CS 470/670 – Intro to Artificial Intelligence – Spring 2020

Instructor: Marc Pomplun

Assignment #4

Posted on April 23, Due by May 10 at 11:59pm

Question 1: Fun with Checkers – the Game Tournament

As explained in the "Assignment #4 Explanation Video" and the "Online Class Session 04/21" videos on Piazza, your task is to develop a Python game playing algorithm that will compete in the game tournament that I will hold offline on May 11, and the winner will be honored in our final class session on May 12.

Download the FunWithCheckers.py, graphics.py, Alan_Turing,py, Cookie_Monster.py, and Homer_Simpson.py files from the General Resources section and put them in the same directory on your computer. You should take the Alan_Turing.py code, name it after yourself in the same fashion (e.g., John_Doe.py), and modify it to create your own game playing algorithm.

Alan_Turing.py only looks ahead by one move and then picks the one that gives the greatest score. You, on the other hand, have to implement a minimax algorithm to look multiple moves ahead. It needs to use iterative deepening, i.e., first look ahead by only one move, then store this as the best move so far, then start over and look two moves ahead, and overwrite the best move with the new one, and so on. Once you run out of time (call the timeOut function regularly to check for this), return the best move you found in the last fully executed minimax procedure. Also, improve the simple GetScore function used by Alan_Turing at least a little bit. If you do all of this correctly, you will get a full score for this assignment.

However, if you want to win the tournament, you will have to do better. For example, implement alpha-beta pruning and think about how to streamline computation if your and the opponent's pieces are far away from each other.

You can only use standard Python modules that are included when you install Python; the only non-standard module allowed is numpy. We talked about ctypes in class, but after reviewing it, I decided that we should not use it because of possible code incompatibilities across platforms.

It should go without saying that you are not allowed to copy code from anyone or anywhere, except for the code provided for this assignment. You can always discuss ideas with other people, and you can look online to study solutions for problems, but you have to write your own code. Anything else would be plagiarism.

Let us discuss any question you may have on Piazza and, most importantly, have fun!