CPSC 231: Introduction to Computer Science for Computer Science Majors I

Assignment 2

Due 23 Oct. 2017 at 9 am

Assignment Objectives:

This is an individual assignment. You must submit your own work. This assignment has three goals:

1. Analyzing requirements and developing a solution
2. Reviewing python constructs including., if, if-else, if-elif-else, loops, and functions
3. Practicing basic python programming

Start the assignment early and avoid procrastination.

Chasing Alice

For this assignment, you develop a turn-based game where you control a blue turtle, Alex, to chase and catch a red turtle, Alice. Create a canvas (also known as screen) of size 500 x 500. Alex must appear at the middle of the canvas. Alice appears at a random location inside the canvas.

In each turn, Alice can move either forward by 20 pixels or she can change her direction randomly to left or right by 90 degrees. 2/3 of Alice's movements should be forward movements and 1/3 should be the random direction changing left or right, see figure 1 below.

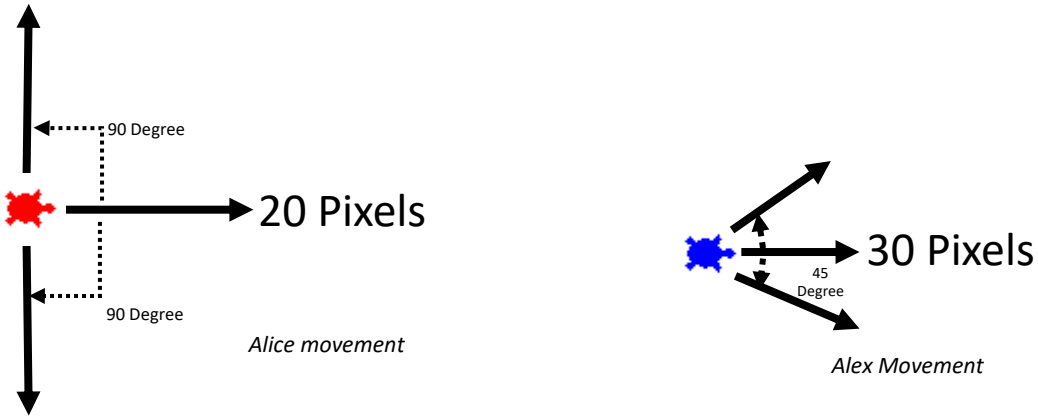

Figure 1: Alice and Alex movements

Alex moves as directed by the player using the keyboard. In each turn, the buttons *w*, *a*, *s*, and *d* lead Alex to move forward for 30 pixels, turn left for 45 degrees, back for 30 pixels, and right for 45 degrees, respectively. If Alex or Alice cross the canvas's boundaries, they should reappear at a random[1] location on the canvas. The game statistic needs to be provided on the screen as shown in the sample. The game ends if Alex comes within 30 pixels of Alice in any direction. See figure 2 to get an idea of how the game will look like.

[1] To learn how to generate random numbers in python, look at: https://docs.python.org/3/library/random.html

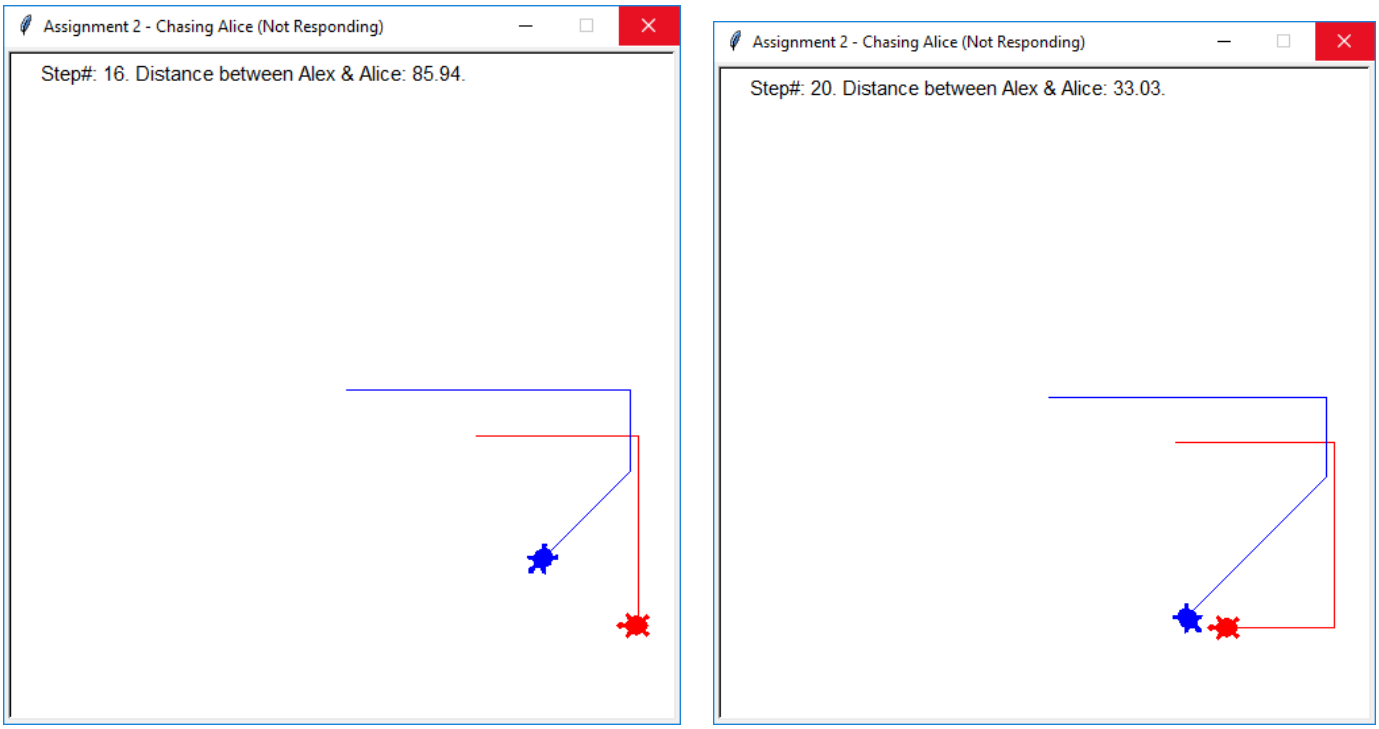

Figure 2: Samples of how the game will look like

Marking:

Category	5 Points	4 Points	3 Points	2 Point	1 Point	0 point
Setup					Turtles are setup correctly (colors, shapes, locations)	Turtles are not setup correctly
Alice movement				Alice moves correctly (distance, angles, 2/3 fwd., 1/3 changing dir.)	Alice moves partially correctly	Alice does not move correctly
Alex movement				Arrow keys properly transfer to Alex movement	Arrow keys partially transfer to Alex movement	Arrow keys does not properly transfer to Alex movement
Modularity	There is one function for each distinct task	Small part of code is not in function	Most of the code is developed inside functions	Half of the code are in functions Or functions contain unrelated codes	Limited use of functions	No proper use of functions
Detection of catching				Correct detection of Alice catching	Some reasonable codes for the catching function	Alice catch is not detected

Detection & handling of turtles leaving the canvas				Turtles leaving the canvas is detected & handled	Turtles leaving the canvas is partially detected or partially handled	Turtles leaving the canvas is not detected
Showing statistics				The statistic is shown correctly	The statistic is shown partially correctly	Statistics are not shown
Using constants and local variables				Code contains local variables and well-named constants Without any magic number or global variables		Code contains magic numbers or global variables
Comments and variable naming				Consistence variable naming, student information at the top of the code + Code is commented well, Program name is correct	Inadequate comments or inconsistent variable naming or variable names are not meaningful	No comments or inconsistent variable naming or variable names are not meaningful, program name is not correct
Total	20					

Submission requirements

In order to receive a complete grade no global variable or codes outside functions should be in your program. Create a main function and control the program by calling other functions through main. The program starts with calling main() only. Use constants instead of magic numbers. Follow variable name conventions all through your code and be consistence. Use white lines to separate blocks of codes.

Name your program *ChasingAlice.py* then submit it to the D2L Assignment 2 dropbox by the deadline stated at the top of this document.

Collaboration, Plagiarism, and Cheating

This is an individual assignment and all work that you submit must be your own work. We encourage you to discuss this assignment with other students in the course and discourage you from sharing solutions and code with one another. Sharing solutions and code is a form of plagiarism.

We use automated procedures to detect plagiarism in assignment submissions. Any student who copies all or part of an assignment that belongs to another student or other sources will be reported to the Dean. The Dean enforces penalties, which may include failing the course and expulsion from the faculty and the university. Please refer to Plagiarism/Cheating/Other Academic Misconduct in the university calendar or the university website on plagiarism for more information.