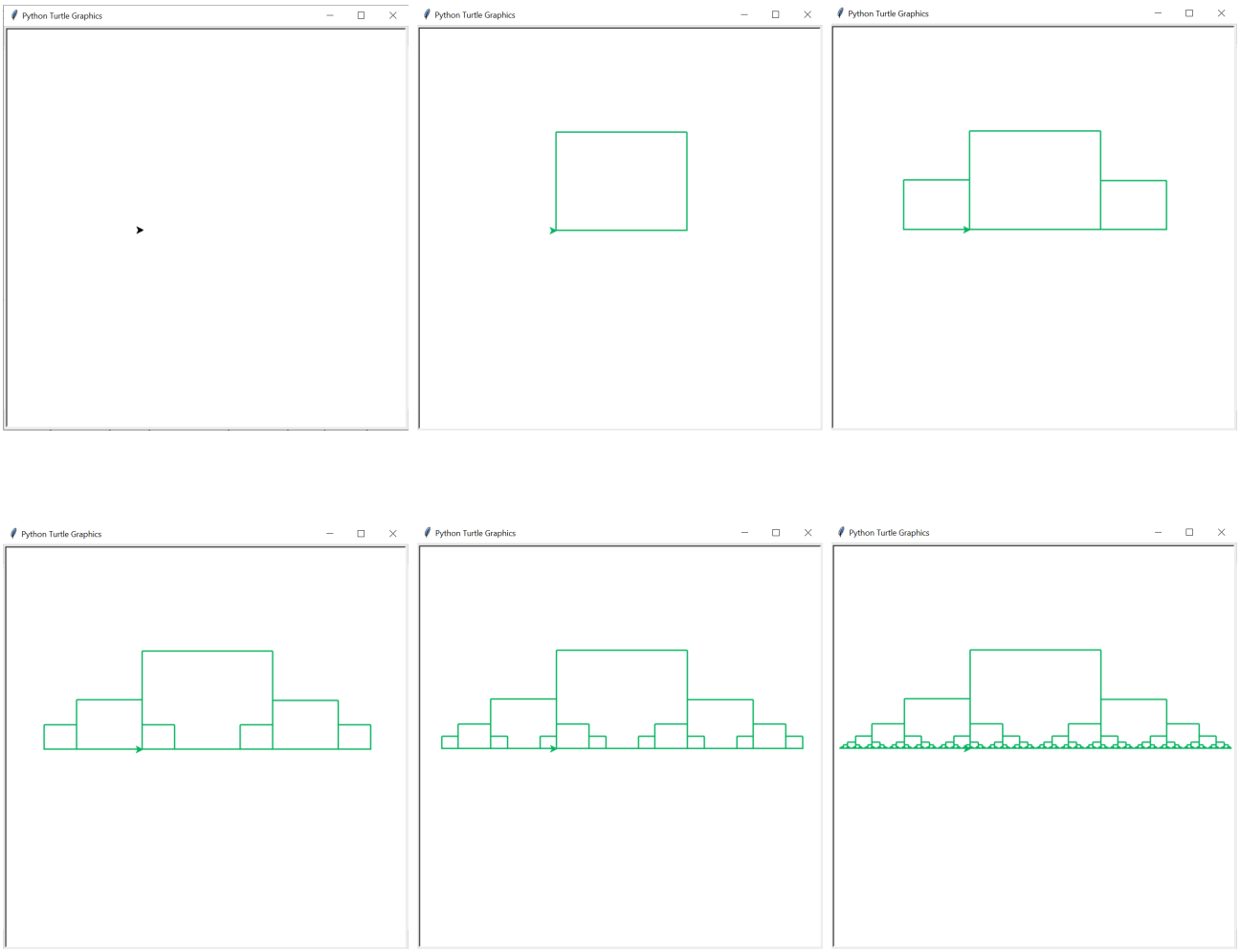
Recursion – Homework 10

- This is an individual assignment.
- Before you start on the homework, please read the rules on collaboration and submission in the syllabus.

Design and write a program **hw10.py** that generates a rectangles image using Python's turtle graphics module. Your program should include a function `one_rectangle` that draws a single rectangle. The rectangle has a length that is twice as long as its width. Use it in another function `rectangles` that draws multiple rectangles ***recursively***. Your program should prompt the user for inputs: `depth` used to generate the image and `size` of the length of a rectangle. The figures below illustrate the output that should be generated for various input values.



Rectangle images for `depth` = 0, 1, 2, 3, 4, 8 and `size` = 200.

Each next `depth` of rectangles (if there is one) has rectangles with length of edges of `size` half shorter than the rectangles in the previous depth. Program uses `turtle.color("#04B45F")`.

Initialization

- Because the size of the images varies based on the value of the input `size`, scale your image within the window (and draw quickly) using the following `init` function:

```
def init(size):
    turtle.reset()
    turtle.setup(600,600)
    turtle.setworldcoordinates (-size, -size, 2*size, size)
    turtle.speed(0)
    turtle.up()
    turtle.pensize(2)
```

- It uses `turtle.speed(0)` to cause your turtle to draw at max speed
- This will scale your drawing and set you up in the proper place of the canvas, facing east, pen up ready to go.

Requirements

- Include your name at the top of your file.
- Include the `main` function to:
  - Prompt the user for the number of levels to include in the squares image. You may assume the input is an nonnegative integer. (You don't have to check for invalid input.)
  - Prompt the user for the size of the longer side of the first rectangle. (You don't have to check for invalid input.)
  - Call `init` function.
  - Call your `rectangles` function.
- Use **RECURSION** to draw the rectangles image. You should have a single recursive function `rectangles` that draws multiple rectangles.
- Use the given `init` function.
- Have a function `one_rectangle` that draws a single rectangle.

Submission Requirements

The title for this lab is hw10. Your submitted file is required to be named `hw10.py`.

Grading

The rubric for this assignment is available through Gradescope.
Submissions that do NOT use recursion will receive zero for the assignment.