

Python Programming Language

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Lecture 9: For Loop and While Loop and Problem Solving

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Today's Learning Objectives

- For Loop
- While Loop
- Practical Exercises
- Exam

Control Flow Statements

- Control flow statements determine the order in which statements are executed in a program.
- They allow you to make decisions and repeat actions.

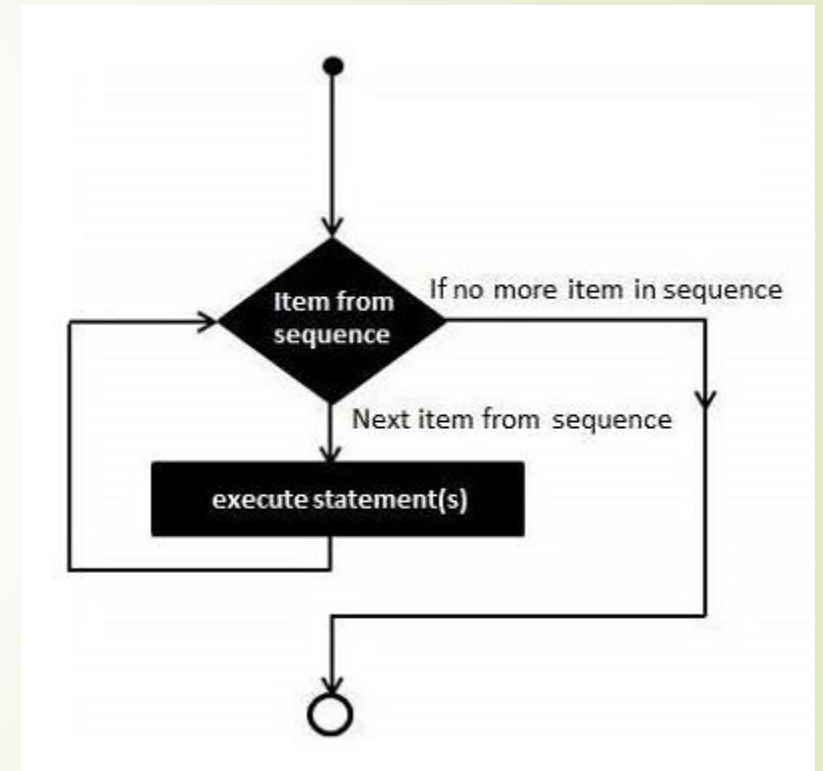
Types of Control Flow Statements:

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- Conditional Statements: if, elif, else
- Loops: for, while
- Other: break, continue, pass

Introduction to For Loops

- A for loop is used to repeat a block of code a certain number of times.
- It iterates over a sequence (like a list or a range).
- The following diagram illustrates a loop statement :



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- Problem: Print "Python is fun!" 7 Times
- ```
for num in range(7):
 print("Python is fun!")
```

# Basic Structure of a For Loop

➤ **Syntax:** for variable in sequence:

# Code to execute

➤ Variable takes on each value in the sequence one at a time.

➤ The indented code block runs for each value.

➤ **Example:** Print 1 to 5 numbers.

➤ **Normal Code :**

```
print(1)
print(2)
print(3)
print(4)
print(5)
```

➤ **Using Loop:**

```
for num in range(1,6):
 print(num)
```

# The range() Function

- The `range()` function returns a sequence of numbers, starting from 0 by default, increments by 1 (by default), and ends at a specified number.
- ```
for x in range(6):  
    print(x)
```
- ```
for x in range(1,6):
 print(x)
```
- ```
for x in range(1,10,2):  
    print(x)
```

Looping Through a String

➤ Displays if it is not a vowel ('a', 'e', 'l', 'o' or 'u')

➤ `str1 = ''`

Beautiful is better than ugly.

Explicit is better than implicit.

Simple is better than complex.

Complex is better than complicated.

`'''`

`for char in str1:`

`if char not in 'aeiouAEIOU':`

`print (char, end='')`

Looping in String Indexing

```
# Input string
```

```
input_string = input("Enter a string: ")
```

```
# Using for loop to index the string
```

```
for index in range(len(input_string)):
```

```
    print(index, "--", input_string[index])
```


If condition in Loop

- Write a program that prints multiples of 3 between 1 and 20.

```
for i in range(1, 21):  
    if i % 3 == 0:  
        print(i)
```

Basic Structure of a While Loop

➤ **Syntax:** while expression:
statement(s)

➤ **Example:** Print 1 to 5 numbers.

➤ **Normal Code :**

```
print(1)
print(2)
print(3)
print(4)
print(5)
```

➤ **Using Loop:**

```
count=1
while count<=5:
    count+=1
    print (count)
print ("End of while loop")
```

Practical Example 1

- Print Numbers and Indicate Even or Odd
- Write a program that prints numbers from 1 to 100 and indicates whether each number is even or odd.
- Solution:

```
for i in range(1, 101):  
    if i % 2 == 0:  
        print(i, " is even")  
    else:  
        print(i, " is odd")
```

Practical Example 2

- Guess the Number
- Task: Write a program where the user has to guess a secret number between 1 and 10..

```
secret_number = 7
guess = 0
while guess != secret_number:
    guess = int(input("Guess the number between 1 and 10: "))
    if guess < secret_number:
        print("Too low!")
    elif guess > secret_number:
        print("Too high!")
    elif guess == 0:
        break
    else:
        print("Congratulations! You guessed it.")
```

Practical Exercise 3

- Title: Multiplication table of 3
- `number = 3`
- `for i in range(1, 11):`
- `print(number, "x", i, "=", number * i)`

Practical Exercise 4

- Title: Print the squares of numbers from 1 to 10
- Input: 10
- Output:
 - 1 squared is 1
 - 2 squared is 4
 - 3 squared is 9
 - 4 squared is 16
 - 5 squared is 25
 - 6 squared is 36
 - 7 squared is 49
 - 8 squared is 64
 - 9 squared is 81
 - 10 squared is 100

Any Question?

References

- <https://www.w3schools.com/python/>
- <https://www.tutorialspoint.com/python/>

EXAM-2

Problem 1

7_Days_in_Week

Write a program that takes an integer input (1-7) and prints the corresponding day of the week. (Start from Sunday)

7_days(1) → 'Sunday'

7_days(4) → 'Wednesday'

7_days(7) → 'Saturday'

Problem 2

Great_number_6

The number 6 is a truly great number. Given two int values, a and b, Print True if one of them is 6. Or if their sum or difference is 6. Note: the function abs(num) computes the absolute value of a number.

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love6(6, 4) → True
love6(4, 5) → False
love6(1, 5) → True"

Problem 3

Diff_21

Given an int n, return the absolute difference between n and 21, except return double the absolute difference if n is over 21.

[Absolute difference = big value – small value, the difference is always positive.]

diff21(19) → 2

diff21(10) → 11

diff21(21) → 0