2019/2020 COMP1037 Tutorial 1 – Search Techniques

Introduction

This tutorial guide you study a piece of Matlab implementation of A* algorithm adopted from the MathWorks. The main goal is to give you first-hand experience on implementing search techniques for solving the shortest route problem in Matlab, one of the mostly adapted high level languages and analytic tools in business and research. Please go through the code 'AStar' and try to implement and answer all the following questions.

(a) Design your problem with given code using a 20 X 20 map (initialize the obstacles, target and starting point). Show the routes found by A* search algorithm. Save all the variables related to defining the problem into '**problem-XXX.mat**'.

(b) You are required to implement Greedy Search and Uninform Cost Search algorithms based on the A* code.

(c) You are required to use the matlab basics from the first lab session to show the evaluation results of the three searching methods (hint: bar/plot) with respect to the '**total path cost**', '**number of nodes discovered**' and '**number of nodes expanded**'. Explain how you can extract the related information from data stored in variable '**QUEUE'**

(d) Design and implement another heuristic h2 which is different from the one (h1) is used in the A* matlab code, explain how h2 works and show what changes you have made to change the heuristic function from h1 to h2. Is h2 optimal? Why? Which heuristic is better? Why?