LAB MODULE A

Coding & Big Data

Part 5

Iteration in Python

Outline

Introduction to Iteration

What is Iteration?

Iteration is a **repeating** process to generate outcomes

Iteration is also called **loop**. **Loop** is a programming structure that repeats a sequence of instructions until a specific condition is met, usually until a variable reach certain value.

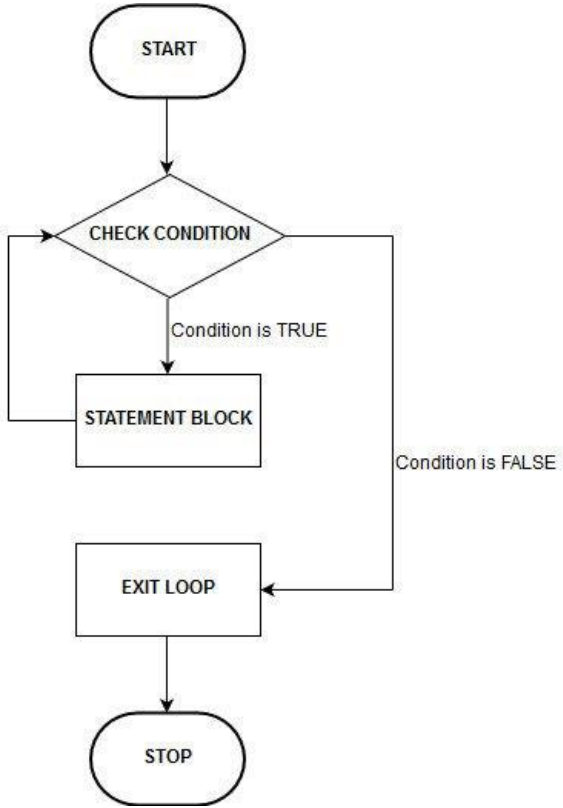
Example Of Iteration In Real Life

You are playing basketball. Then your coach asking you to score the hoops 5 times. This means, you will repeatedly shooting the ball until you can score 5 times.

While Loops

While Loops is an iteration method that will repeat the code inside based on its condition / expression.

- If the condition / expression is **TRUE**, it will repeat the code again
- If the condition / expression is **FALSE,** it will exit the loop and continue to the next step



Example

You are given a task to create a program to count up starting from number inputed by the user until 10. This means, when the number is above 10, the program will be terminated

Steps to Solve

1. Take the input from the user and store it into a variable
2. Create a while loop with condition the number is less or equal to 10
3. While the loop is running, print out the number value
4. Increment the value of the variable by 1

Result

```
#1. We will take the input from user
number = int(input("Please input the starting number : "))

#2. We create the while loop with <= 10 condition
while number <= 10:
    #3. We print the number value
    print("The number is :", number)
    #4. We increment the number value by 1
    number += 1 #number = number + 1
```

Be Careful!

There is something called **Infinite loop**. Infinite loop can happen because of the condition of the loop is always true (will never change to false)

```
1   number = 5
2
3   while number <= 10:
4       print("The number is :", number)
```

This code is the example of infinite loops, because the number value will always be 5 (always less than 10)

Practice I

For student whose last digit of student id is odd

Recreate previous program, by changing the maximum number is 15 , and the output will have your name similar to the following picture

```
Please input the starting number : 10
My name is Francis : 10
My name is Francis : 11
My name is Francis : 12
My name is Francis : 13
My name is Francis : 14
My name is Francis : 15
```

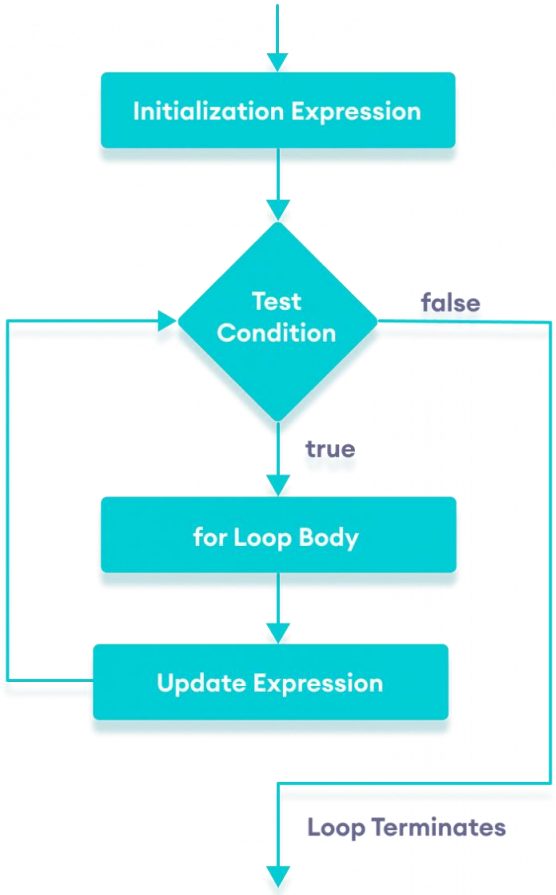
For student whose last digit of student id is even

Recreate previous program, by changing the maximum number is 8 , and the output will have your last 2 student digits, similar to the following picture

```
Please input the starting number : 3
3 , My ID is 13
4 , My ID is 13
5 , My ID is 13
6 , My ID is 13
7 , My ID is 13
8 , My ID is 13
```

For Loops

For Loops is used for iterating over a sequence. Different than while loops, for loops by default has an increment of the condition variable by 1. So if we want to have an increment by 1 we don't need to do anything, but if we want the increment by other values, we can define it as our liking



range()

range() is a function used in for loops to iterate over numbers inside the function. range() function can hold 1, 2, and 3 parameters.

- range(x) [with 1 parameter] means we will iterate from 0 to x-1, with increment by 1
- range(x,y) [with 2 parameters] means we will iterate from x to y-1, with increment by 1
- Range(x,y,z) [with 3 parameters] means we will iterate from x to y-1, with increment by z

Example of range(x)

```
1    for num in range(5):
2        print("the number is :", num)
```

```
the number is : 0
the number is : 1
the number is : 2
the number is : 3
the number is : 4
```

Example of range (x,y)

```
1    for num in range(2,7):
2        print("the number is :", num)
```

```
the number is : 2
the number is : 3
the number is : 4
the number is : 5
the number is : 6
```

Example of range(x,y,z)

```
1    for num in range(2,10,2):
2        print("the number is :", num)
```

```
the number is : 2
the number is : 4
the number is : 6
the number is : 8
```

Keywords

break

break keyword is used to forcefully exit the loop even though the condition is still true

```
1    for num in range(5):
2        if num == 4:
3            break
4        print("the number is :", num)
```

```
the number is : 0
the number is : 1
the number is : 2
the number is : 3
```

continue

continue keyword is used to skip the current iteration and continue with the next iteration

```
1    for num in range(5):
2        if num == 2:
3            continue
4        print("the number is :", num)
```

```
the number is : 0
the number is : 1
the number is : 3
the number is : 4
```

Practice II:

For student whose last digit of student id is odd

Create a program contains for loops that count up by 2. It also will ask for an input about the starting number. The maximum number for the program is 15. If the number reach 7, it will print (“Lucky seven”) and end the loop . The output is going to be something like this :

```
Enter the starting number 2
the number is : 2
the number is : 4
the number is : 6
the number is : 8
the number is : 10
the number is : 12
the number is : 14
```

```
Enter the starting number 3
the number is : 3
the number is : 5
Lucky seven
```

For student whose last digit of student id is even

Create a program contains for loops that count down by 1. It also will ask for an input about the ending number. The starting number for the program is 10. If the number reach 7, it will print (“Lucky seven”) and continue the iteration. The output is going to be something like this :

```
Enter the ending number 3
the number is : 10
the number is : 9
the number is : 8
Lucky seven
the number is : 6
the number is : 5
the number is : 4
```

Submission

Screenshot & Upload to eCampus

Screenshot your codes and terminals, put them into docx or pdf file. Don’t forget to put your name and student id in the top of the file. Upload the file to e-Campus on Practice Week 5 before Friday.

Practice I ➔ Screenshot your program code and output depending on your student id last digit

Practice II ➔ Screenshot your program code and output depending on your student id last digit

Questions?

References

Python While Loops
Python For Loops