ORMC Intermediate Group **May 10, 2026**

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Intro to Python, Part 2

Recall that to use the Turtle module commands without the *turtle.* beginning, we employ the following prompt.

```
>>> from turtle import *
```

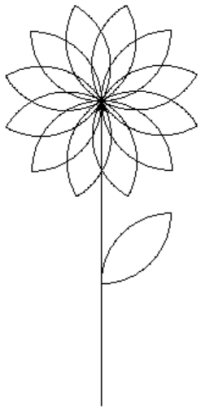
Problem 1 *Do you think the following Python code would draw a circle of radius r? Why or why not? Try to answer the question without running the code.*

```
>>> def circle (r=80):
        for i in range(1000):
            fd(3.1416*r/500)
            rt(.36)
```

Run the code, then enter the prompt `>>> circle(120)` *to check your answer.*

Problem 2 *Change the code of the function circle(r) to increase the speed of drawing without lowering the visual quality of the picture.*

Problem 3 *Using the Turtle module, write the code for the function petal(r) that draws two quarter-circles of radius r forming a petal as on the next page.*



In programming, a function used by another function is called a *subroutine*.

Problem 4 *Using the Turtle module, write a function flowerhead() that uses the subroutine petal(r) to draw a flowerhead of twelve congruent petals equally spaced around the common center as shown above.*

Problem 5 *Using the Turtle module, draw a flower similar to the one at the top of this page.*

We have learned the following four major tools of programming.

LOOPS

FUNCTIONS

VARIABLES

SUBROUTINES

Problem 6 *In your own words, explain what a programming loop is and what it is good for.*

Problem 7 *In your own words, explain what a function is in programming and what it is good for.*

Problem 8 *In your own words, explain what a variable is in programming and what it is good for.*

Problem 9 *In your own words, explain what a subroutine is in programming and what it is good for.*

Input, output, and the *while* loop

Problem 10 *Type in the following command.*

```
>>> print("Hello world!")
```

Then press ENTER and see what happens.

The *print* command will reproduce whatever you have in quotation marks! This is the simplest form of output.

In the following example, we will make the computer learn your name (or any other). Type in the following line of code.

```
>>> name = input("What is your name? ")
```

It assigns whatever you type in the input to the variable *name*.

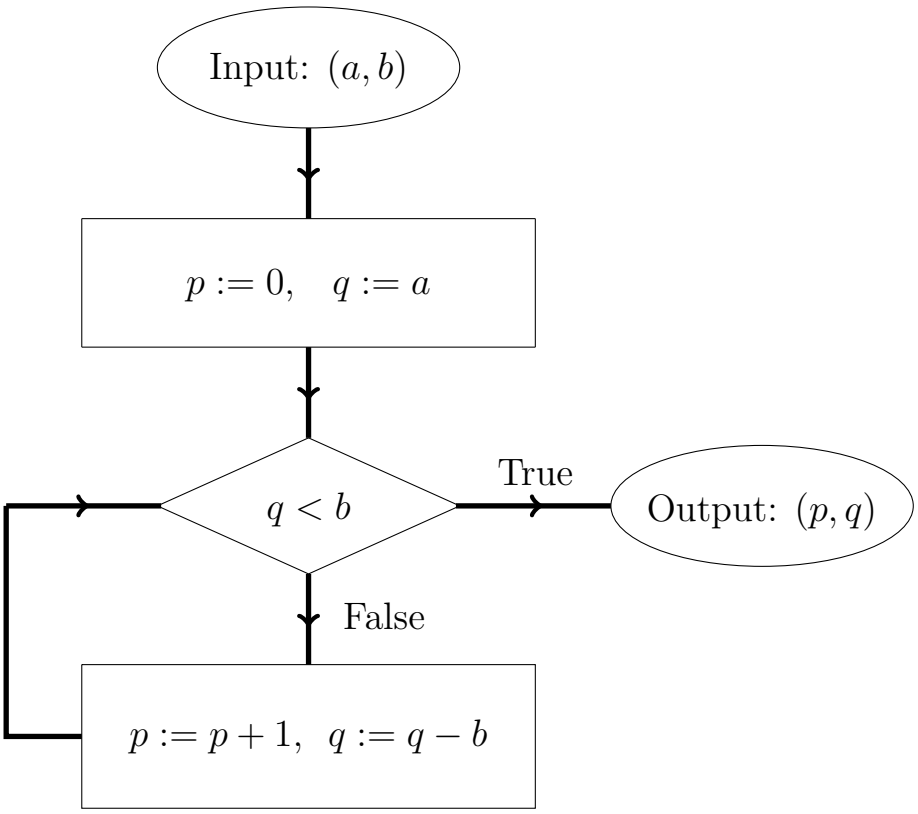
Problem 11 *Now type in the prompt >>> name, hit ENTER, and see what happens.*

Problem 12 *Use the command print and the variable name to make the computer greet you.*

In the input example above, Python understands the input as a *string*, a formal sequence of characters, letters, numbers, and other symbols.

We will see more input and output options later. Below, we will also need the *while* loop construction that is quite self-explanatory.

The following is the algorithm that takes two positive integers, a and b as inputs and finds the positive integers p and q such that $a = pb + q$. In other words, it divides a by b and finds the quotient p and the remainder q, $a \div b = p$ rem q.



Note that division is implemented as repeated subtraction!

Problem 13 *Please apply the algorithm, pen on paper, to the numbers* $a = 7$ *and* $b = 3$.

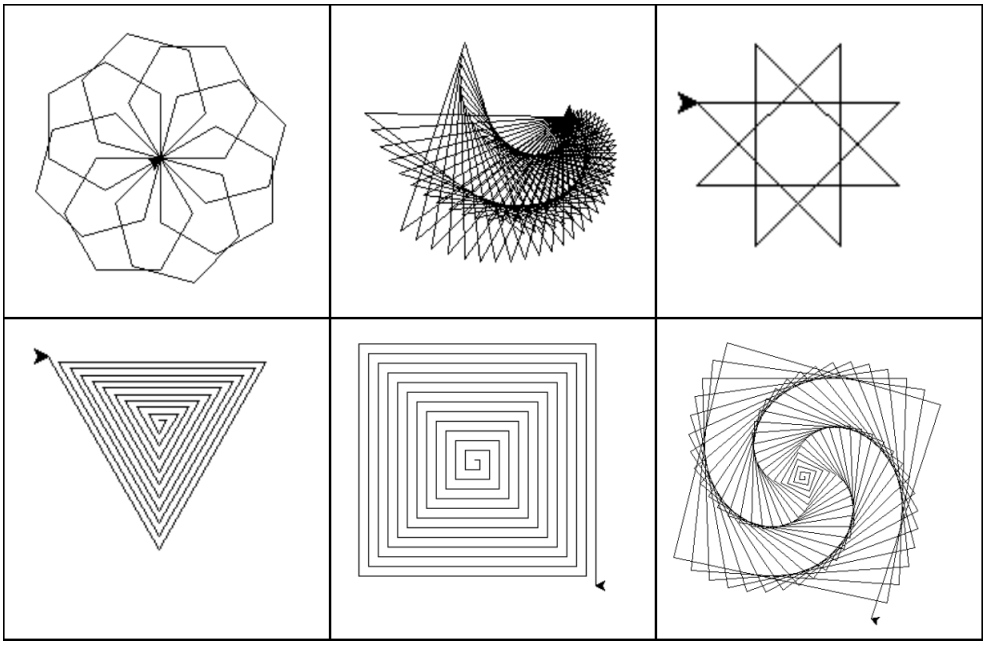
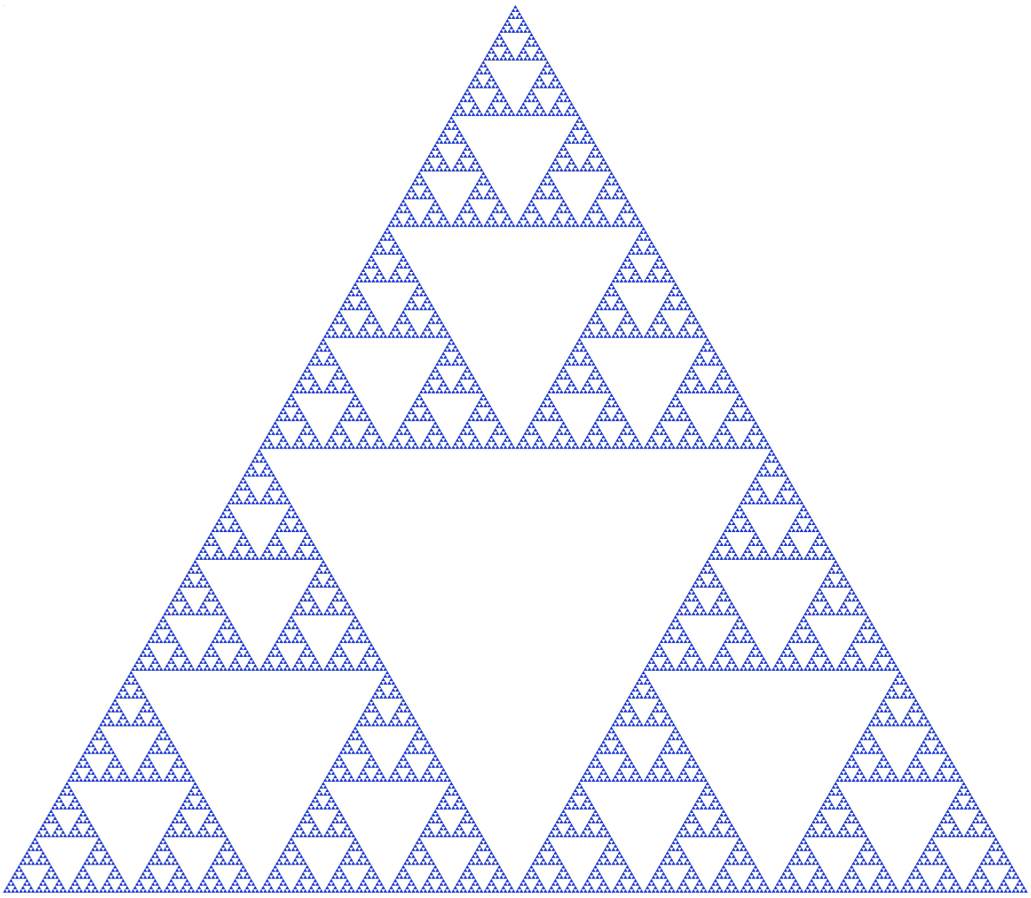
The following Python code seems to be a perfect implementation of the algorithm.

```
a = input("Please enter a positive integer a you'd like to divide. ")

b = input("Please enter a positive integer b you'd like to divide a by. ")

p=0
q=a

while q>=b:
        p=p+1
        q=q-b

print("p=",p," q=",q)
```

Problem 14 *Try to run the code in Python. What's wrong? Can you correct the code?*

The following problems are your homework. You can do it in class, if you have time.

Problem 15 *Use the Turtle module to draw the shapes below.*



Problem 16 *Too easy for you? Write a Turtle program that draws out Sierpinski's Triangle, and ask the user for how many iterations to draw. Recursion may be very helpful here!*