

Program Requirements

Working on the finding the shortest path for an emergency vehicle using the shortest path algorithm. Where the program will read in the data files with distances and different routes and output the shortest path to get to the final destination.

Program Inputs:

- Starting Destination
- Final destination
- Different Routes and their times.

Program Outputs:

- Shortest path between starting and final destination
- Distance of the shortest path

Test Cases:

Test Case 1:

Start location: A

End Location: D

A-B (3km)

B-C (7km)

C-D (2km)

A-C(5km)

Shortest path is A-C-D which is 7km

Test Case 2:

Start location: I

End Location:

I-J (5km)

J-K (1km)

K-L (2km)

J-L (4km)

Shortest path is I-J-K-L which is 8km

Test Case 3:

Start location: X

End Location: Z

X-Y (2km)

Y-Z (2km)

X-Z (8km)

Shortest path is X-Y-Z which is 4km

Algorithm:

1. Read in the text file as a graph which will have the location and the distance between each location
2. Have a start and an end location.
3. Have a structure which will keep track of all the locations that the program has compare. This is to revisit later and compare more the paths.
4. In the data structure, when items are pushed, prioritize the locations which have the shortest distance in between them.
5. Always select the location with the least distance between them compared to the locations adjacent to it.
6. From the adjacent location then look at the next location with the shortest distance
7. Compare the locations from the start till this point.
8. Again prioritize the path which has the shortest distance from the starting point to the current location..
9. Add the new shortest path to the queue.
10. Repeat the steps 5 through 10 till the final location is reached and the shortest path between the starting and the final point is found.
11. Output the top of the queue which is the shortest distance from the starting point to the final point.