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Course: CS151
Section: A
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Project 4 Report:

Title: Turtle Races

Abstract:

Key lecture concepts that made this project possible are while and for loops, if statements and conditionals, and turtle methods such as object and screen creation. The majority of my time in this project was spent on using these concepts together simultaneously in order to create a more complex race.

I created a few different things in this project. The first thing I created was a screen that contained my race track. I was able to do this using the same turtle methods as in the lab, changing the background color and what was drawn on top. I then created 2 turtle objects – my racers – which move around the track at varying speeds. For both of these types of objects, I used positional and keyword arguments to customize manipulations in each object. Additionally, the random module was used to make a jitter in the speeds of the turtles, adding a randint to the speed, ranging from -1 to 1. This either decreases the speed, keeps it the same, or increases the speed. For my extension, I drew bleachers and added new turtle objects to represent fans watching the racers. Counters on scoreboards also keep track of the number of laps each turtle has completed.

Results:
IMAGE 1:
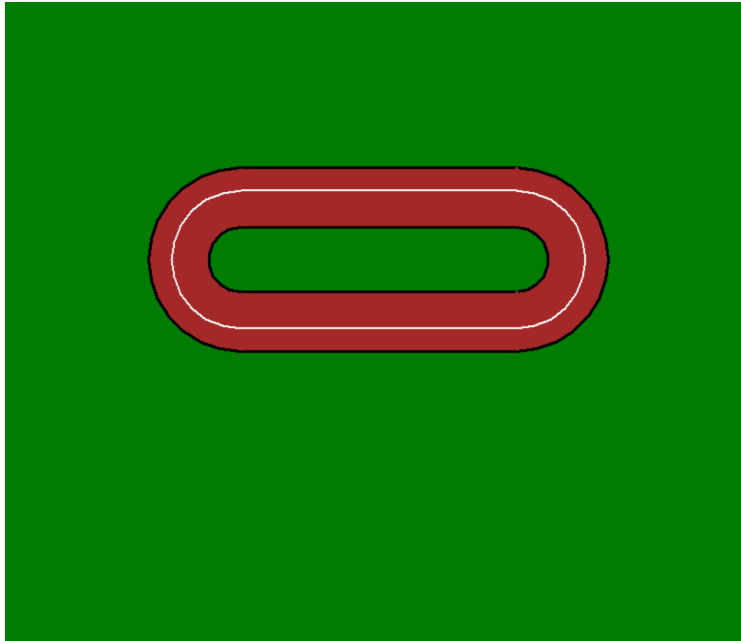
This is my race track. It is a regular track with a lane divider for the two racers. I made the background green in the screen function. I made the track itself with 2 rectangles and 4 semi-circles. To get the turns as they appear, I had to make a larger semi-circle and fill it brown, and then make a smaller semi-circle and fill it green, or the background color. This took me a little bit of time, but I was able to figure it out!

IMAGE 2:
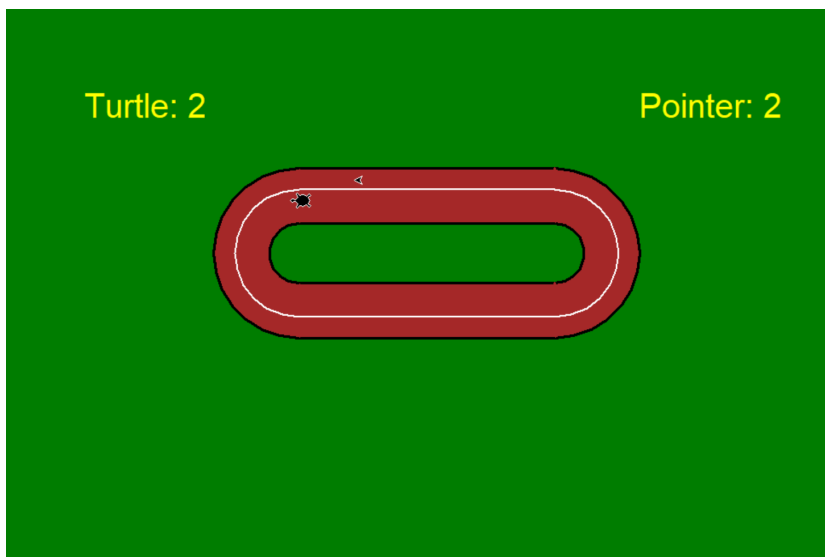
This is my race in progress. Both turtles have done 2 full laps, as displayed by the counter. Because the turtle's speed is 5 and the pointer's is 4.9, we can see the turtle is

ahead and is winning the race. Each time they pass the start line, or the middle of the bottom straight, the respective counter will increase by 1. I put the turtles in their respective lanes using turtle.goto functions, and then they move accordingly from there. The turtle, because it is higher than the pointer, makes the turns around a smaller radius than the pointer, in order to keep it in its lane. Every time the turtle gets to the end of a lap, I made the counter score increase by += 1. Once the pointer reaches the end, its counter also += 1. The while loops of my move_turtles function are based on the turtle's position, but takes if-else statements and conditionals to execute a movement operation based on the pointer's location.

Personal Learning Reflection:
Implementation of lecture concepts is what made this project achievable. One case of this is my function which moves turtles; my move_turtles function is composed of many while loops. Inside these while, loops are if-else statements and turtle methods, such as turt.forward. While the loop iterates, the method would do something to the racing objects all while a condition is true. This allows the objects to keep moving even while the other is doing something else. For example, while turtle is turning a corner, previously, it would have to wait for pointer to catch up before starting. But, with this code, if the turtle is on the turn, it does not have to wait for the pointer to catch up. It lets both objects keep moving without having to wait for the other to catch up. Additionally, implementing lecture concepts into the project allowed me to create the objects in the bleachers, which I discuss more below in my extension.

Extensions (if included in project):
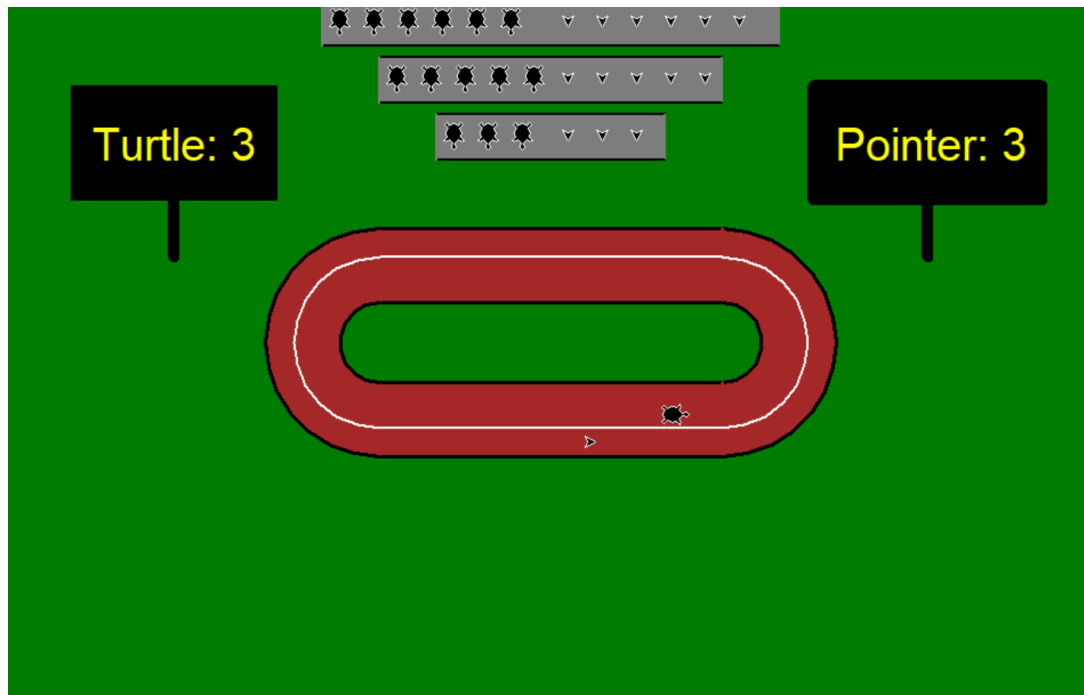
My extension contains additional bleachers and scoreboards in the race track scene. There are also turtles and pointers on the bleachers cheering on their racers. I simply added some functions to draw the scoreboards and bleachers in object_shapelib. For the fans in the bleachers, I made more turtle objects as spectators. I put this in my extension because I was able to create this by combining key concepts: loops and objects. I was able to first create the objects, and then have a for loop make more objects which would take the number of iterations as a parameter that I could control. I made it so it would iterate just enough times so I could fill each bleacher with an equal number of turtles and pointers.

Sources, imported libraries, and collaborators are cited, **or a note is included indicating that none were referenced:** This ensures you are properly crediting the people and sources who help you achieve your results. Not listing them in the report is considered plagiarism or stealing. Please code with honor.

https://www.w3resource.com/python-exercises/basic/python-basic-1-exercise-114.php
https://www.geeksforgeeks.org/turtle-register_shape-function-in-python/
https://docs.python.org/3/library/string.html
CS151A Google Classroom - Lab 4 + Project 4
CS151A Google Classroom - Lecture Slides (While loops, For loops, and Lists)
TA Hours