Draw different geometric shapes using Python

Introduction

This report presents the implementation of Python functions that draw different geometric shapes using both **terminal-based** and **graphical-based** approaches. The **TerminalScribe** class enables rendering shapes in the terminal, while the **TurtleScribe** class provides graphical drawing using the turtle module. The implemented shapes include squares, rectangles, and triangles.

Python Functions Overview

This project implements shape-drawing functions using two approaches:

1. **Terminal Output:** Uses loops and print() statements to draw shapes using * characters.
2. **Graphical Output (Turtle Module):** Uses Python's turtle module to create graphical representations of shapes.

Code for Square (Terminal Output)

```
class TerminalScribe:
    def __init__(self):
        pass
    def draw_square(self, size):
        for _ in range(size):
            print('*' * size)
```

This method iterates through a loop, printing a line of * for each row to form a square.

Drawing Other Shapes

Besides squares, the program also includes functions to draw rectangles and right-angled triangles.

Code for Rectangle (Terminal Output)

```
def draw_rectangle(self, width, height):
    for _ in range(height):
        print('*' * width)
```

This method prints width asterisks in each row and repeats for height rows to form a rectangle.

Code for Triangle (Terminal Output)

```
def draw_triangle(self, size):
    for i in range(1, size + 1):
        print('*' * i)
```

This method prints an increasing number of asterisks per line, creating a right-angled triangle.

Graphical Drawing with the Turtle Module

Code for Square (Graphical Output)

```
import turtle

def draw_square(size):

  t = turtle.Turtle()
  for _ in range(4):
    t.forward(size)
    t.right(90)
  turtle.done()
```

The turtle moves forward and turns 90 degrees four times to form a square.

Code for Rectangle (Graphical Output)

```
def draw_rectangle(width, height):
    t = turtle.Turtle()
    for _ in range(2):
        t.forward(width)
        t.right(90)
        t.forward(height)
        t.right(90)
    turtle.done()
```

This method moves the turtle forward by width, turns, then moves by height, repeating the pattern to complete the rectangle.

Code for Triangle (Graphical Output)

```
def draw_triangle(side_length):
    t = turtle.Turtle()
    for _ in range(3):
        t.forward(side_length)
        t.left(120)  # 120 degrees for an equilateral triangle
    turtle.done()
```

The turtle moves forward and turns **120 degrees** three times to complete an equilateral triangle.

Implementation in a Class

The TerminalScribe and TurtleScribe classes provide modular and reusable implementations. This structured approach improves code organization and scalability, allowing easy expansion with additional shapes or customization options.

Conclusion

This project demonstrates how Python functions can create both **text-based** and **graphical** shapes. The **TerminalScribe** class provides a simple ASCII representation, while the **TurtleScribe** class utilizes Python's turtle module for visual drawing. The combination of **procedural and object-oriented** programming enhances code clarity and flexibility for future modifications.

References

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