Project 1: Artificial Intelligence

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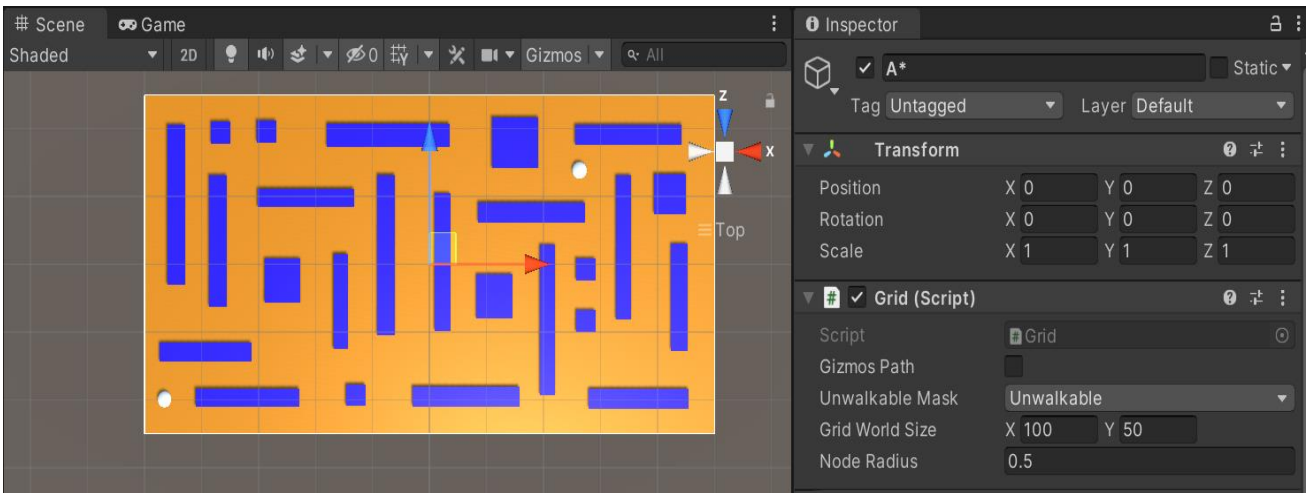
Introduction:

In this project, we implemented pathfinding algorithms (A* with different heuristic function, BFS, DFS, UCS).

We run this project using Unity 2D, and we got different paths using different strategies which are represented with different colors.

We used seeker (white capsule), target (white capsule), and obstacles (blue boxes) in a large environment: a plane with a grid world size (100 × 50) to find a path from the seeker to the target which is the objective of each strategy.

Grid World Size



The screenshots:

We will first show all the paths together in one screenshot. And then we will show the screenshot of each strategy separately because sometimes they may intersect with each other.

In all the screenshots, each color represents a specific path:

A* Euclidian: red

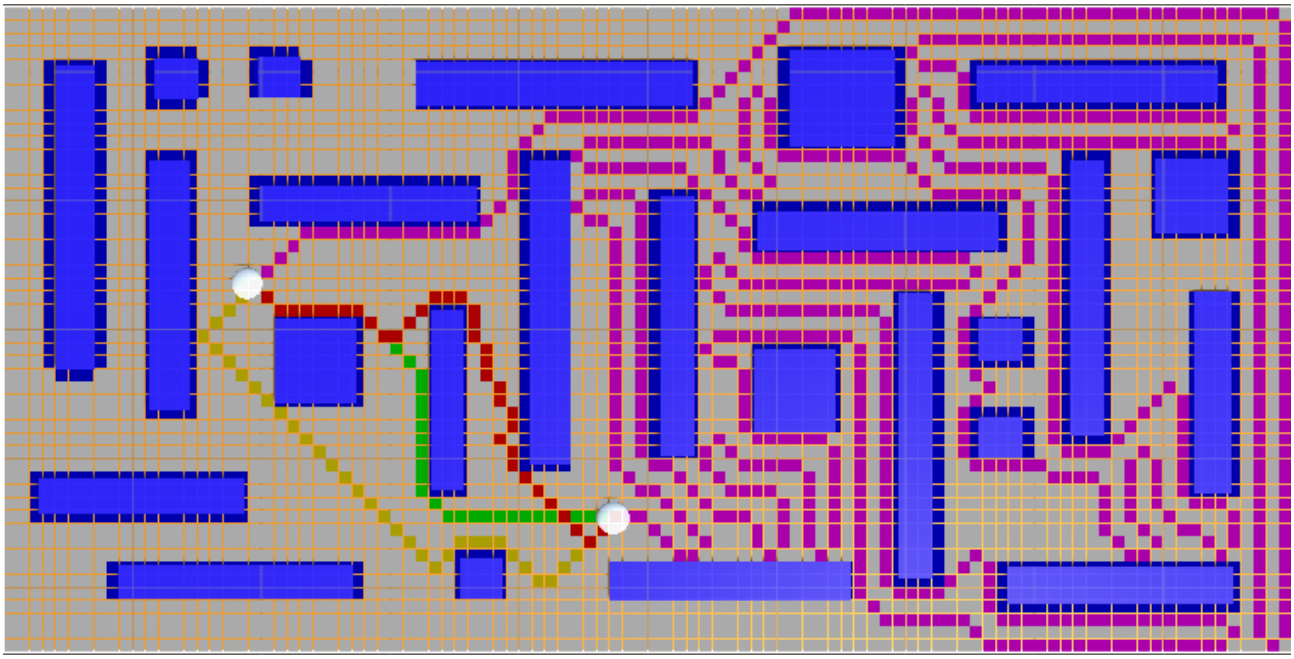
A* Manhattan: green

BFS: black

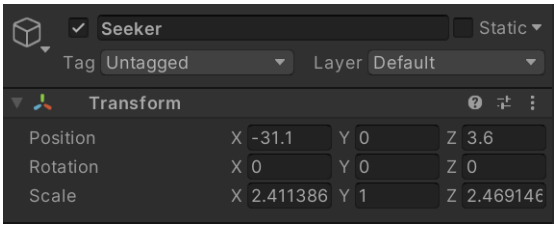
DFS: magenta

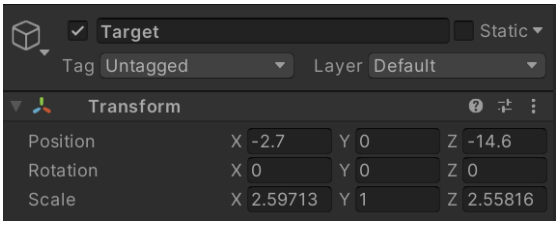
UCS: yellow

All the paths in one configuration:

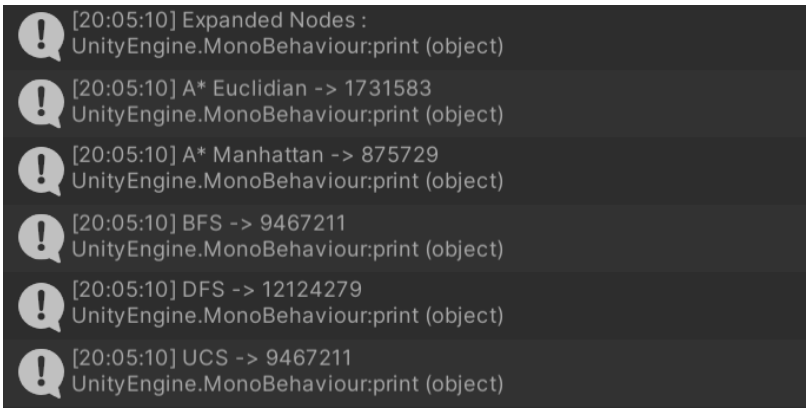


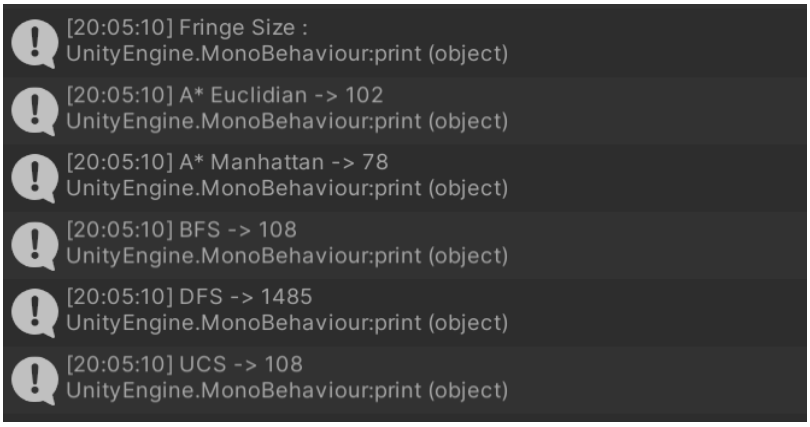
In this example, we have the position of the seeker and target:

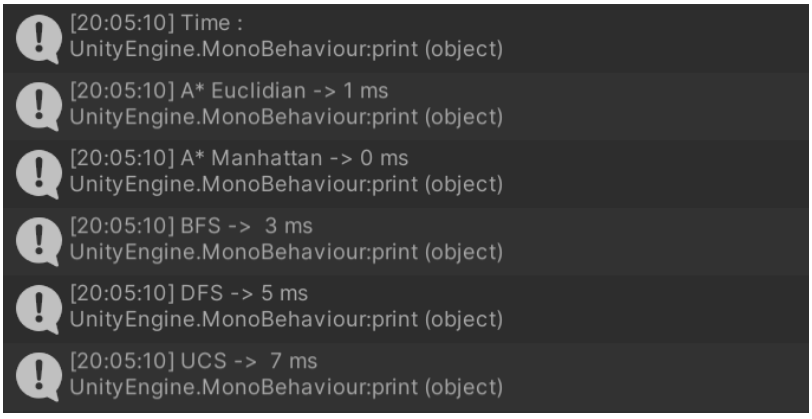




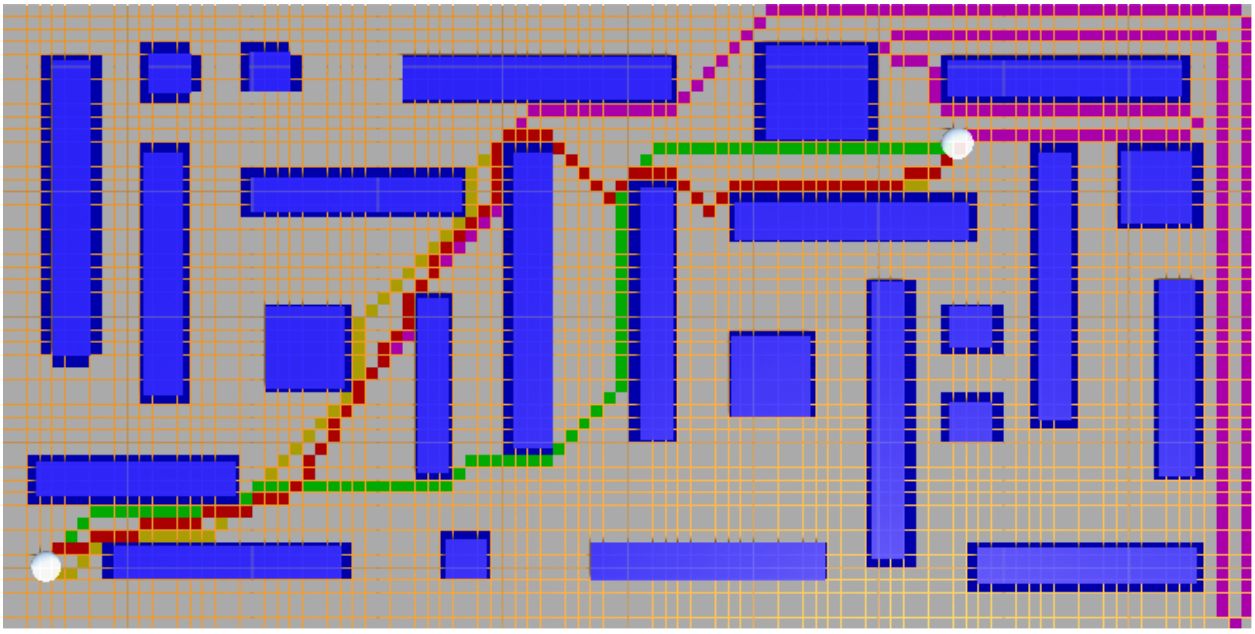
The Expanded nodes, Fringe, and Time:

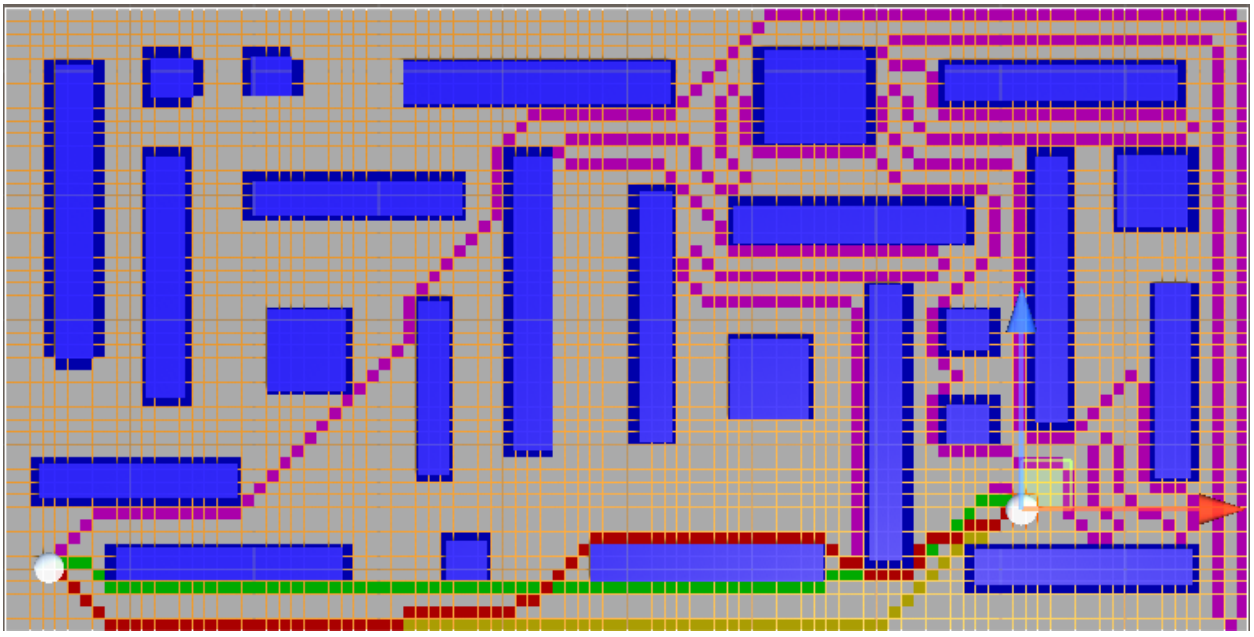






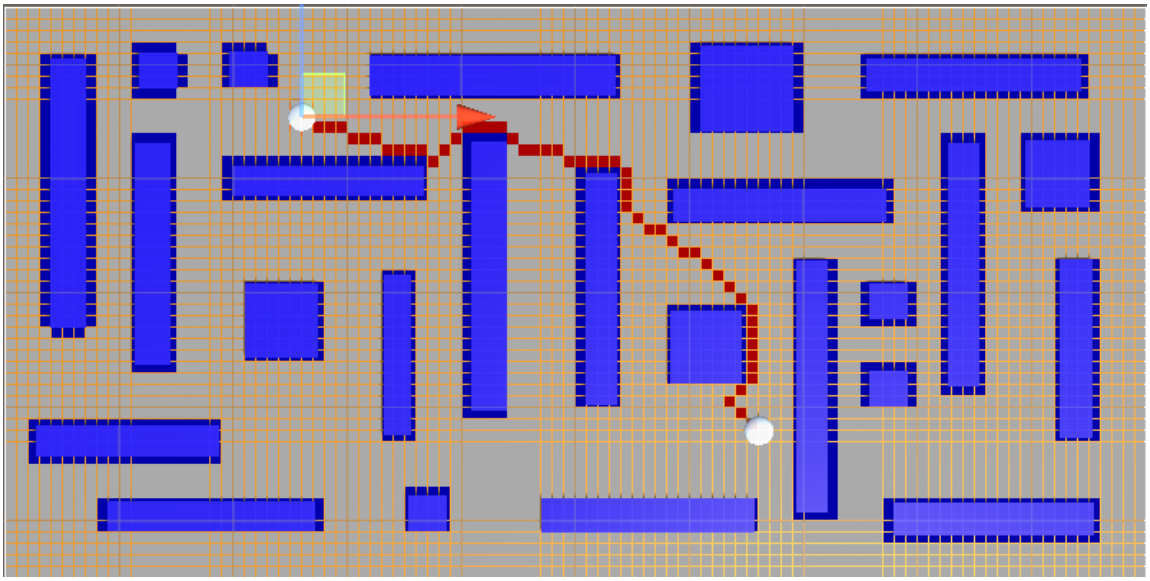
All the paths in one configuration with different positions:



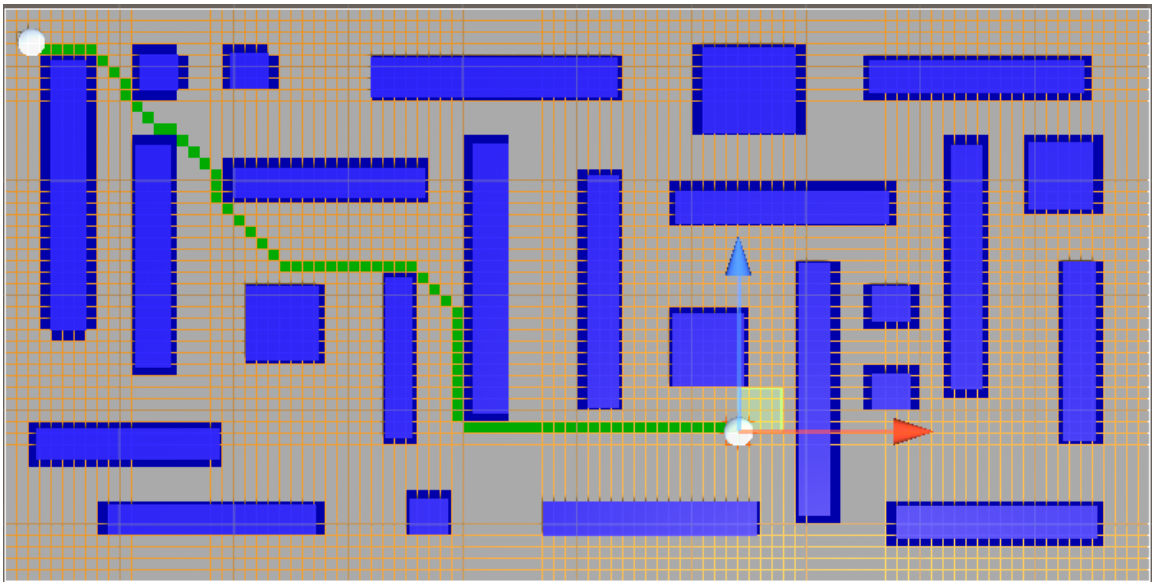


Different paths in separate configurations:

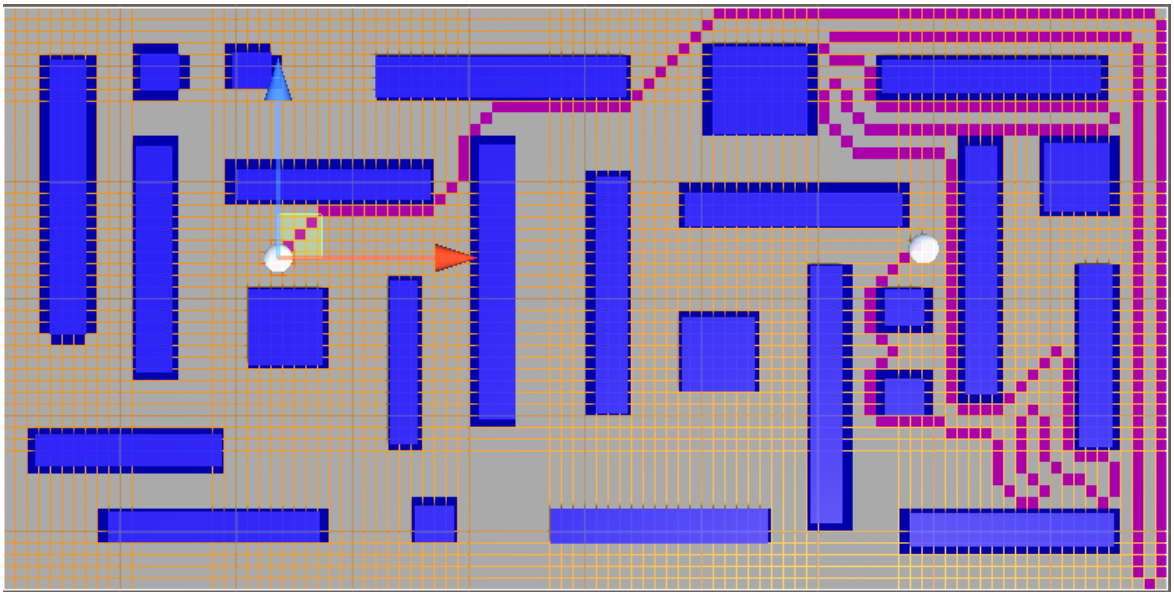
-A* Euclidian:



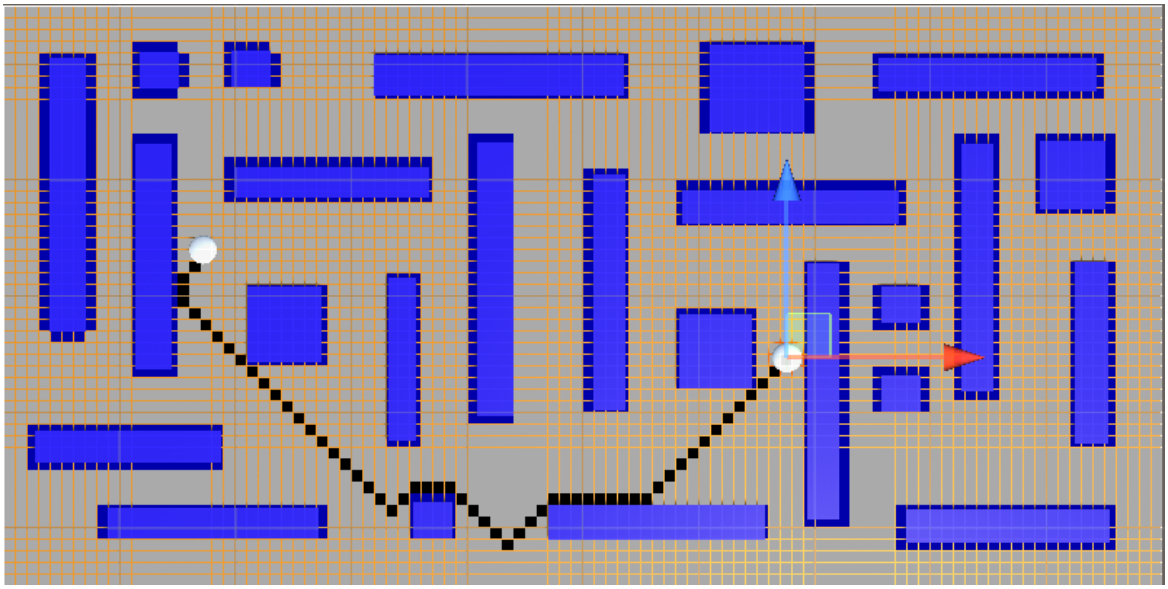
-A* Manhattan:



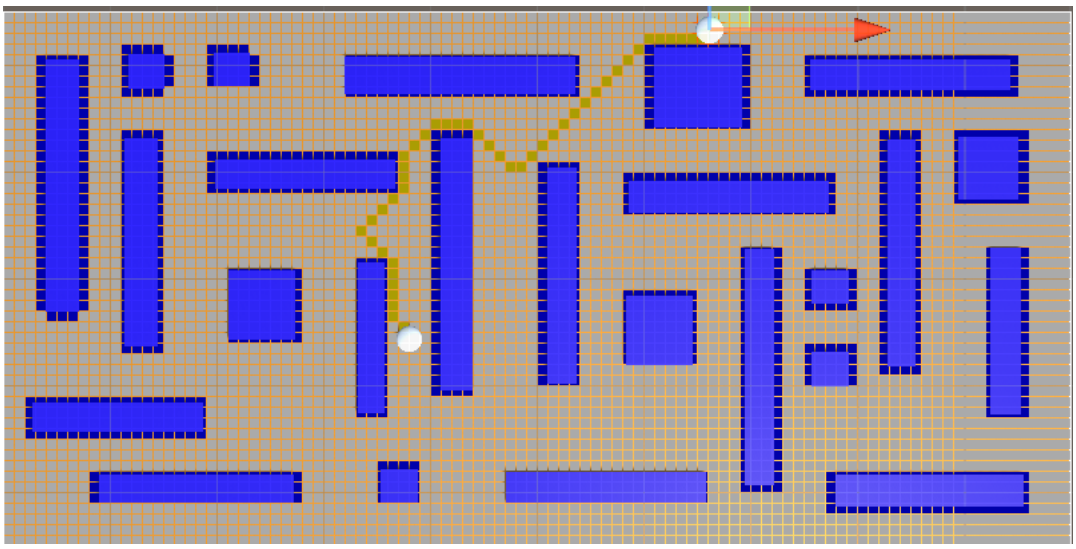
-DFS path



-BFS path:



-UCS:



References:

Sebastian Lague Youtube channel: https://www.youtube.com/watch?v=-L-WgKMFuhE&list=PLFt_AvWsXl0cq5Umv3pMC9SPnKjfp9eGW
Github course code: https://github.com/SebLague/Pathfinding