**HW1 Extra Problem 1 Readme**

**Student name: Peiye Liu**

**USC Student ID: 5961770016**

**Email:** [**peiyeliu@usc.edu**](mailto:peiyeliu@usc.edu)

**Brief program summary:**

In this problem, the network of people can be represented by an undirected graph. Each node represents a person. Also, each edge should have its weight. In my work, the edge weight can be 1(closest), 2, 3, 4, 5. For example, you and your roommate will have a distance of 1. A person in LA might have a distance of 5 with his/her friend in San Diego.

The general idea is to use Bellman-ford algorithm to find the distance of a positive node to every other node. A specific benchmark will be applied to tell whether the distance is short or not.

**Test cases:**

Here is a sample graph input file:

3

4 5

1

0

0 1 3

2

5

1 2 5

4

2 3 1

3

2

3 0 2

1

0 2 4

The first line tells the number of nodes and the number of edges respectively.

From the second line, each line has three integers represent source node, destination node and the edge distance. The nodes are 0-based.

Here is a sample positive case input file:

3

0

2

4

The first line tells how many people in this group has COVID-19 test positive. Each following line represent the index of that positive node.

**Instructions:**

To run this program, type the following command first to compile the file:

g++ HW1-extra.cpp -lstdc++ -Wall -Wextra -std=c++17 -o hw1extra

To execute the program, type:

./hw1extra [graph input file name] [positive case input file name]

The graph input file is required. And the positive case input file is optional. If no positive case input file is given. 100 random node numbers will be created. Input files should be in the same folder with the code file.

Test Cases:

In my work, the test case was generated by using this online tool:

<https://test-case-generator.herokuapp.com/>

Here is an example of create a test input file:

Graphical user interface, text, application, email

Description automatically generated

**Reference:**

Test cases:

<https://test-case-generator.herokuapp.com/>