Report of Project #1

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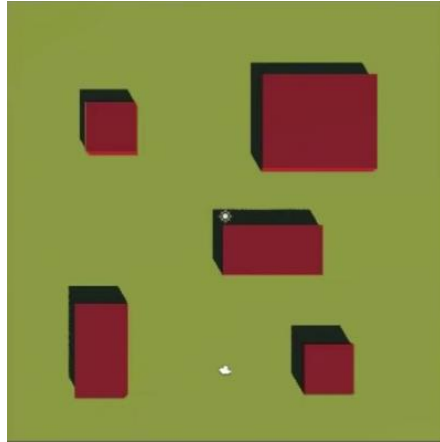
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CSC 4301

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1- The environment/grid:

The first screenshot shows the environment/grid that Sebastian has made in the YouTube video, we thought about making an environment that will be lager and more complex than the one Sebastian has made.
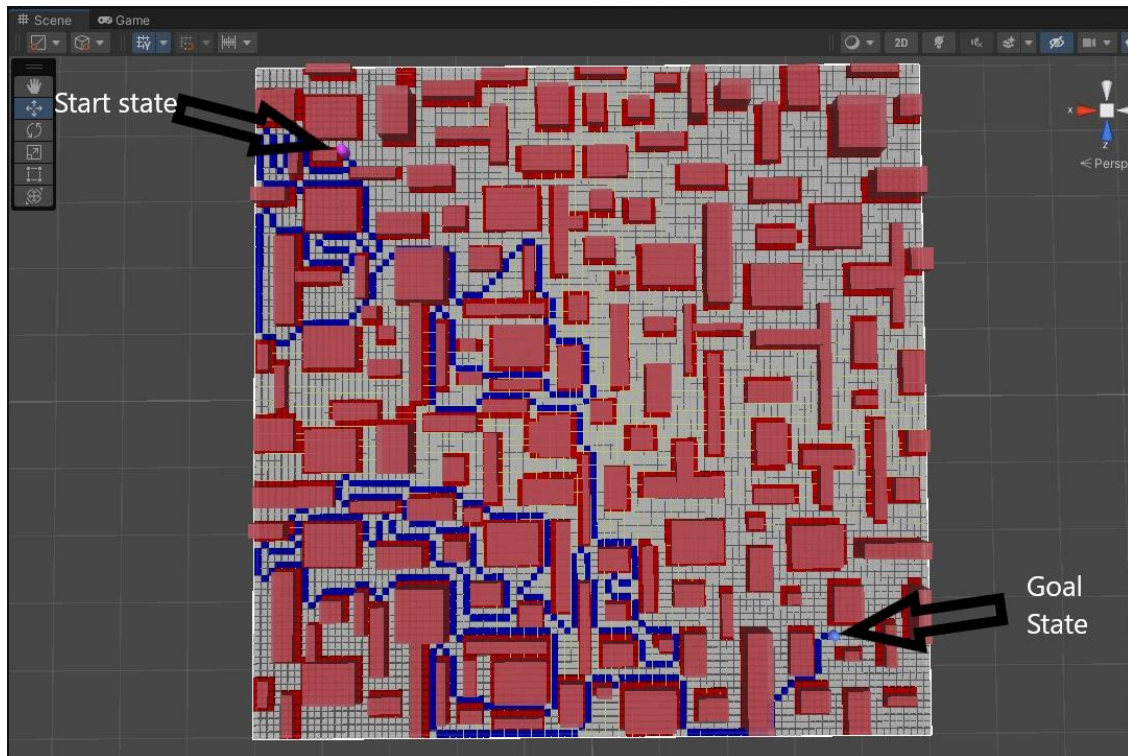

This second screenshot shows the environment/grid that we have created, we believe that this one is more complex and leverages the attributes of the search techniques that we are going to test.
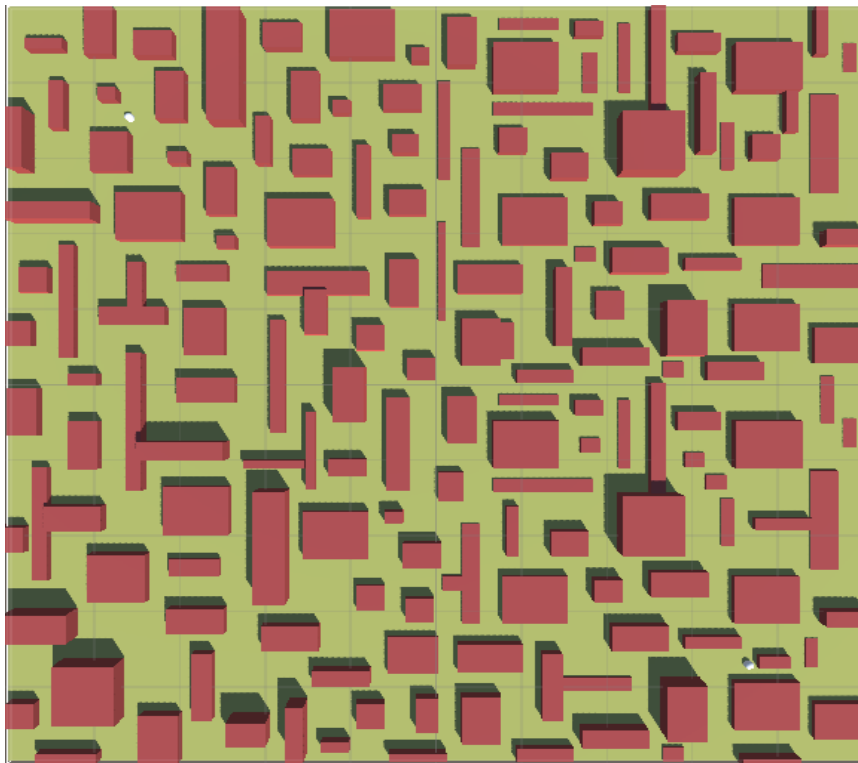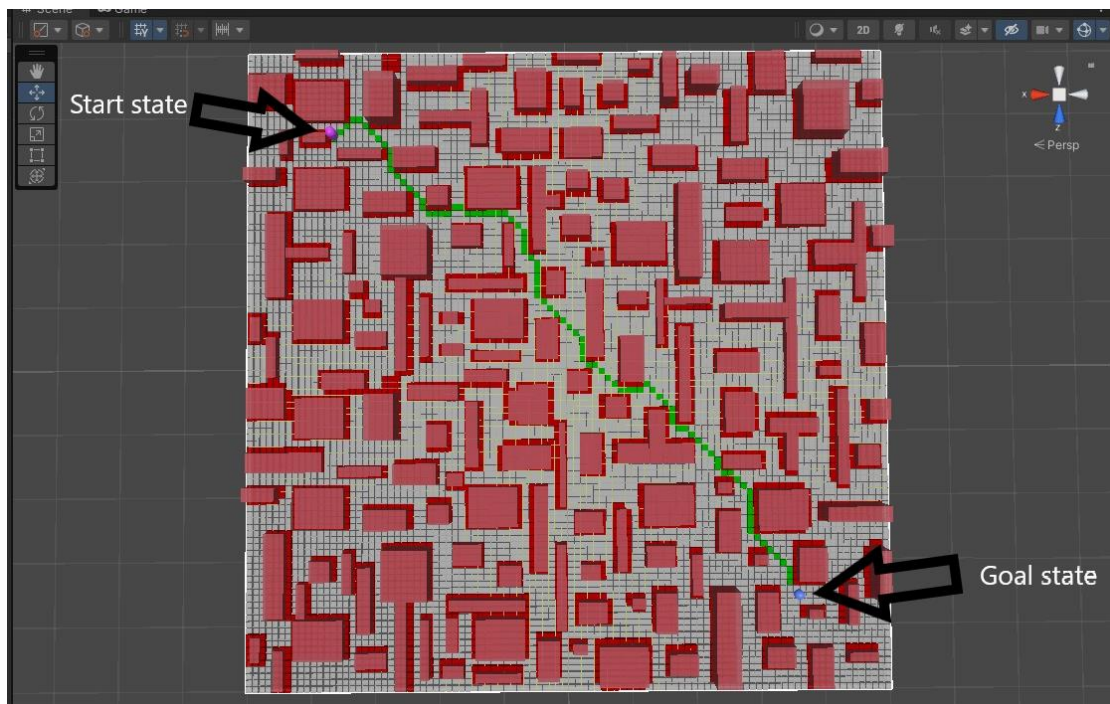
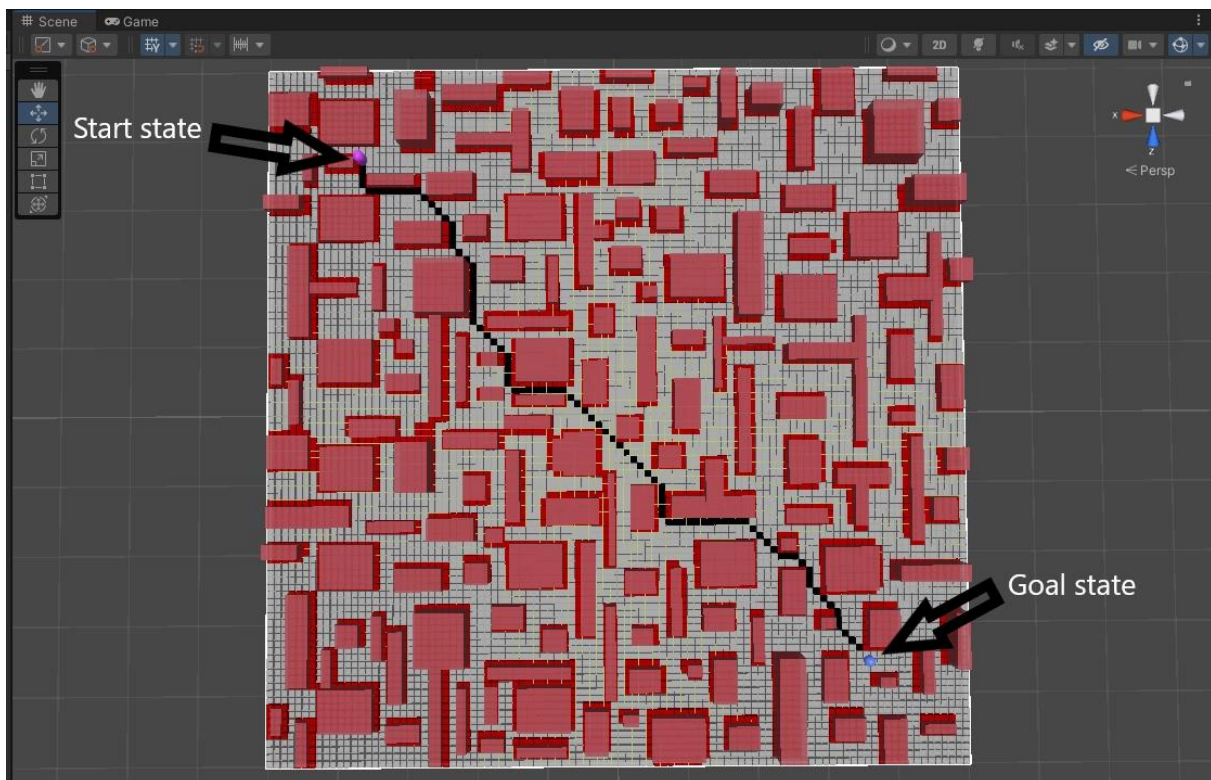## 2- **(DFS, BFS, UCS, A*) simulations:**

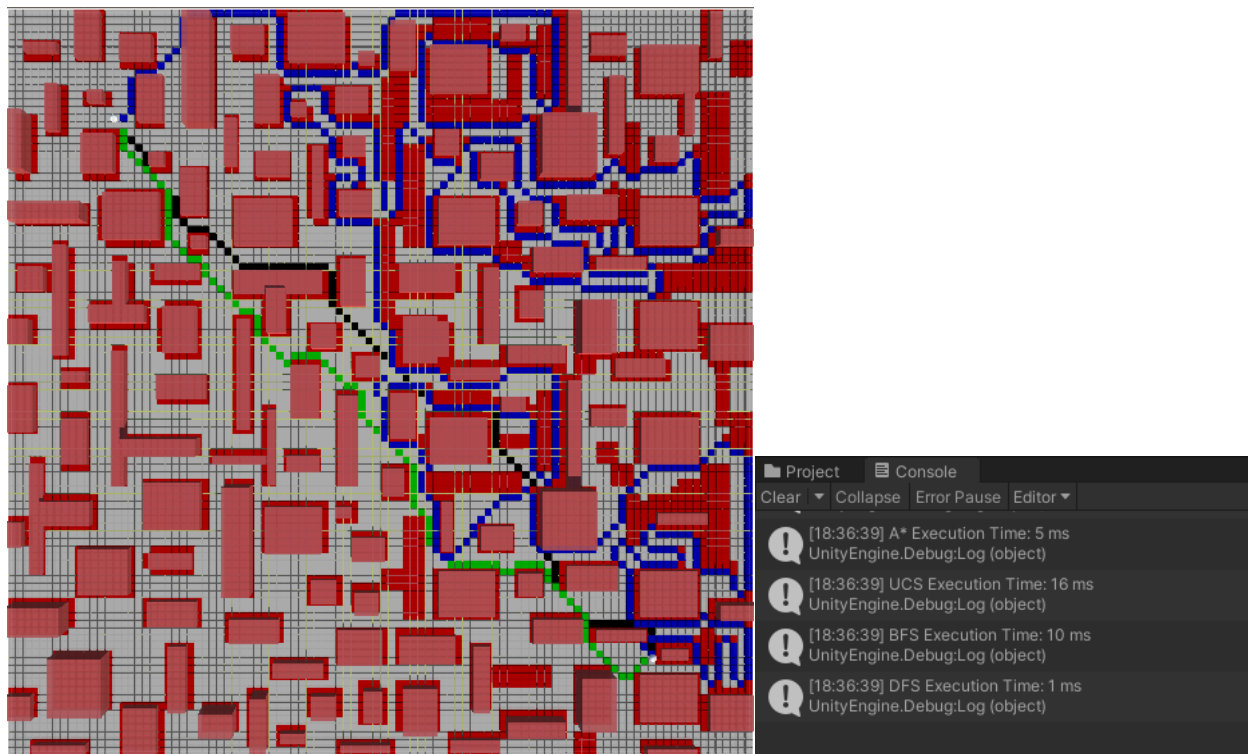a- DFS simulation:

b- BFS simulation:

c- UCS simulation:

Start state

Goal state

d- A* simulation:

Start state

Goal state

3- Performance & Solutions comparison:

Trial 1:

[18:36:39] A* Execution Time: 5 ms
UnityEngine.Debug:Log (object)

[18:36:39] UCS Execution Time: 16 ms
UnityEngine.Debug:Log (object)

[18:36:39] BFS Execution Time: 10 ms
UnityEngine.Debug:Log (object)

[18:36:39] DFS Execution Time: 1 ms
UnityEngine.Debug:Log (object)

Trial 2:

[18:39:03] A* Execution Time: 2 ms
UnityEngine.Debug:Log (object)

[18:39:03] UCS Execution Time: 80 ms
UnityEngine.Debug:Log (object)

[18:39:03] BFS Execution Time: 6 ms
UnityEngine.Debug:Log (object)
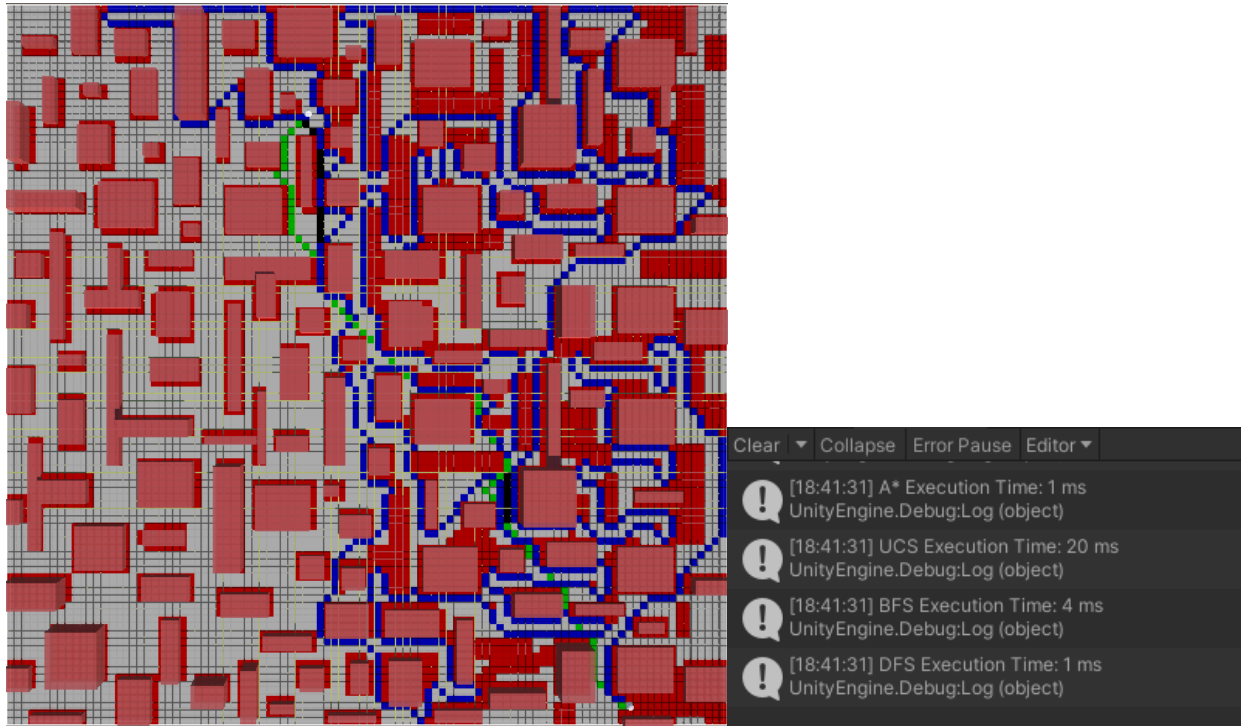
[18:39:03] DFS Execution Time: 3 ms
UnityEngine.Debug:Log (object)

Trial 3:

From the three trials that we have made, we can clearly see that A* generates the shortest/cheapest path in a relatively short amount of time, the four search techniques average the following amount of time:

- A*: 2.66 ms
- UCS: 38.66 ms
- BFS: 6.66 ms
- DFS: 1.66 ms

These results may vary depending on the processing power, operating system, background processes and start/goal state. We can safely assume that UCS is the slowest, BFS being the fastest, A* generates the cheapest path and DFS generates the most expensive path.