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# CS B551

## Elements of Artificial Intelligence

### Homework 1.

**Due by 4:00pm on Friday, Sept 4.**

#### Part I:

In 2013 Paul Allen, co-founder of Microsoft, founded an AI institute, to which he has provided \$400 million of funding. A major effort is developing systems which can pass standardized tests such as the New York Regents Science Test for fourth graders ([sample tests](#) are online). In about 200 words, what are the pros and cons for using performance on tests such as the grade 4 Science Test as the “gold standard” for measuring an AI system’s ability, compared to the Turing Test?

#### Part II: Decision-Making for Tic-Tac-Toe

This short assignment will refresh your python skills and start thinking about decision-making in AI systems. It will also provide a comparison point for possible methods when we begin our unit on AI methods for games. It asks you to write a move generator for tic-tac-toe. We provide a link to code to manage the board.

*For this assignment, you may talk with anyone you wish on how the existing code works, and do not need to acknowledge those discussions. You should not discuss your move selection strategies with anyone or look at any references on how to select moves.*

#### Provided Code

You will start from the [tic-tac-toe code](#) in an online tutorial describing writing a tic-tac-toe manager. If you are new to python, understanding this code will be very helpful as an illustration of common functions. This code manages a game between two human players.

#### Python Version

Code will be graded using the version of Python installed on the CS linux machines, Python 2.6.6.

#### Your task

Modify the code to take the input of whether the human will play X or O, and to replace the other player with a move-generation procedure. Note that in tic-tac-toe X always moves first.

You may wish to think of the move generation procedure as implementing a set of rules

for reacting to board positions (implementing a “simple reflex agent”). If you implement it this way, your program should satisfy at least the following: (1) if the other player has two in a row, the program should make its move to block the other player getting three (if the opponent could get three in a row in two ways---a “fork”---it can block either), (2) if it can get three in a row, it should, and (3) it should implement strategies for picking a good move in at least two other situations. In any other situation, any legal move is acceptable. Thus its play should be better than that of an agent which only satisfies (1) and (2).

Alternatively, you are free to pursue more novel approaches for which excellent performance is expected but not necessarily guaranteed. If you would like to do so, please discuss this with one of the AIs to have the approach approved before you begin, and note the AI with whom you discussed it in your submission file on strategy (see below).

Clearly designate the parts of the code you add and be sure to include comments (sufficiency and clarity of comments will be a factor in grading).

## Submission

The assignment will be submitted on [Canvas](#). Please ***include your name and username at the top of each file you submit and name all submission files based on your username.***

On all homeworks, we allow unlimited submissions up to the due date. We encourage making periodic submissions as you refine your answers. You should keep a copy of your solution until the grades have been posted.

You will submit three text files, (1) A text file with your answer to part I and for Part II a brief description of the strategy your program implements, and, if you developed strategy beyond the two rules above, why you expect the strategy to perform well (named <username>hw1-strategy.txt), (2) sample output showing your program running (named <username>-hw1-output.txt) and (3) your python code (named <username>-hw1.py).

## Please let us know if you have any questions!