Homework 1 - 17/10/17 **Deadline: 1/11/17 - 23:59**
CS 445/545
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Homework 1: Playing Checkers (Draughts - English)

In this assignment you are asked to implement the value iteration algorithm for playing the game English Checkers aka Draughts.

Description

- The majority of the game description is taken from `http://www.cs.wustl.edu/~sg/CS527_SP02/lecture2.html`. This description depends on estimating the value function.
- You will use a 8x8 board. Each of 64 (32 actually because only blacks are used) positions can; be empty, have a red piece, have a red king, a black piece, or a black king.
- To make things simple we assume that there are two players during the training; learner and its opponent. You are playing against yourself, so you get to decide what move your opponent is going to play, while generating states.
- Each board in an episode is on the learner's turn.
- Choose a move by looking at all legal moves and picking the one that takes us to a board of maximum value. (You can also apply this strategy to the opponent.)
- Rewards for terminating states could be modeled as follows; winning states (+100), losing states (-100), and draw (0).
- You can play the game here `http://www.247checkers.com`.
- The solution here (https://github.com/SamRagusa/Checkers-Reinforcement-Learning) uses Q-Learning algorithm to learn from an AI that uses Alpha-Beta pruning. It is enough if you can convert Q-Learning to DP Value Iteration.

Deliverables

- Your code and a list of dependencies. e.g. a requirements.txt file
- A one page report explaining your MDP, reward function, and the RL algorithm

Notes

- Team submissions are not allowed.
- Please do NOT copy a "dynamic programming solution" from existing online solutions.
- There will be a careful review to detect plagiarism, especially in the RL algorithm. However, you may re-use functions (like game rules, drawing the board etc.).
- If you fail to pass the plagiarism test, you will fail the course with an F.