Comparison Operator

Covered In - Depth

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Quick Recap

Quick Recap

==

Equality

Purpose: Checks if the value on the left side is *equal* to the value on the right side.

Syntax: a == b

Returns: True if a is equal to b, otherwise False.

!=

Inequality

Purpose: Checks if the value on the left side is *not equal* to the value on the right side.

Syntax: a != b

Returns: True if a is not equal to b, otherwise False.

Quick Recap

>

Greater Than

Purpose: Checks if the value on the left side is *greater than* the value on the right side.

Syntax: a > b

Returns: True if a is greater than b, otherwise False.

<

Less Than

Purpose: Checks if the value on the left side is *less than* the value on the right side.

Syntax: a < b

Returns: True if a is less than b, otherwise False.

Quick Recap

>=

Greater Than or Equal To

Purpose: Checks if the value on the left side is *greater than or equal* to the value on the right side.

Syntax: a >= b

Returns: True if a is greater than or equal to b, otherwise False.

<=

Less Than or Equal To

Purpose: Checks if the value on the left side is *less than or equal to* the value on the right side.

Syntax: a <= b

Returns: True if a is less than or equal to b, otherwise False.

02

Chaining Comparison Operators

Chaining Comparison Operators

Purpose: Python allows you to chain multiple comparison operators in a single expression.

Syntax: a <op> b <op> c

Returns: True if the entire chain of comparisons is true, otherwise False.

Python

```python
print(3 < 5 < 7)  # True
print(3 < 5 > 4)  # True
print(3 < 5 > 6)  # False
```

03

Comparing Different Datatype

Comparing Different Data Types

Python allows comparison between different data types in some cases, though the behavior may not always be intuitive.

Be **cautious** when comparing different data types, as Python 3 **does not allow arbitrary comparisons** between incompatible types (e.g., comparing a string with an integer).

Python

```python
print(3 == 3.0)  # True (integer and float comparison)
print(3 < "3")  # TypeError in Python 3 (int and str cannot be compared)
```

Comparison Between Integers and Floats

Python allows comparisons between integers and floats **because these data types are both numeric**.

Python

```
print(10 == 10.0)  # True
print(10 < 10.5)  # True
print(10.5 > 10)  # True
```

Explanation: Python automatically converts the integer to a float during the comparison, so 10 == 10.0 is True.

Comparison Between Integers/Floats and Strings

In Python 3, comparing numeric types (like integers or floats) directly with strings results in a TypeError. This is **because Python does not know how to logically compare numbers and strings.**

Python

```
print(10 < "10")
# TypeError: '<' not supported between instances of 'int' and 'str'
```

Explanation: The comparison fails because Python does not attempt to convert the types; it raises an error instead.

Comparing Strings with Other Strings

String comparisons in Python are based on the lexicographical order (dictionary order) of characters, where **each character is compared based on its ASCII value.**

Python

```
print("apple" < "banana")  # True
print("Apple" < "apple")   # True
print("apple" == "apple")  # True
print("apple" < "apricot")  # True
```

Explanation: Python compares strings character by character. In the ASCII table, capital letters come before lowercase letters, so "Apple" < "apple" is True.

Comparison Between Integers/Floats and Boolean Values

Python treats **True** as **1** and **False** as **0** in comparisons.

Python

```
print(True == 1)  # True
print(False == 0)  # True
print(True > 0)  # True
print(False < 1)  # True
```

Explanation: When comparing a Boolean value with an integer or float, Python internally converts the Boolean to its numeric equivalent (1 or 0).

04

Practical Example

Practical Example - 1

Using Comparison Operators in Conditional Statements

Code:

```
age = 20
if age >= 18:
    print("You are eligible to vote.")
else:
    print("You are not eligible to vote.")
```

Explanation: This code *checks if age is greater than or equal to 18*. If true, it prints a message stating eligibility to vote.

Practical Example - 2

Filtering a List with a Comparison

Code:

```
numbers = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]

even_numbers = [num for num in numbers if num % 2 == 0]

print(even_numbers)
```

Explanation: This list comprehension *filters out even numbers from the numbers list* using the equality operator (==).

Practical Example - 3

Chaining Comparisons

Code:

```
temperature = 25
if 20 <= temperature <= 30:
    print("The temperature is in the comfortable range.")
else:
    print("The temperature is outside the comfortable range.")
```

Explanation: This example checks *if the temperature is within the range of 20 to 30*, inclusive.

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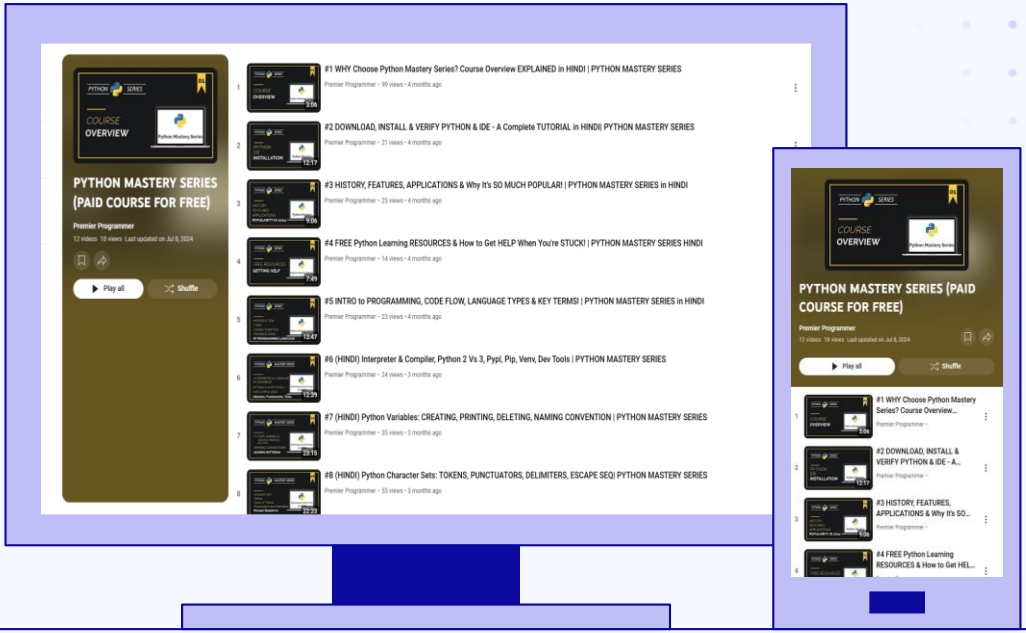

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