some coding style uniformly. Provide proper comments in your code.
- Submit only through Moodle. Submit well in advance. Any hiccups in the Moodle/internet at the last minute is never acceptable as an excuse for late submission.
- Acknowledge the people (other than the instructor and TAs) who helped you to solve this assignment. The details of the help you received and the names of the people who helped you (including internet sources, if applicable) should come in the main file or in a separate file (acknowledge.txt). Copying others' programs is a serious offence.
- Honesty policy of the institute will be strictly followed. Note that we have access to a very good software to check plagiarism.