Code For China
Lesson 3

Review of Lesson 2

- Comments, print statements
- Updating and changing variables
- Nested For Loops

Comments

```
#any line that starts with '#' is a comment
#it will not affect the code
#comments are good for notes
```

Adding Variables

```
Addition: + or +=
Subtraction: - or -=
Division: / or /=
Multiplication: * or *=
```

Print Statements

```
x = 5
print(x)
#5 is printed to the console
print(x + 5)
#10 is printed to the console
```

Nested For Loop

```
num = 1
for i in range(3):
    for j in range(4):
        num = num + 1
print(num)
```

Today's Overview

- Introduce Functions and Parameters
- Helper Functions
- Update old projects using functions
- Event Listeners
- If/Else Statements
- Turtle Position

Functions and Parameters

- A **function** is a set of instructions that we call
- Functions help us to **organize our code**
- A function accepts zero or more variables
- These variables are called **parameters**
- A function **always** begins with “def”

```
def rgb(low,high):
    color = random.randint(low,high)
    return color
```

Functions and Parameters

- **Functions** can return 0 or more values
- For now, we will focus on returning 1 value

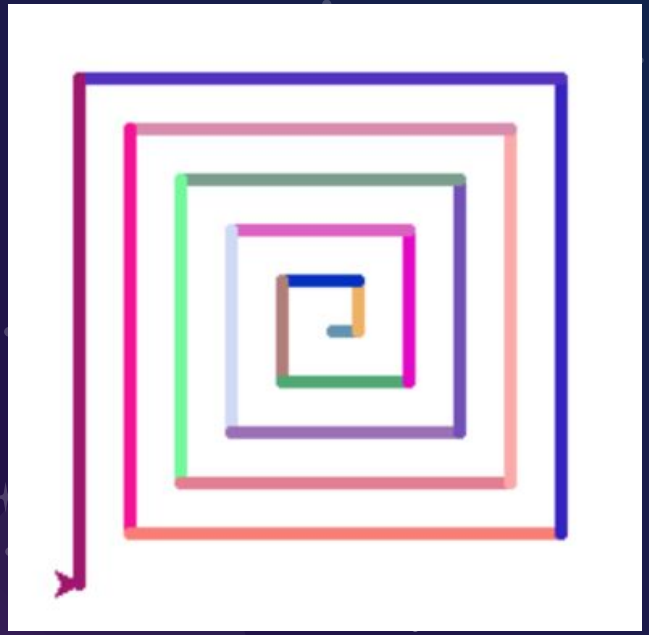
```
def rgb(low,high):
  color = random.randint(low,high)
  return color
```

Helper Functions

- A helper function allows us to **break up our code into parts** that each have their own job
- We can have many helper functions but we **must call them** so they can do their job
- Helper functions should exist after import statements (import turtle, import random ...)

Square Spiral with Helper Function

https://repl.it/@jessicae5/squareSpiralFunction

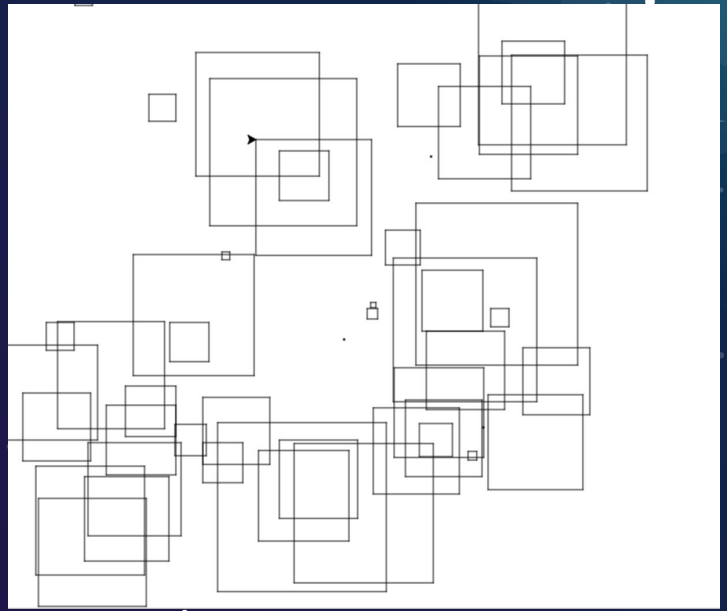


CODING TIME!

Random Square with Helper Function

https://repl.it/@jessicae5/randomSquaresFunction

- Draw 50 squares in a random (x, y) location
- Draws each square using a **helper function** that takes **3 parameters** to decide where each square will be drawn & its size



15 min break 🥳

Variable Scope

https://repl.it/@jessicae5/randomSquaresFunction

- If we want to use any values from the other function, we need to pass them as parameters
- If we try to use a variable that is not in our function, we get the error: **local variable referenced before assignment**

CODING TIME!

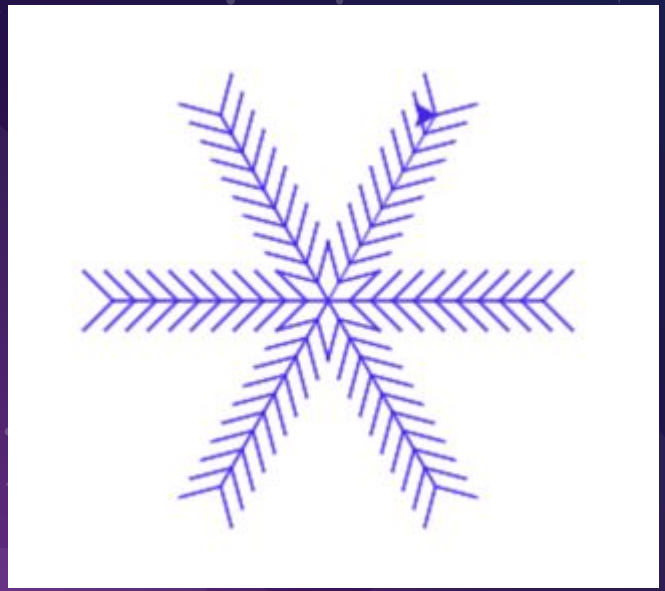
More Functions

- **getRandomNumber:** takes 2 values and returns a random number between those values
- **printLowToHigh:** takes 2 values and prints values between those, inclusive
- **addValues:** takes 3 values and returns the sum squared

CODING TIME!

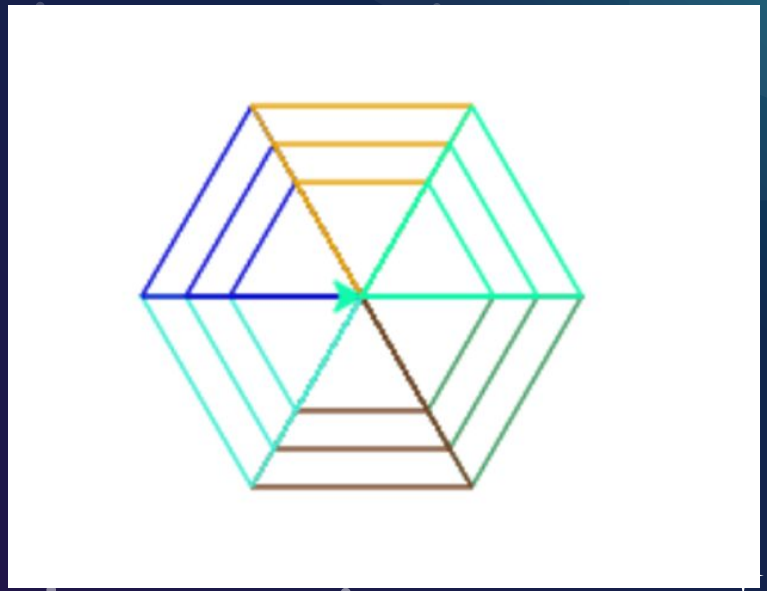
Snowflake

https://repl.it/@jessicae5/snowflake



Hexagon Triangles

https://repl.it/@jessicae5/hexagon



CODING TIME!

The Tree

- Start simple
- How does turtle draw the shape?
- Notice the **order**
- Notice **repetition**

Use helper functions!

NEW CONCEPT

Event Listeners

- Pressing the left, right, up, down keys are **events**
- We write functions that run when these keys are pressed

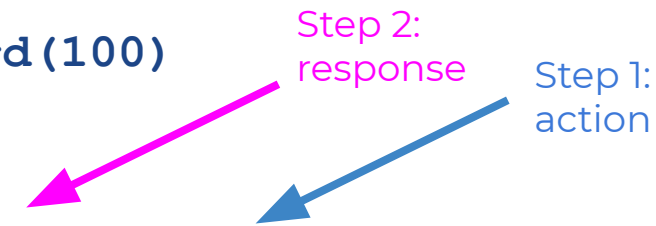
NEW CONCEPT

Event Listeners

```
def forward():
    turtle.forward(100)



screen.onkey(forward, "Up")
screen.listen()
```



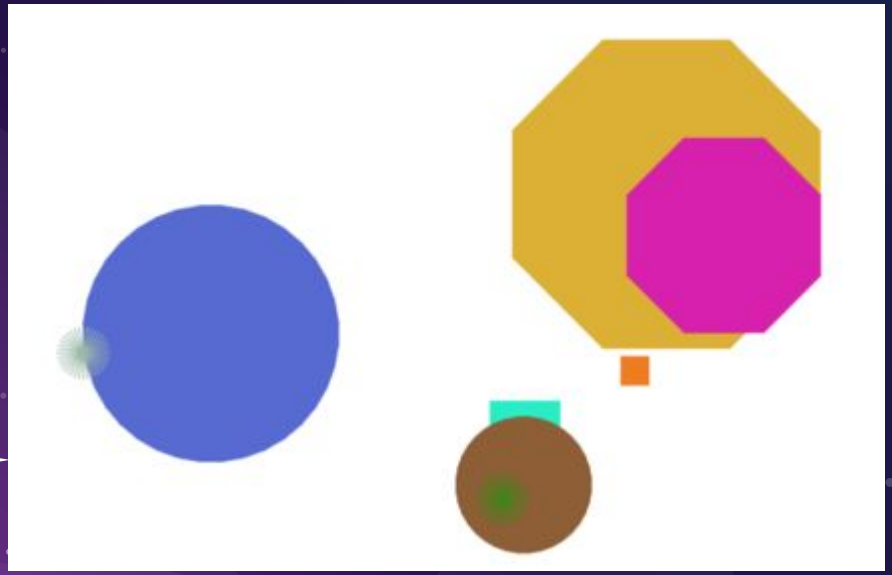
- Event listeners **capture user input**
- Think about how you want users to interact with your game!

NEW CONCEPT

DEMO & Interactive Coding: Event Listeners

CODING TIME!

Shape Maker



- Up: Square
- Down: Octagon
- Left: Firework
- Right: Circle

Use **functions** and **event listeners**

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