ARTIFICIAL INTELLIGENCE Spring 2020

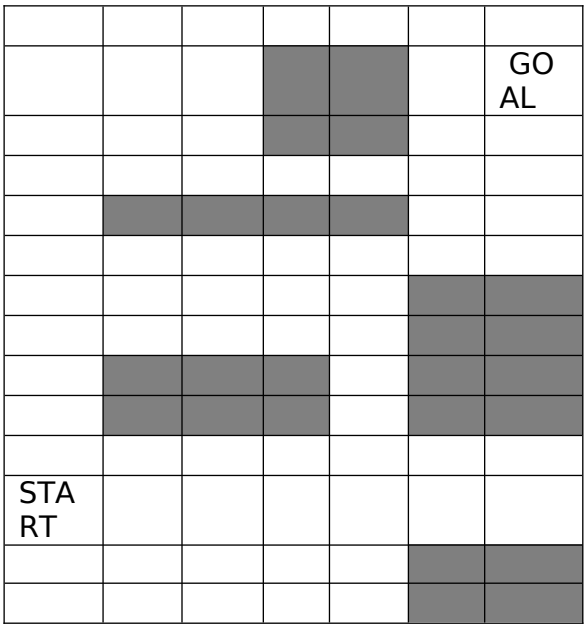
ASSIGNMENT 1

Due: 11th February 4:00 PM

You can do this in a group of two people.

PROBLEM

Design a robot navigation system which is able to conduct blind searches to find its path from start to goal state. As input, the system will take a description of the maze stored as a text file. The maze is a 2D grid with obstacles inside it. An example of such a maze is given below:



The obstacles are filled rectangles of unknown dimensions and can be found anywhere in the maze. The robot cannot be in those cells. There are 3 actions allowed. Up one cell (cost is 2), right one cell (cost is 2), diagonally up towards the right(cost is 3). Carefully think about the configuration of a **state**. The system should output:

1. The complete path if goal is found otherwise failure
2. The total cost of the path
3. A grid which shows the path followed. You do not need graphics for this output. The grid can be made textually using 1 for obstacles, 0 for empty cells and '*' for path followed

FORMAT OF INPUT FILE (sample file grid.txt for above grid provided.)

Rows Cols //dimensions of the grid on line one

start coordinates on line two

goal coordinates on line three

the grid itself, one row per line. There will be a zero for empty slot and one for an obstacle. **The (0,0) coordinate is the bottom left cell.**

You need to follow this format of text file as your code will be tested with similar grid files.

ALGORITHMS TO IMPLEMENT

1. Breadth-first search
2. Depth-first search
3. Iterative deepening search

Submit at Xeon. You can implement this using any programming language. You may use any built-in template-based stacks/queues.