Assignment 4

Design & Analysis of Algorithms Lab

January 25, 2022

1. Given a network of n nodes $\{1, 2, \ldots, n\}$, and a list of m travel times as directed edges $\langle u_i, v_i, t_i \rangle$, where u_i is the source node, v_i is the target node, and t_i is the time it takes for a signal to travel from source to target.

   We will send a signal from a given node k. Write a C/C++ program that prints the minimum time within which, all the n nodes will receive the signal. If it is impossible for all the n nodes to receive the signal, print -1.

   ```
   Input:   n = 4 m = 4 k = 1
            1 2 1
            1 3 1
            3 4 5
            2 4 2
   Output: 3
   Explanation: From node 1, it will take 1, 1, 3 units of time
   to reach the signal to the nodes 2, 3, and 4 respectively.

   Input:   n = 2 m = 1 k = 2
            1 2 1
   Output: -1
   ```

2. Given an undirected bipartite graph, where partite X has a vertices and partite Y has b vertices, and m edges (where $m \le ab$) in the form $\langle p, q \rangle$, where $p \in X$ and $q \in Y$, write a C/C++ program that prints the size of the maximum matching in the graph, and also it will print the matched edges.

   ```
   Input:   a = 2 b = 3 m = 4
            1 2
            1 3
            2 3
            2 1
   Output: 2
            1 2
            2 3
   ```

Submission Instruction:

File Name: A4_RollNo.c/cpp
Email to: *pds2016autumn@gmail.com* with **subject line**: A4_RollNo