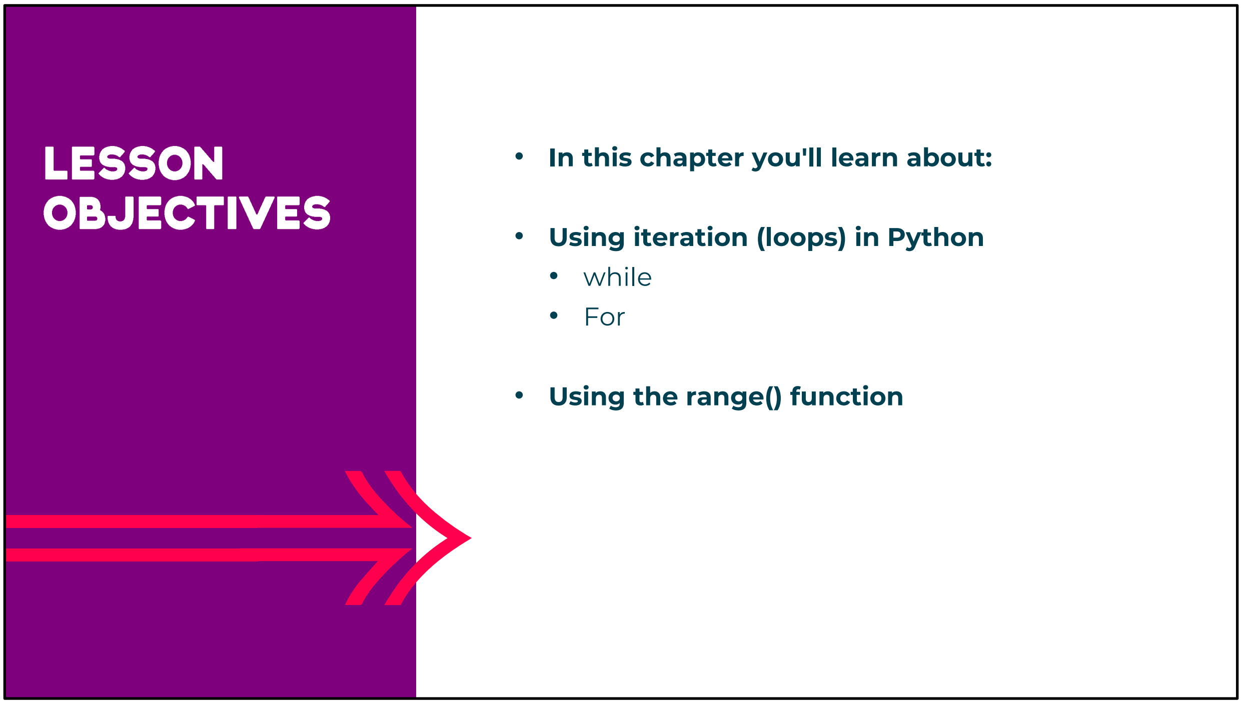
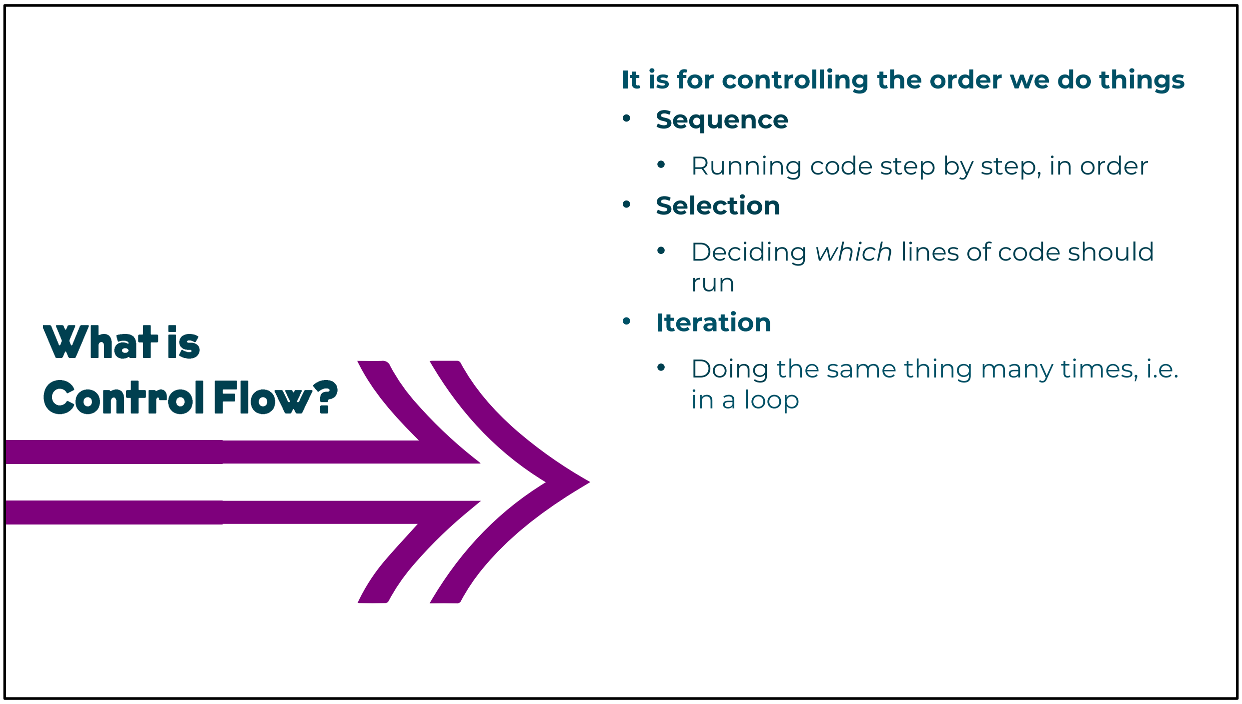
Control Flow - Iteration



LESSON OBJECTIVES

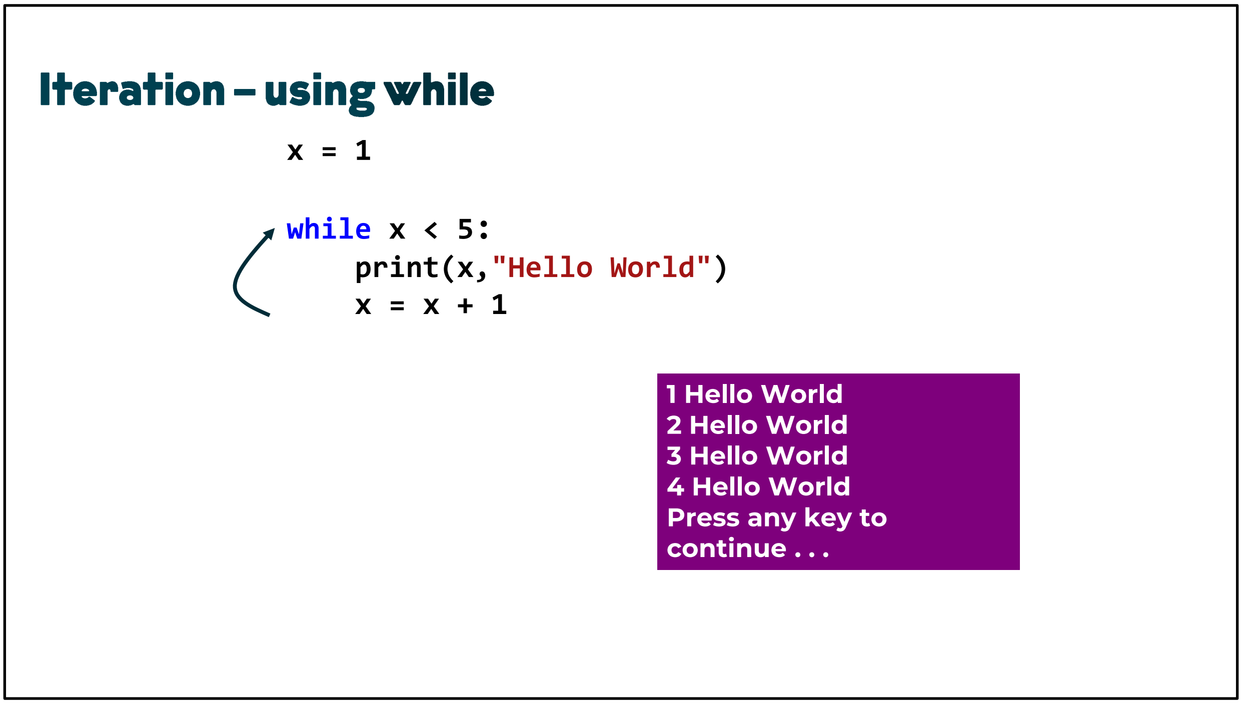
- **In this chapter you'll learn about:**
- **Using iteration (loops) in Python**
  - while
  - For
- **Using the range() function**



What is Control Flow?

It is for controlling the order we do things

- **Sequence**
  - Running code step by step, in order
- **Selection**
  - Deciding *which* lines of code should run
- **Iteration**
  - Doing the same thing many times, i.e. in a loop

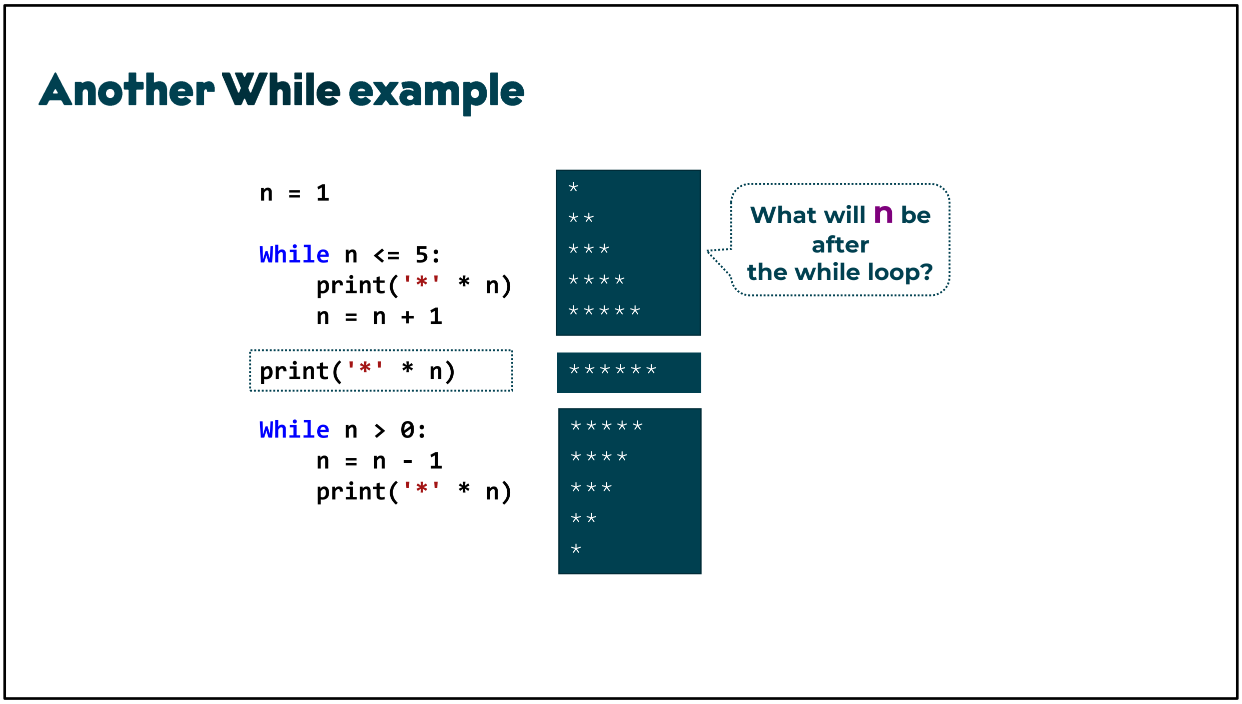


Iteration – using while

```
x = 1

while x < 5:
    print(x,"Hello World")
    x = x + 1
```

```
1 Hello World
2 Hello World
3 Hello World
4 Hello World
Press any key to
continue . . .
```

Another way of saying do something repeatedly. Each iteration is once around the loop.
Computers are very good at doing loops, very quickly and without getting tired or bored!
The first example is what is called an “infinite loop” – generally something we *don’t* want to do.
The second example will print “Hello World” four times – not five. Can you see why?
The comma in the print statement is very useful and allows us to print a number of values, even if they are not the same type, on the same line.



Another While example

```
n = 1

While n <= 5:
    print('*' * n)
    n = n + 1
```

```
*
**
***
****
*****
```

What will n be after the while loop?

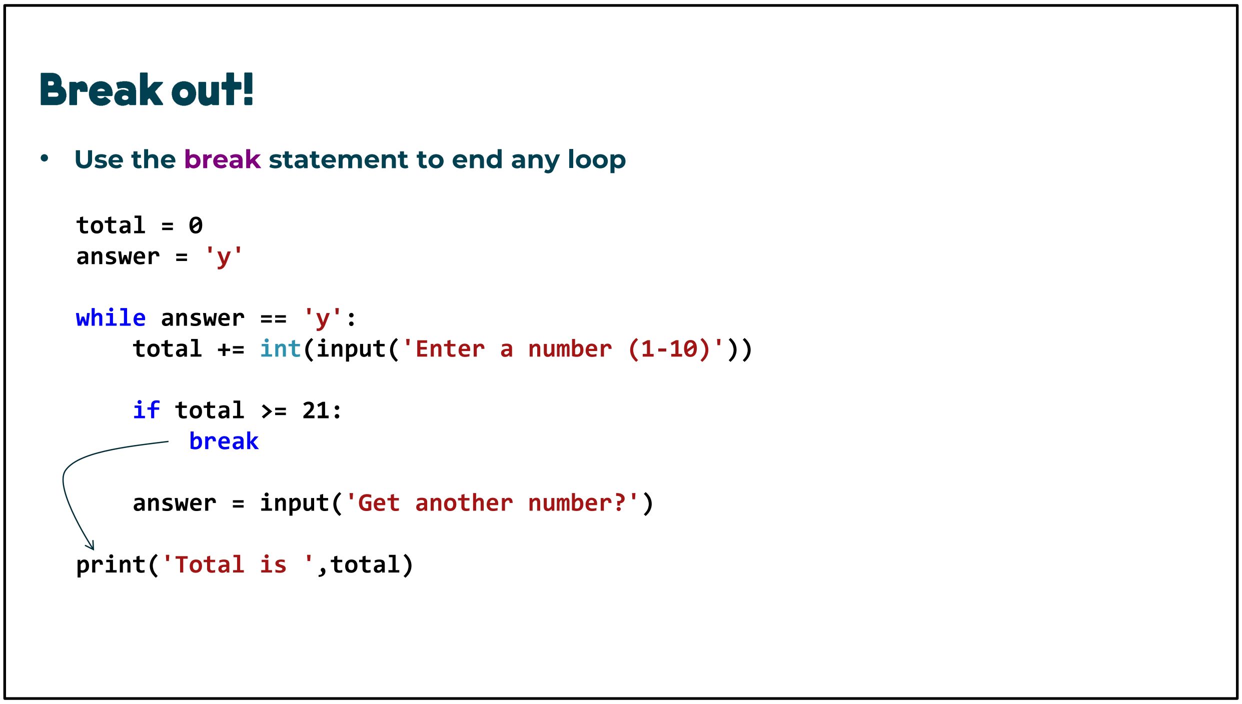
```
print('*' * n)
```

```
******
```

```
While n > 0:
    n = n - 1
    print('*' * n)
```

```
*****
****
***
**
*
```

The first while loop increases n from 1 to 6
Print('*' * n) will print 6 *s
The second while loop decreases the value of n so long as n is greater than zero.

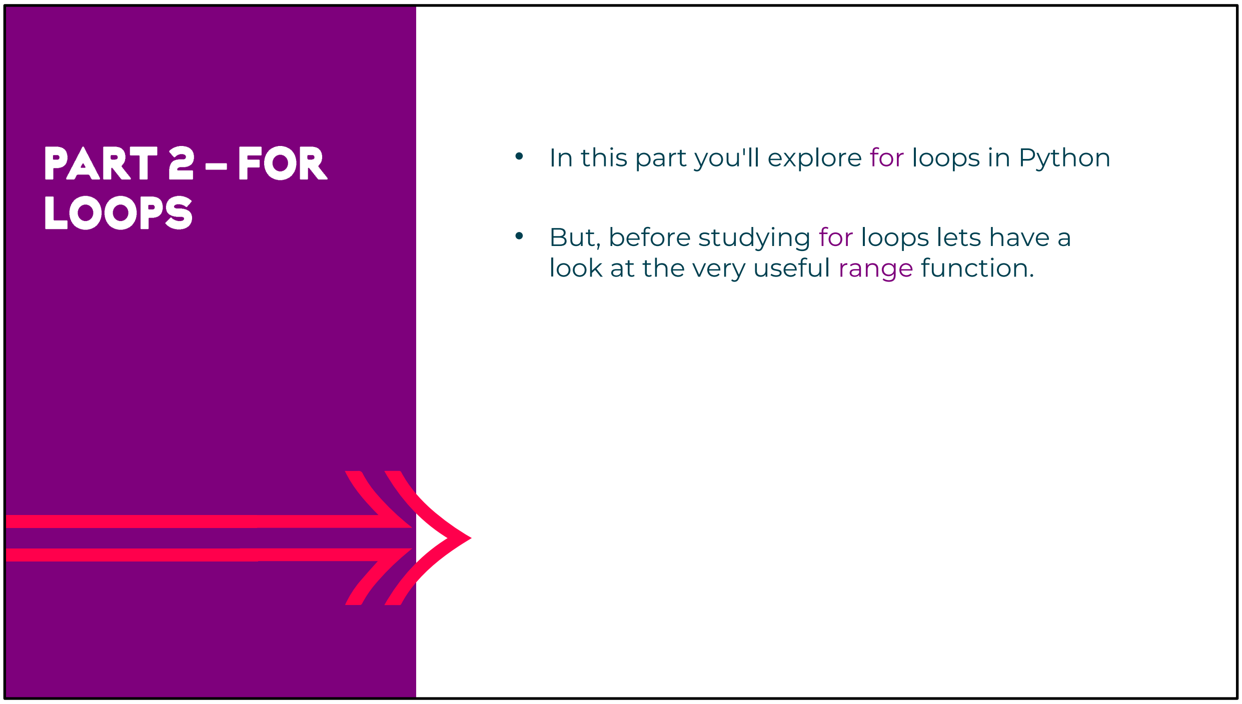


Break out!

- Use the **break** statement to end any loop

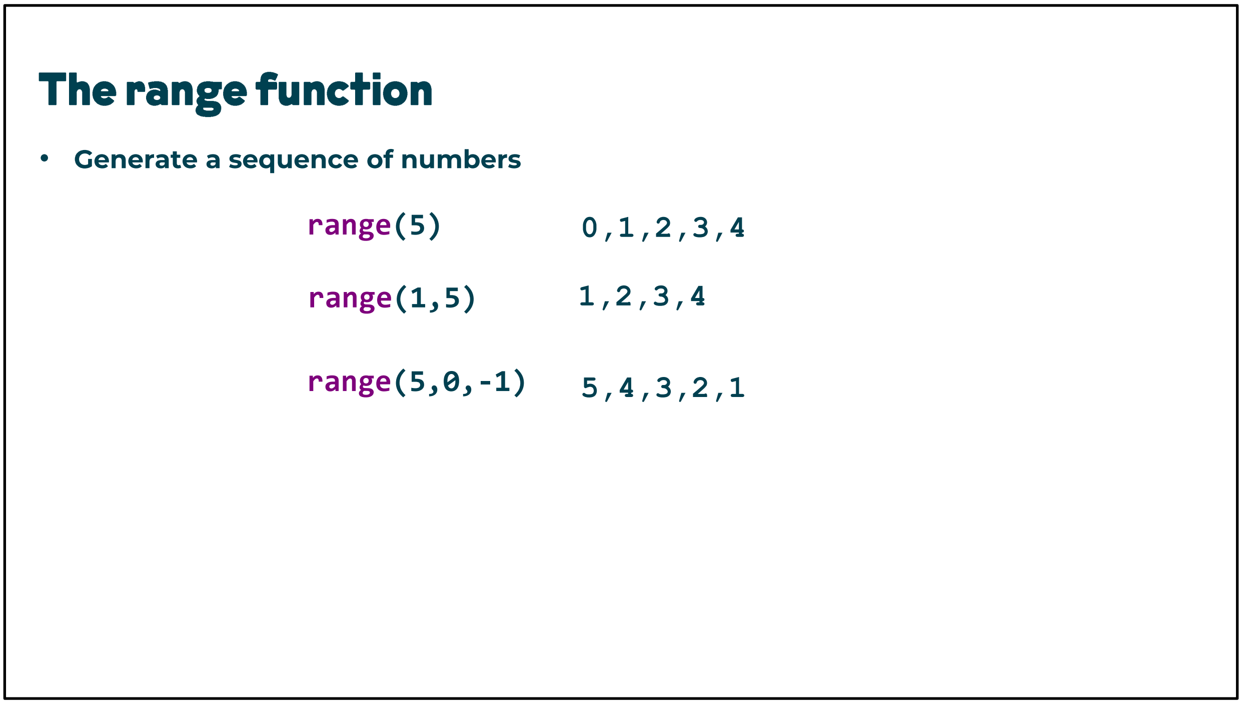
```
total = 0
answer = 'y'

while answer == 'y':
    total += int(input('Enter a number (1-10)'))

    if total >= 21:
        break

    answer = input('Get another number?')

print('Total is ',total)
```

Use break to exit any kind of a loop. The break command must only be used in exceptional circumstances.



PART 2 – FOR LOOPS

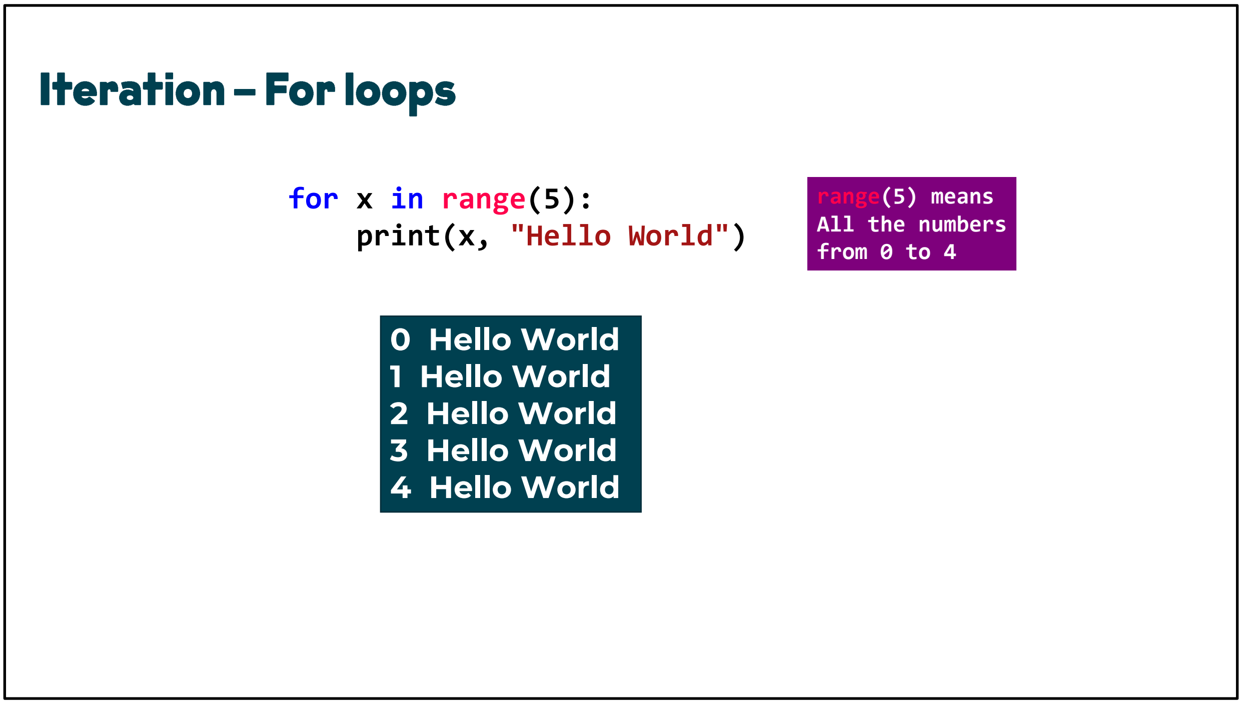
- In this part you'll explore for loops in Python
- But, before studying for loops lets have a look at the very useful range function.



The range function

- Generate a sequence of numbers

```
range(5)          0,1,2,3,4

range(1,5)        1,2,3,4

range(5,0,-1)     5,4,3,2,1
```



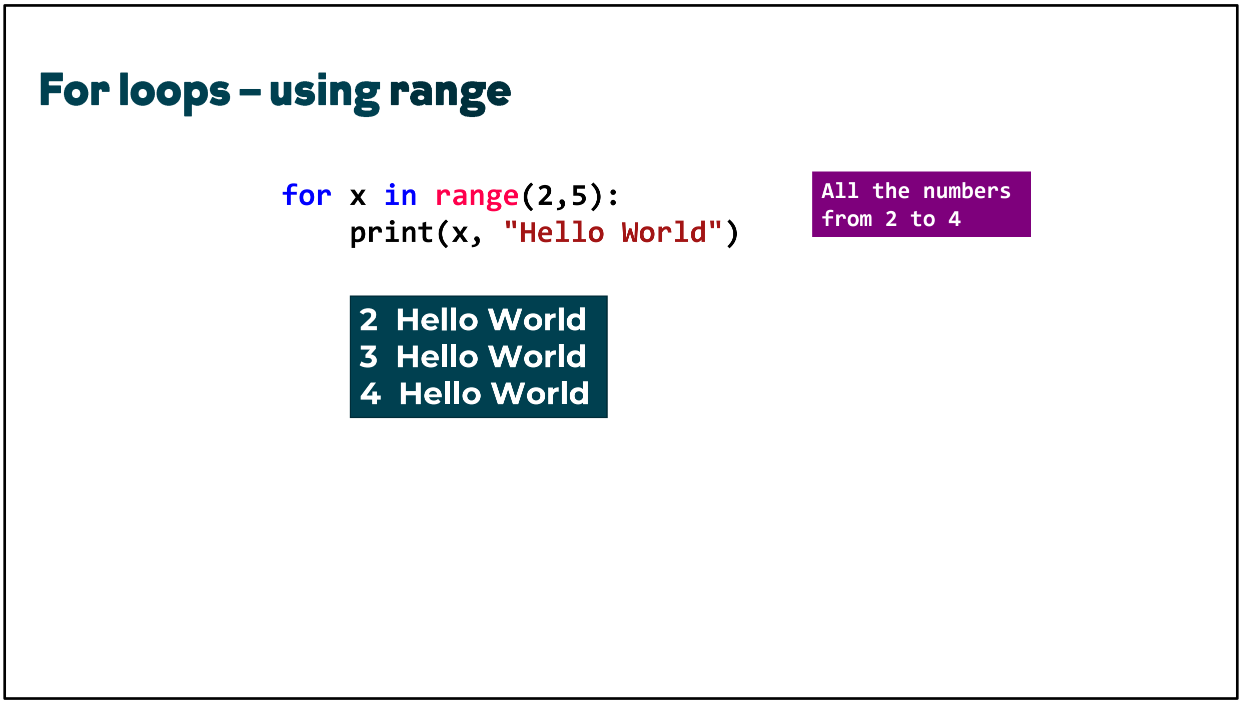
Iteration – For loops

```python
for x in range(5):
    print(x, "Hello World")
```

```
range(5) means
All the numbers
from 0 to 4
```

```
0  Hello World
1  Hello World
2  Hello World
3  Hello World
4  Hello World
```

Python for loops are not the same as loops in other languages.



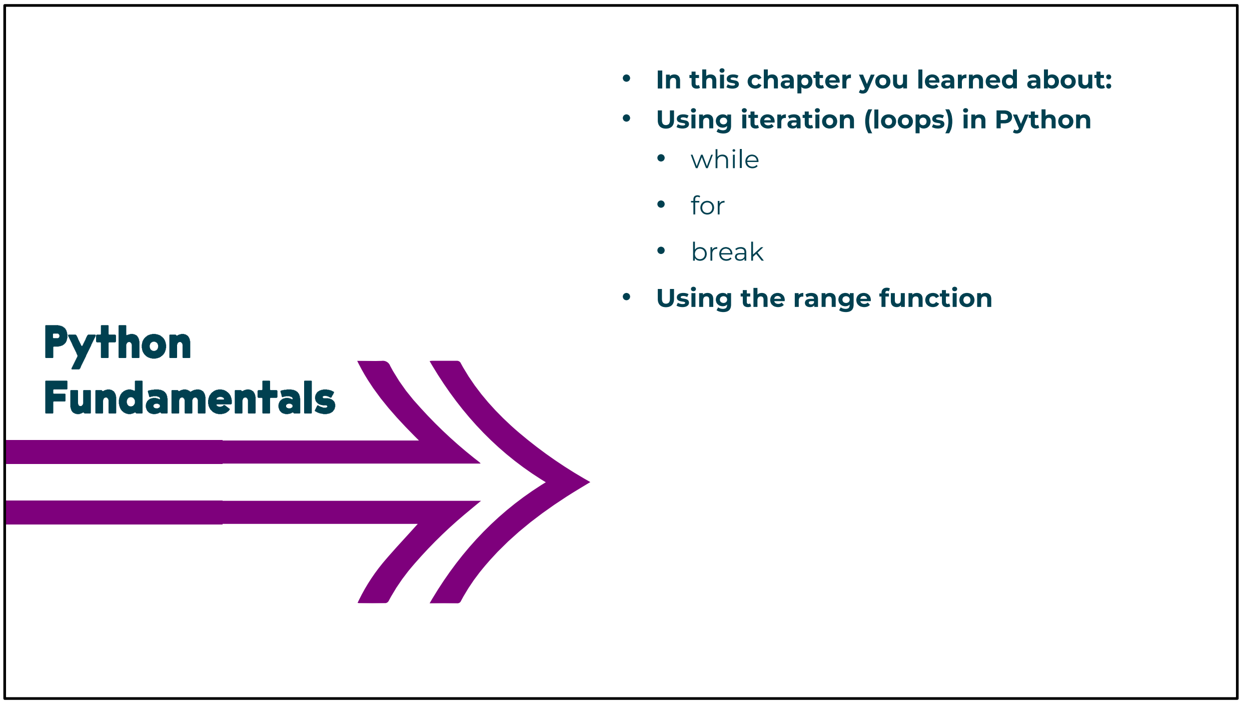
For loops – using range

```
for x in range(2,5):
    print(x, "Hello World")
```

All the numbers from 2 to 4

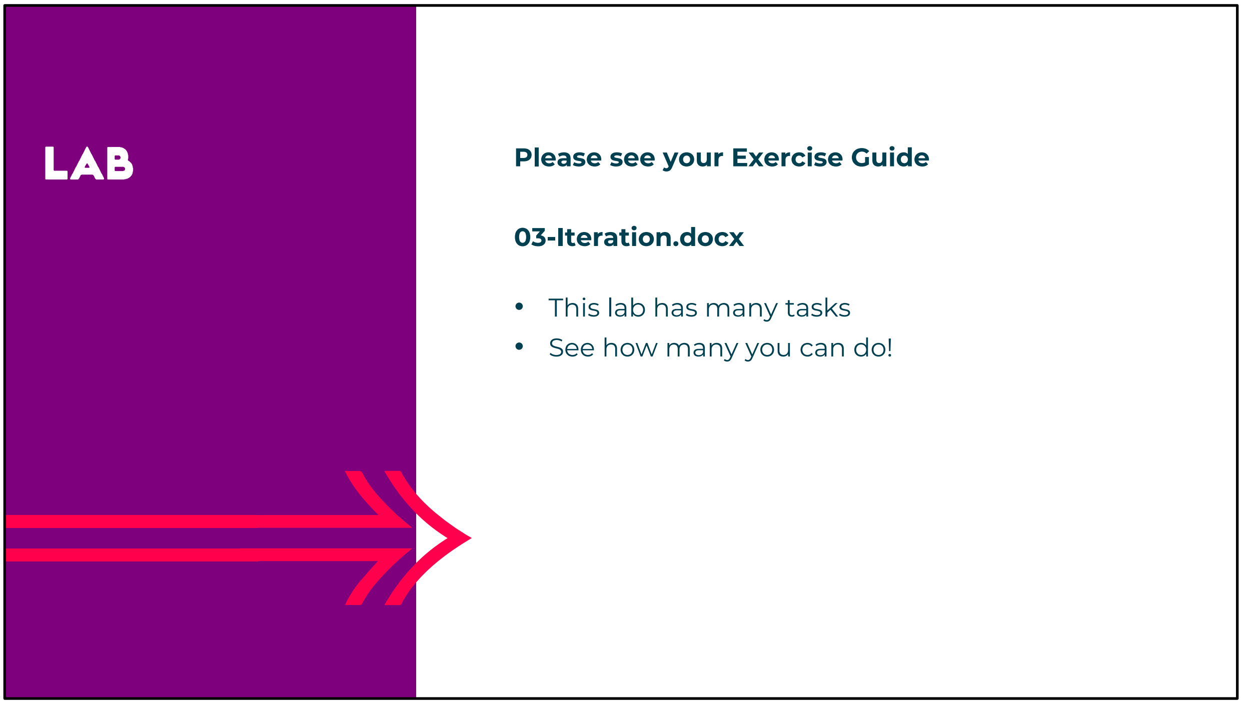
```
2  Hello World
3  Hello World
4  Hello World
```

Python for loops are not the same as loops in other languages.



Python Fundamentals

- **In this chapter you learned about:**
- **Using iteration (loops) in Python**
  - while
  - for
  - break
- **Using the range function**

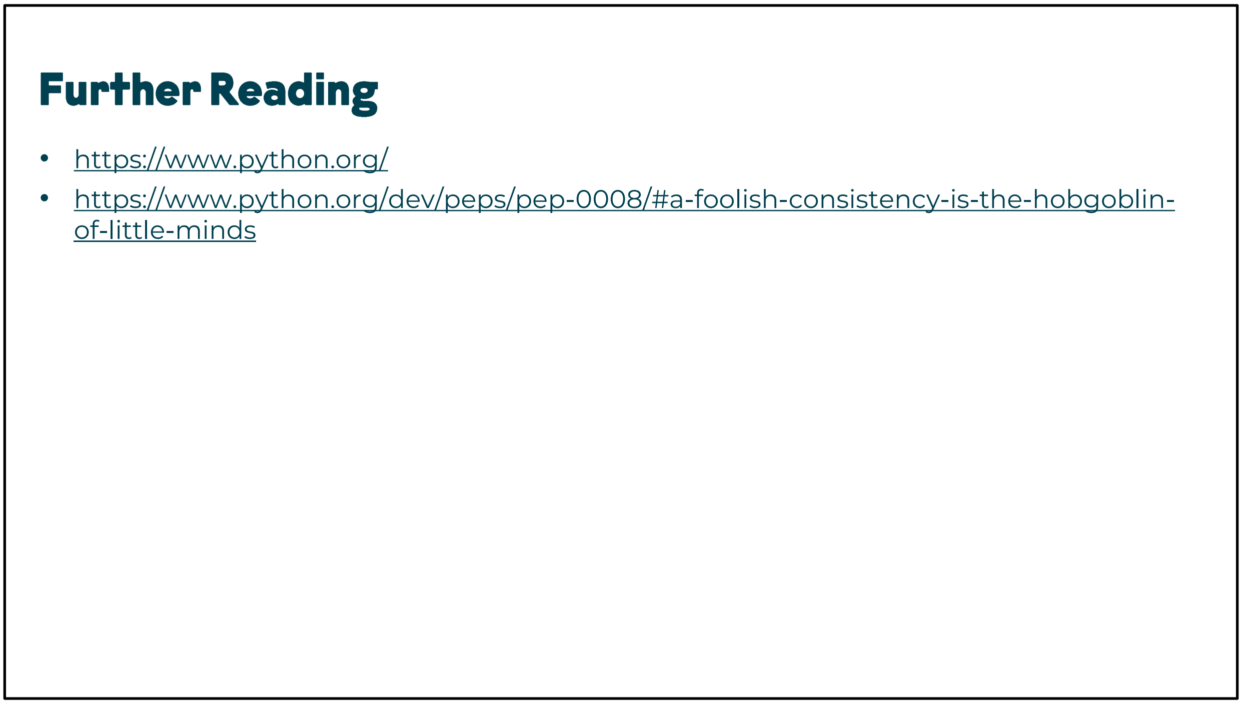


LAB

Please see your Exercise Guide

03-Iteration.docx

- This lab has many tasks
- See how many you can do!



Further Reading

- https://www.python.org/
- https://www.python.org/dev/peps/pep-0008/#a-foolish-consistency-is-the-hobgoblin-of-little-minds

Thank you