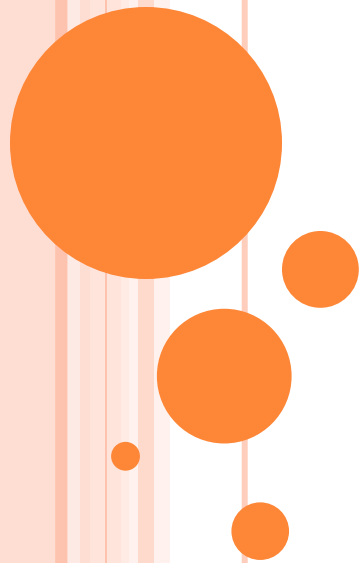# CT60A0203
Introduction to Programming: Python
Week 4

Learning objectives: Python loops/Iteration and Iterative statements

❑ To learn "executing group of statements multiple times and when?"

❑ To use **while**, **for** loop statements to control the repetition of statements

❑ To use selection control statements (if-else) in loops

❑ To implement program control with ***break*** and ***continue*** keywords

❑ To write **nested loops** and using selection.

At the conclusion of this lecutre, students will be able to understand the need of loops in programming. In addition, they know how to control loop process and use of selection statements inside loop in programming.

- **What do you mean loop statements in programming? Or**
- **What is loop in programming?**
- **When do we need loop statements in programming?**
- **How can I understand loop in programming?**
-

To make monotonous repeating work easier

- Count the number of students in the class who wear blue color dress today
- Does **dragon fruit** there in the mixed fruit?

So, loops **means repetition of same work.** That is, executing a block of statements again and again until the condition is satisfied, or search is complete, or the expected result is out.

Library database → search for a book "Introduction to Programming with Python"

- Search the customer database to find customers who hasn't paid last month loan amount and then send reminder email to them.

- So, loop means repetition of same process until specified number of times or search completed. Am I right? Well, yes for now.

- **Example scenario**

- <u>**Display your name 5 times:**</u>

- **print ("Ashok Kumar "*5)** → well Python is handy here which is not available in some other programming languages.

- Write code that prompts the user to ask for input 5 times continuously.

```
ex1b.py ×
1   for i in range(5):
2       x = int(input("Enter any integer number:"))
```

```
Shell ×
Python 3.7.9 (bundled)
>>> %Run ex1b.py
  Enter any integer number:5
  Enter any integer number:-6
  Enter any integer number:3
  Enter any integer number:9
  Enter any integer number:1
```
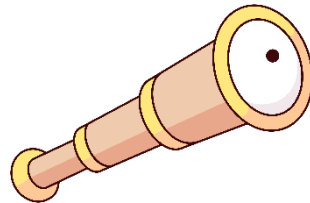
```
i = 1
while i<=5:
    x = int(input("Enter any integer number:"))
    i = i + 1
```

Python loop statements:
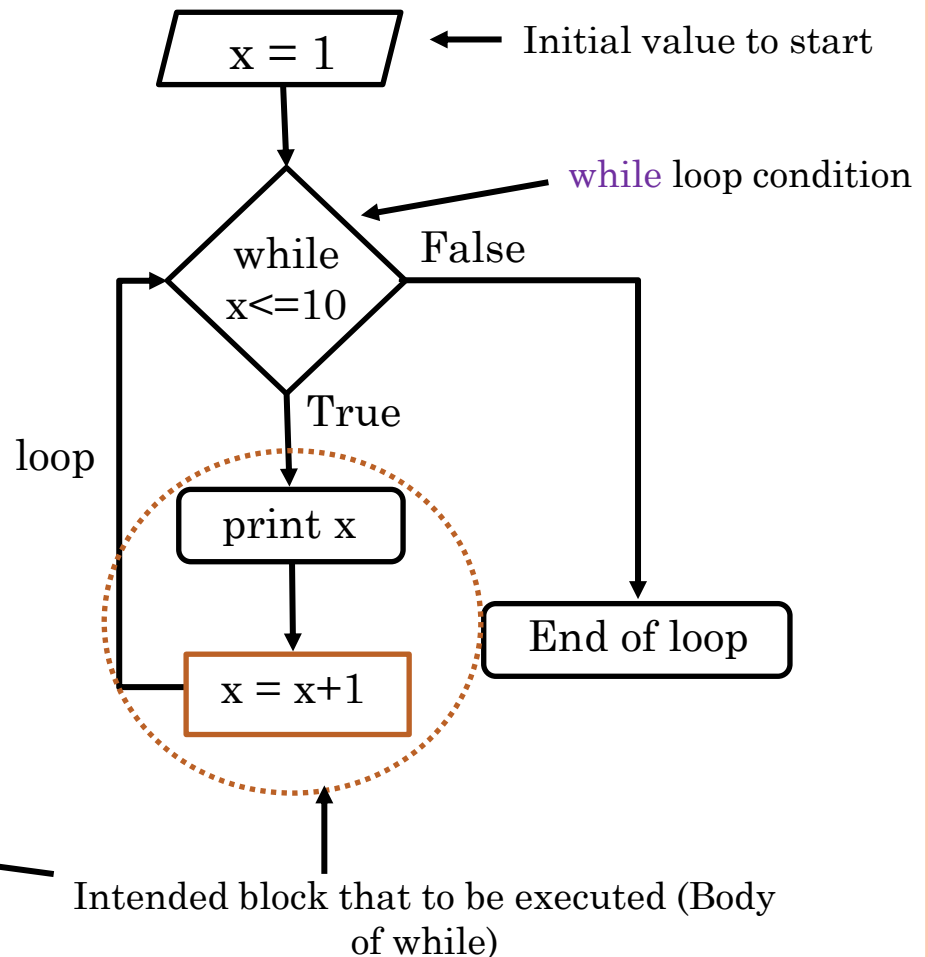while and for

How **while** loop works in Python?

Print numbers from 1 to 10

1. Starting value 1 (**x = 1**)
2. print till 10 (**while condition x<=10)**
3. Print x value
4. To get next value **x = x+1**
   Goto step 2 check the condition
   Repeat the process until the
   condition true Otherwise end of
   the program **(loop).**

```
1  x = 1
2  while x<=10:
3      print(x)
4      x = x+1
```

x = 1 ← Initial value to start

while loop condition

while x<=10 — False

True

loop

print x

x = x+1

End of loop

Intended block that to be executed (Body of while)

So. while loop repeatedly executes the statements in the loop body when the loop continuation condition evaluates to true

Here some more examples to understand how while loop works

```
1  i = 1
2  sum1 = 0
3  while i<=5:
4      sum1 = sum1 + i
5      i = i + 1
6  |
7  print("sum of those numbers:", sum1)
```

Print the sum of 1+2+3+4+5

while **<condition true>:**
        statements

This loop is infinite, because **i** value is always 1 here and did not iterate/get incremented

```
1  i = 1
2  sum1 = 0
3  while i<=5:
4      sum1 = sum1 + i
5      |
6  print("sum of those numbers:", sum1)
```

What is the output?
[Assume n value is 10]

```
1  i = 1
2  n = int(input("Enter the n value:"))
3  while i<=n:
4      print(i)
5      i = i + 2
6
```

```
1  i = 10
2
3  while i<=20:
4      print(i)
5      i = i + 2
6
```

The program given here suppose to print the odd numbers that are in between 10 and 20. but it didn't. Why? And how to fix it?

Write code that prompts the user to get input at least 5 times but input should not be odd number

```
1   i = 1
2   while i<=5:
3       x = int(input("Enter any integer as input but not odd number:"))
4
5       if x%2 != 1:
6           print (x)
7           i = i+1
8       else:
9           print ("Should not be odd number")
10
```

Shell ×
Python 3.7.9 (bundled)
>>> %Run ex4.py

 Enter any integer as input but not odd number:4
 4
 Enter any integer as input but not odd number:9
 Should not be odd number
 Enter any integer as input but not odd number:14
 14
 Enter any integer as input but not odd number:-17
 Should not be odd number
 Enter any integer as input but not odd number:90234
 90234
 Enter any integer as input but not odd number:190001
 Should not be odd number
 Enter any integer as input but not odd number:1
 Should not be odd number
 Enter any integer as input but not odd number:46
 46
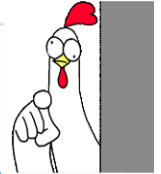 Enter any integer as input but not odd number:900
 900

Ok. Let us fix or complete the missing code now.

Write a program that accepts and calculates the sum of an unspecified number of integers. The input 0 signified the end of the input.

```python
1  i = 0
2  sum1 = 0
3  while i!=0:
4      i = int(input("Enter an integer value or enter o to exit from the loop:"))
5      sum1 = sum1+i
6
7  print("sum of given numbers:",sum1)
8
```

The program given above looks fine. But did not ask any input and print sum of given numbers: 0.
Could you fix it?

```python
1  i = 1
2
3  while i<=5:
4      x = input("Enter your country name:")
5      if (              ):
6          print("Your country is : ", x.upper())
7          i = i + 1
8
9
10
```

The program given on right side supposed to accept country names five times and print those in **capital letters** format. The condition is input must contain only alphabets without any other characters including spaces. So completed the missing part in the code.

Shell ×

```
Python 3.7.9 (bundled)
>>> %Run ex6.py

Enter your country name:Japan
Your country is :   JAPAN
Enter your country name:Finland
Your country is :   FINLAND
Enter your country name:Estonia
Your country is :   ESTONIA
Enter your country name:China1231
Enter your country name:1234.45
Enter your country name:South Korea
Enter your country name:Nigeria
Your country is :   NIGERIA
Enter your country name:Brazil
Your country is :   BRAZIL
```

Self regulated study : What these programs do?

Thonny - Z:\Python 2021_Fall\Fall 2021_CT60A0203\Week 4\ex6awhile.py @ 8 : 1

File Edit View Run Tools Help

ex6awhile.py | **ex6.py**

```python
2
3  while i<=5:
4      string = input("Enter your country name:")
5      if all(string.isalpha() for x in string) or any(x.isspace() for x in string) and string.isalpha():
6          print("Your country is : ", string.upper())
7          i = i + 1
8  |
9
```

```python
3  while i<=5:
4      x = int(input("Fill the items in the box:"))
5      item_Total = item_Total + x
6      i = i+1
7      |
8      if item_Total >100:
9          break
10
11 print("the items packed in the box is: ",item_Total)
```

```python
1  i = 1
2  item_Total = 0
3  while i<=5:
4      x = int(input("Fill the items in the box:"))
5
6      if x<=0:
7          continue
8      else:
9          item_Total = item_Total + x
10         i = i+1
11
12 print("the items packed in the box is: ",item_Total)
13
```
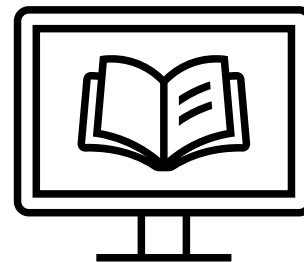
Week 1 - 4

- ➢   lecture notes, (Moodle → lectures)
- ➢   weekly assignments (Moodle → Weekly programming assignment)
- ➢   practice exercises and (Moodle → practice exercises)
- ➢   Chapters 2-4 of prescribed textbook (Moodle → learning resources)

Type of questions (and or in the combination of):

- ❑ **Multiple choice**
- ❑ **Complete missing code**
- ❑ **Yes or no**
- ❑ **Short answer**
- ❑ **Find the error or output of given code**

When will it be conducted? → during **tutorial sessions of Week 5**

Duration: 15 – 30 minutes (maximum 3 attempts)

Possible total number of questions: 10-15
Possible total score : 100

You are not allowed to use or refer any materials including electronic devices , software during Quiz time.