

day38 turtle

11/12/20

Today we're going to play with Turtle, a drawing library in Python.

Open [today's repl from the Google Classroom](#) or by clicking the linked text to the left. The file contains this program:

```
from turtle import *  
circle(50)
```

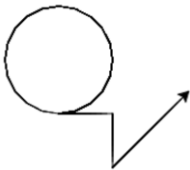
Run it and it draws the following:



Add the following commands to your program:

```
forward(50)  
right(90)  
forward(50)  
left(135)  
forward(100)
```

Run it again, see that it draws the circle, then draws some straight lines. The above commands do just what you'd imagine: "forward" moves the turtle forward that many pixels, "right" turns 90 degrees towards the right and so on.



Replace your entire program with this program (copy and paste):

```
from turtle import *  
penup()  
goto(-50,50)  
pendown()  
for x in range(24):  
    forward(50+x)  
    right(30)  
    dot()
```

Run it. In this program we draw each line segment 4 pixels longer than the previous one using a variable and a for loop, to make the start of a cool spiral. The "dot()" command draws a dot where the turtle is once through each loop.

The turtle draws a line whenever it moves. You can control the line thickness, color, and direction using various turtle commands (see below). You can "lift the pen up" using the penup() command, then move the turtle without drawing, then put the pen back down and draw some more. The whole drawing board is an x-y coordinate plane (like you learned in math class) where (0,0) is the center.

Replace your program with the following to draw something insane:

```
from turtle import *
import random
speed(0)
for x in range(50):
    goto(random.randint(-300,300),random.randint(-200,200))
    dot()
    write(pos())
```

This program goes to 50 random locations and puts a dot at each one followed by the location of the dot. Add a penup() command and a pendown() command as follows to make it do the same thing without drawing lines between the dots:

```
from turtle import *
import random
speed(0)
for x in range(50):
    penup()
    goto(random.randint(-300,300),random.randint(-200,200))
    pendown()
    dot()
    write(pos())
```

penup() and pendown() let you move the drawing pen around without drawing lines as you move.

There are tons of turtle commands, here are some I recommend you experiment with:

```
forward(distance)
backward(distance)
right(degrees)
left(degrees)
dot(size)          you can make dots larger by including a number, or leave blank
circle(r)          r is the radius of the circle
penup()            lifts up the imaginary pen that the turtle draws with
pendown()          puts the pen back down so you can draw
home()             goes back to the center of the screen
speed(n)           1 (slow) to 10 (faster), or 0, which makes turtle go the fastest
pensize(n)         sets line thickness
color("red")        or pink, or blue, yellow, etc.
color("c1","c2")   giving two colors makes one the line and one the fill
begin_fill()       say begin_fill(), then do a bunch of stuff that includes overlapping lines,
                  then when you are done, do "end_fill()" to fill areas with color. See
                  example below.
end_fill()
goto(x,y)          Goes to the location (x,y) on the drawing board
write("text")      writes text on the screen. You can set the font using a call like this:
                  write("Mr. Hays",font=("Times New Roman", 18, "normal"))
bgcolor("color")   Sets the whole window background color
```

Here's a fun example that uses begin\_fill() and end\_fill():

```
from turtle import *
color('red', 'yellow')
penup()
goto(-100,0)
pendown()
speed(0)
begin_fill()
for x in range(36):
    forward(200)
    left(170)
end_fill()
```

Here's a fun spiral program that uses the dot() command:

```
from turtle import *
penup()
for x in range(50):
    dot(x)
    right(10)
    forward(5+x)
```

Try it. Try changing some of the numbers, see what happens.

Play around with the commands from the previous page. Try out lots of different things. Have some fun.

Today's actual assignment is on the next page.

## When you are ready, here is our assignment for today:

Create a program called "day38 turtle", put your name and the date in a comment at the top.

Part 1: Use turtle to draw a plus sign like the image to the right with sides that are 50 in length. Set the pen width to be 4. Draw the plus sign using forward() and right() and left() commands. Write your name in the middle like I have done. Use a font size that is readable and fits nicely. Use penup() to move to an appropriate position then write your name so that it fits nicely in the plus sign. You'll just have to use trial and error to figure out where to use the write call.

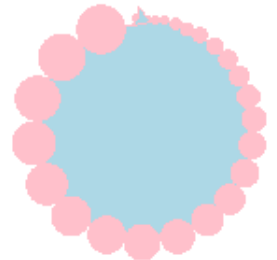


Label your parts with comments in your program (#Part 1, #Part 2, etc.)

Part 2: In the same program go to (-50,100) and draw a plus sign again, this time with two different colors (one color for the lines and one for the fill). By the way, up towards the top of your entire program, add a "speed(0)" call to make all of your drawings go as fast as possible.



Part 3: In the same program go to (-150,0) or so and draw a shape of some kind that has fill, that uses dots or circles, and that uses a for loop. Use different colors than you used for the second plus sign. A sample thing is to the right. Yours should be something of your own creation. (You can take one of my sample programs and mess with it, but what you create should be your own.)



I made a video where I work the whole thing out, [feel free to watch that](#).