Python: How To Get Started

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To download a copy of the slides go to
https://tamaraclelford.co.uk/iop.html

INTRODUCTION TO PYTHON

- What is Python
- Examples from my work
- Python fundamentals
- How can I learn more?

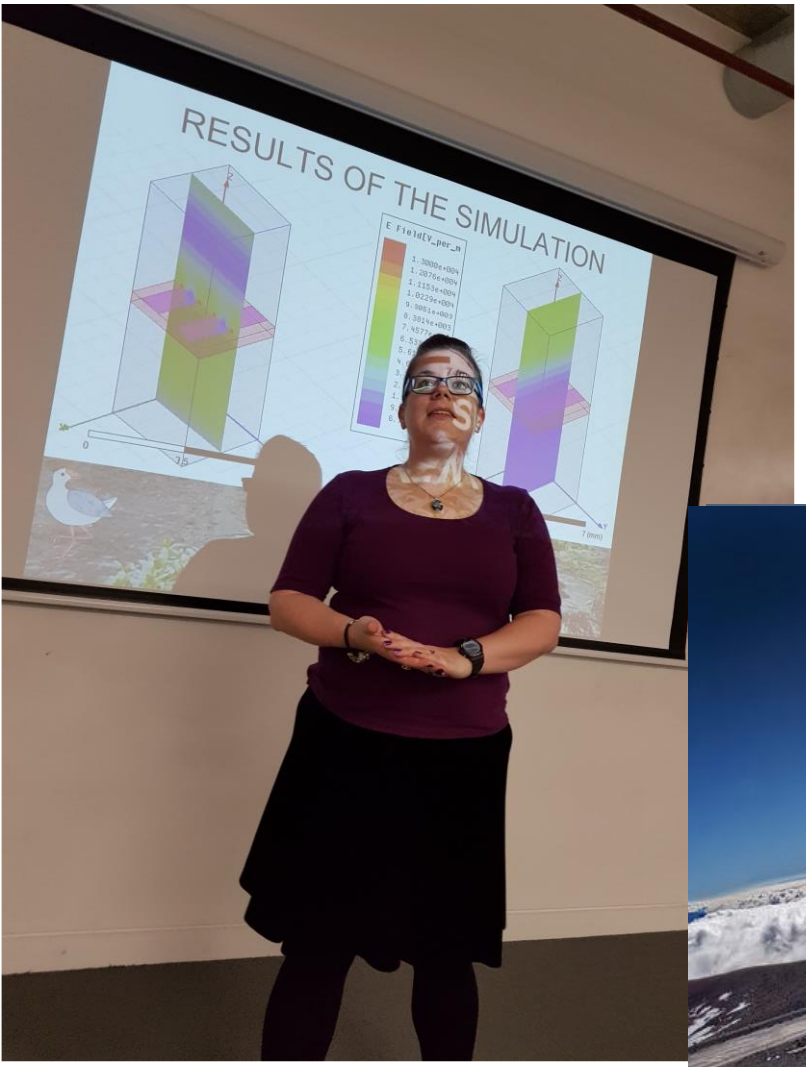
WHAT IS PYTHON?

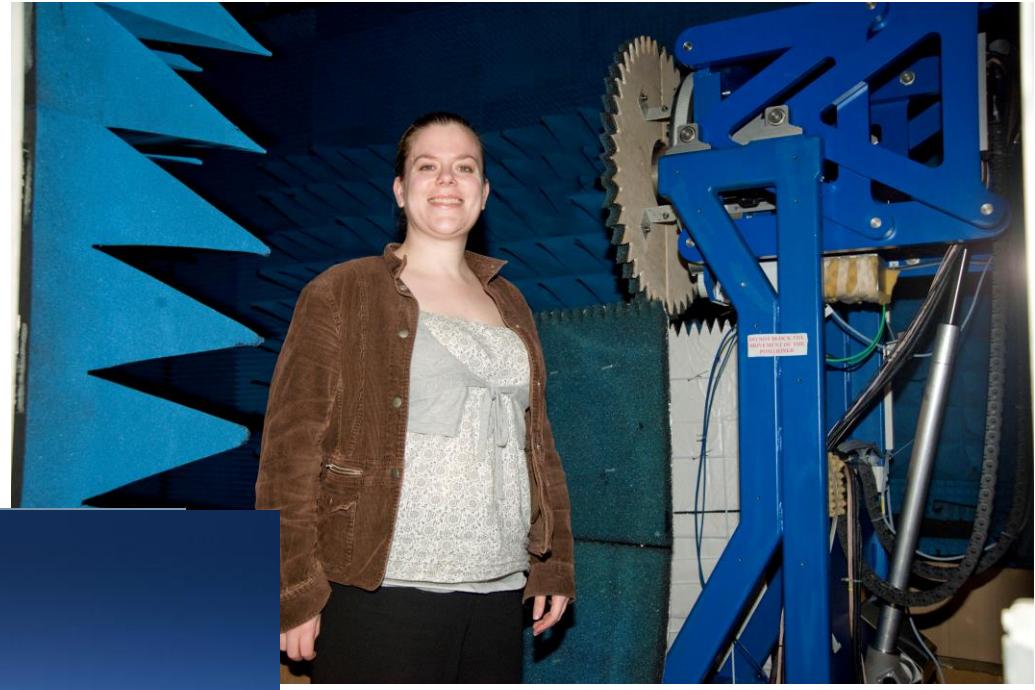
- Created in 1991 by Guido Van Rossum
- Interpreted
- High-level, focusing on readability
- General purpose
- Object-orientated and functional

WHY USE PYTHON?

- Free
- Open source
- Used by a lot of different industries
- Modules, Packages and Libraries
  - https://wiki.python.org/moin/UsefulModules
  - https://docs.python.org/3/library/

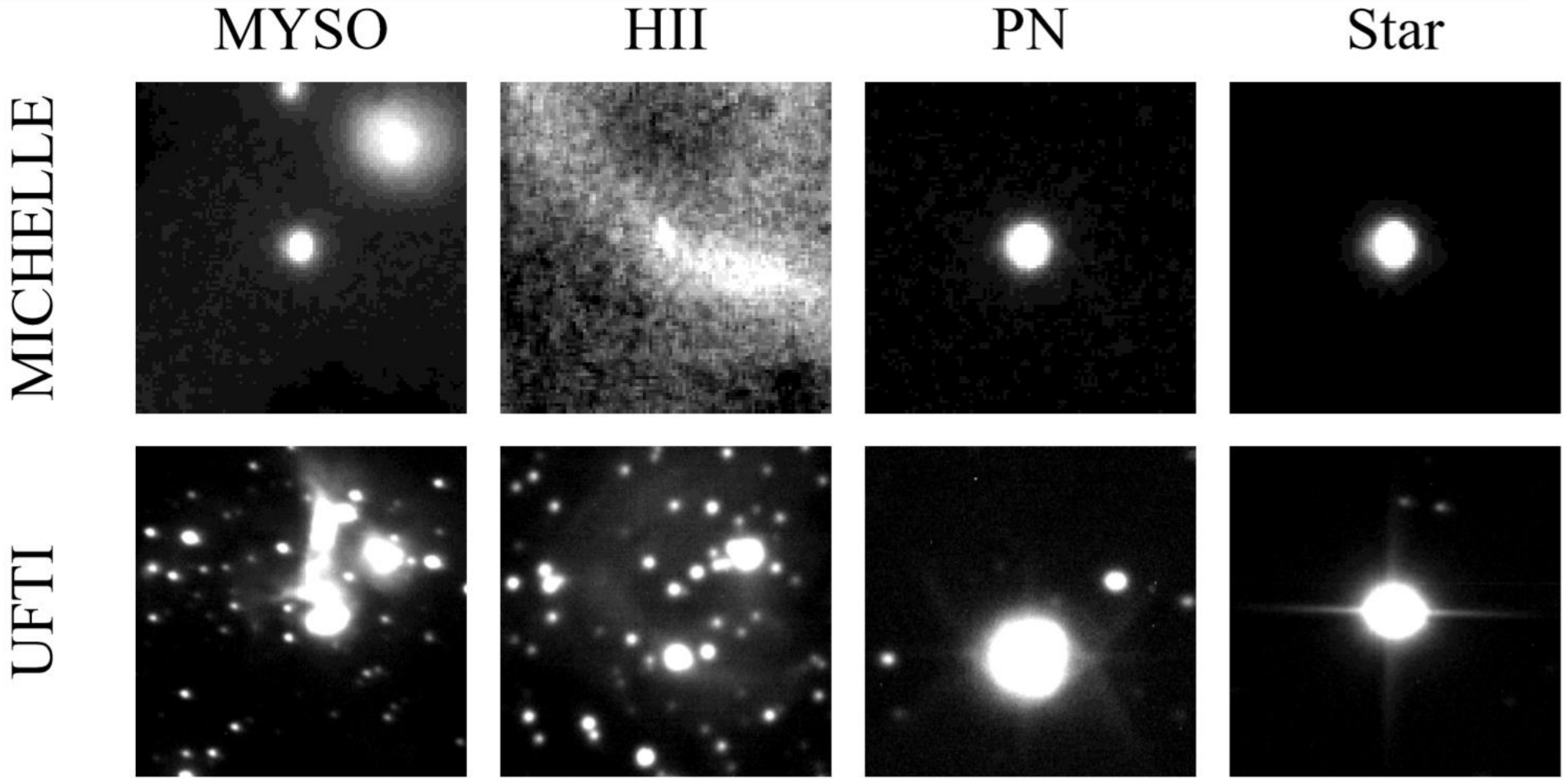
ABOUT ME





https://www.needpix.com/photo/920796/mountain-telescope-hawaii-summit-astronomy-astrophysics-mauna-kea-keck-telescope-subaru-telescope

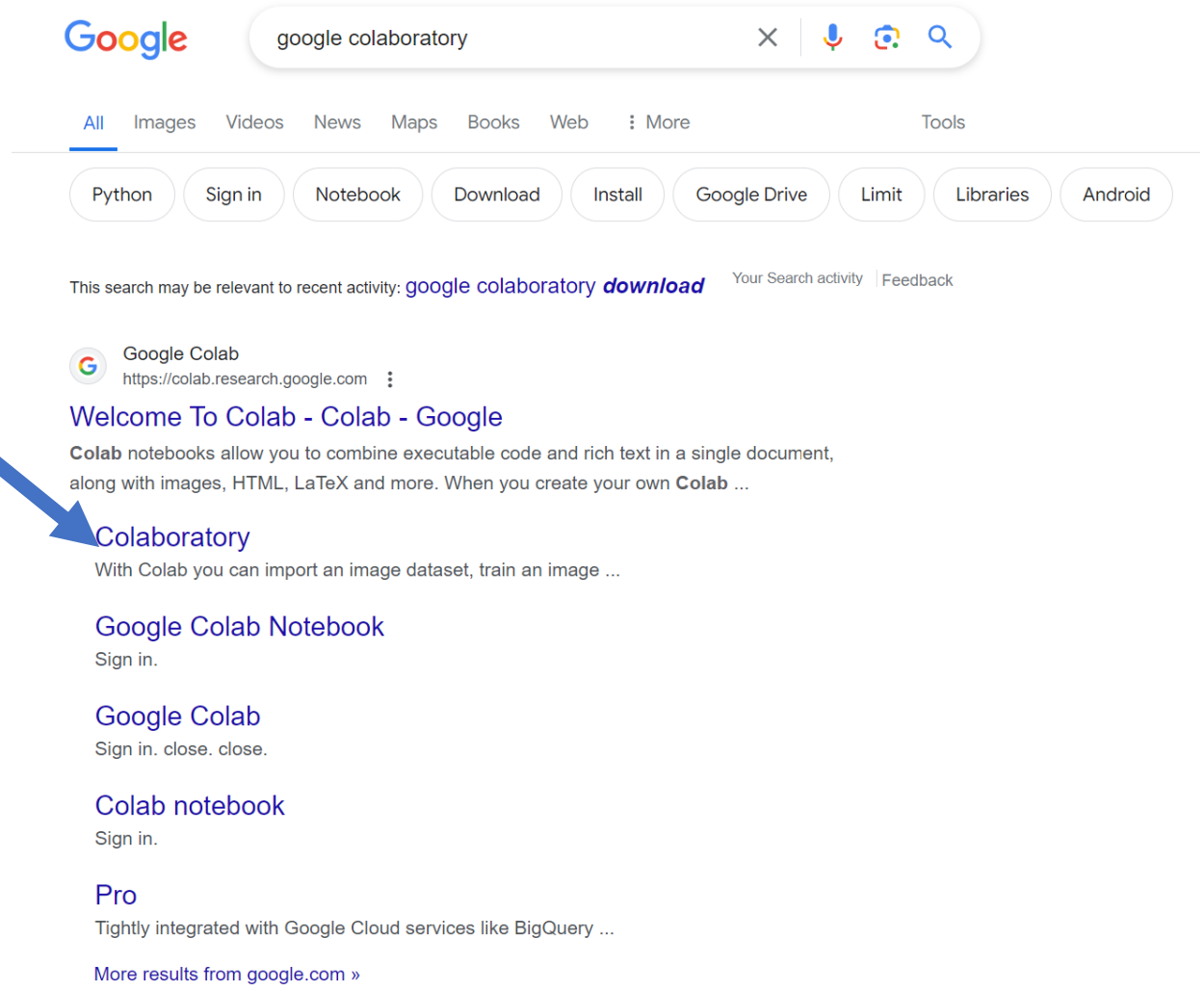
STELLAR CLASSIFCATIONS



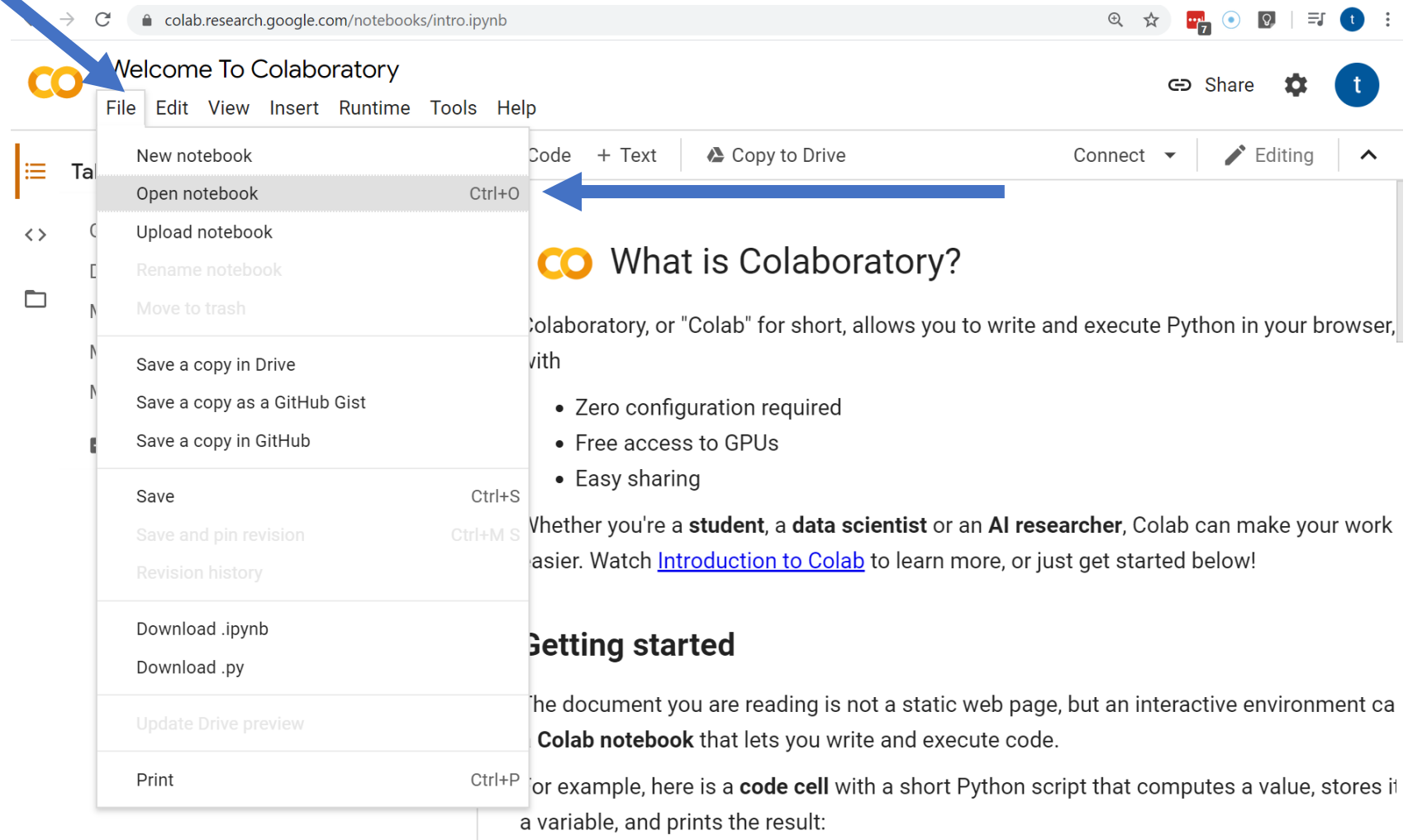
SET UP PYTHON TOOLS

- Integrated Development Environment (IDE)
  - Jupyter notebook style
  - Google Colaboratory

GOOGLE ‘GOOGLE COLABORATORY’



OPEN A NEW PYTHON 3 NOTEBOOK



GET TO GRIPS WITH YOUR GOOGLE COLAB

- Print a string:

```
print('hello, world!')
```

- Work out how to execute the code block
- Work out how to get a new code block
- Try printing some other strings
- Try some maths:

```
print(4+6)
print(9<3)
```

data types, variable names

```
[1]   1 type(1.1)
```

```
[2]   1 name = 'hello, world!'
```

```
[3]   1 print(name)
```

```
[4]   1 type(name)
```

operators

```
[5]   1 a = 9
      2 b = 5.3
      3 c = 22.4
```

```
[6]   1 print(a*b)
```

```
[8]   1 print(c>1)
```

lists

```
[9]   1 my_list = [1,2,3,4,5,6,7,8,9]
```

```
[10]  1 print(my_list)
```

```
[11]  1 my_list[1:3]
```

```
[12]  1 my_list.append(10)
      2 print(my_list)
```

```
[13]  1 my_list.remove(10)
      2 print(my_list)
```

```
[14]  1 new_list = []
      2 print(new_list)
      3 type(new_list)
```

```
[15]  1 new_list.append('first')
      2 print(new_list)
      3 new_list.append('second')
      4 print(new_list)
```

FOR LOOPS

```
1  print(0)
2  print(1)
3  print(2)
4  print(3)
5  print(4)
```

```
1  for item in [0,1,2,3,4]:
2      print(item)
```

```
1  print(range(5))
```

```
1  for item in range(5):
2      print(item)
```

OUR DATA SET

- possum_mf = [0, 1, 1, 1, 1, 1, 0, 1, 1, 1, 1, 1, 0, 0, 0, 0, 1, 0, 1, 1, 1, 0, 1, 0, 0, 0, 1, 0, 1, 1, 0, 1, 0, 0, 0, 0, 1, 0, 1, 1, 0, 1, 0, 0, 0, 0, 1, 1, 0, 1, 0, 0, 0, 1, 0, 1, 0, 1, 0, 1, 1, 1, 1, 0, 0, 0, 1, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 0, 1, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 1, 0, 1]
- possum_total = [89, 91, 95, 92, 85, 90, 89, 91, 91, 89, 89, 92, 89, 91, 85, 86, 89, 90, 90, 89, 96, 91, 89, 84, 91, 90, 85, 87, 88, 84, 93, 94, 89, 85, 85, 88, 82, 80, 75, 84, 77, 81, 81, 89, 85, 85, 88, 85, 93, 91, 91, 92, 93, 93, 91, 96, 88, 86, 90, 88, 89, 88, 86, 85, 88, 88, 87, 90, 80, 82, 83, 89, 89, 84, 81, 81, 84, 85, 82, 81, 80, 92, 86, 93, 87, 84, 85, 89, 85, 82, 84, 88, 83, 86, 84, 86, 81, 82, 89, 82, 89]

READ IN DATA

```
1 possum_mf = [0, 1, 1, 1, 1, 1, 0, 1, 1, 1, 1, 1, 0, 0, 0, 0, 1, 0, 1, 1, 1, 0
2 possum_total = [89, 91, 95, 92, 85, 90, 89, 91, 91, 89, 89, 92, 89, 91, 85, 8
```

```
1 print(possum_mf)
2 print(possum_total)
```

```
1 len(possum_mf)
```

```
1 for i in range(len(possum_mf)):
2     print(i, possum_mf[i])
```

IF STATEMENTS

```
for i in range(len(possum_mf)):
    if i == 1:
        print(i)
```

```
# can skip and do both together
female_total = []

for i in range(len(possum_mf)):
    if possum_mf[i] == 1:
        female_total.append(possum_total[i])

print(female_total)
print(sum(female_total)/len(female_total))
```

```
# can skip and do both together
male_total = []

for i in range(len(possum_mf)):
    if possum_mf[i] == 0:
        #print(possum_num[data])
        male_total.append(possum_total[i])

print(male_total)
print(sum(male_total)/len(male_total))
```

```
# can skip if done these separately
male_total = []
female_total = []

for i in range(len(possum_mf)):
    if possum_mf[i] == 0:
        male_total.append(possum_total[i])
    else:
        female_total.append(possum_total[i])

print(sum(male_total)/len(male_total))
print(sum(female_total)/len(female_total))
```

PLOTTING

```
1 plt.plot(male_total, label = 'male', color = 'g')
2 plt.plot(female_total, label = 'female', color = 'k')
3 plt.title('possum total length')
4 plt.xlabel('number')
5 plt.ylabel('possum total length (cm)')
6 plt.legend()
```

```
1 plt.hist(female_total, alpha = 0.5, label = 'female')
2 plt.hist(male_total, alpha = 0.5, label = 'male')
3 plt.title('possum total length')
4 plt.xlabel('possum total length (cm)')
5 plt.ylabel('number')
6 plt.legend()
```

HOW DO I LEARN MORE?

- Practice programming in Python
- Use the resources on the web
- Practice!!

- Get to grips with the libraries such as:
  - NumPy, pandas and scikit-learn

https://en.wikipedia.org/wiki/Rubber_duck_debugging

QUESTIONS!

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https://tamaraclelford.co.uk/online_courses.html