Honors Student: Carrie Mu
Project Mentor: Carlos Moreno
Course: CS20

3D Tic-tac-toe Artificial Intelligence

I.   Guiding Question/ Thesis/ Idea

Tic-tac-toe may seem like a very simple game, but 3D Tic-Tac-Toe is far from easy. In 3D tic-tac-toe, there is a cube with side length r. The goal of this game is to get r spots in a row horizontally, vertically, or from one corner of the cube to another. As the value of r increases, the difficulty of the game increases to the point where it is challenging for humans to play, as humans are prone to making errors and cannot keep a lot of contingency plans in their head. However, if done by a machine, winning or tying every time is very possible no matter how big r is. In my project I intend to create an artificial intelligence (AI) program that will always win or draw at a game of 3D tic-tac-toe, where the value of r is determined by the user, in the range 3-6.

II.   Method of Research

My plan is to first learn to understand how AI can be applied to generate successful strategies in 3D tic-tac-toe, along with how game theory fundamentals provide justification for such strategies. Secondly, I will find a library that I can use to create the visuals of the game and learn how to use it. I will then plan the algorithms and data structures needed to create this project. Lastly, I will implement these ideas to create a program. After the coding is completed, I will write a summative report and create a presentation about the concepts behind this project.

III.   Outcome

The outcome of this honors project will be an artificial intelligence program that plays 3D Tic-tac-toe and will not lose. I will also submit a report talking about the implementations of my code in a addition to a presentation.

IV.   Project Timeline

- Feb 3: Submit proposal
- Feb 28: learn about game theory and how I can implement AI in a game like tic-tac-toe
- April 2: Find a visual library for c++ and learn how to use it
- May 5: Create the program and submit it to my professor for review
- May 19: submit final program + report + presentation

I will meet with the professor every 2 weeks.