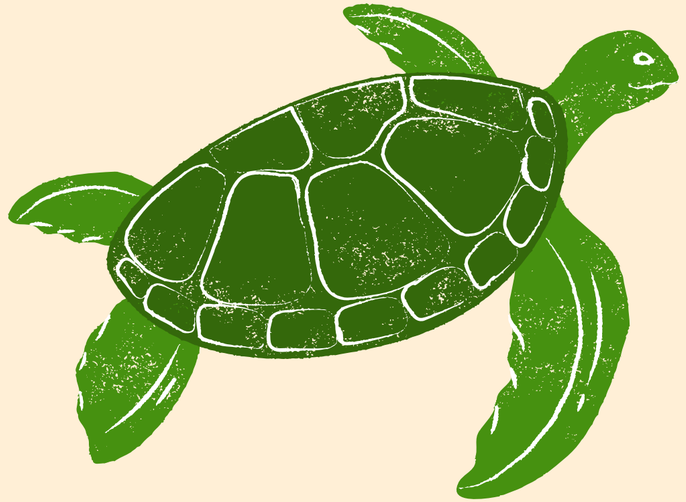
Intro to working with Objects in Python



Understanding the basics of Objects

What is Turtle?

Turtle is a Python Module, Which allows us to draw and create art

Why are we doing this Module?

Although this seems like something for kids, **Turtle Module is simply a hidden gem** for learning OOP.

This Module will give you a **strong understanding of how Objects work** in Programming and how we can use them throughout out code

What is Turtle?

We have 9 objects, all of which are Turtles

Every Turtle has its own properties, such as **Color or Speed**.

They all have **different actions** that can do different tasks

What are Methods & Properties?

Methods and Properties:

A **Method** is a Function, specifically it is a **function in a Class**

A **Property** is a Variable, specifically it is a **variable in a Class**

Properties (Variables)	Methods (Functions)
owl.color = "maroon"	owl.fly()
parrot.speed = 5	parrot.eat()
canary.width = 2	canary.speak()

A Property & Method **must be linked** to an object to work

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Setting up your code:

```
from turtle import *

t1 = Turtle()
t2 = Turtle()

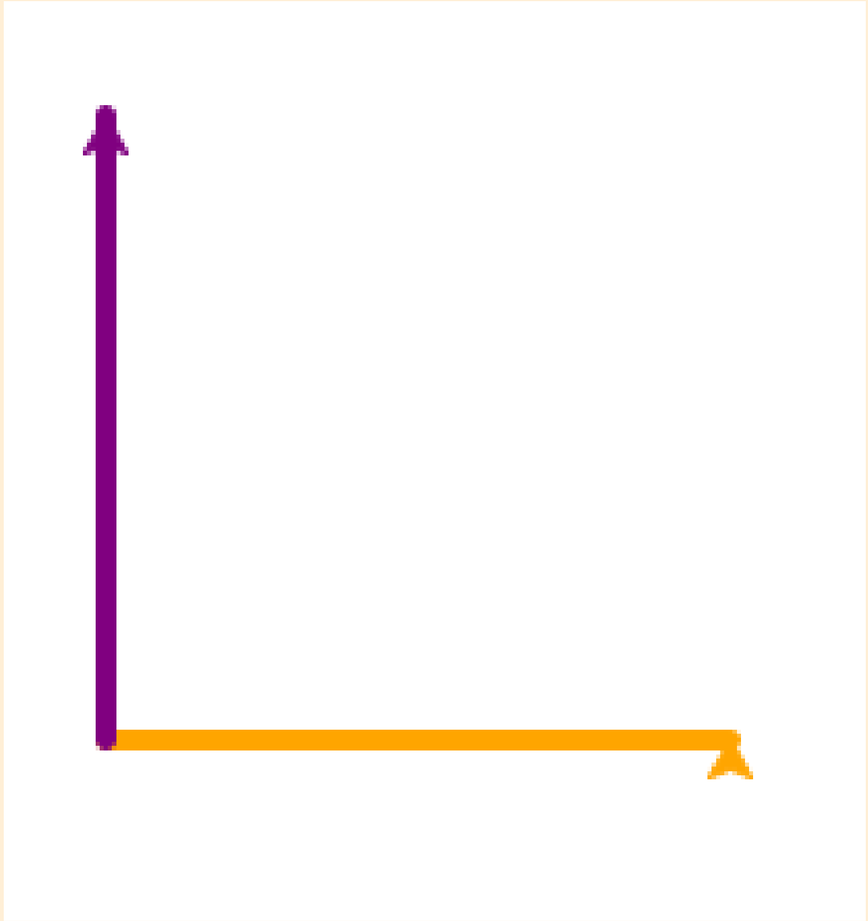
t1.color("orange")
t2.color("purple")

t1.forward(50)
t1.left(90)

t2.left(90)
t2.forward(50)

done()
```

Final Output



Setting up your code:

```
from turtle import *
```

Importing everything from the Turtle Module

```
t1 = Turtle()
t2 = Turtle()
```

Creating two Objects

```
t1.color("orange")
t2.color("purple")
```

Assigning the a Color Property to each object

```
t1.forward(50)
t1.left(90)
```

Linking two methods to object one to move

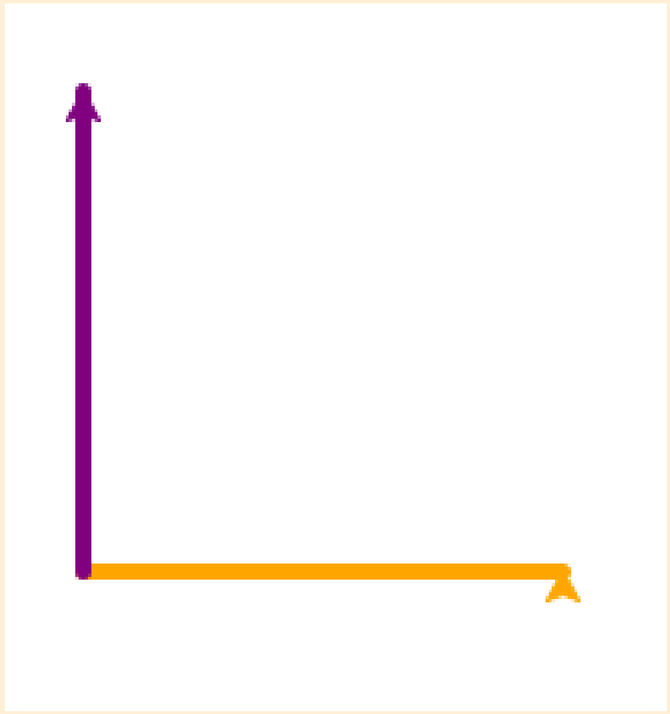
```
t2.left(90)
t2.forward(50)
```

Linking two methods to object two to move

```
done()
```

Allows the drawing to stay on the screen once done

Final Output



Methods and properties of the Turtle Module:

Property / Method	What they do
.color("green")	**Assigns a Color** to your object, the color is a string
.width(5)	**Assigns a width** to the Line
.shape("circle")	**Assigns a shape** to the object (arrow, circle, square, triangle, turtle)
.speed(10)	**Assigns a Speed** to the object
.fd(100)	A method to **move your object forward** a number of pixels
.left(90) or .right(45)	A method to **turn your object**, a number of degrees

Methods and properties of the Turtle Module:

Property / Method	What they do
.up()	**Lifts your object** off the screen
.goto(x, y)	**Moves your object** to a new location (x , y)
.down()	**Places your object back down** once moved
.circle(10)	Used to **draw a circle** (takes a radius)
.begin_fill() or .end_fill()	Allows you to **fill in your drawing** with a solid color
.done()	Used to keep the drawing displayed once complete

Use Turtle with the basics of Python:

```
from turtle import *

t1 = Turtle()
t1.color("orange")
t1.width(5)

t1.begin_fill()
for i in range(5):
        t1.forward(150)
        t1.left(144)
t1.end_fill()



done()
```

You can use your previous knowledge to expand with turtle, this includes:

- Using **For Loops** to repeat
- Using **Conditional Statements**
- **Creating Functions**

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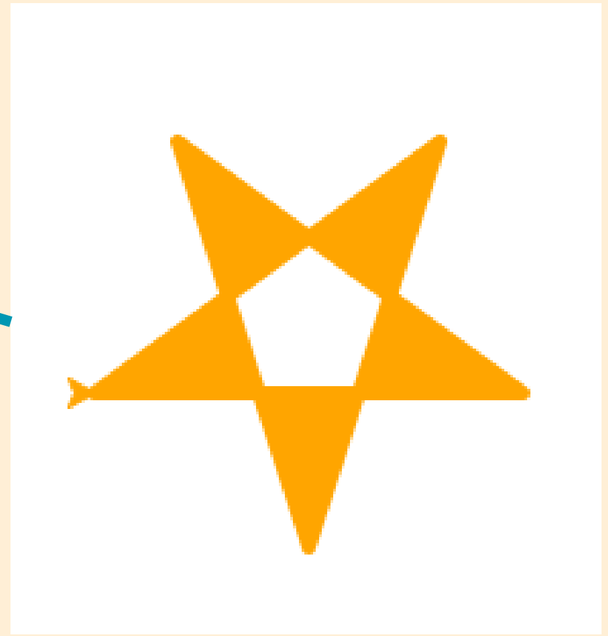

Additional Code Examples:

```
from turtle import *

def star(t,width,size,color):
    t.color(color)
    t.width(width)
    t.begin_fill()
    for i in range(5):
        t.forward(size)
        t.left(144)
    t.end_fill()

def circle(t,radius,color):
    t.color(color)
    t.begin_fill()
    t.circle(radius)
    t.end_fill()
```

```
t = Turtle()
ask = input("Enter shape: ")
while ask != "done":
    if ask == 'star':
        width = int(input("Enter width: "))
        col = input("Enter a color: ")
        size = int(input("Enter a length: "))
        star(t,width,size,col)
    elif ask == 'circle':
        radius = int(input("Enter a radius: "))
        col = input("Enter a color: ")
        circle(t,radius,col)
    else:
        print("No shape entered")
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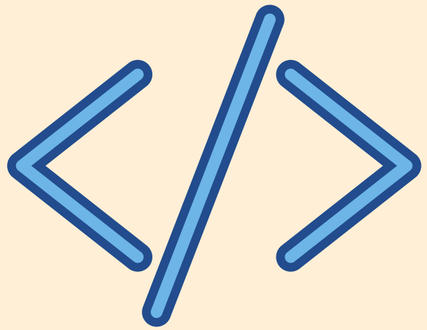
Code Challenges:

1. Draw a hollow pentagon, each side a different color

2. Draw 4 solid squares all different colors in different locations

3. Create 3 functions that'll draw something different when called (similar to the previous example)

4. Draw 10 circles, each at a **random** location with a **random** radius
(hint -> Use the Python random module, randint()



5. Create 3 objects, that'll draw 3 triangles in a column, all a different color

Turtle Graphics Module Documentation