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Section: A

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Project 2 Report:

Title: Making an Outdoor Scene with Functions

Abstract:

There are many lecture concepts that were applied to complete this project. Of course, like last time, functions, variables, and parameters were crucial in making my program work. However, some new things that I included were the scale parameter, randomness, and math module. We mentioned all of these in the lecture, although some more briefly than others, and these all had various importance in my project, but randomness probably was the most important for my extension. Otherwise, the math module helped me with my triangles for the grass and water.

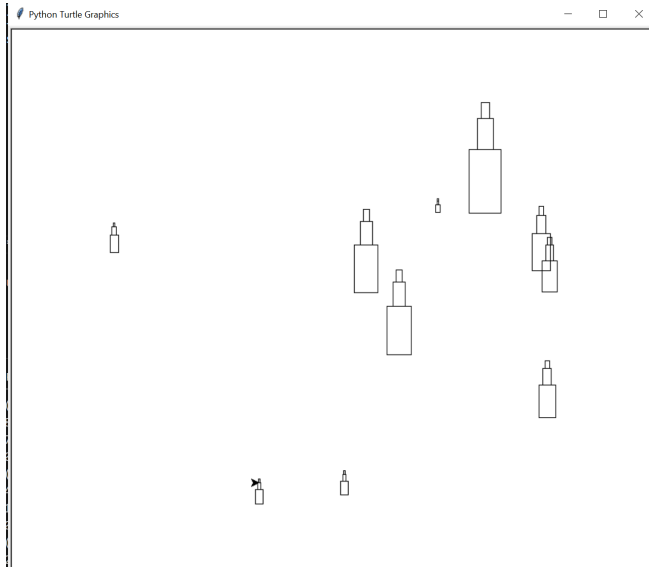
I created many images, most of them coming together into 1 larger outdoor scene. For the actual project, I made different shapes out of functions which culminated in a sunset over the water, with a colorful sky.

These functions all are inspired by one of my favorite images that I took recently:



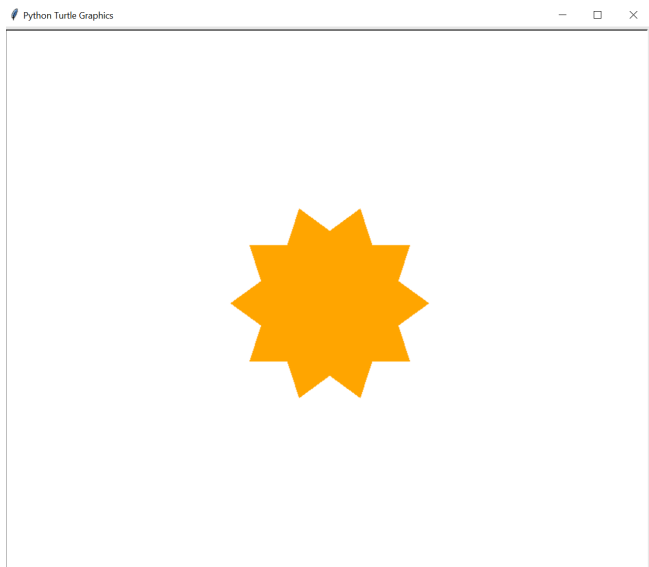
Results:

IMAGE 1



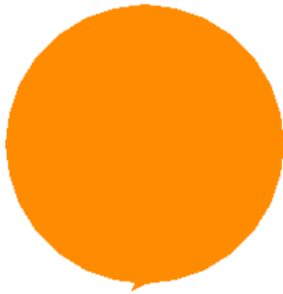
I made this image using 3 functions and a for loop. The first function creates a goto command to put the blocks anywhere. The second function creates a block, and the third function stacks 3 blocks on top of each other. I imported the random module to randomize where the blocks would go, and put my stacked blocks function into the for loop, randomizing each parameter for 10 separate function calls.

IMAGE 2



To make this Sun, I consolidated my code for a star from Project 1 into 2 lines with a for loop which repeated 5 times. I put this inside another for loop which ran 10 times and rotated slightly each time and filled each star with orange.

IMAGE 3



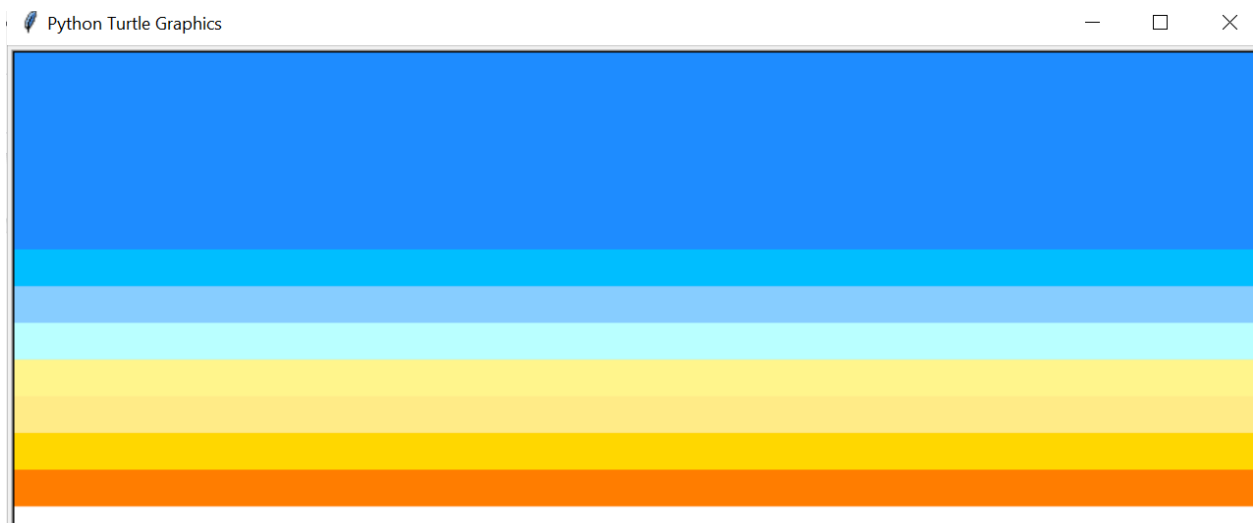
I made a dark orange circle on top of the stars. I made a function that simply drew a circle and colored it dark orange. Together, Images 2 and 3 make my sun (Image 4)

IMAGE 4



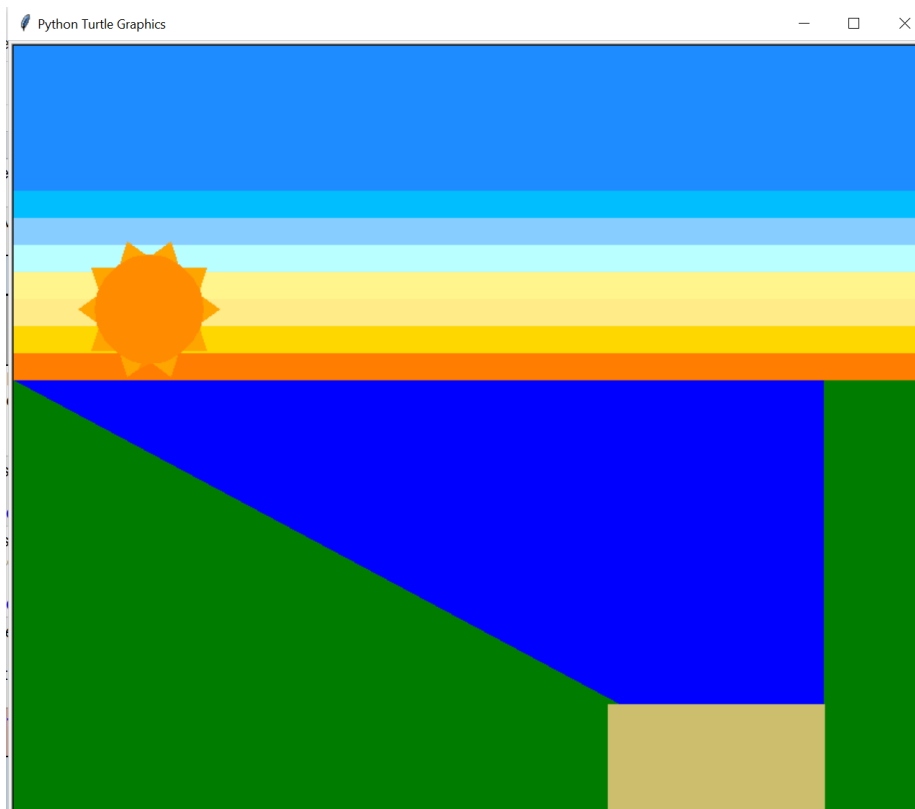
For this image, I simply put my circleSun function after my starSun function to layer the dark orange circle on top of the orange star. Together, these make a cooler, multicolored sun.

IMAGE 5



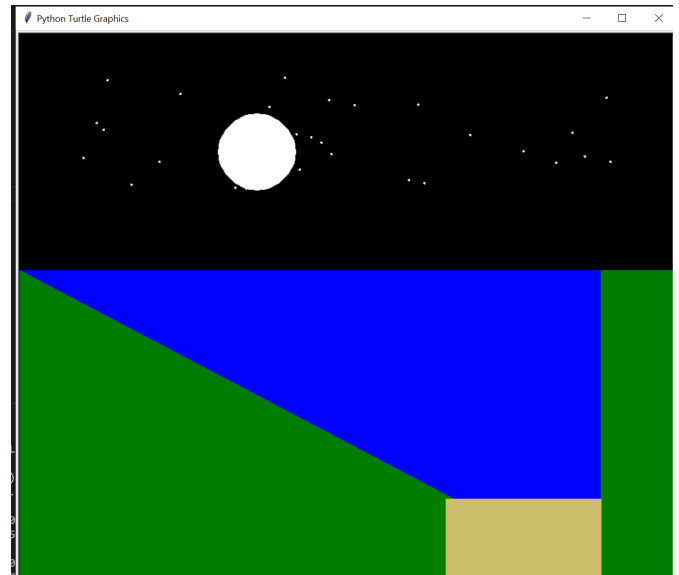
This image is at its base is a simple rectangle. While not compounded from previous images, it takes parameters for coordinates, scale, and color. I stacked rectangles on top of each other at different y-values and colors to create this sky

IMAGE 6



This is my outdoor image. I used my outdoor scene function to layer all my shapelib.py functions on top of each other in a specific order. The green shapes are grass, the light brown is shrubs and water plants, the blue is water, and above is the sky and sun.

EXTENSION



These are 2 examples of my extension for this project. I made a few more functions for this part:

1. sunRandom, which draws my sun at any random coordinates in the sky. I made this function by taking my regular sun function and using random.randint for both x and y coordinates. This puts the sun anywhere in the sky.
2. Moon, which draws the moon. I did this simply by making a circle and filling it with white with turtle.
3. moonRandom, which draws the moon at any random coordinates in the sky. I did this the same way I made the sunRandom function.
4. skyNight, which makes a night sky. I just made a rectangle and filled it with black.
5. Stars, which makes stars in the night sky. I did this by using the turtle goto function with r.randint for both x and y coordinates. This was all in a for loop which repeated 30 times.

I say those are example images because my extension function has a 50% chance to generate either a sunset picture or a night-time picture. I made a variable i equal to either 1 or 2, with randint(1,2). Then, I made an if statement with an else if condition.

- if i == 1: generate sunset.
- elif: generate night time.

- This means that, if 1 is the randomly generated integer value for i, code for my sunset image is executed. If the randomly generated integer value for i is not 1 (elif), code for my night-time image is executed.

However, every time you see a sunset picture it will not look like this, and likewise with a night-time picture. For the sunset option, I made it so the sun will be in a random location in the sky. For the night-time option, I made it so both the moon and the stars will be at any random location in the sky. Thus, the program needs to be run a few times to see that there are different possibilities for both sunset and night pictures.

Note for Professor Doore: I wasn't able to figure out how to add music to my images yet...however, I am working on that!

Reflection:

Addressing how lecture concepts in summary made this project achievable.

1. My favorite part of this project was the use of the random module. At first, for my extension, I attempted to make an animation with this module, but unfortunately, could not figure out how to do it. Instead, for my extension, I brought in as many random parameters as possible. I made getting either a sunset or night picture random, the placement of the sun and moon both random, and the stars random. Nearly every aspect apart from the base picture in my extension is random. I also really enjoyed seeing my functions come together in the final image. Although as stated, it did not come out entirely like the actual image I was using as a reference, it was very satisfying to see the work come together in a coherent image.
2. For this project, I tried to prioritize color, complexity, and documentation. I found many new shades of colors that can be used in order to make my sunset as detailed and realistic as I could. However, I think with more learning, I'll be able to really fade and blend colors into each other. I wanted to try new, complex things. Some things I tried, like animation, did not work out, however, what I was able to complete still is the peak of my complexity at this moment. Using tools we

touched on in class, such as the random module, I needed to go to the documentation to find the commands to get the result I wanted. Hence, I also heavily prioritized documentation with both the random and math modules to complete this project. There is a lot to learn, and the documentations make it so much easier!

3. The pictures I made are attempts to recreate the below image. I took it in Southold, NY, on Long Island, right by the water. The sunsets there are beautiful! While my project did not come out with all the detail as the actual image, I tried to replicate some aspects, especially the vibrant colors the sun produces, which I tried to replicate with my sky.



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.

Turtle module Documentation: <https://docs.python.org/3/library/turtle.html>

Random module Documentation: <https://docs.python.org/3/library/random.html>

- Used for r.random and r.randint commands

Math module Documentation: <https://docs.python.org/3/library/math.html>

- Used for hypotenuse and Pythagorean theorem calculations in 'grassOrWater' function

More Flow Tools Documentation: <https://docs.python.org/3/tutorial/controlflow.html>

- Used for if, Elif, and for statements

Python color names: <https://www.wikipython.com/tkinter-ttk-tix/summary-information/colors/>

- Used to learn more color possibilities and names in python

CS151A Google Classroom - Lectures 3, 4, 5 Slides