CAP 5636 – Fall 2022 - Homework 3

Due: November 18, 2022

Instructions:
- Remember that the homework is **individual** work.
- Points add up to 10, with 8 + 2 bonus points

Homework journal: For this homework, you need to document the progress of the solution in a Homework Journal. This is a series of screenshots on the progress of the homework, labeled as nnn-text.jpg. For instance:

001-Original code.jpg
002-After creating the learning code.jpg
…
012-First try for running.jpg

Screenshots should document evolution of the code, the tries, challenges, the breakthroughs etc. of the process. Feel free to also document the bugs and how you fixed them.
The easiest way (on Windows) to do this is by hitting Windows Key + Prnt Screen when a step is achieved. On Ubuntu, you simply hit PrntScreen. You can select, crop and rename the pictures later. Please crop away any private information from your screen.

Note about academic honesty: The projects on the Berkeley class have been around for a while. A number of people had posted solutions of various quality to github, bitbucket etc. For instance, you can google:

   "berkeley ai project :site github"

to find at least 10 different projects. Here is a list of some of these projects: advaypakhale, angelahnicole, dgggit, druyvchadha2212, jasonwu0731, karlapalem, Matiatus, molson194, OctaviPascual raymondngiam, rsk2327, shiro876, Shourov1. We **will** run a soft comparison checker between your implementations and a growing collection of other projects (as well as between the projects submitted by students on this class). Projects with plagiarized code will receive a 0 grade.

Step 1: Problems Q1, Q2, Q3 and Q6 from Berkeley AI reinforcement learning project (4 pts)

~~Solve problems Q1 to Q4 from the Berkeley AI reinforcement learning project:~~

https://inst.eecs.berkeley.edu/~cs188/fa18/project3.html

Note about fix of the autograder: download from the class website the file called reinforcement-fixed.zip which contains a version of the class which fixes the escape bug in the autograder.

Submit:

- the changed files: analysis.py, qlearningAgents.py, valueIterationAgents.py
- the homework journal for this step.

Step 2: Visualize the evolution of the V-value (3 pts)

Re-run problem Q1 from Step 1. Plot the evolution of the V value in the upper-left corner. You can try to do this in Excel or other spreadsheets. A better solution is to learn and use pyplot.

Submit:

- the homework journal for this step, with the last screenshot showing the plot

Step 3: Visualize the evolution of the Q-value (3 pts)

Re-run problem ~~Q4~~ the 4th problem from Step 1 (this is problem Q6 from the Berkeley website, the one that is focuses on Q-learning). Plot the evolution of the four state action (Q) values for the second state from left in the top row. Put all values in a single plot. Again, Excel is acceptable, but pyplot is better.

Submit:

- the homework journal for this step, with the last screenshot showing the plot