Compulsory 3 Report

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For this compulsory, we used C# and Unity. You can choose which problem to solve and algorithm to use in the menu system. When the algorithm is done, you can hide unused edges by hitting spacebar, and you can return to menu by hitting backspace.

The assignment was not too difficult nor too easy. The difficulty depended on how many algorithms we decided to do. Since we are both working on a game beside our studies, and the system thinking course took so much time, we decided to do A*, Dijkstra and Nearest Neighbor for the traveling salesman problem. Anders did the menu-system, graph generation, and Nearest Neighbor, while Thomas did A*, Djikstra and the visualization of path cost.

The most difficult parts of this assignment were where to start, and generating a random, but connected graph. To generate the graph, we shuffle the list of nodes, and connect node number i to node number i+1. This ensures that there is always at least one connected path through all nodes. Then we loop through each node and connect it to random other nodes, until there is the correct number of edges per node.

Doing the compulsory took us about 40-ish hours total, but this was spread out between having to work on big projects in system thinking, so it was nice having many weeks to work over.

We used the following sources:

- Traveling salesman (Nearest Neighbour):

Wikipedia contributors. (2022, November 18). Travelling salesman problem. In *Wikipedia, The Free Encyclopedia*. Retrieved 09:43, November 21, 2022, from https://en.wikipedia.org/w/index.php?title=Travelling_salesman_problem&oldid=112266 3503

- Dijkstra and A*:

A* Search Algorithm. (2016, June 16). *GeeksforGeeks*. https://www.geeksforgeeks.org/a-search-algorithm/

de Byl, P. (n.d.). *The Beginner's Guide to Artificial Intelligence (Unity 2022)*. Udemy. Retrieved November 21, 2022, from https://www.udemy.com/course/artificial-intelligence-in-unity/

- Unity menu system:

gamesplusjames (Director). (2021, June 30). *Creating A Main Menu Screen—Complete Unity Menu System*. https://www.youtube.com/watch?v=76WOa6IU_s8

gamesplusjames (Director). (2021, July 7). *Adding Graphics Options To Your Games—*

Complete Unity Menu System. https://www.youtube.com/watch?v=eki-6QBtDAg

- Shuffling list:

Shah, S. (2014, March 26). *Answer to "Randomize a List<T>."* Stack Overflow.

https://stackoverflow.com/a/22668974