**Project 3**

**Artificial Intelligence**

**CSCE 5210 – Fall 2021**

**Distributed: Wednesday 27 October**

**Due: Wednesday, November 24**

*[Solutions to this assignment must be submitted via CANVAS prior to midnight on the due date. Submissions no more than one day late will not be penalized. Submissions up to one week late will be penalized 10 points. Submissions will not be accepted if more than one week later than the due date.]*

**Purpose**: To demonstrate understanding of α-β search.

**What to do:** Implement the α-β search algorithm given the following specifications:

* The game is Tic-Tac-Toe
* The initial state is a blank board
* There are two opposed and informed players, MAX and MIN
* The program is the MAX player and MAX’s actions are chosen by the program
* The opposed player is MIN, and MIN’s actions are chosen via keyboard input
* The terminal state utilities are +1 (MAX wins), -1 (MIN wins), and 0 (tie)

After each MAX action, there must be a clear display of the current board configuration and clear directions to the keyboard user (MIN) indicating how to enter an action. MAX’s actions should be displayed as an ‘X.’ MIN’s actions should be represented as an ‘O.’

**Hand in**:

* The Python code in pdf form
* Sample executions (screen views):
  1. A case in which MAX wins (include the α-β values for the game nodes)
  2. A case in which MIN wins (may be omitted with an explanation)
  3. A case in which there is a tie

There have also been some queries about the requirement for showing the alpha beta values. Basically, what we need is an assessment of how effective the pruning process has been. Thus the ideal way of demonstrating this is to capture summary statistics about the effectiveness of the pruning - it is not required to show the values for each cut. You may also wish to show some sample cuts but a more effective approach is the summary statistics.