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Course: CS151
Section: A
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Project 1 Report:

Title: Making Shapes and Scenes with Turtle Graphics

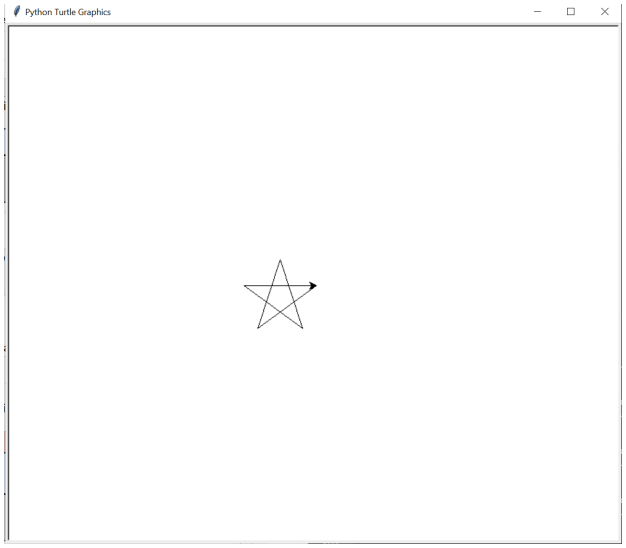
Abstract:

There are many key concepts we discussed in lecture and lab which proved to be relevant when completing this project. Navigating the terminal was a crucial concept for this project which we learned in lecture. I used this to place my Project01 files in the correct folder in the directory. I used the cd + drag and drop trick we learned! Turtle commands were fundamental to this lab. We learned how to use both forward() and right() commands in lecture, and the Documentation supplemented this with other commands, like left(), penup(), pendown(), pencolor(), and fillcolor(). Functions were also crucial in the code of this project. They helped tremendously with efficiency and automation. For example, the first two shapes A and B had to be used in Shapes C and D. With functions, these shapes only needed to be coded for once, and could then be called over and over in later steps. Likewise, parameters were also very important; distance and size, specifically, were very useful for calling functions of shapes of different sizes and dimensions. The specific values of sizes and distances are arguments.

I created a total of 5 images for this project. The first two were simple shapes: a star and a diamond. My third image was a new image, created by using both previous images in different locations to make a cool geometrical image. The fourth image is a sky of stars. The final image is my extension, which is a night-time scene.

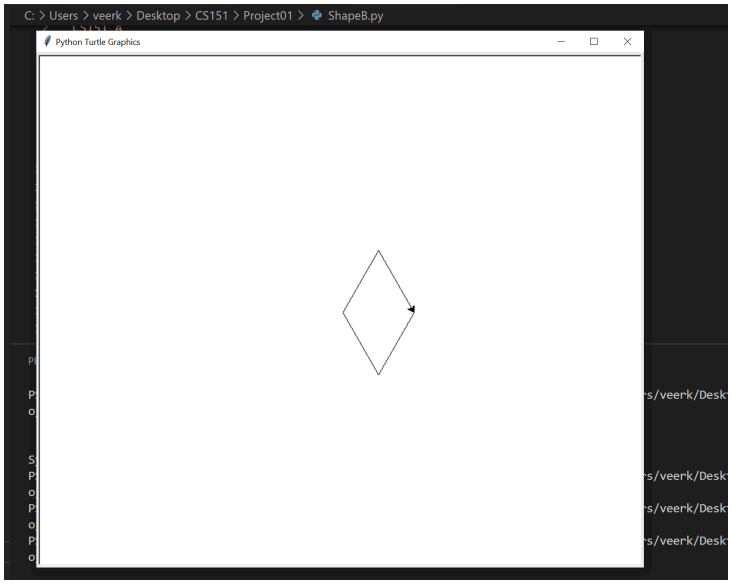
Results:

shapeA



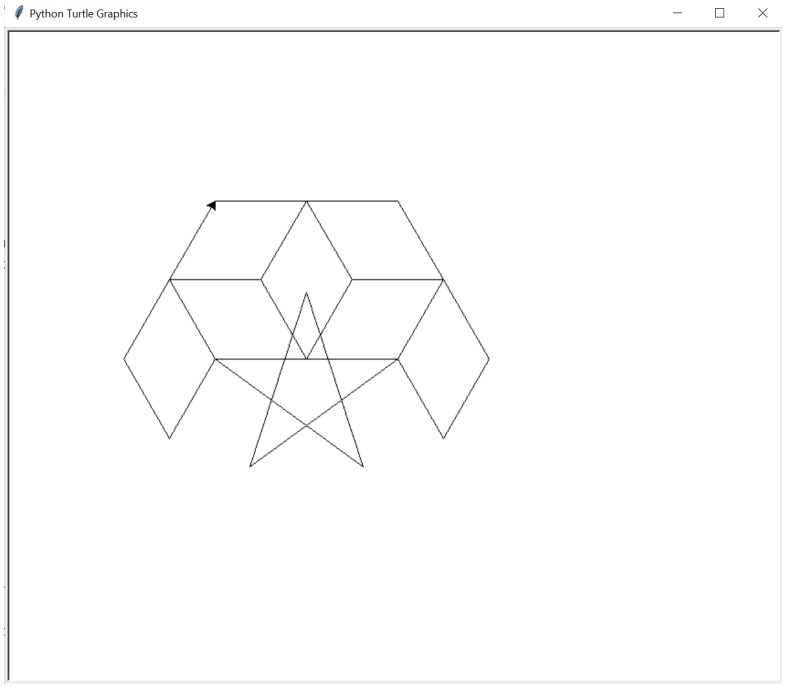
For shapeA, I chose to make a star. I did this by alternating right(144) with forward().

shapeB



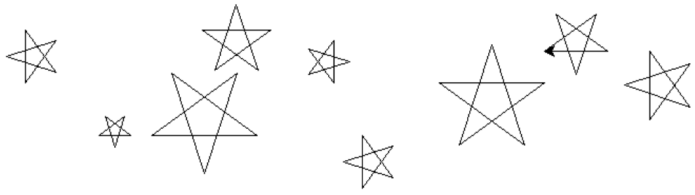
For shapeB, I again used the forward and right commands to create a diamond. Forwards were all the same length, as in a diamond, all sides are equal in length. However, I used two different angle degrees in the right commands, which resulted in the obtuse and acute angles as seen.

shapeC



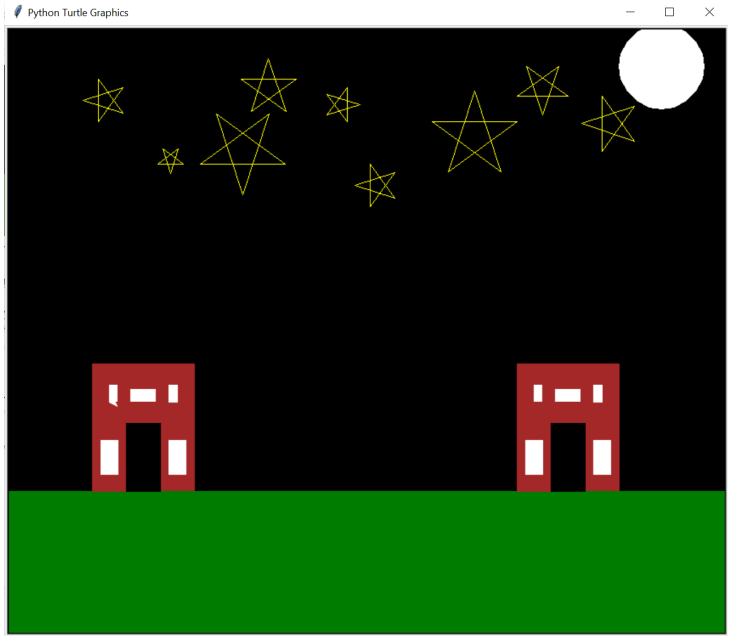
For shapeC in Task 5, I used shapeA and shapeB to make a new image. I made a cool geometric shape by calling shape B many times around shapeA

shapeD



For Shape D, I used my shapeA at different positions to make a sky of stars. Using a size parameter in the shapeA function, I put different arguments when calling it in shapeD. I spaced them out with penup(), forward(x), pendown(), and left(x) or right(x).

EXTENSION:



For my extension, I opted to make a more complete scene out of my function shapeD (sky of stars). After consulting the Turtle Documentation, I learned some color commands, including pencolor, fillcolor, beginfill, and endfill. I used these 4 commands to color in my scene. The first thing I did was add “pencolor(‘yellow’)” before calling shapeD. This made the stars yellow. I could not figure out how to fill the stars without adding yellow marks all over the screen. I believe this is due to the fact I used penup and pendown between the stars, so turtle read it as filling in all those spaces as well.

Next, I wanted to add a moon. I found circle commands in Turtle Documentation, and added a moon with “circle(50).” I placed the moon in the top right corner of the screen and colored it in with fillcolor commands.

Then, I needed to add ground, and so I made a large, green rectangle at the bottom of the screen to represent grass.

I then wanted to add houses. The first thing I did was make a function called house. I made the shape of it with forward and right/left commands and colored it in. Then, I added a door function within the house function (hierarchy). I made a main door which is the black in the middle, and used the same door function for the white windows. Then, I used forward to go to the other side of the screen, and called my entire house function again to create another house.

Reflection:
Addressing how lecture concepts in summary made this project achievable.

1. **You must also address the following questions in your response.**
   You should always label (a,b,c…) your responses. It easier for us to grade:
   a. A variable is a symbol that can store an assigned value, including strings, integers, and floats. These values can be used throughout the code, and their stored values can be changed. They are created when the variable is assigned its value.
   b. A function is a segment of code we can use to make a program more efficient through automation. We can call functions later in a program to reapply the same code without re-entering all of it.
   c. A parameter is a condition of a function that acts as a placeholder for a value. Parameters allow the same function to be used in different ways and contexts, increasing its generality. They are called in the function with arguments.
   d. Print and return statements are both ways to display outputs. However, they also have very different functionalities. A print statement simply displays a string input on the screen. It shows this in the terminal for the programmer but does not store any data, meaning it cannot be used later in a program. Meanwhile, a return statement will save a value and end the function. Return is for the computer, not necessarily the programmer.

2. We are going to be talking about visual images this semester. Show me an image from your favorite place in the natural world (v.s a built environment). You can be in the picture or you can find a picture of that place online. Just be sure to credit and cite where you found the image with a link if you did not take the picture.

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, materials, and sources who help you achieve your results. Not listing them in the report is considered plagiarism or stealing. Please code with honor.

Python Documentation
Turtle Documentation on Python.org
Professor Doore
Lab Assistant Sam
Google Classroom - CS151 S23 Computational Thinking: Visual Media Section A