Project #3 – Maze Game

Story:

The purpose of this project is to design and create a multiplayer Maze Game. The different players will be placed somewhere in the maze and the main objective is to exit it as fast as possible. Different players will adopt different strategies of navigation in order to find the way out. Thus the project is divided into two main compartments: Building the maze and navigating it.

To simulate the maze, we will build an undirected weighted graph. The nodes in the graph represent the turning points (when the player needs to make a choice which direction to follow if there is more than one choice). The edges represent the path that the player needs to follow to reach the next turning point. Like real life, there are distances that separate every two neighboring turning points (nodes); those distances are represented by the weights of the edges. Some of the nodes (randomly selected) will be marked as exit nodes. If a player reaches that node, the game will be over.

After the maze is built, three players will be created and placed on one of the nodes (none marked). Every player will have a vision limit where they can only see nodes less or equal to a certain distance. The goal of each player is to find the exit node and leave the maze. Every player will adopt a specific navigation strategy: random - where the player chooses the direction randomly, Shortest Path – where the player will always go to the closest node while the exit node is not within the vision limit, and Farthest Path – where the player will favor the path with the longest distance (biggest weights). In order to navigate, every player will roll a dice with a certain max value specified when the maze is built. The number obtained from rolling the dice decides the distance that the player will go. If the player is currently at a node, or the steps take the user past the next node then go on to the next step to determine the direction to move past the node. Otherwise, just continue in the current direction for the number of steps. *("CS150 Project 2 Description")*

When the game starts, in every round, each player will get roll the dice and proceed the amount of step got. At the beginning of each round where every player takes a turn, the program will prompt the user for a command: • 'x': exit the program • 'c': continue running the program without stopping to prompt the user • 'p': print the position of every player 1 • 'i': continue with the round, making sure every player has a turn. ("CS150 Project 2 Description")

Our aim is to find out which of the navigation strategy is better to exit the maze depending on the parameters (limit of vision, dice max value …).