Route Finding

1. Introduction

This project is a programming project using C to develop a program. The topic is route finding. The aim of this project is to compute the best path between 2 points on a map. The best path is defined as the shortest route between 2 points on a map in this project.

2. Design plan

2.1 Large-scale

This project is to develop an executable program which can work in Windows and Linux system and compute the best path between 2 given points on a map. The map is given by a date file: *Final_Map.map.* When the program is executed, it will read the date file and then print the welcome user interface. After user inputs two available points date, the program will output the shortest route between 2 given points. This project will solve two main problems. The first one is how to read and store the map date into an adjacency list. The second one is how to compute the shortest route between 2 given points in an adjacency list.

2.2 Medium-scale

The program includes 5 code modules: map initializing, map changing, map printing, route finding and user interface.

Map initializing module will read the date file in the beginning of the program. And then it uses an adjacency list to store the whole map.

Map changing module is to change the map by adding or deleting vertexes or edges from the map.

Map printing module will output current map date into a given file.

Route finding module will compute the shortest route between 2 given points on the map.

User interface module will read user's input and call other modules to output proper result.

2.3 Iterations of design

Map initializing module will be developed first. The program should read the date file and store it in an adjacency list first. Then map changing and printing modules will be developed. At last, the route finding and user interface modules will be developed. The date structure to store the map date is the simplest application of this program.

3. Test plan

The program will work in both Windows and Linux system. So, it will be tested in both two systems.

For map initializing, changing and printing modules, there will be three tests. First, let the program read the date file and then output its map date into a given file. The expected output is that the date outputting is the same as the date inputting. Second, let the program read the date file and add one vertex and one edge into the map. And then the program prints the map. The expected

output is that the program prints the right map. Third, let the program read the date file and delete one vertex and one edge from the map. The expected output is that the program prints the right map.

For the route finding and user interface modules, there will be two tests. First, input two unavailable points which don't exist in the map. The expected output is an error message. Second, input two available points in the map. The expected output is the shortest route between 2 given points.

4. Schedule

In the first week of this project, the map initializing, changing and printing modules will be developed and tested. The developed code and test results will be updated to Github. And the route finding and user interface modules will be designed.

In the second week of this project the route finding and user interface modules will be developed and tested. The developed code and test results will also be updated to Github.