

Report of final project COMP424

Hao Chen He (260917762) and Cindy Hu

April 2022

1 Introduction

For the final project, we are tasked to reproduce a game of "Colosseum Survival" using our own heuristics and algorithm to create an agent using the code provided.

2 Technical approach

2.1 Motivation for the approach

Our game is composed of two players, in our case, it would be our own agent that we create and a random agent provided.

Since it is a game, our first thought was to use an algorithm that allowed us to predict optimal moves for our opponents as well as our own agent's optimal moves. "Colosseum Survival" is a 2-player, turn-taking, perfect information, deterministic game. Therefore, this game can be modelled as a search problem. We have perfect information because although as the game start, our agents are not entirely aware where all the barriers are, they can look for it and determine whether or not there is one and the barriers do not change as the game progresses.

The first thing to figure out for us is to define our utility, which is the way we measure how optimal a step that our agent is about to take is. Therefore, our idea is to implement the Minimax algorithm with alpha-beta pruning to allow us to complete the game. Minimax is an algorithm that allows our agent to maximize its moves while also minimizing the moves the opponent makes. Alpha-beta pruning is an optimization algorithm that will allow us to cut down the computation time to find the optimal path for our agent.

3 Pros and cons of the approach

4 Improvements