

Python Iteration Loop

Sirinthorn Cheyasak, Asst. Prof.

CS310 : Computer Programming I

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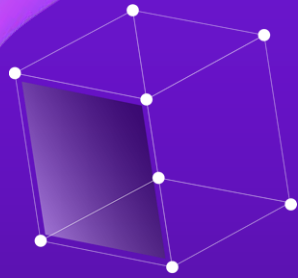
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Class Activity

Write a program that repeatedly prompts using for and while loops.



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python

Iteration and LOOP

Getting to know python iteration and Loop.



Iteration and Loop Concept

Repetitive execution of the same block of code over and over is referred to as iteration.

Iteration คือ กระบวนการที่มีการเริ่มต้น, การทำซ้ำ, และเงื่อนไขที่ก่อให้เกิดจุดจบของกระบวนการนั้น เรียกว่า กระบวนการ


Iteration



Iteration



Loop



Loop is a sequence of the instructions that is continually repeated until a certain condition is reached.

Loop คือ code ที่เราเขียนลงบนโปรแกรมให้เกิดกระบวนการ Iteration

Iteration Types

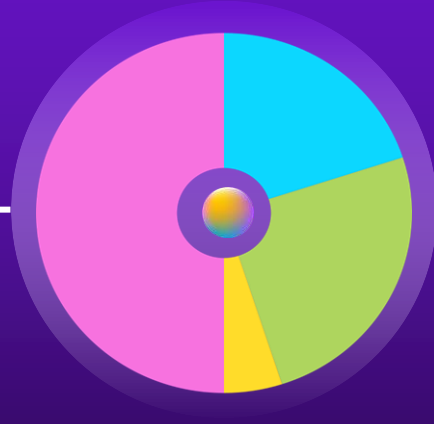


Definite Iteration

Iteration, in which the number of repetitions is specified explicitly in advance.

จำนวนรอบของการทำซ้ำได้ถูกกำหนดไว้แล้วว่าจะให้ทำซ้ำทั้งหมดกี่ครั้ง

FOR LOOP



Infinite Loop

ระวังอย่าให้เกิดการวนไม่รู้จบ



Indefinite Iteration

Iteration, in which the code block executes until some condition is met.

จำนวนรอบของการทำซ้ำจะขึ้นอยู่กับเงื่อนไข ว่าตรงกับเงื่อนไขมีทั้งหมดกี่ครั้ง ก็จะทำซ้ำไปตามจำนวนครั้งที่ตรงกับเงื่อนไขนั้น

WHILE LOOP



2

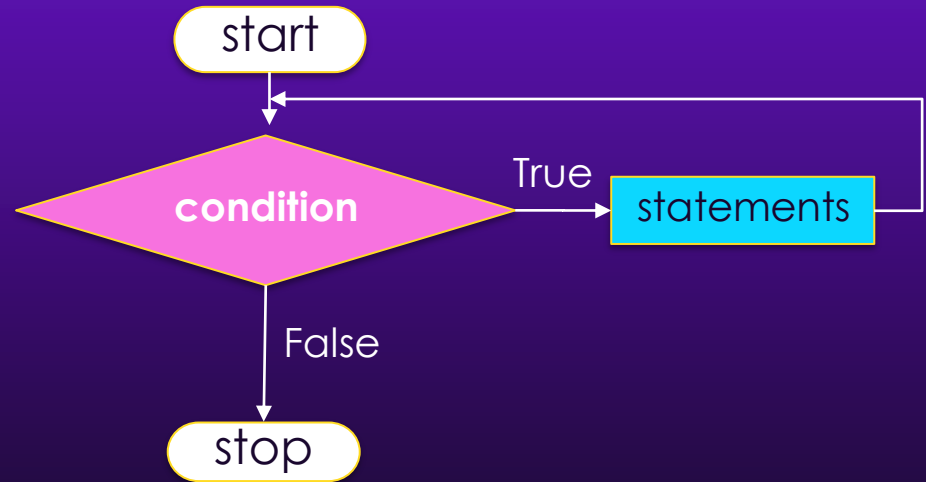
Python

For Loop

For Loop concept and how to write a program that executes repeatedly

Python For Loop Definition

The for loop in Python is used to iterate over a sequence (list, tuple, string) or other iterable objects. Iterating over a sequence is called traversal.



Python For Loop Statement



Range() function

For loop statement using
range() function.



Iterating on Lists

used to iterate over a sequence
(list, tuple, string) or other
iterable objects



Iterating on indices

For loop iterating on indices
by enumerate() function

Python "for" Loops (Definite Iteration)

Range()



- The Python range() function returns the sequence of the given number between the given range. The most common use of it is to iterate sequence type (Python range() List, string, etc.)

Range Parameter



Parameter:

- **start:** integer starting from which the sequence of integers is to be returned
- **stop:** integer before which the sequence of integers is to be returned. The range of integers ends at stop – 1.
- **step:** integer value which determines the increment between each integer in the sequence



Python for loop using range function

This function yields a sequence of numbers. When called with one argument, say n, it creates a sequence of numbers from 0 to n-1.

SYNTAX:

```
for iterating_variable in range(start, stop, step) :  
    statements
```

i
n
d
e
n
t

Python For Loop in range() Example

```
#printing hello and CS310
for i in range(1,6,1):
    print("Hello.")
for i in range(5) :
    print("CS310")
print("END")
```



Hello.
Hello.
Hello.
Hello.
Hello.
CS310.
CS310.
CS310.
CS310.
CS310.
END

For loop using range function examples

Ex.1

```
for n in range(6) :  
    print(n)
```

?

Ex.2

```
for n in range(3,6) :  
    print(n)
```

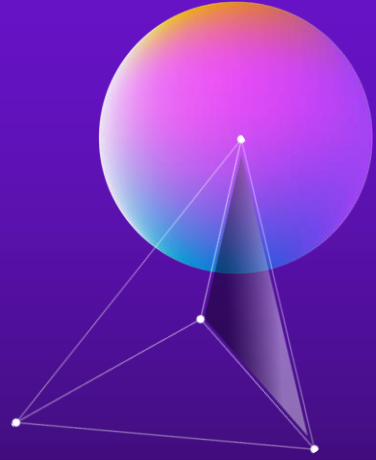
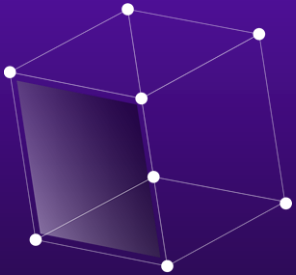
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Ex.3

```
for n in range(3, 15, 2)  
    print(n)
```

?

For in range() examples



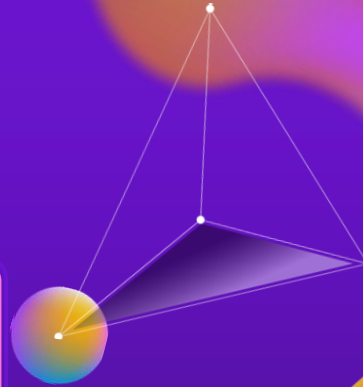
Python For Loop in range() Example

```
for num in range(6):  
    print(num, end=" ")
```

Output

0 1 2 3 4 5

Note that `range(6)` is not include 6 by mean only 0 to 5.



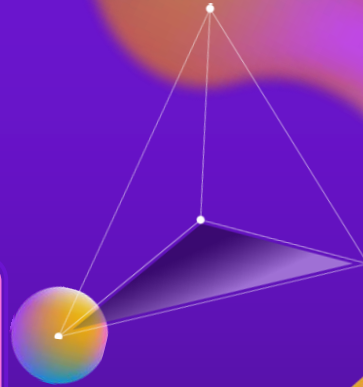
Python For Loop in range() Example

```
for num in range(1,7):  
    print(num, end=" ")
```

Output

1 2 3 4 5 6

Note that `range(1,7)` start at 1 and stop at 6 is not include 7



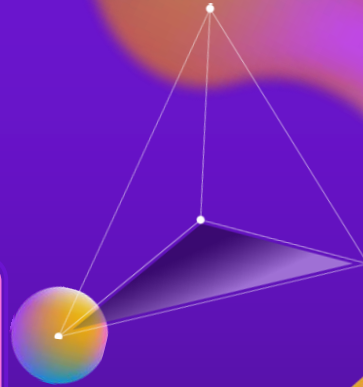
Python For Loop in range() Example

```
for i in range(2,6):  
    print(i, end=" ")
```

Output

2 3 4 5

Note that `range(2,6)` start at 1 and stop at 5 is not include 6



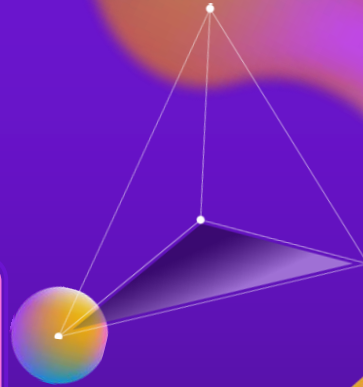
Python For Loop in range() Example

```
for i in range(3,15,3):  
    print(i, end=" ")
```

Output

3 6 9 12

Note that `range(3,15,3)` start at 3, step is 3 and stop at 14 is not include 15



Python For Loop in range() Example

Example : What is the output of the following code

```
for i in range(10, 15, 1):  
    print( i, end=', ')
```

A. 10,11,12,13,14,15

B. 11,12,13,14

C. 10,11,12,13,14

Python For Loop in range() Example

Example : What is the output of the following code

```
for i in range(5, 30, 5):  
    print( i, end=', ')
```

A. 1,5,10,15,20,25

B. 1,5,10,15,20,25,30

C. 5,10,15,20,25,30

D. Not all above

Python For Loop in range() Example

Example : using range() function to accessing element on lists

```
trainee = ["Trainee1","Trainee2","Trainee3","Trainee4"]  
age = [22,34,28,43]  
sex = ["Male","Female","Male","Male"]
```

```
for i in range(len(trainee)) :  
    print("%d. - Name : %s , Age : %d, Sex : %s"%(i+1,trainee[i],age[i],sex[i]))
```

Output :

1. - Name : Trainee1 , Age : 22, Sex : Male
2. - Name : Trainee2 , Age : 34, Sex : Female
3. - Name : Trainee3 , Age : 28, Sex : Male
4. - Name : Trainee4 , Age : 43, Sex : Male

Algorithm to calculate the average of first n natural numbers

1. Allows a user to enter the number (n) he wishes to calculate the sum and average. The program accepts user input using the **input function**.
2. Next, run loop till the entered number using the for loop and **range() function**
3. Next, calculate the sum using a **$\text{sum} = \text{sum} + \text{current number}$** formula.
4. At last, after the loop ends, calculate the average using **$\text{average} = \text{sum} / n$** .
n is a number entered by the user.

Algorithm to calculate the average of first n natural numbers

```
ending = int(input("Enter ending number : "))
```

```
sum = 0
```

```
for num in range(0, ending+1, 1):
```

```
    sum = sum + num
```

```
avg = sum / n
```

```
print("SUM of first %d numbers is %d"%(n,sum))
```

```
print("AVG of first %d numbers is %0.2f"%(n,avg))
```

The background is a deep purple color. It is decorated with several abstract elements: a wireframe tetrahedron in the top left, a large colorful blob in the top center, a small sphere in the top center, a large sphere in the top right, a colorful blob in the bottom left, a small sphere in the bottom left, and a wireframe cube in the bottom right. The shapes are rendered with a gradient of colors including yellow, orange, and blue.

Class Activity

Write a program that repeatedly prompt using for and while loop

LAB5

@ MS-Teams

For Loop Iterating on List



For Loop using in sequence syntax

SYNTAX:

for *iterating_variable* in sequence :
statements

i
n
d
e
n
t



List

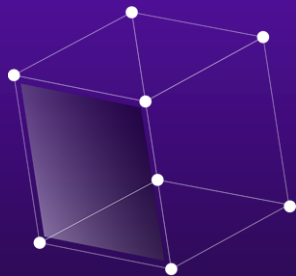


Tuple



String

For using in sequence
examples



For Loop using in sequence example

```
fruits = ["apple", "banana", "cherry"]  
for x in fruits :  
    print(x)
```

Result

```
apple  
banana  
cherry
```

For Loop using in sequence example

```
fruits = ["apple", "banana", "cherry"]  
for x in fruits :  
    print(x, end=" ")
```

Result

apple banana cherry

For Loop using in sequence example

```
number = [1,2,3,4,5]  
for x in number:  
    print(x)
```

Result

```
1  
2  
3  
4  
5
```

For Loop using in sequence example

```
number = [1,2,3,4,5]
for x in number:
    print(x ,end = " ")
print()
for x in number:
    print(x ,end = " ,")
```

Result

```
1 2 3 4 5
1,2,3,4,5,
```


For Loop using in sequence example

```
number = [1,2,3,4,5]
for x in number:
    print(x ,end = " ")
print()
for x in number:
    print(x ,end = " ,")
```

Result

```
1 2 3 4 5
1,2,3,4,5,
```


For Loop using in sequence example

Example : Print each fruit in a fruit list:

```
fruits = ["apple", "banana", "cherry"]  
for x in fruits:  
    if x == "banana":  
        print(x)
```

Result

banana

For Loop using in sequence example

```
for letter in "Python Programming":  
    print(letter, end=" ")  
print()  
for letter in "Python Programming":  
    print(letter, end="")
```

Result

```
P y t h o n   P r o g r a m m i n g  
Python Programming
```

The background is a deep purple color. It is decorated with several abstract elements: a wireframe tetrahedron in the top left, a large colorful blob in the top center, a small sphere in the top center, a large sphere in the top right, a colorful blob in the bottom left, a small sphere in the bottom left, and a wireframe cube in the bottom right. The shapes are rendered with a gradient of colors including yellow, orange, and blue.

Class Activity

Write a program that repeatedly prompt using for and while loop

LAB5

Write a program that repletely prompt using for and while loop





Thank you

Any question?
contact me at Sirinthorn.c@bu.ac.th
or MS Team