**K. J. Somaiya College of Engineering, Mumbai-77**

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| **Batch:** | **Roll No.:** |
| **Experiment / assignment / tutorial No.** | |
| **Grade: AA / AB / BB / BC / CC / CD /DD** | |
| **Signature of the Staff In-charge with date** | |

**TITLE:** Write a program to demonstrate the use of decision-making statements in Python.

**AIM**: 1) Write a program to read the numbers until -1 is encountered. Also, count the number of prime and composite numbers entered by the user.
2) Write a program to check whether a given number is Armstrong.

**Outcome:** Students will be able to

**CO1:** Formulate a problem statement and develop the logic (algorithm/flowchart) for its solution.

**CO3:** Use different decision-making statements and functions in Python.

Use the input-output function. And different decision-making statements in Python.

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**Resource Needed: Python IDE**

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**Books/journals/websites referred:**


1. Reema Thareja, *Python Programming: Using Problem-Solving Approach*, Oxford University Press, First Edition 2017, India
2. Sheetal Taneja and Naveen Kumar, *Python Programming: A Modular Approach*, Pearson India, Second Edition 2018, India
3. https://www.geeksforgeeks.org/python-strings/?ref=lbp


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**Theory:**

**Decision Control Statements**

**1) Selection/Conditional branching statements**
- a) if statement
- b) if-else statement
- c) if-elif-else statement

**2) Basic loop structures/iterative statements**
- a) while loop
- b) for loop

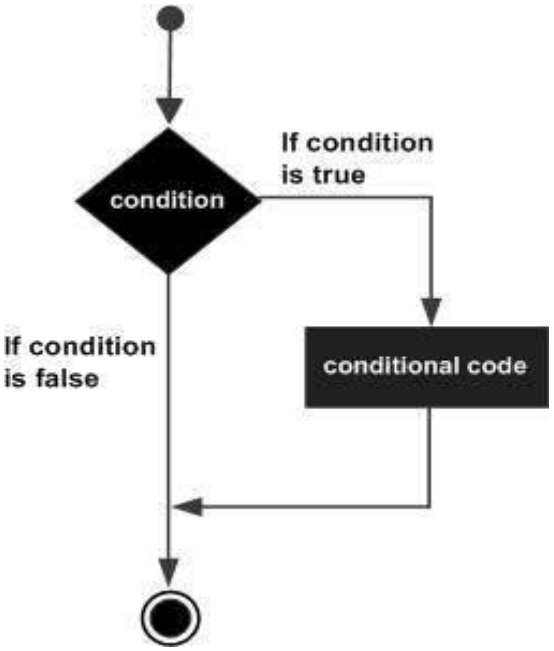
**If statement:**

In Python, the **if** statement is used for decision-making operations. It contains a body of code that runs only when the condition given in the **if** statement is true.

Syntax:

```
if condition:
   statement(s)
```

If flowchart:




**If-else Statement:**

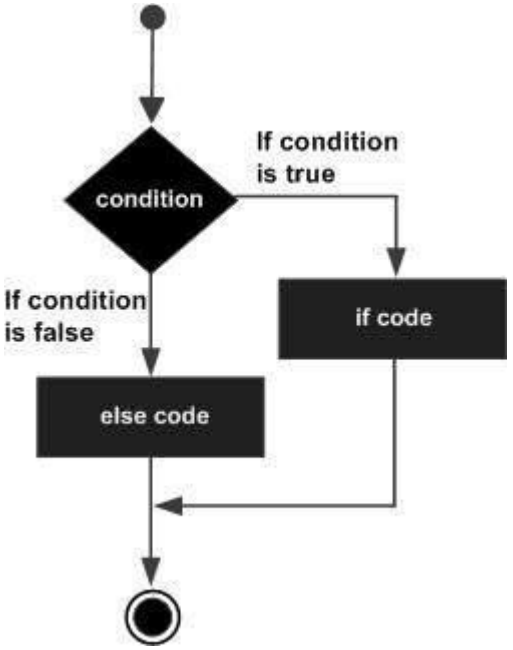
An **else** statement can be combined with an **if** statement. An **else** statement contains the block of code that executes if the conditional expression in the **if** statement resolves to 0 or a FALSE value.

The **else** statement is an optional statement, and there could be at most only one **else** statement following the **if**.

Syntax:

```
if expression:
   statement(s)
else:
   statement(s)
```

If-else flowchart:




**If-elif-else Statement:**

The **elif** statement allows you to check multiple expressions for TRUE and execute a code block as soon as one of the conditions evaluates to TRUE.
Similar to the else statement, the **elif** statement is optional. However, unlike **else**, for which there can be at most one statement, there can be an arbitrary number of **elif** statements following an **if.**

Syntax:

```
if expression1:
   statement(s)
elif expression2:
   statement(s)
elif expression3:
   statement(s)
else:
   statement(s)
```

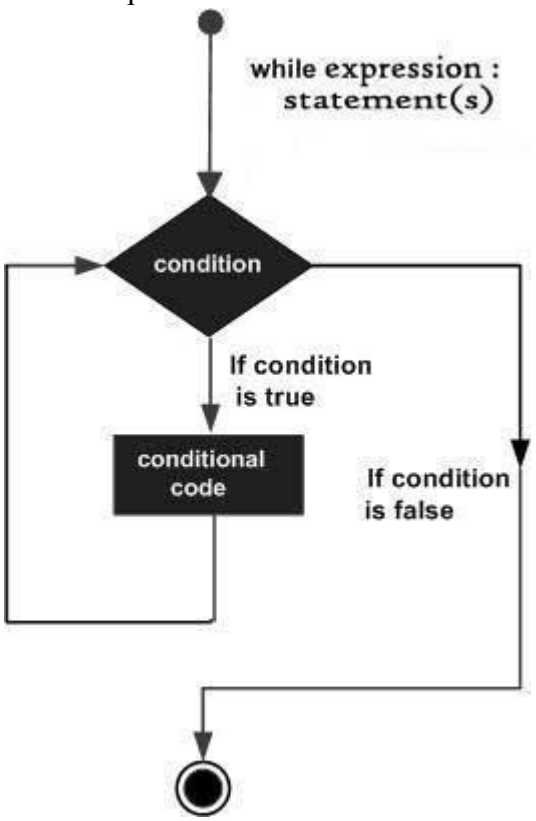
**While loop:**

A **while** loop statement in the Python programming language repeatedly executes a target statement as long as a given condition is true.

Syntax:

```
while expression:
   statement(s)
```

While loop flowchart:



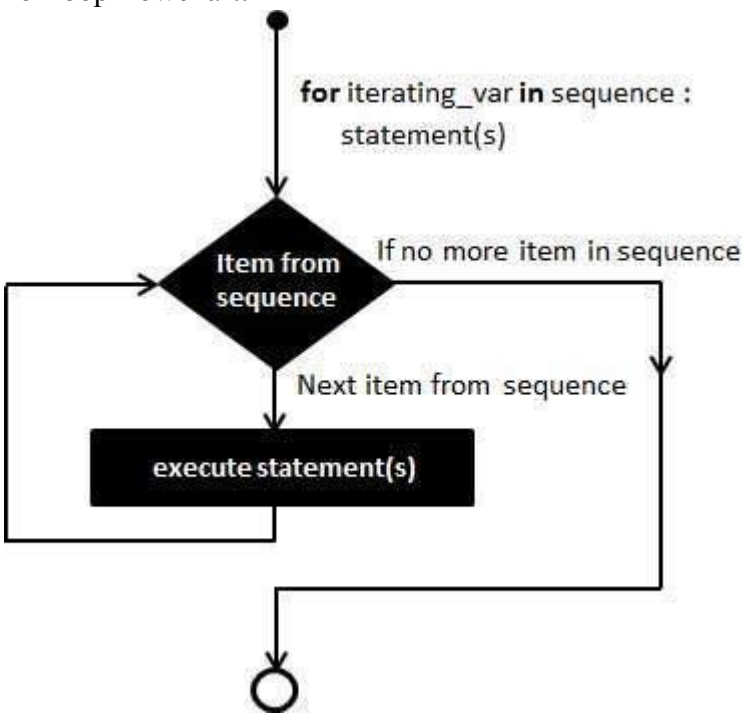

**For Loop:**

The **for** statement in Python differs a bit from what you may be used to in C. Rather than giving the user the ability to define both the iteration step and halting condition (as C), Python's **for** statement iterates over the items of any sequence (a list or a string), in the order that they appear in the sequence.

Syntax:

```
for iterating_var in sequence:
   statements(s)
```

For loop flowchart:

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**Problem Definition:**

1) Write a program to read the numbers until -1 is encountered. Also, count the number of prime and composite numbers entered by the user.

2) Write a program to check whether a number is Armstrong or not.
(An Armstrong number is a number equal to the sum of cubes of its digits; for example, 153 = 1^3 + 5^3 + 3^3.)

**Implementation details:**

**Output(s):**

**Conclusion:**

**Post Lab Questions:**

1) When should we use nested if statements? Illustrate your answer with an example.
2) Explain the utility of break and continue statements with the help of an example.
3) Write a program that accepts a string from the user and calculates the number of digits and letters in the string.