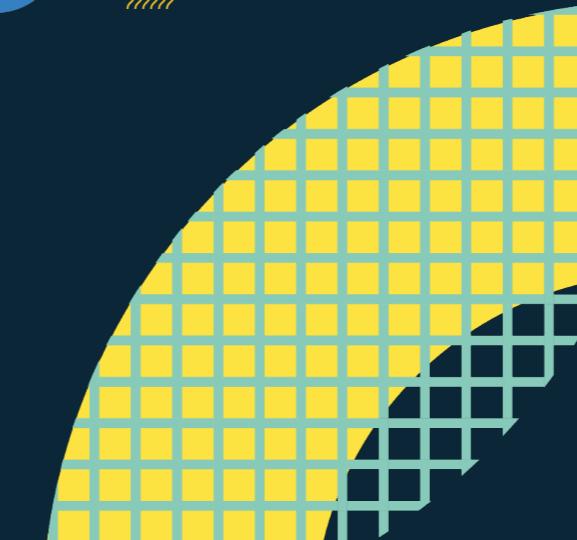




</coding> 101

Gavin McClary
Senior Lecturer



YOUR SITE



FACEBOOK



What would you rather do?



What will you learn?

- Where and how code is used in the real world
- What coding languages are available and what they are used for
- How to use the Python programming language
- You will get to know some common, foundation level concepts that apply in most programming language
- Some common coding concepts such as:
 - Input
 - Output
 - Variables
 - Data Types
 - Dealing with errors



Why should you learn?

Coding will be the most important skill in
the future

THE IRISH TIMES

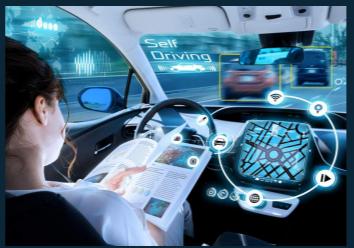
Rise of the machines: why coding is the
skill you have to learn

The
Guardian



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Code in the real world



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Examples of code

There are many different coding languages out there and they are designed to be used for different purposes such as:

- Website development
- Creating desktop software e.g. Word, Excel and PowerPoint
- Solving scientific problems
- Analysing data
- Mobile phone apps
- Games
- And many, many more...



Languages: Web Development



Work Packages: HTML – Hyper Text Markup Language

Describes the structure and presentation of information on a web page

CSS – Cascading Style Sheets

Colours, layout, and fonts of a web page

JavaScript

Used mostly for user interaction
e.g. buttons and menus

Languages: Desktop Software



cplusplus



java



csharp

C++

Microsoft Windows Operating System

Java

Official language for Android development

C#

Enterprise applications



Languages: Scientific Problems and Analysing Data



Python

Popular in Data Science, AI and Machine Learning

Also, widely taught in schools due to its readability

Can be used for web development and many more uses...



Why Python?

As stated previously it is easy to read...

Python

```
print("Hello World")
```

Java

```
class HelloWorldApp {  
    public static void main(String[] args) {  
        System.out.println("Hello World!"); // Prints the string to the  
        console.  
    }  
}
```



Shall we get started?



If you don't have Python installed
use this...

<https://repl.it>

**It should look like this... (Hint: Use
Chrome browser)**

Code and collaborate, without friction.

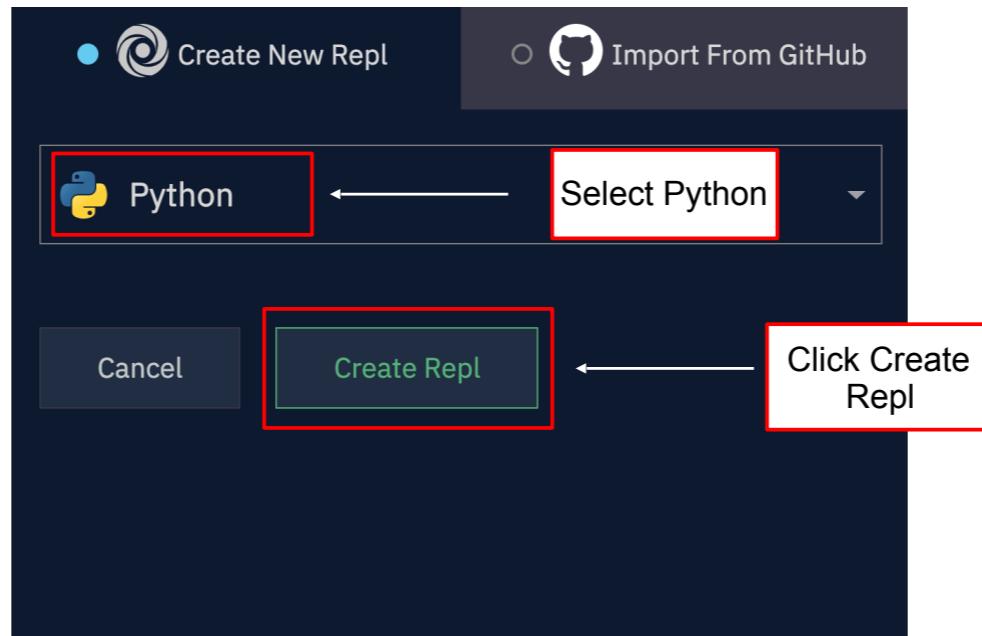
Use our free, collaborative, in-browser IDE to code in 50+ languages — without spending a second on setup.

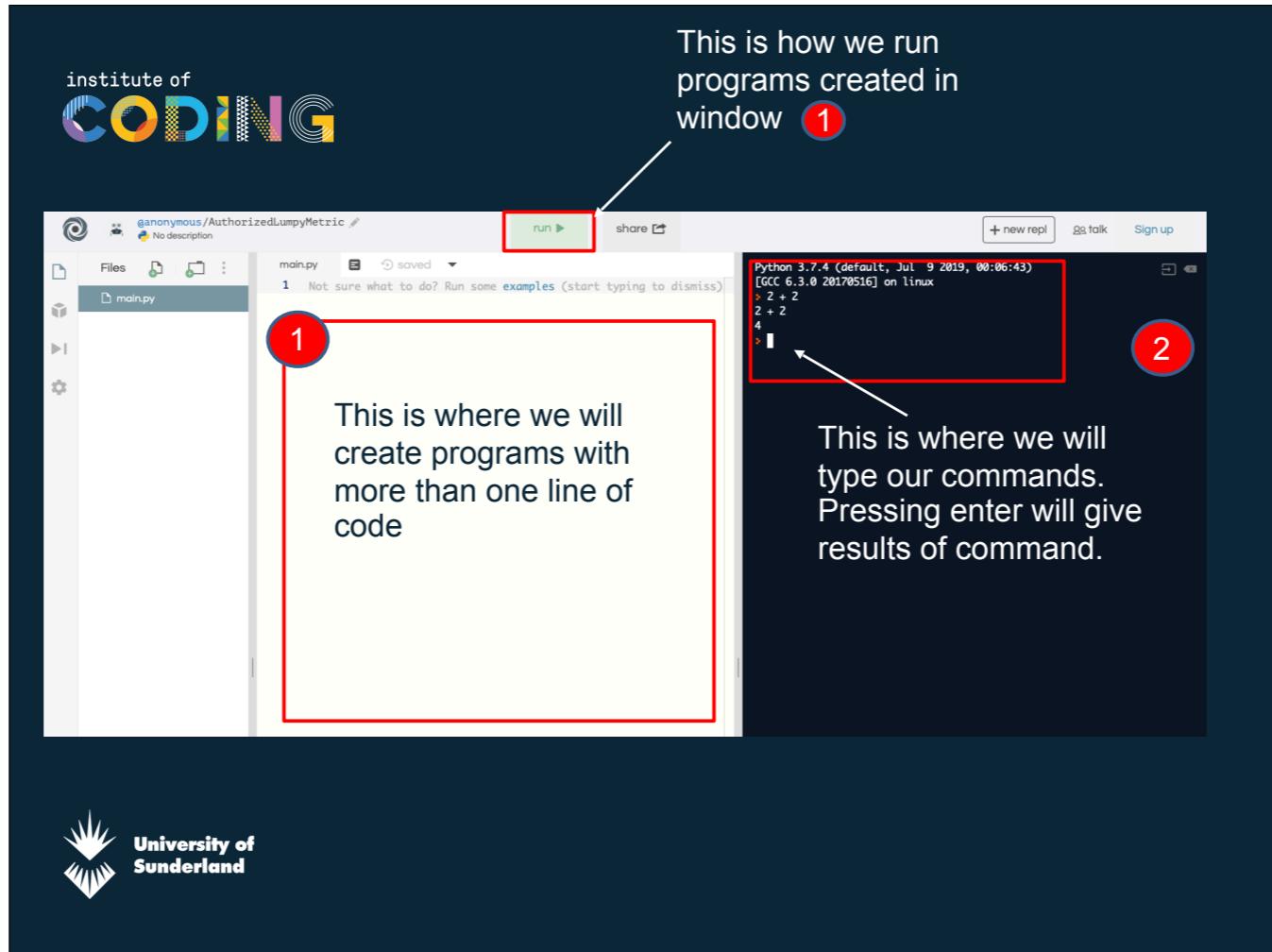
Click Here

↗ start coding

sign up

It should look like this... (Hint: Use Chrome browser)





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Common Concepts

- Input
- Output
- Variables
- Data Types
- Errors
- Sequencing of commands
- Syntax

Output

```
Python 3.8.1 (default, Feb  2 2020, 08:37:37)
> print("This is how you do output!")
This is how you do output!
> █
```

If we want to display information on screen in Python we use the “Print” function.

The computer is “dumb”. If you want it to print some output you have to tell it explicitly.

Unless it's an error (you'll find this out quick no doubt!)



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```
Python 3.8.1 (default, Feb 2 2020, 08:37:37)
```

```
> input("This is how you do input: ")  
This is how you do input: Hi!  
'Hi!'  
> |
```

Input

If we want to gather information from the keyboard into Python we use the “Input” function.

The computer is “dumb”. If you want it to gather some information you have to explicitly tell it.



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Variables: Declaring

```
Python 3.8.1 (default, Feb 2 2020, 08:37:37) [Q]
```

```
> name = 'Gavin'  
> #
```

Variables are SUPER useful in coding.

They are used to store information somewhere for later use.

The computer is DUMB. Unless you tell it to store the information you give it somewhere, guess what it won't!



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Variables: Retrieving

```
Python 3.8.1 (default, Feb 2 2020, 08:37:37) [Q]
```

```
> name = 'Gavin'  
> name  
'Gavin'  
> |
```

If we want to access the contents of a variable later we refer to the variable name.

In this example the variable name is “name”

Note: We won’t always be printing the variable contents.



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Data Types: String

```
Python 3.8.1 (default, Feb 2 2020, 08:37:37) Q
```

```
> string = "Characters"  
> type(string)  
<class 'str'>  
> |
```

Data Types are another SUPER useful and commonly used concept in coding.

I'll show you **4** data types today but there are many more.

First up is the **String** data type.

A **String** is just a string of characters.

So here we are declaring a variable of type **str** (short for string).

(You don't have to name the variable "string" btw!)



Data Types: Integer

- Next we have the **Integer** data type.

- An **Integer** is just a whole number e.g.
1, 2, 10, 100, 1000

- So here we are declaring a variable of type **int** (short for integer)

Pro Tip: Use the **type** function to check the type of your variable

```
Python 3.8.1 (default, Feb 2 2020, 08:37:37) [Q]
```

```
> my_number = 100
> type(my_number)
<class 'int'>
> [REDACTED]
```

Data Types: Float

```
Python 3.8.1 (default, Feb 2 2020, 08:37:37) [Q]
```

```
> my_float = 2.0
> type(my_float)
<class 'float'>
> [
```

Next we have the **Integer** data type.

A **float** is just a decimal i.e. has a . in the number e.g. **2.0, 10.1, 100.10**

So here we are declaring a variable of type **float** (short for floating point)



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Data Types: Boolean

```
Python 3.8.1 (default, Feb 2 2020, 08:37:37)
```

```
> bool = False
> type(bool)
<class 'bool'>
> bool = True
> type(bool)
<class 'bool'>
> 
```

Finally (for today) we have the **Boolean** data type.

A **Boolean** is either **True** or **False** and nothing else!

So here we are declaring a variable of type **bool** (short for Boolean)

More on **booleans** in Coding 102!



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Dealing with Errors

```
Python 3.8.1 (default, Feb 2 2020, 08:37:37)
> Print("Hello World!")
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'Print' is not defined
> print("Hello World!")
  File "<stdin>", line 1
    print("Hello World!")
           ^
SyntaxError: EOL while scanning string literal
> name = Gavin
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'Gavin' is not defined
> █
```

Errors are annoying!

Errors are frustrating!

Errors are common!

You'll get used to them 😊

Here we have three common errors you might experience today.

My name will not be in your error!

READ the errors and **THINK!** What could be causing it?

Code Comments

```
main.py   ⏺  ⏴ saved
1  # Any text/code inside your Python program
2  # that is preceded by a # (hash) symbol
3  # is considered a code comment.
4
5  # This means you can view it but it won't
6  # be run as code.
7
8  # Aren't you glad you added these comments
9  # all those years ago!?
10
11
```

Imagine years from now, you are a wildly successful software developer working in Silicon Valley.

Someone asks you to refactor (change) some code you wrote years ago (today).

Wouldn't it be useful if you left some comments for yourself to read to help you understand what you did all that time ago?

Code comments!!!



Challenge: Basic calculator

Requirements

Must include code comments

Must accept user input (include a prompt)

Must store input in a variable

Must be able to accept whole numbers e.g. (21,100,1000)

Must be able to add two whole numbers together

Must be able to print the sum of the two numbers that were input

Must include a message along with the sum of the numbers e.g. "The sum of x plus x is: y"



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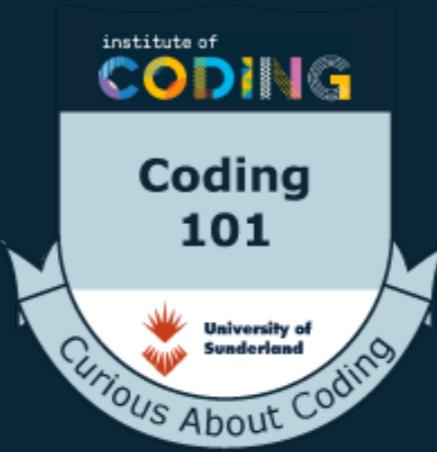
Digital Badges

All of the Coding 101/102/103 courses come with a Digital Badge which confirms attendance and contains information on the subjects studied today.

If you would like a badge for this session please email:

gavin.mcclary@sunderland.ac.uk

If you do not want to receive a badge - no problem!



Next Steps

- Coding102 – Part 2 (of course!)
- Free online resources:
 - www.codecademy.com
 - www.sololearn.com
 - <https://realpython.com>
 - <https://automatetheboringstuff.com>





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**[https://www.sunderland.ac.uk/study/
computing/postgraduate-data-science](https://www.sunderland.ac.uk/study/computing/postgraduate-data-science)**

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