Overview of Iterative Functions

In this lesson, we will learn about Iteration.

We'll cover the following

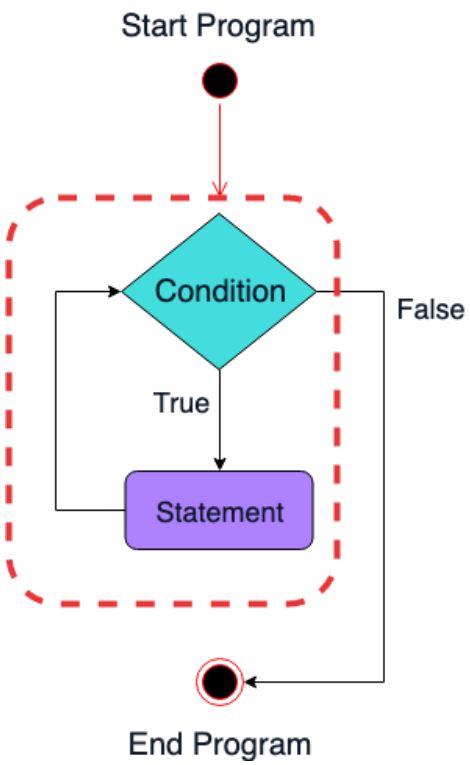
What is Iteration?

Iteration means repeating some steps to achieve the desired outcome. In computer programming, iteration processes usually involve a mechanism, including **loops**.

As we learn about recursion, it is also important to have an overview of iteration.

Format of an Iterative Function

Each iterative function consists of a loop and a conditional statement that determines whether to continue iteration or to stop further execution.



Code flow of an iterative function

In the illustration above, the dotted line encapsulates the **iterative** part of the code flow.

Syntax of an Iterative Function

Let's take a look at how to code an iterative function using python:

```
def IterativeFunction() :
  <some local variables if required>
  while <someCondition == TRUE> :
    # Perform a task
```

Calculating Factorial of a Number

Let's take a look at the iterative code for calculating the factorial of a specific number. Review the recursive code for this function in our previous lesson (https://www.educative.io/collection/page/6151088528949248/4547996664463360/6091301726453760).

Iterative Recursive

```
def factorial(targetNumber) :
 # Base case
 if targetNumber == 1 : # Factorial of 1 is 1
   return 1

 # Recursive case
 else :
   return (targetNumber * factorial(targetNumber - 1))

# Driver Code
targetNumber = 5
result = factorial(targetNumber)
print("The factorial of " + str(targetNumber) + " is: " + str(result))
```

Recursive method for calculating factorial of a number

For the **iterative** version of this function, we initiate a simple `while` loop and multiply `targetNumber` with `index` in each iteration. `index` is reduced by 1 in each iteration. This step is important because otherwise the program will be stuck in an infinite loop. The initial value of `index` is `targetNumber - 1`. Let's dry run this code by **keeping track of its variables**.

`targetNumber = 5`

`index = 4`

Initiating Loop

Start loop

condition index >= 1 is satisfied

Update targetNumber and subtract 1 from index

`targetNumber = 20`

`index = 3`

Iteration 1

condition index >= 1 is satisfied

Update targetNumber and subtract 1 from index

```
targetNumber = 60
```

```
index = 2
```

Iteration 2

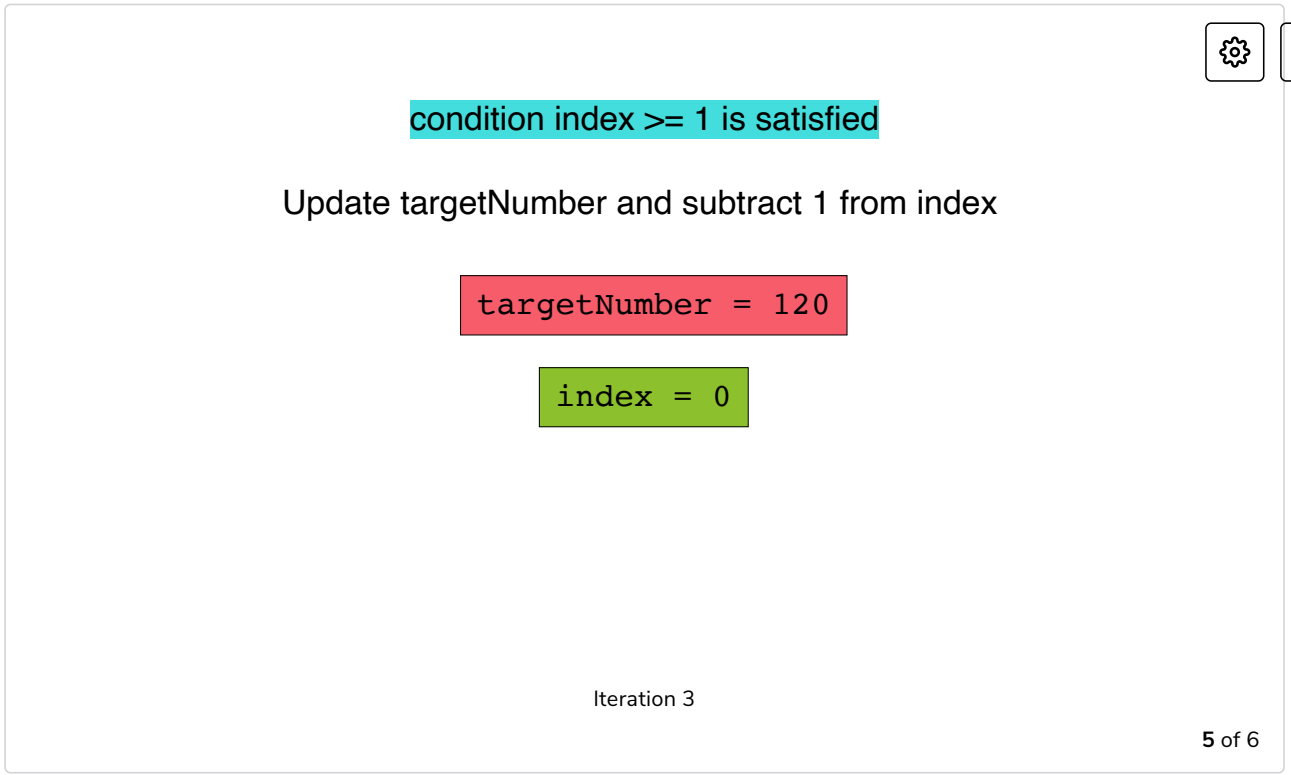
condition index >= 1 is satisfied

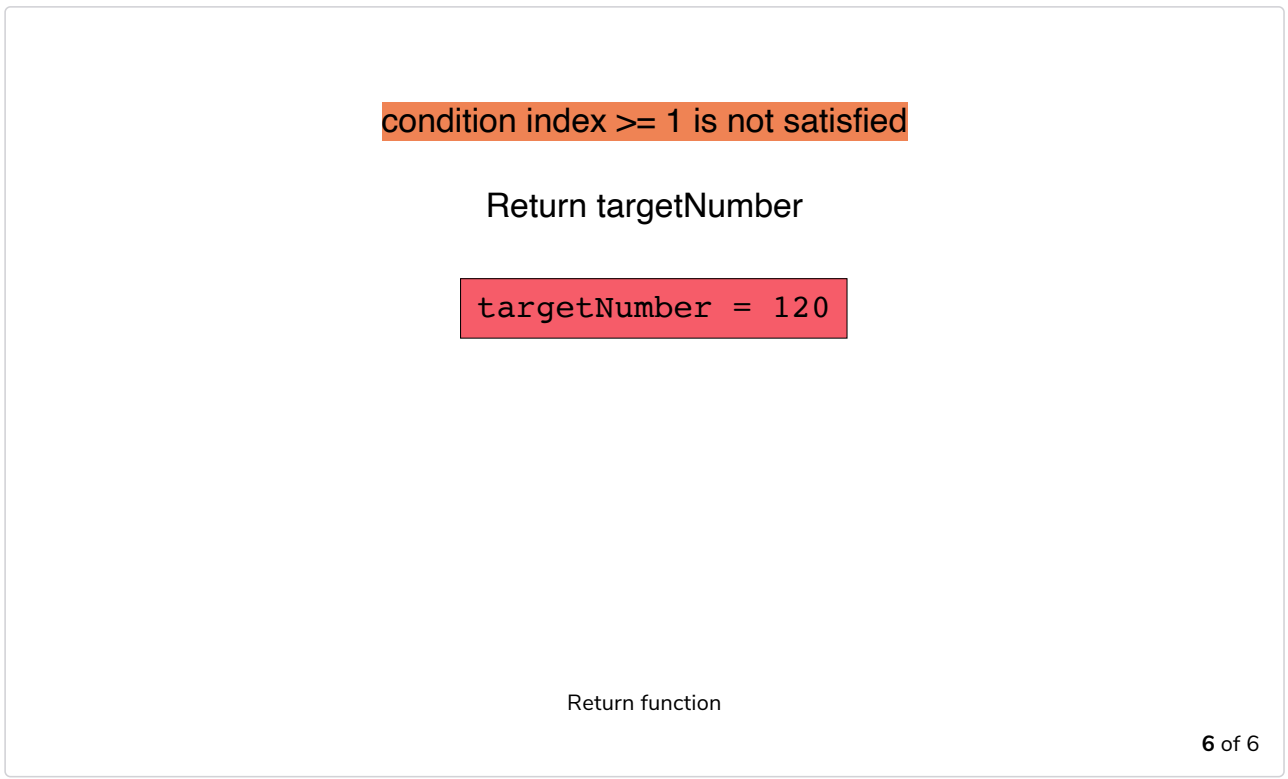
Update targetNumber and subtract 1 from index

```
targetNumber = 120
```

```
index = 1
```

Iteration 3





In the next lesson, we will highlight the major differences between iteration and recursion.

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