

5.2: The range() Function

In this topic, we will be focussing on the following learning outcome for this week:

* Use iteration-based control structures within problems utilising Python

You will have the following learning opportunities:

* To experiment with and understand the range() function



Within this section, you will engage in acquisition and practice learning activities.

In this section, we will be investigating the range() function. We will walk you through using the range function, then get you to think about what each method of running range() does.

In general, range is used to create a sequence of numbers. This sequence of numbers will be output in the form of a list. By default, these numbers will start at 0, finish before a specified point, and will increment by 1. We can, however, change this based on how we use the function.

Let’s start by looking at the basic form of the range function. We won’t worry about functions for this guided walkthrough – we will only be working with a few lines of code. Start by entering the following code into your Python file:

numbers\_list = range(5)

print(numbers\_list[0])

print(numbers\_list[1])

print(numbers\_list[2])

print(numbers\_list[3])

print(numbers\_list[4])

print(numbers\_list[5])

Run your program and then answer the following questions, based on the output.

What do you notice about the output?

What does this tell you about the range() function?

Now adapt your program so that you get a list which contains the numbers 0-10 (inclusive)

In the above example, we essentially told the program where to finish generating numbers. In our next example, we are going to look at how we can get a sequence of numbers to be generated which goes from 1 to 5 (inclusive). Enter the following code into your document:

numbers\_list = range(1, 6)

print(numbers\_list[0])

print(numbers\_list[1])

print(numbers\_list[2])

print(numbers\_list[3])

print(numbers\_list[4])

Run your program and then answer the following questions, based on the output.

What happened to your output?

What does this tell you about this form of the range() function?

Why do you think I used 6 as my second number rather than 5?

Adapt your program so that it prints the numbers 10-25 (inclusive).

The final way we are going to adapt the range() function is to change the interval for the numbers. Let’s say we want to print every third number between 0 and 20. We need to adapt our program as follows:

numbers\_list = range(0, 20, 3)

print(numbers\_list[0])

print(numbers\_list[1])

print(numbers\_list[2])

print(numbers\_list[3])

print(numbers\_list[4])

print(numbers\_list[5])

print(numbers\_list[6])

Run your program and then answer the following questions, based on the output.

What happened to your output?

What does this tell you about this form of the range() function?

What happens if you don’t include the 0 part of the range function call?

What happens if you try to use a negative interval?

What happens if you try to use a decimal interval?

Adapt your program so that it prints the multiples of 5 between 10 and 25 (inclusive).

How could you adapt your program so that it counts down (e.g. from 5 to 0)?