Python if...else Statement

In computer programming, the `if` statement is a conditional statement. It is used to execute a block of code only when a specific condition is met. For example,

Suppose we need to assign different grades to students based on their scores.

1. If a student scores above **90**, assign grade **A**
2. If a student scores above **75**, assign grade **B**
3. If a student scores above **65**, assign grade **C**

These conditional tasks can be achieved using the `if` statement.

Python if Statement

An `if` statement executes a block of code only when the specified condition is met.

Syntax

```
if condition:
    # body of if statement
```

Here, **condition** is a boolean expression, such as `number > 5`, that evaluates to either `True` or `False`.

- If `condition` evaluates to `True`, the body of the `if` statement is executed.
- If `condition` evaluates to `False`, the body of the `if` statement will be skipped from execution.

Let's look at an example.

Working of if Statement

Example: Python if Statement

```
number = int(input('Enter a number: '))

# check if number is greater than 0
if number > 0:
    print(f'{number} is a positive number.')

print('A statement outside the if statement.')
```

Sample Output 1

```
Enter a number: 10
10 is a positive number.
A statement outside the if statement.
```

If user enters **10**, the condition `number > 0` evaluates to `True`. Therefore, the body of `if` is executed.

Sample Output 2

```
Enter a number: -2
A statement outside the if statement.
```

If user enters **-2**, the condition `number > 0` evaluates to `False`. Therefore, the body of `if` is skipped from execution.

Indentation in Python

Python uses indentation to define a block of code, such as the body of an `if` statement. For example,

```
x = 1
total = 0

# start of the if statement
if x != 0:
    total += x
    print(total)
# end of the if statement
```

```
print("This is always executed.")
```

Here, the body of `if` has two statements. We know this because two statements (immediately after `if`) start with indentation.

We usually use four spaces for indentation in Python, although any number of spaces works as long as we are consistent.

You will get an error if you write the above code like this:

```
# Error code
x = 1
total = 0

if x != 0:
total += x
print(total)
```

Here, we haven't used indentation after the `if` statement. In this case, Python thinks our `if` statement is empty, which results in an error.

Python if...else Statement

An `if` statement can have an optional `else` clause. The `else` statement executes if the condition in the `if` statement evaluates to `False`.

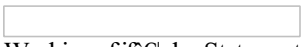
Syntax

```
if condition:
    # body of if statement
else:
    # body of else statement
```

Here, if the `condition` inside the `if` statement evaluates to

- **True** - the body of `if` executes, and the body of `else` is skipped.
- **False** - the body of `else` executes, and the body of `if` is skipped

Let's look at an example.



Working of ifâ€¦else Statement

Example: Python ifâ€¦else Statement

```
number = int(input('Enter a number: '))

if number > 0:
    print('Positive number')
else:
    print('Not a positive number')

print('This statement always executes')
```

Sample Output 1

```
Enter a number: 10
Positive number
This statement always executes
```

If user enters **10**, the condition `number > 0` evalutes to `True`. Therefore, the body of `if` is executed and the body of `else` is skipped.

Sample Output 2

```
Enter a number: 0
Not a positive number
This statement always executes
```

If user enters **0**, the condition `number > 0` evalutes to `False`. Therefore, the body of `if` is skipped and the body of `else` is executed.

Python ifâ€¦elifâ€¦else Statement

The `if...else` statement is used to execute a block of code among two alternatives.

However, if we need to make a choice between more than two alternatives, we use the `if...elif...else` statement.

Syntax

```
if condition1:
    # code block 1

elif condition2:
    # code block 2

else:
    # code block 3
```

Let's look at an example.

Working of ifâ€¦elifâ€¦else Statement

Example: Python ifâ€¦elifâ€¦else Statement

```
number = -5

if number > 0:
    print('Positive number')

elif number < 0:
    print('Negative number')

else:
    print('Zero')

print('This statement is always executed')
```

Output

```
Negative number
This statement is always executed
```

Here, the first condition, `number > 0`, evaluates to `False`. In this scenario, the second condition is checked.

The second condition, `number < 0`, evaluates to `True`. Therefore, the statements inside the `elif` block is executed.

In the above program, it is important to note that regardless the value of `number` variable, only one block of code will be executed.

Python Nested if Statements

It is possible to include an `if` statement inside another `if` statement. For example,

```
number = 5

# outer if statement
if number >= 0:
    # inner if statement
    if number == 0:
      print('Number is 0')

    # inner else statement
    else:
```

```
        print('Number is positive')

# outer else statement
else:
    print('Number is negative')
```

Output

```
Number is positive
```

Here's how this program works.

Working of Nested if Statement

More on Python ifâ€¦else Statement

Compact `if` Statement

In certain situations, the `if` statement can be simplified into a single line. For example,

```
number = 10

if number > 0:
    print('Positive')
```

This code can be compactly written as

```
number = 10

if number > 0: print('Positive')
```

This one-liner approach retains the same functionality but in a more concise format.

Ternary Operator in Python `if...else`

Python doesn't have a ternary operator. However, we can use `if...else` to work like a ternary operator in other languages. For example,

```
grade = 40

if grade >= 50:
    result = 'pass'
else:
    result = 'fail'

print(result)
```

can be written as

```
grade = 40

result = 'pass' if number >= 50 else 'fail'

print(result)
```

Logical Operators to Add Multiple Conditions

If needed, we can use logical operators such as `and` and `or` to create complex conditions to work with an `if` statement.

```
age = 35
salary = 6000

# add two conditions using and operator
if age >= 30 and salary >= 5000:

    print('Eligible for the premium membership.')
else:
    print('Not eligible for the premium membership')
```

Output

```
Eligible for the premium membership.
```

Here, we used the logical operator `and` to add two conditions in the `if` statement.

We also used >= (comparison operator) to compare two values.

Logical and comparison operators are often used with `if...else` statements. Visit Python Operators to learn more.

Also Read

- Python pass Statement
- Python break and continue

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