CS 211 Data Structures and Algorithms Lab
July -- December, 2018
Assignment 7
Total Marks: 10
Due on 13th October

The objective of this assignment is to obtain (connected) components of a graph using disjoint-set forest data structure with union by rank and path compression heuristics.

Inputs

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

The input file represents a graph. Every node (vertex) in the graph is uniquely labelled with a non-negative integer. Every line in the graph is of the form x y, which represents an edge between the nodes x and y. Both x y and y x represent the same edge. No edge is repeated in the input file.

Task

You have to find the components of the input graph using the disjoint-set data structure with union by rank and path compression heuristics, as discussed in the class.

Output

Every line in the input file should represent a component in the input graph. A component is represented by a sequence of vertices in the component, where the labels of two consecutive vertices are separated by a single white space. The components can be arranged in any order and the vertices in a component can be arranged in any order.

Submission and Evaluation

- The program you submit should output a file named 'components.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.
- This assignment is due on 13th October. Penalty for late submission is 5% per week; i.e., if you submit on 15th 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.