Lab 9: Turtle

This lab is **asynchronous due to Veteran's Day.**
Labs are graded for participation rather than correctness. Keep all your lab code in your course GitHub repo to receive credit for your work. We'll be looking to see that you have at least partially completed all problems in each lab.

If you finish the lab assignment early, you may get started on the homework.

The Assignment

In this lab, you'll get some practice today using Python's turtle graphics. Turtle allows us to draw shapes and animations and interact with the user on-screen. Turtle graphics allow us to build on the simple text interfaces we've done so far.

You know all the computer science you need to use Turtle. What you may not know is all the individual little quirks of the module itself. One of our most important skills in computer science is the ability to study a module someone else has written and put it to use. Turtle has a bunch of documentation, which you can find here: https://docs.python.org/3/library/turtle.html

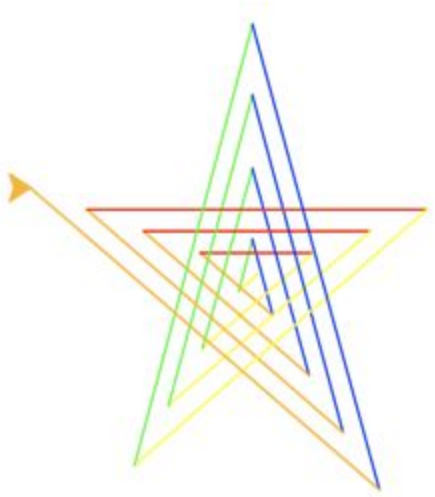
The first thing you need to do is create a new file and import a module named turtle. The first line in your file (after the file comment) should be:

```
import turtle
```

The Python Turtle is also a class, which means function calls look slightly different than functions like *print* and *input*. We define a variable of data type Turtle (also called "instantiating a Turtle object"), and then call *methods* on that variable using the "." operator:

```
turt = turtle.Turtle()  # Create a variable of data type Turtle,
# with label turt
turt.color('yellow')    # Modify the color of the turtle you just made
```

For this lab, you're going to draw a star that looks like this:



Your first job is to explore the Turtle documentation. How might you draw the above star using the module?

The star is really a series of nested stars constructed from the center, starting with the shortest green line. Each star consists of 5 segments (or lines), each which is a different color.

The recommended approach to figuring out how to use Turtle to draw this star is to start simple – how can you draw a line? How might you change the color of the line? How might you change the direction of the line? From there, how can you string together a collection of function calls that draws a single star?

If you are completely stumped after ~45 minutes of trying, starter code is available in lecture-code > Starter code > Lab 9

The posted starter code will draw a star, but it isn't structured correctly. You'd have to type out every turn and line of the star -- which is ridiculous, especially when there's a clear pattern we can exploit.

Your next job for this lab is to draw the star using iteration. In the drawing above, the loop ran 20 times, so start with that. But then you can also vary the number of loops, the length of each line, the colors, etc., to get a star you like.

Extension: How would you modify your solution to use recursion? Write code that creates the star using recursion instead of a loop.