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Project Proposal

1. Introduction of the problem:

   Path-planning in multi-agent environments:

   This project will be a version of assignment 1 where there are three pathfinding agents instead of just one. Each agent will attempt to get to the closest start square that is not its own. Each square that an agent explores will be made impossible for the other agents to explore and vice versa, forcing the agents to path find dynamically around each other. They take turns exploring one square at a time.

2. Motivation for the problem:

   The motivation for this problem is to model how three agents could compete against each other for the optimal path to each other's start spots. As they broaden their search and attempt to find the optimal path, optimal routes are taken over by the opposing agent. This could be expanded on to model how to opponents might behave in a competitive game involving traversing an environment, like capture the flag.

3. Method of AI:

   The AI method used will be pathfinding, specifically the A* heuristic search.

4. Deliverables:

   The project will consist of four text files; one is a CSV with a grid of squares to be traversed, with A representing the start square of the first agent, B representing the start square of the second agent, C representing the start square of the third agent, X representing squares that can't be traversed, and numbers representing the cost of traversal for all other squares. Then there will be one text file for each agent, with the optimal path cost, explored nodes, and optimal path of that agent output to it.