

Intelligent Robotics

ENGT4311

Lab Assignment - Path Planning

Lab Assignment G2 Group Assignment (2 weeks)

Due: week 8

Implement the Dijkstra Algorithm as defined in the lecture notes.

- An environment file that specifies distances between max. 40 nodes is given as a text file, which has to be read at the beginning of the program.
- The first node in this list is the start node
the last node is the goal node

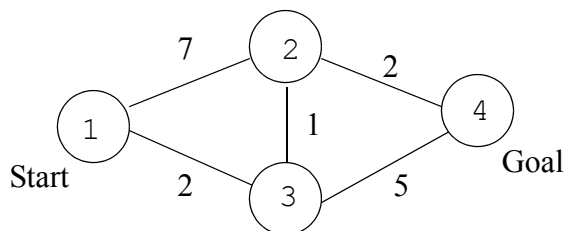
Format: number of nodes (newline)
 distances from first node to all other nodes (newline)
 distances from second node to all other nodes (newline)
 ...

Note: Table will be symmetric since we use undirected arcs
 Value 99999 is used to indicate no link (or infinite length)

Example with 4 nodes:

```
4
0      7   2  99999
7      0   1   2
2      1   0   5
99999  2   5   0
```

Corresponding graph:



Task1: Read the input file, print the shortest path sequence and the corresponding path length.
E.g. for the above example:
Shortest path is: 1 --> 3 --> 2 --> 4, Path length is: 5

Task2: An extended input file also contains the [x, y] coordinates of all n nodes.
So e.g. extending the previous example:

```
4
0      7      2  99999
7      0      1   2
2      1      0   5
99999  2      5   0
      0  500
700  100
100  400
800  200
```

Assuming the robot starts in the start node (node 1) in default orientation, write a driving program for the EyeSim simulation system that lets the robots calculate the shortest path to the goal node, then drive along the shortest path in the simulation.

For details on EyeSim see:

<http://robotics.ee.uwa.edu.au/eyebot/doc/sim/sim.html>