Assignment Overview

This assignment is for you to practice using loop, function call, and Turtle graphics.

(a)

(b)

(c)

(d)

(e)

(f)

(g)

(h)
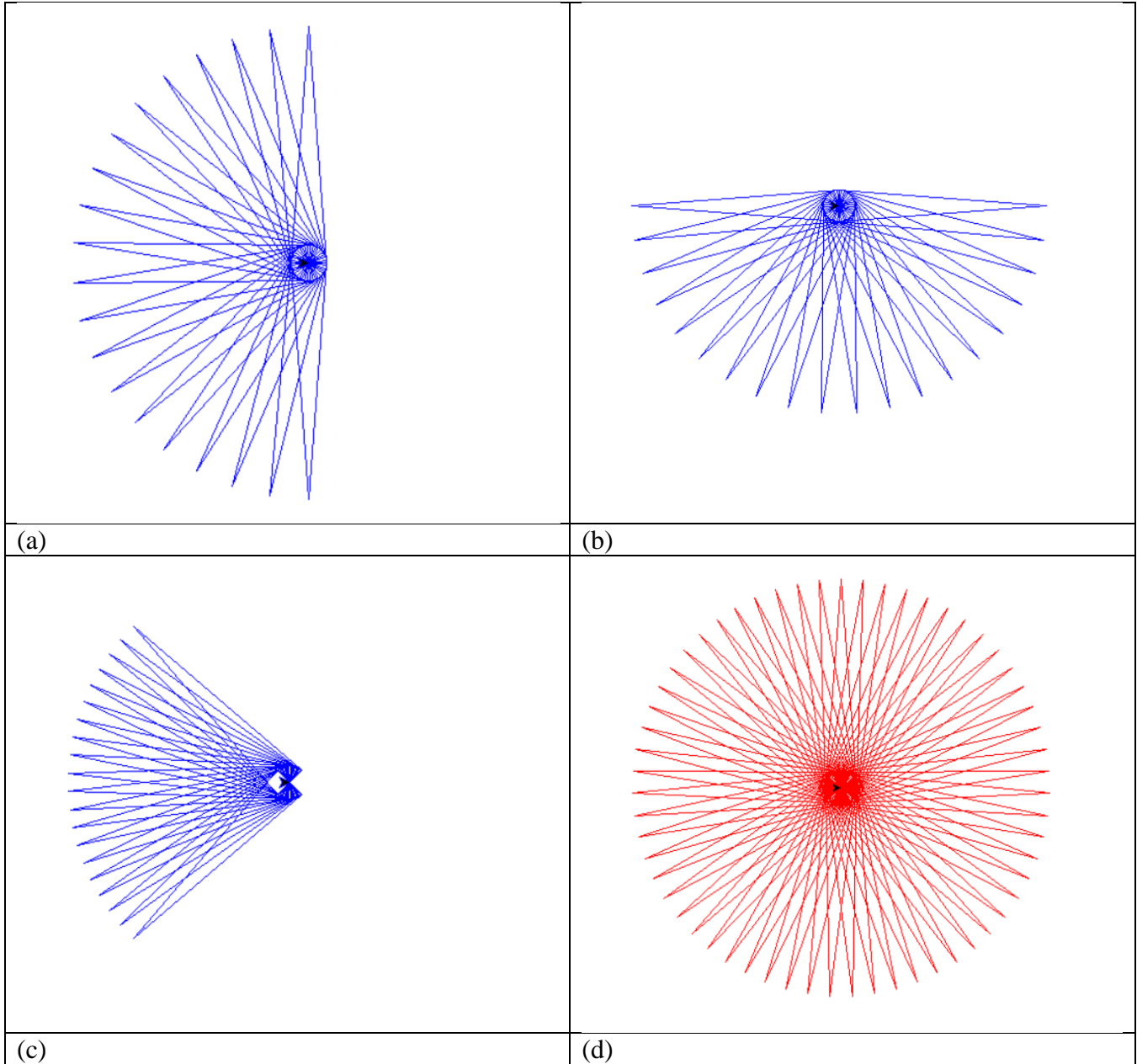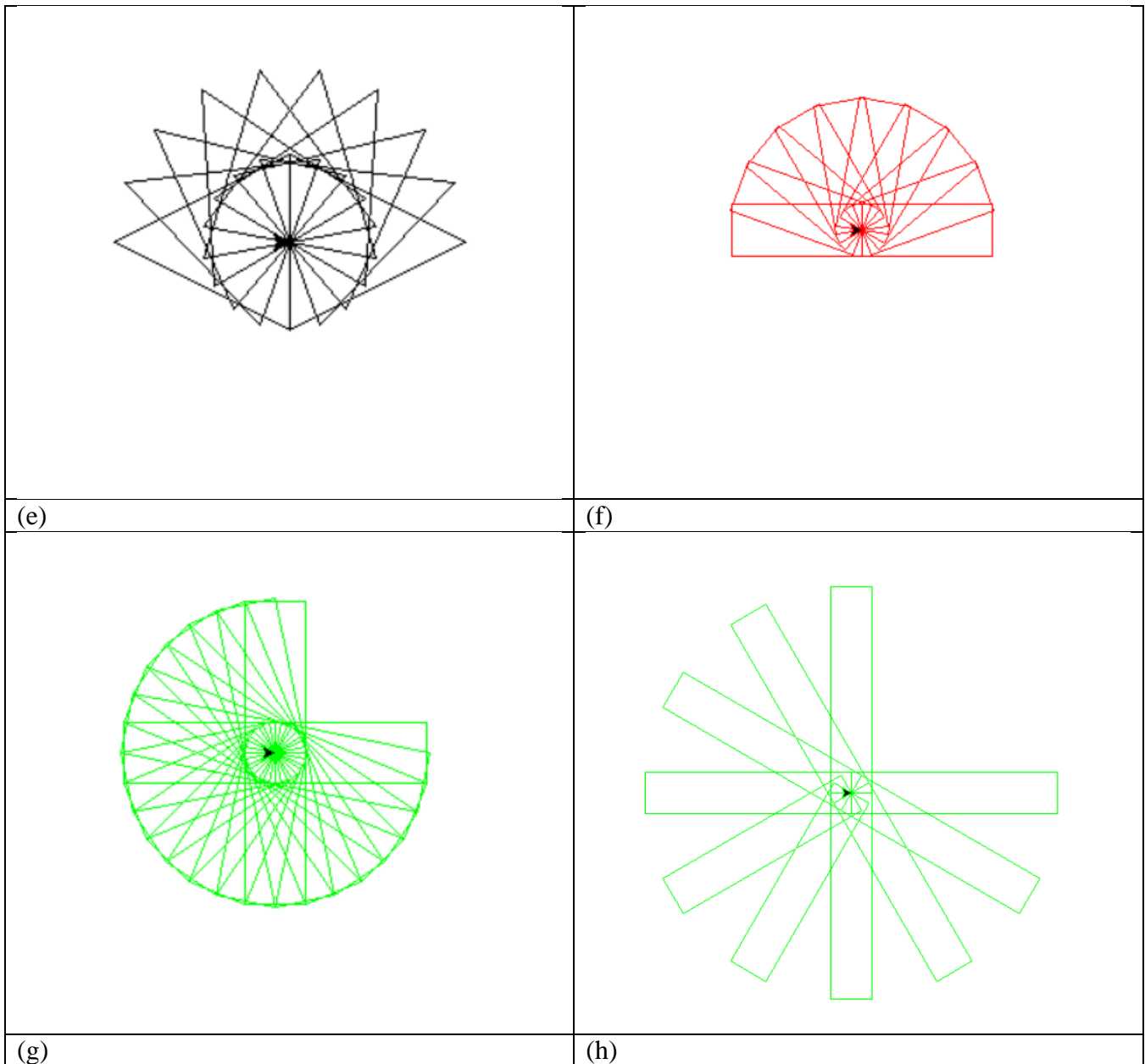
Assignment Specifications

You are to draw some pretty figures similar to the ones shown above. These figures comprise repeated drawing of some basic shapes, arranged in a roughly a fan shape. There are many possible variations including:

- Angular range: e.g., (a) is from 90 to 270 degrees, (b) is from 180 to 360 degrees, (d) is a full circle, etc.,
- Basic shape: a triangle (a)-(e) or a rectangle (f)-(h),
- Color: red, green, blue and black colors are used,
- Shape parameters: e.g., (a) to (d) uses a "skinny" triangle while (e) uses a "fat" triangle, and
- Number of Shapes: e.g., (g) and (h) both draw from 90 to 360 degrees, but (g) uses a lot more rectangles than (h).

Your program must comprise (at least) the following function definitions:

- rectangle (turtle, xpos, ypos, width, height, angle, color)
  - turtle: the turtle object for drawing
  - xpos, ypos: the pixel position in the middle of the lower edge in the width dimension
  - width, height: the width and height (in pixels) of the rectangle
  - angle: the line direction of the lower edge in the width dimension
  - color: color of the shape

  These parameters must be specified in the order given, with angle and color taking default values of 0 and 'red', respectively. All other parameters must be specified.

- triangle (turtle, xpos, ypos, width, height, angle, color)
  - turtle: the turtle object for drawing
  - xpos, ypos: the position in the middle of the triangle base
  - width, height: the width and height (in pixels) of the triangle
  - angle: the line direction of the base
  - color: color of the shape

  The triangle is an equilateral one. These parameters must be specified in the order given, with angle and color taking default values of 0 and 'red', respectively. All other parameters must be specified.

The position, angle, and size parameters are illustrated graphically in the following figure.
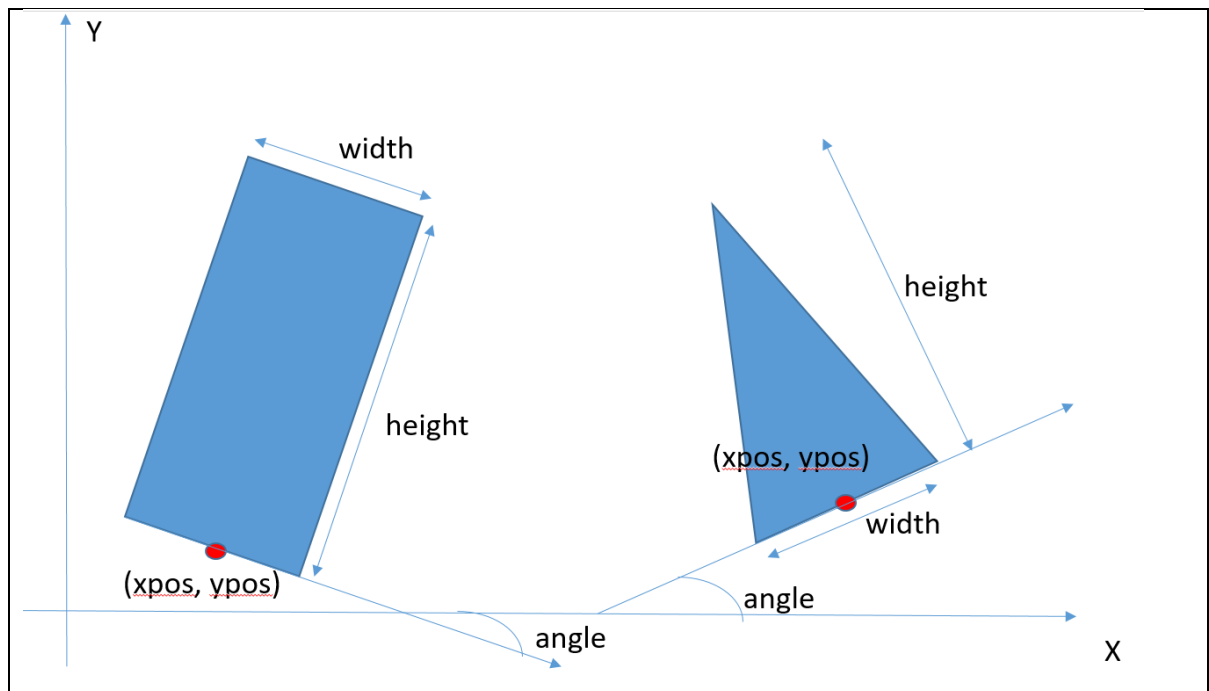
- Fan (shape, width, height, number, angle1, angle2, color)
  - shape: draw either rectangle or triangle
  - width, height: the width and height of the basic shape
  - number: how many basic
  - shapes are drawn
  - angle1, angle2: the start and end angles of the fan
  - color: color of the fan

These parameters must be specified in the order given, with number, angle1, angle2 and color taking default values of 10, 0, 180 and 'red', respectively. All other parameters must be specified.

Assignment Deliverables

The deliverable for this assignment is the following file:

Shape2D.py – the source code for your Python program

Be sure to use the specified file name and submit it for grading via the **turnin** system before the project deadline.

Assignment Notes

1. You should debug your shape2D.rectangle and shape2D.triangle separately to make sure that they work before you test shape2D.fan that calls these functions for drawing. Make sure that you change all the parameters and observe the desired effects.

2. For grading, only shape2D.fan() will be used.