**Lesson 1: Intro to Coding and Python**

**What is Code?**

***Code is like a recipe that you give to a computer to do something that you want.***

Like a recipe, the steps have a certain **order.** The computer looks at your recipe (code) and knows it has to do the steps from top to bottom.

When we write code to solve a specific problem, we call that an **algorithm**. That also makes us sound smarter than we are.

In this example the “x = 0” will happen before the “x = x + 1” because it comes before.

'''

What even is code?

This is a BLOCK COMMENT. The computer skips everything between the 3 tick marks.

'''

# This is a comment because it started with #

# The computer sees the # and knows it doesnt have to do anything

x = 0       # x is a variable that has the value 0

print(x)    # this will output x to the screen

x = x + 1   # we can change the value of x

print(x)    # and output it again.

The red and green text are **comments**. The computer sees a comment and says “that’s not part of the recipe” and skips it. You can write whatever you want there and the code won’t behave any differently.

When the computer sees a line that isn’t a comment, it knows that’s **code** and it needs to do what you told it to do.

**How do we write it?**

We create our code in **an editor.** Sometimes that’s also called **a development environment.** It’s basically a fancy way of editing text files, and will usually highlight your stuff.

We’ll use **Visual Studio Code** to edit our code.

In VS Code you can create a new file by right clicking on the left hand menu, selecting New File, and typing a name like myfile.py.

**How do we run it?**

We run it in the terminal. Hit **CTRL+`** in VS Code to open the terminal. In there type **python <your file name>** to run that code.

**What is Python?**

Python is a **scripting language.** That means you can write code, and there’s only **1 step to run it.** Other programming languages like Java, C++, C, etc. need to be **compiled** first before they can be run.

**Hello World**

In programming it’s a tradition to right a “hello world” program when you first start learning a new language. In Python that’s literally one line, because the **print()** function will take what you give it as a parameter and output that to the console.

print("Hello, World!")

Try creating a file **hello.py** and running that code. You should see Hello, World! in the Terminal output.

**Variables**

In programming we use variables as a way to store some information. For example, if I want my code to ask you what your username is, I’ll store your username as a variable.

Variables can have different values in Python:

a = 1           # an integer

b = 1.5         # a decimal number (we call these "floats")

c = 'q'         # One character

d = "a string"  # a string is a bunch of characters in one variable

**Number Variable Operations**

In code we can do different operation on variables:

a = a + 1

b = a + b

a = a \* 2

b = a / 2

a = a - b

**Activity:** Try writing Python code to create 2 variables, name **first\_number** and **second\_number**.

* Set first\_number to any number you’d like
* Print first\_number to the console
* Create second\_number and set it equal to 2 x first\_number
* Print second\_number
* Divide first\_number by second\_number and print that

**String Variable Operations and input()**

c = "My name is " + " Josh." # adding strings

c = f"A is {a} and B is {b}" # inserting values into strings

c = "BlahBlahBlah " \* 10 # will be BlahBlahBlah BlahBlahBlah... 10 times

c = input("What's your name? ")

\*\* The input line will ask “what’s your name?” and take your answer in the terminal and save it to c!! **\*\***

**Activity:**

* Write a Python script/program to ask you what your first and last name is and save those to 2 different variables
* Add those variables and save it in a third variable
* Print the third variable to the screen 20 times (**we’ll learn next time how to do this better**)

**Changing Variable Types (“Casting”)**

What if you want to get some input that isn’t a **string type**. For example, if you want to calculate the area of a square with side length 5, you need the side length of 5, not **“5”**. **Because “5” \* “5” doesn’t make sense.** If you try to do that, Python will give you this:

Traceback (most recent call last):

File "<stdin>", line 1, in <module>

TypeError: can't multiply sequence by non-int of type 'str'

In this example, we **cast the answer to the types we want** so that we can do math with them later on. We use **int()** to convert to an integer and **float()** to a decimal number.

# Casting

age = input("What's your age")

age = int(age) # save it as a number

pi = input("Whats pi?")

pi = float(pi) # save it as a decimal number

**Activity:**

* Write a Python script/program which asks the user what the length and width of a rectangle is, and it calculates and outputs the area and perimeter of that rectangle.