# How Java differs from Python

- You cannot simply “run” the code
- Java is compiled  and not interpreted like Python
- This means that if Java is not perfectly set up it will not compile and it needs a lot more to be setup than python does

# Hello World in Python

```
print(“Hello World!”)
```

# Hello World in Java (in a file called Main.java)

```
public class Main {
    public static void main(String[] args) {
        System.out.println("Hello world!");
    }
}
```

# public class Main {

This is the first line of our file.

For the time being it will always start with public class “name of file” {

The name of file must match the file name. For example, if your file is called Potato.java then the first line would be

public class Potato {

# public static void main(String[] args) {

- This is called the main method. Whatever is in here it what will run when you hit run
- Its syntax is ALWAYS the same
- IntelliJ will create this for you, but you should know how to write it on your own.
- The use of the worlds, public, static and void will be addressed later

# System.out.println("Hello world!");

- This is the equivalent of of print(“Hello world”) in python as long as the class is defined and the main method exists.
- Must end in a ; (all lines of code in java that are not ending in {, [, ( must end in a ;)

# Hello World in Java (in a file called Main.java)

```
public class Main {
    public static void main(String[] args) {
        System.out.println("Hello world!");
    }
}
```

# Day 2 - intro to java

# If long is “better” than int…

Why would we ever use int anymore?

# Data Types in Java - slightly more complex than Python

| Data Type | Size | Description |
|---|---|---|
| byte | 1 byte | Stores whole numbers from -128 to 127 |
| short | 2 bytes | Stores whole numbers from -32,768 to 32,767 |
| int | 4 bytes | Stores whole numbers from -2,147,483,648 to 2,147,483,647 |
| long | 8 bytes | Stores whole numbers from -9,223,372,036,854,775,808 to 9,223,372,036,854,775,807 |
| float | 4 bytes | Stores fractional numbers. Sufficient for storing 6 to 7 decimal digits |
| double | 8 bytes | Stores fractional numbers. Sufficient for storing 15 decimal digits |
| boolean | 1 bit | Stores true or false values |
| char | 2 bytes | Stores a single character/letter or ASCII values |

# What does that mean?

A bit is super simple… it is either 0 or 1  (you can think of it a part of a computer 0 means electricity is not currently flowing through it, 1 electricity is flowing)

A byte is 8 consecutive bits. And gives us 2^8 = 256 possible states

# Data Types in Java - The ones we will actually use

| Data Type | Size | Description |
| --- | --- | --- |
| int | 4 bytes | Stores whole numbers from -2,147,483,648 to 2,147,483,647 |
| long | 8 bytes | Stores whole numbers from -9,223,372,036,854,775,808 to 9,223,372,036,854,775,807 |
| double | 8 bytes | Stores fractional numbers. Sufficient for storing 15 decimal digits |
| boolean | 1 bit | Stores true or false values |
| char | 2 bytes | Stores a single character/letter or ASCII values |

# Java is a Typed language

- Each variable needs its type declared when creating the variable
- The variable can only store that data type

In python we can do

x = 3

x = ”Hello”

# In Java

```
public class Main {
    public static void main(String[] args) {
        int x = 3; // x will always be an int. It cannot be anything else
        System.out.println(x);
    }
}
```

# In Java

```
public class Main {
    public static void main(String[] args) {
        int x = 3;
        x = 4.4;   // This will cause an error
        x = 3     // will also cause an error because of the lack of ;
        System.out.println(x);
    }
}
```

# If statements

- In python we had if, elif, else
- In java it is if, else if and else

# From python

```
x = 5

if x < 10:

    print(“This is less than 10”)
```

# to Java

```
public class Main {
    public static void main(String[] args) {
        int x = 4;
        if (x < 10) {
            System.out.println("This is less than 10");
        }
    }
}
```

# From python

```
x = 5

if x < 10:

        print(“This is less than 10”)

elif x < 20:

        print(“x is …”)

else:

        print(“x is …”)
```

# to Java

```
public class Main {
    public static void main(String[] args) {
        int x = 4;
        if (x < 10) {
            System.out.println("This is less than 10");
        } else if (x < 20) {
            System.out.println("x is …");
        } else {
            System.out.println("x is …");
        }
    }
}
```

# Do not use Scanners!!!!

- Like input() from python
- Scanners are banned from this class. If you need to use a number code it in a variable. For example:

```
public class Main {
    public static void main(String[] args) {
        Scanner myObj = new Scanner(System.in);
        System.out.println("What is your number?");
        int x = myObj.nextInt();
        System.out.println("You number + 12 is :" + (x + 12));
    }
}
```

# Do not use Scanners!!!!

- Becomes:
- If you want to change the value that is being run, change x and recompile/run the program.

```
public class Main {
    public static void main(String[] args) {
        int x = 25;
        System.out.println("You number + 12 is :" + (x + 12));
    }
}
```

# Loops in Java

For

While

Do while (we wont be using this one)

## For loop Structure

```
for(initial value; condition; increment) {
        // body of code
}
```

## while loop

```
Initial value;
while(condition) {
        // body of code
        increment;
}
```

# For loop Structure

```
for(int i = 0; i < 10; i++) {
        System.out. println(“i = “ + i);
}
```

# while loop

```
int i = 0;
while(i < 10) {
        System.out. println(“i = “ + i);
        i++;
}
```

# Practice

Write a java program that has a defined variable x. All of this should be in your main. We will discuss methods after

The program should print “x is greater than 10” or “x is less than 10 “ or “x is equal to 10”

Then it should print “x is a multiple of 3” if it is

Then it should print “x is a prime number” if it is