Laboratory 04

Fall 2017

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Lab04A

- Each member of the team will enter and get running, one of the programs, Program4-21.py, Program4-22.py, and Program4-23.py.
  - The person sitting in the lowest number seat of the team will do Program4-21.py
  - The person sitting in the middle of the team will do Program4-22py
  - The person sitting in the highest number seat of the team will do Program4-23.py
- Be sure that each member of the team understands the programs that the other two team members were working on.
- Each member demonstrates to the Instructor the working program that (s)he was working on.
- Once the three programs have been reviewed, go on to Lab04B.

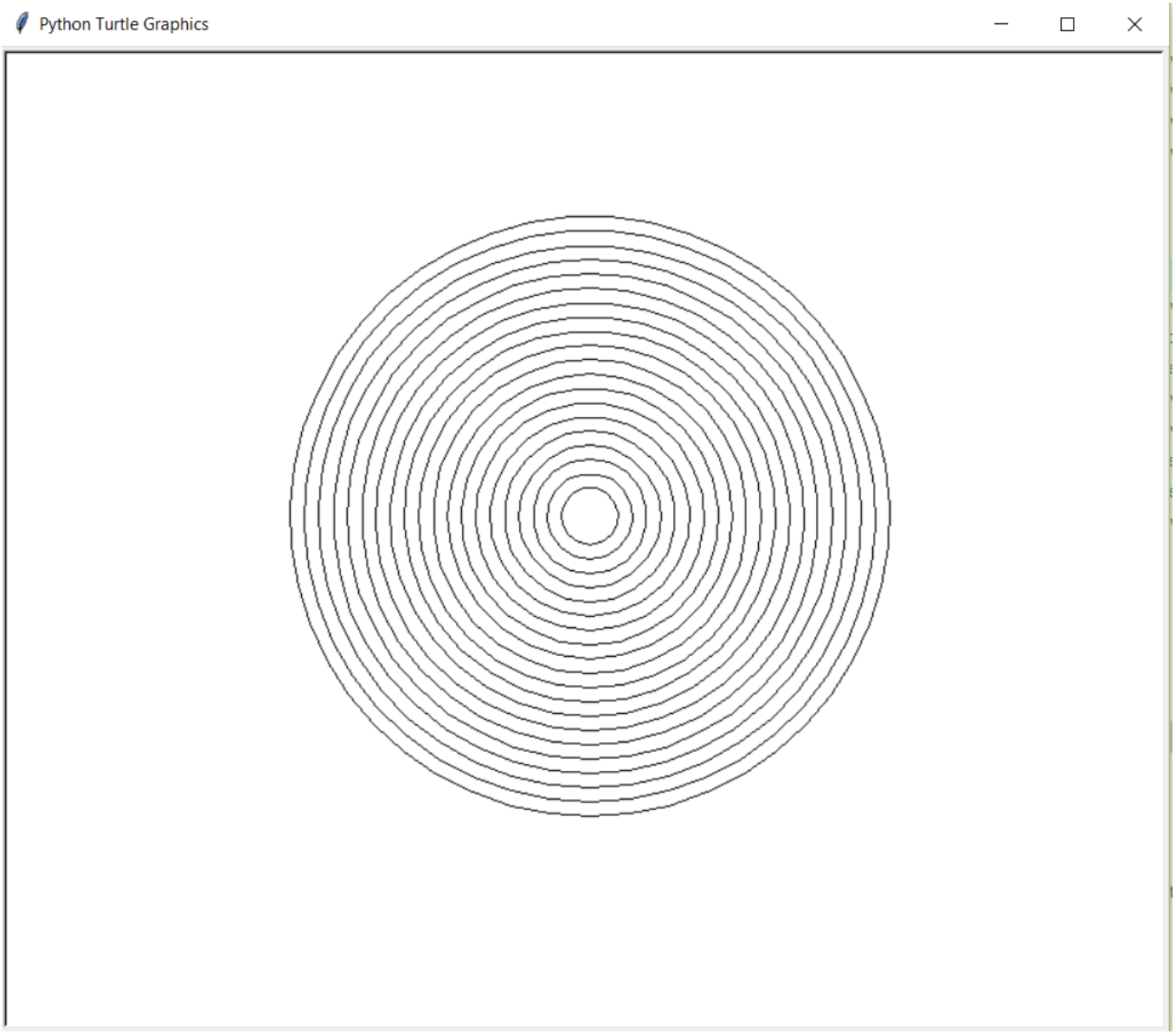
Program 4-21 (concentric_circles.py)

```
1  # Concentric circles
2  import turtle
3
4  # Named constants
5  NUM_CIRCLES = 20
6  STARTING_RADIUS = 20
7   OFFSET = 10
8   ANIMATION_SPEED = 0
9
10  # Setup the turtle.
11  turtle.speed(ANIMATION_SPEED)
12  turtle.hideturtle()
13
14  # Set the radius of the first circle
15  radius = STARTING_RADIUS
16
```

Program 4-21
part 1 of 2

```
17  # Draw the circles.
18  for count in range(NUM_CIRCLES):
19      # Draw the circle.
20      turtle.circle(radius)
21
22      # Get the coordinates for the next circle.
23      x = turtle.xcor()
24      y = turtle.ycor() - OFFSET
25
26      # Calculate the radius for the next circle.
27      radius = radius + OFFSET
28
29      # Position the turtle for the next circle.
30      turtle.penup()
31      turtle.goto(x, y)
32      turtle.pendown()
```

Program 4-21
part 2 of 2

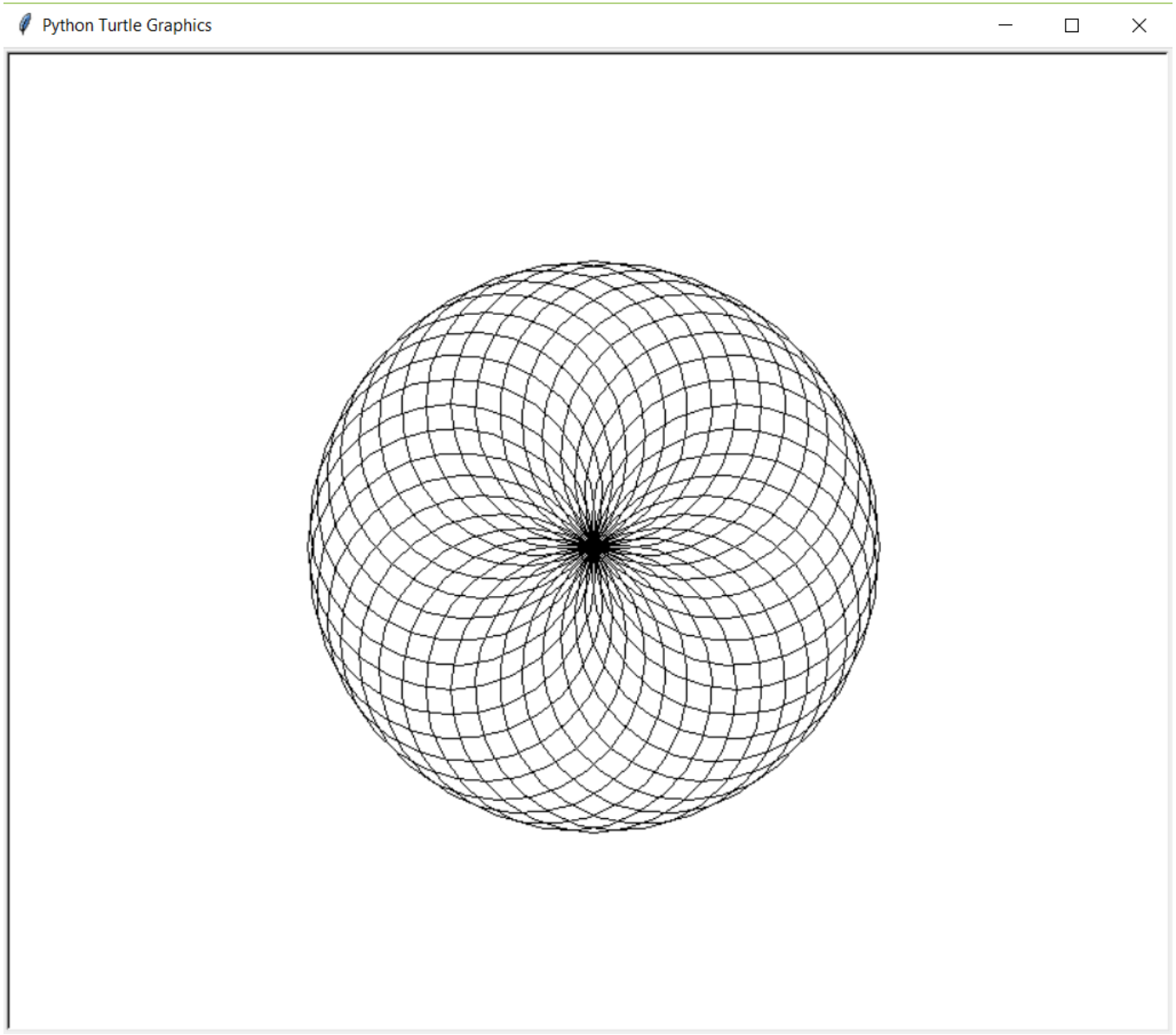


Output of Program 4-21: Concentric Circles

Program 4-22 (spiral_circles.py)

```
1  # This program draws a design using repeated circles.
2  import turtle
3
4  # Named constants
5  NUM_CIRCLES = 36     # Number of circles to draw
6  RADIUS = 100         # Radius of each circle
7  ANGLE = 10           # Angle to turn
8  ANIMATION_SPEED = 0 # Animation speed
9
10 # Set the animation speed.
11 turtle.speed(ANIMATION_SPEED)
12
13 # Draw 36 circles, with the turtle tilted
14 # by 10 degrees after each circle is drawn.
15 for x in range(NUM_CIRCLES):
16     turtle.circle(RADIUS)
17     turtle.left(ANGLE)
```

Program 4-22

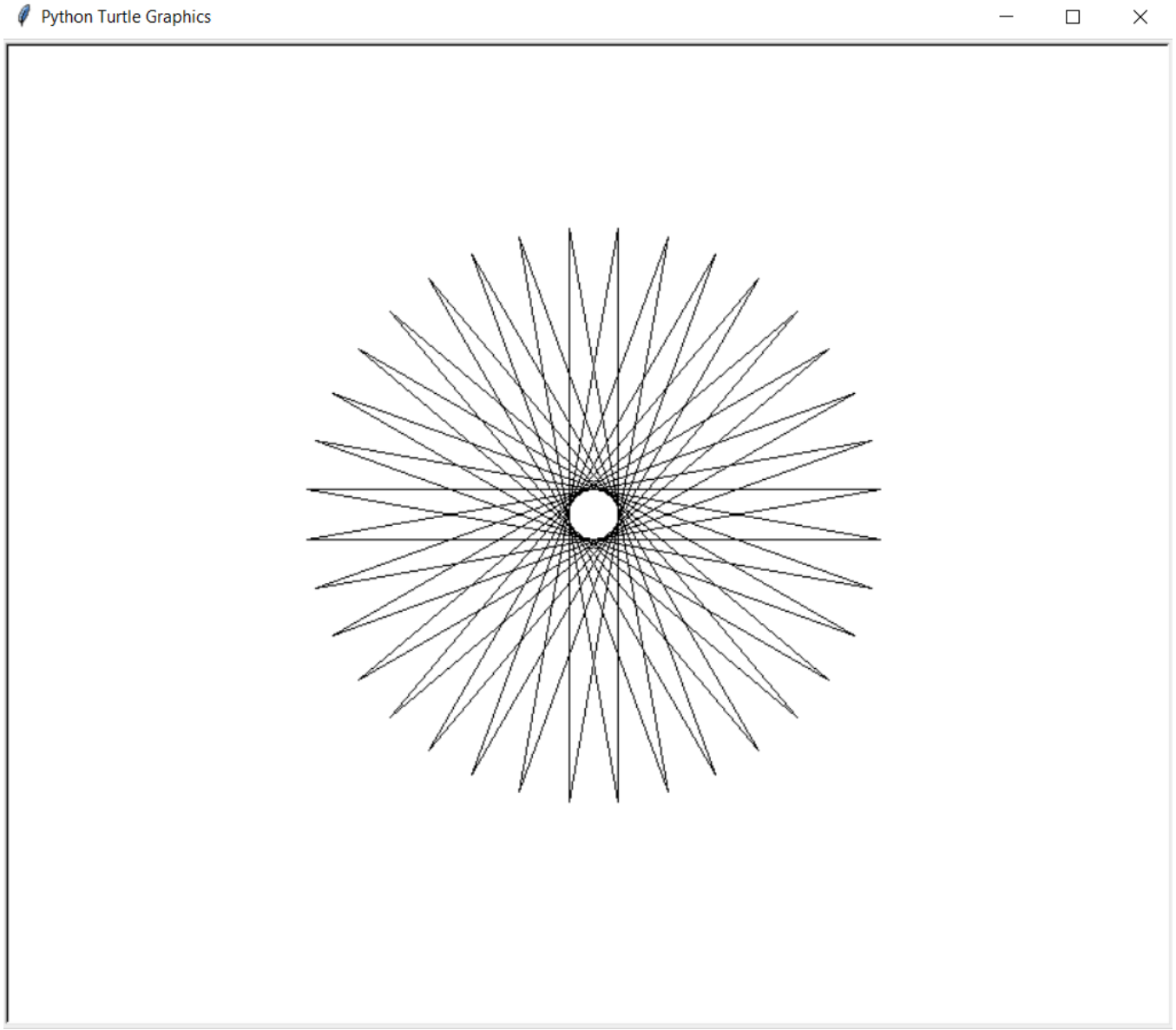


Output of Program 4-22: Spiral Circles

Program 4-23 (spiral_lines.py)

```
1  # This program draws a design using repeated lines.
2  import turtle
3
4  # Named constants
5  START_X = -200       # Starting X coordinate
6  START_Y = 0          # Starting Y coordinate
7  NUM_LINES = 36       # Number of lines to draw
8  LINE_LENGTH = 400    # Length of each line
9  ANGLE = 170          # Angle to turn
10 ANIMATION_SPEED = 0  # Animation speed
11
12 # Move the turtle to its initial position.
13 turtle.hideturtle()
14 turtle.penup()
15 turtle.goto(START_X, START_Y)
16 turtle.pendown()
17
18 # Set the animation speed.
19 turtle.speed(ANIMATION_SPEED)
20
21 # Draw 36 lines, with the turtle tilted
22 # by 170 degrees after each line is drawn.
23 for x in range(NUM_LINES):
24     turtle.forward(LINE_LENGTH)
25     turtle.left(ANGLE)
```

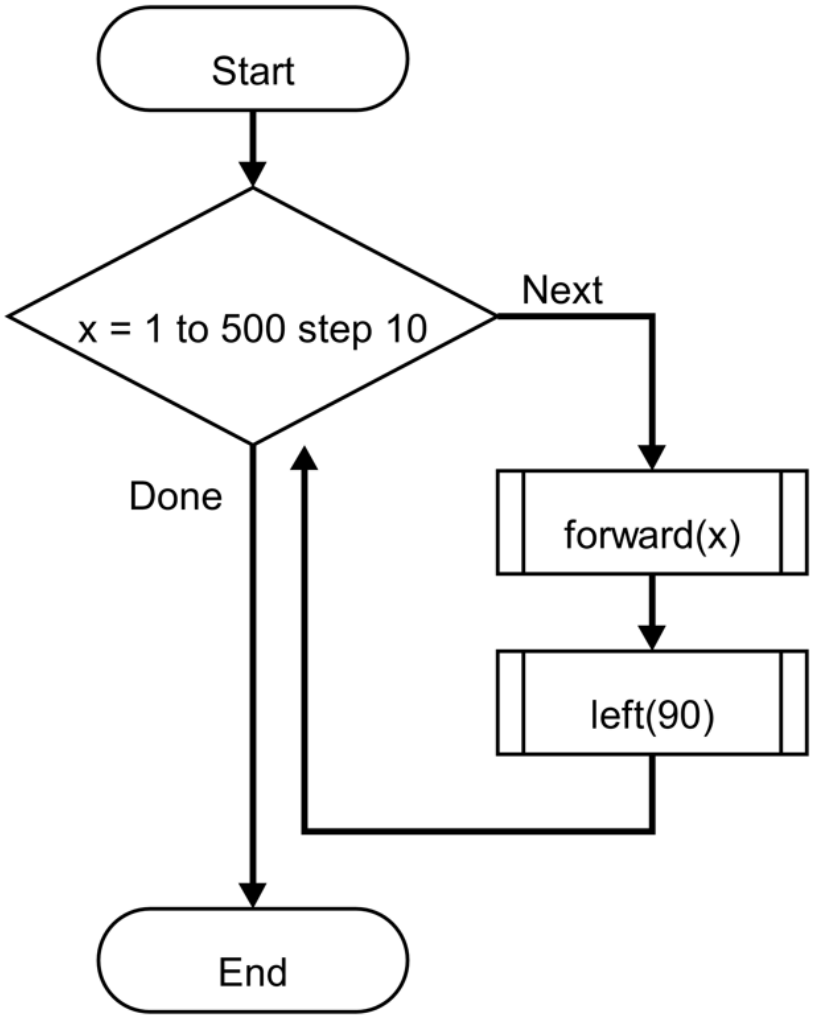
Program 4-23



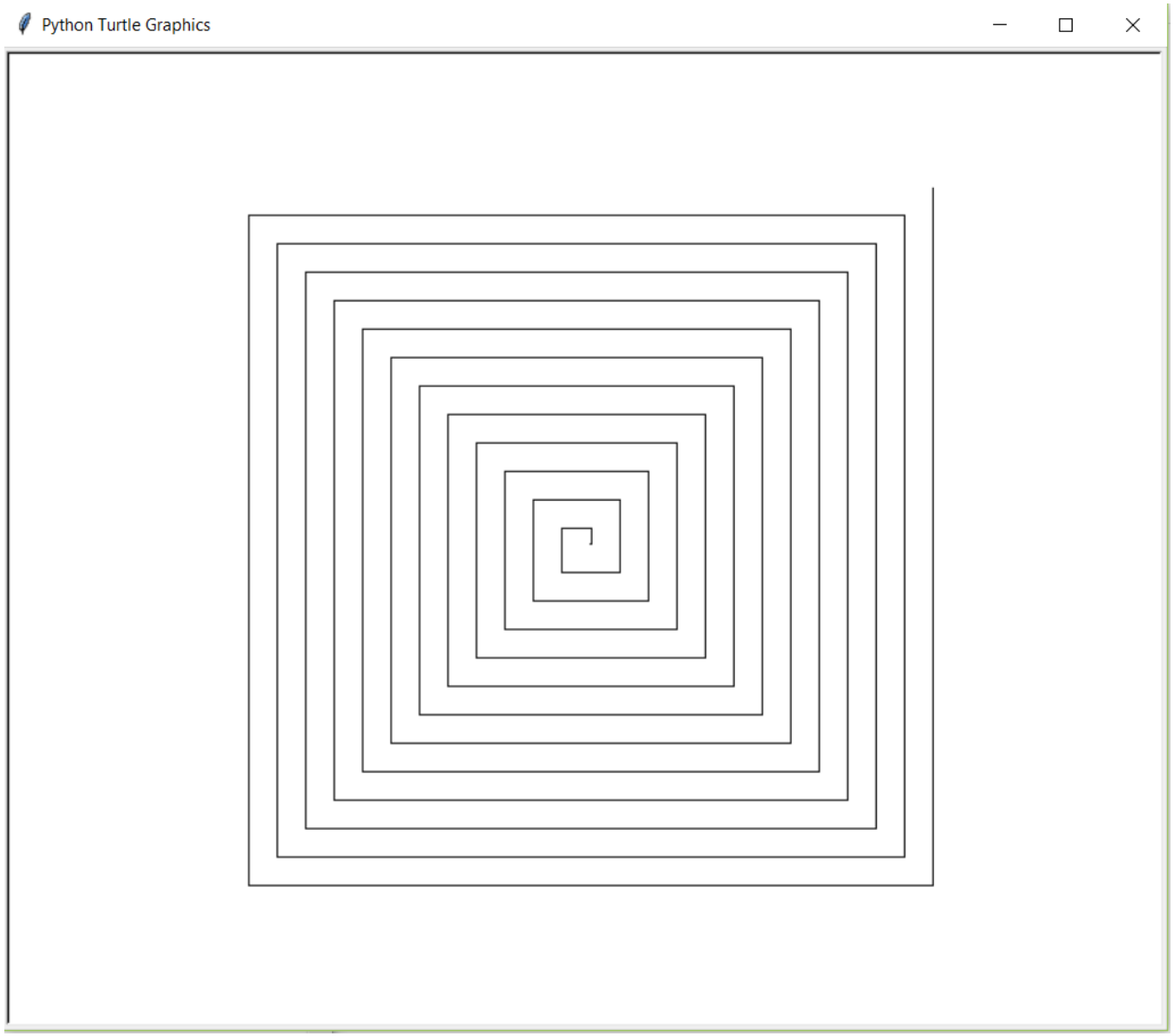
Output of Program 4-23: Spiral Lines

Lab04B

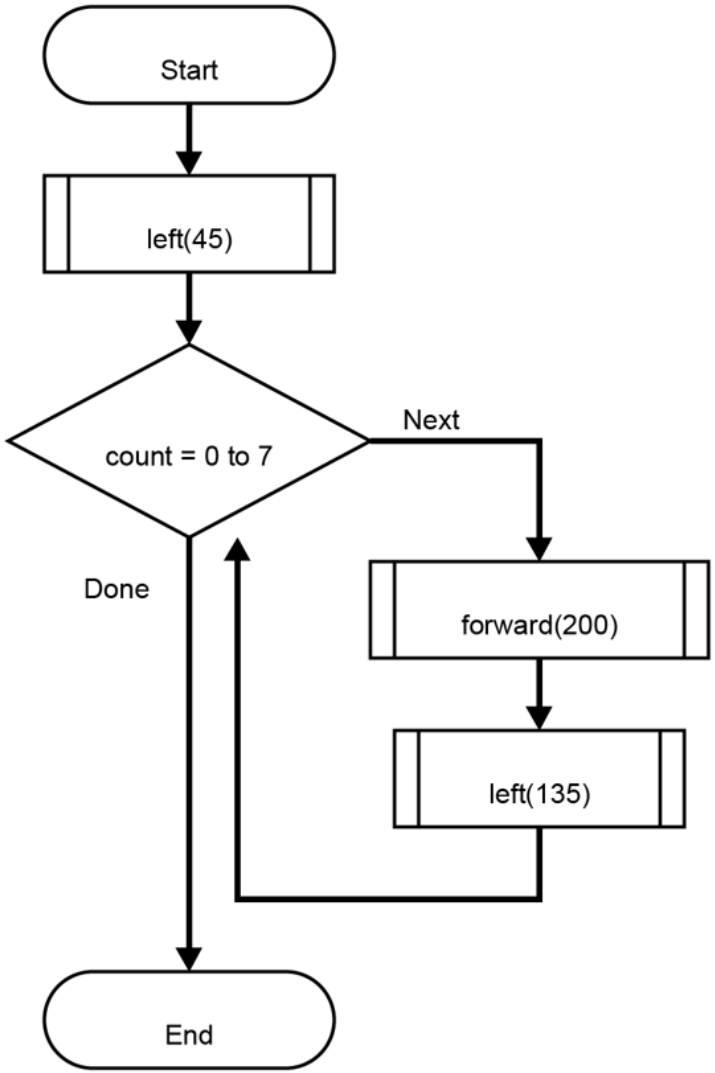
- The flow chart for each of the three following problems is shown, as well as the result of running the program that you will write.
- When the person with the lowest number seat, of the team, is done part A, then (s)he should write the program, the algorithm for which, is given by the flowchart labeled, Hypnotic Pattern.
- When the person sitting in the middle of the team is done with Part A, then (s)he should write the program, the algorithm for which, is given the by flowchart labeled, Star Pattern.
- When the person with the highest number seat, of the team, is done part A, then (s)he should write the program, the algorithm for which, is given by the flowchart labeled, Repeating Squares.
- When you have your flowchart coded and the program working, call over the instructor so that you may be given proper credit for your work.



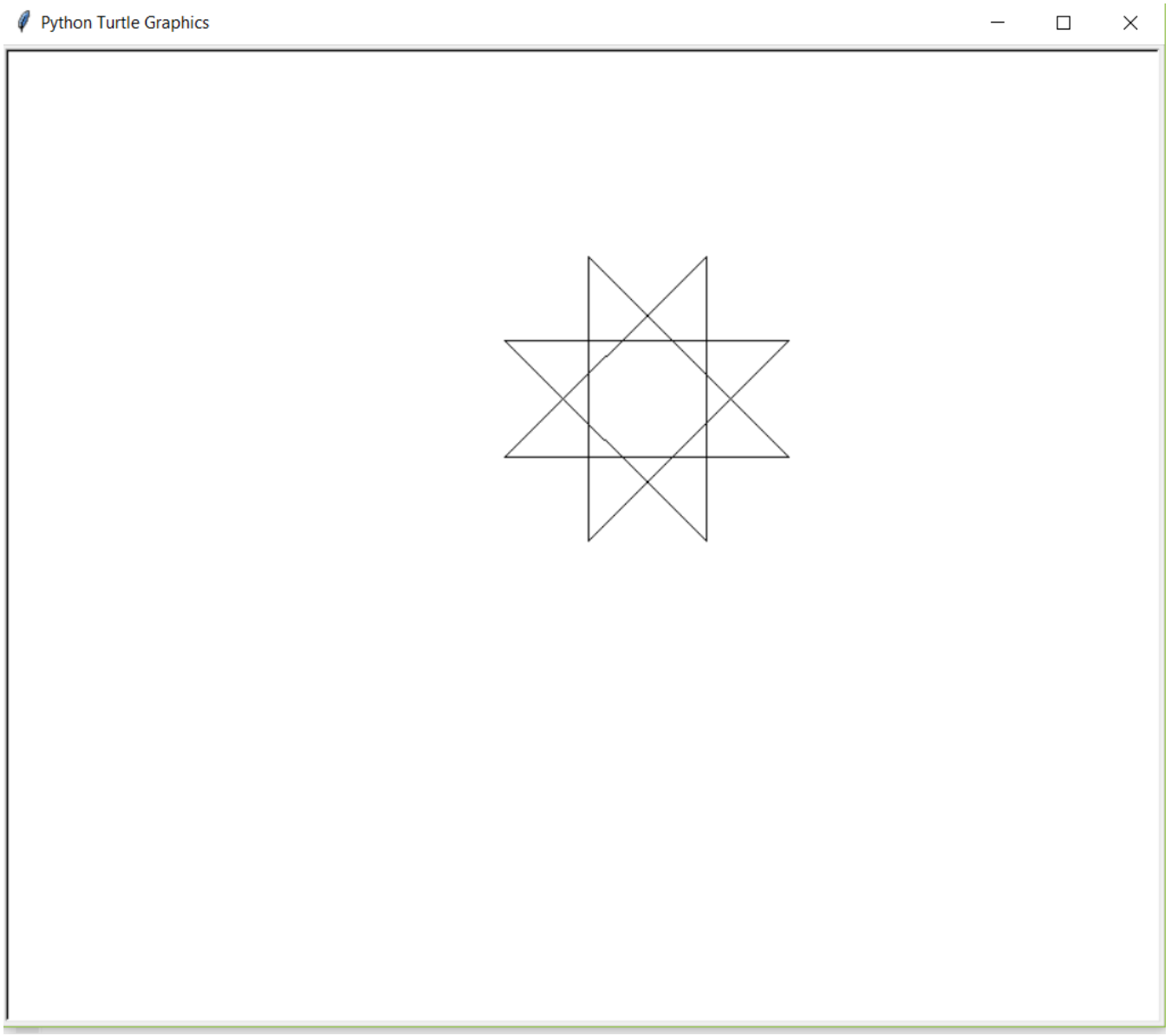
Hypnotic Pattern Algorithm



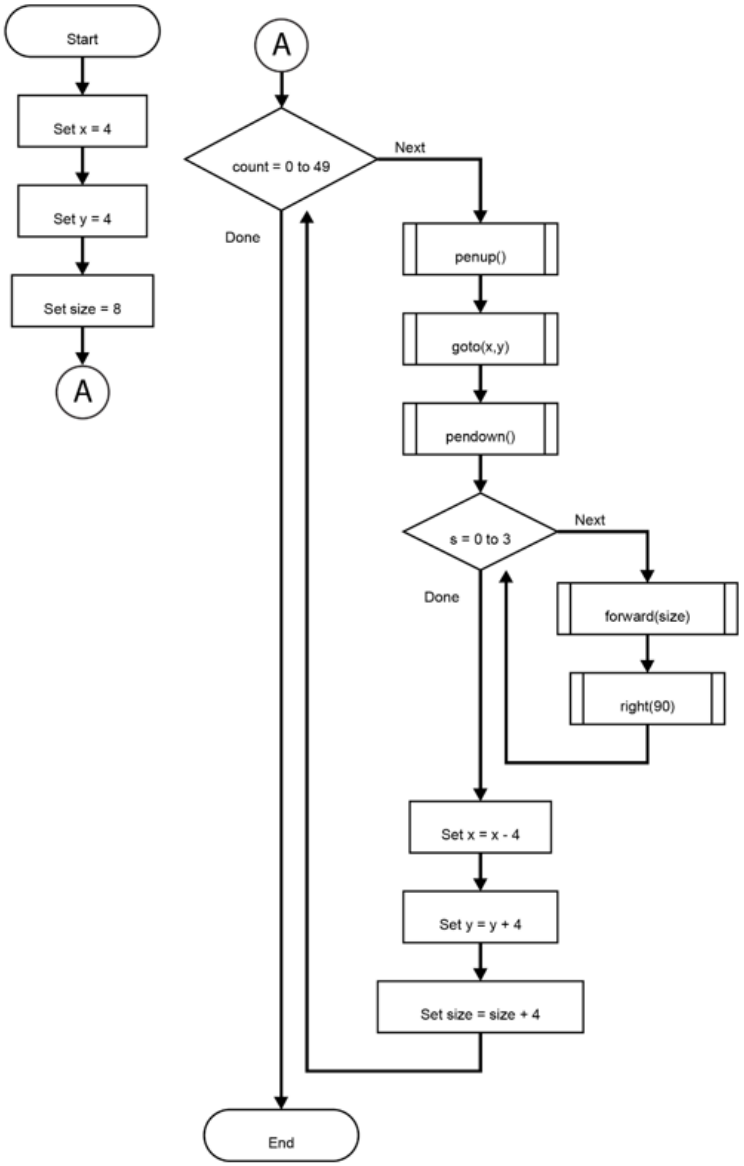
Hypnotic Pattern Display



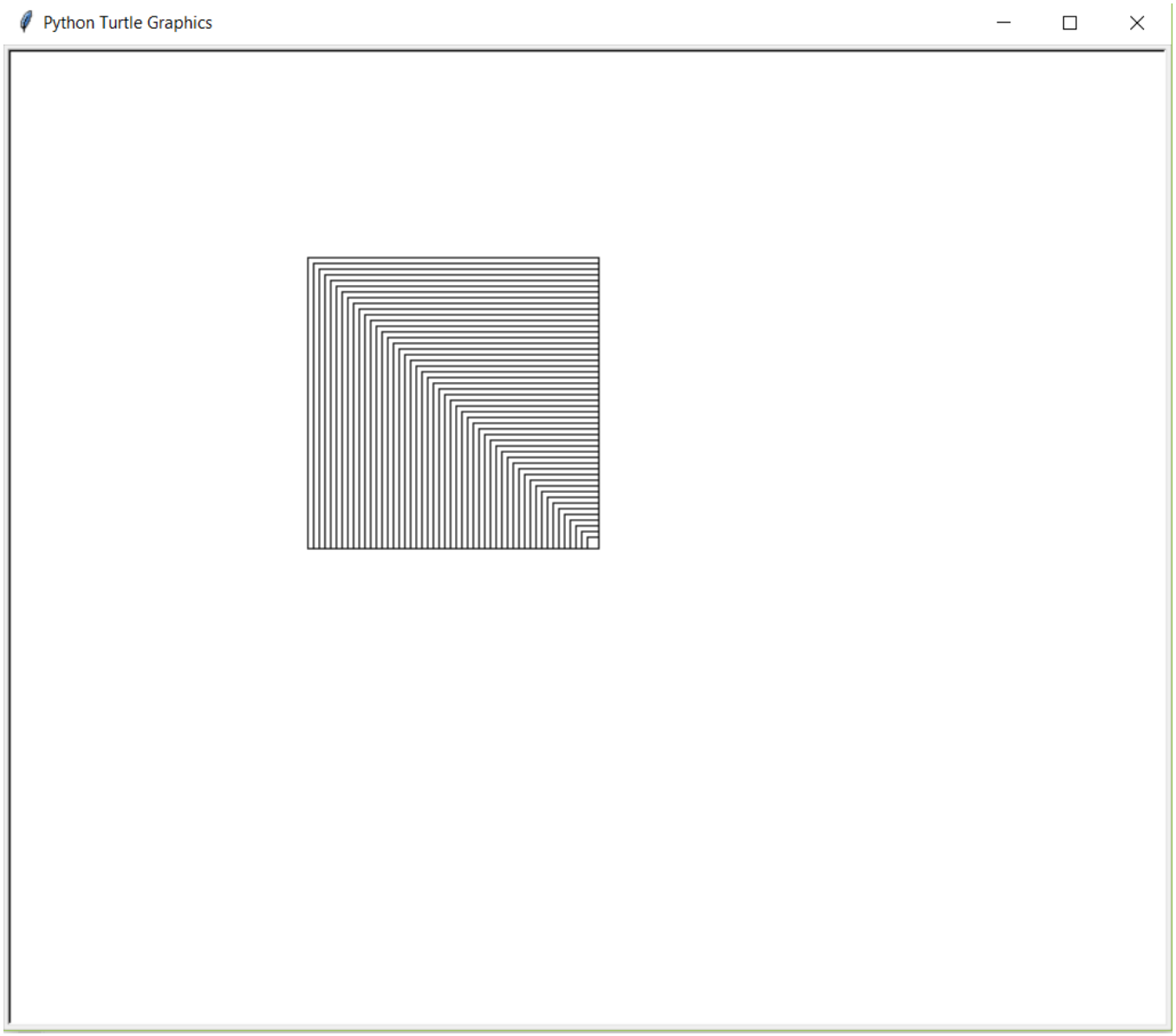
Star Pattern Algorithm



Star Pattern Display



Repeating Squares Algorithm



Repeating Squares Display