**California State University, Fresno – Fall 2013**

**Computer Science 166, Principles of AI (3 units)**

**Assignment #4**

**Due:** 1/30/14

**Value:** 30 points

**Part 1: Min-Max Search: tic-tac-toe**

In this part of the assignment you will play a few games of tic-tac-toe with the computer and keep track of the moves made by the computer and the number of nodes the computer needed to search to decide its move.

To play tic-tac-toe with the computer you will need to run the file tic-tac-toe.py.

Play three different games trying different moves for each of the games, and recording all of the nodes expanded for each of the moves.

**Part 2: Min-Max Search Algorithm**

Find the python code for MiniMax\_Decision and list it. The search algorithm depends upon several functions defined within the Game class. Find and describe these functions.

**Part 3: Alpha-Beta Pruning**

Explain how Alpha-Beta Pruning can help Min-Max search.

**Part 4: Heuristic Evaluation Function**

Explain how a heuristic evaluation function (rather than searching all the way to the final state) can further improve search performance. What is the danger when using the Heuristic Evaluation Function.