Laboratory Work #4

Deadline May 9, 2016

Finding shortest path between two points in a maze using A* algorithm

Given the following map find the shortest path from point A to point B using A* algorithm.

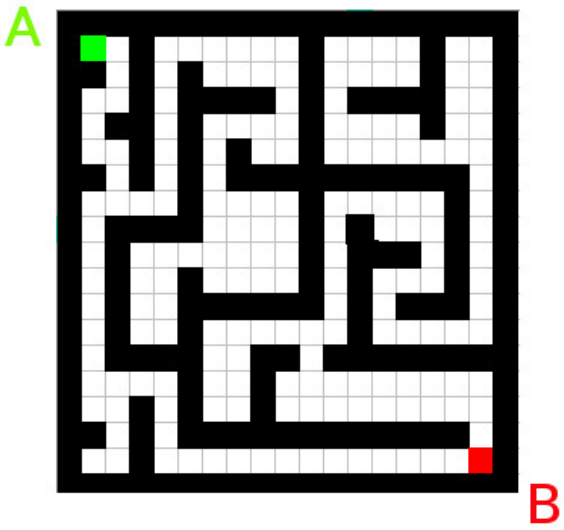

Figure 1: Square shaped maze. Each cell is one unit. Square is 19x19 units. Source point is green, destination point is red.

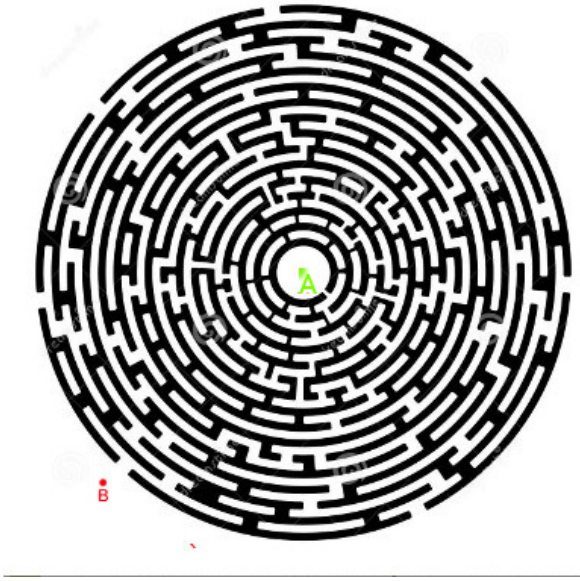

Figure 2: Round shaped maze, Source: http://www.dreamstime.com/stock-photos-round-maze-izolated-white-image16894343

Report should include:

1. Brief explanation of A* algorithm.
2. Judgements on the cost function used in algorithm implementation. Discuss criteria which cost function must respect so that algorithm will converge.
3. Propose a cost function for round shaped maze. See example on Figure 2.
4. Compare performance of A* algorithm to that of Dijkstra algorithm of finding shortest distance in the graph.

Grades:

The report should be written in such a manner that another person will be able to decide if this algorithm is suitable for this type problems. You should be ready to write the implementation of this algorithm as accurately as possible in the language of your choice using only pen and paper.