CS Homework #27: Numpy & matplotlib

Deadline: 5/16/2020, 9:00 pm. Save your code as *lastname_homework27.py* and submit on Google Classroom

Task 1 (CS 101A, CS 101B, CS 201)
Using the Rock-Paper-Scissors game that we created in class (use the code posted on Google Classroom), make the following change: Instead of having two separate memories and two separate arrays to store game choice and points, have a single memory and array to store both players choice and points. It should look like this, for example (for *ngames* = 3):

0	2	3	1
1	1	2	2
2	1	3	1

First column: User choice (0-Rock, 1-Paper, 2-Scissors). Second column: AI choice. Third column: User points. Fourth column: AI points. Notice that I am not asking you to merge the two memories. Instead, you should start with a single array with *ngames* by 4 shape.

Task 2 (CS 101A, CS 101B, CS 201)
Add the following information to your memory array: TOTAL points for the User and AI. It should looks something like this, for example (for *ngames* = 3):

0	2	3	1	3	1
1	1	2	2	5	3
2	1	3	1	8	4

Fifth column: total (cumulative) points for User. Sixth column: total (cumulative) points for AI.

Task 3 (CS 101B and CS 201)
Create a bar chart displaying the total points. Assume that the User always plays Rock, while the AI always plays Paper. Display the results of this game using the bar chart.

Task 4 (CS 101B and CS 201; optional for CS 101A)
The following function can be used to model "simple adaptive learning" (choose best response to whatever the other player used in the previous round, *user_latest*):
def best_response(user_latest):
    return(PM[:, user_latest].argmax())

Implement this function for AI choices (notice that the choice in the very first round would have to be random). Test that it works properly by playing against AI.

Task 5 (CS 101B and CS 201; optional for CS 101A)
Examine a game in which two AI players play against each other (*ngames* = 10) and both players use the "simple adaptive learning" function above.

Task 6(CS 101B and CS 201)
Display the total points of the game from Task 5 using the bar chart.