

## Session 4: Comparison and Logical Operators

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### Session Objective

By the end of this session, students will be able to use comparison (==, !=, >, <, etc.) and logical (and, or, not) operators in real-world problems. They will understand how to write conditions in Python and evaluate complex expressions.

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### 1. Comparison Operators

Comparison operators are used to compare two values and return a Boolean result (True or False).

Operator Meaning		Example
==	Equal to	<code>a == b</code>
!=	Not equal to	<code>a != b</code>
>	Greater than	<code>a &gt; b</code>
<	Less than	<code>a &lt; b</code>
>=	Greater than or equal to	<code>a &gt;= b</code>
<=	Less than or equal to	<code>a &lt;= b</code>

#### Example:

```
x = 5
```

```
y = 10
```

```
print(x < y) # True
```

```
print(x == y) # False
```

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## 2. Logical Operators

Logical operators are used to combine multiple conditions.

Operator	Meaning	Example
and	True if both conditions are true	$x > 10$ and $x < 20$
or	True if at least one is true	$x > 10$ or $x == 5$
not	Reverses the result	$\text{not}(x > 10)$

### Example:

```
a = 15
print(a > 10 and a < 20) # True
print(a > 20 or a == 15) # True
print(not a < 10)      # True
```

## 3. Using Conditions in Programs

You'll use these operators inside if statements to build decision-based programs.

### Example:

```
age = int(input("Enter your age: "))
```

```
if age >= 18:
    print("Eligible to vote")
```

```
else:
    print("Not eligible")
```

### Combined Condition Example:

```
marks = int(input("Enter marks: "))
```

```
if marks >= 40 and marks <= 100:
```

```
    print("Pass")
```

```
else:
```

```
print("Fail")
```

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#### 4. Real-Life Examples

- **Offer Eligibility**

```
amount = int(input("Enter amount: "))
```

```
coupon = input("Enter coupon code: ")
```

```
if amount >= 500 and coupon == "SAVE10":
```

```
    print("Discount Applied")
```

```
else:
```

```
    print("No Discount")
```

- **Multiple Choices**

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

```
if x < 0 or x > 100:
```

```
    print("Out of range")
```

```
else:
```

```
    print("Within range")
```

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#### 5. Common Mistakes to Avoid

- Don't use = (assignment) instead of == (comparison)
  - Check data types: "5" == 5 is False (string ≠ int)
  - Use parentheses to group complex expressions
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### Classroom Exercises (5)

1. Input two numbers and check if they are equal.
  2. Write a program to check whether a person is eligible for voting ( $\text{age} \geq 18$ ).
  3. Input marks and check if the student has passed ( $\text{marks} \geq 40$ ).
  4. Accept three numbers and check which is the greatest.
  5. Write a program to accept age and print whether the person is a child, adult, or senior (use multiple conditions).
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### Homework Exercises (10)

1. Check if a number is even or odd using % and comparison.
  2. Accept two numbers and print the larger one.
  3. Write a program to check whether a number is positive, negative, or zero.
  4. Check if the entered year is a leap year (divisible by 4 but not 100 unless divisible by 400).
  5. Write a discount eligibility program (if  $\text{price} > 1000$  and  $\text{coupon} = \text{"OFFER20"}$ ).
  6. Take a number and check if it lies between 1 and 100.
  7. Accept two subject marks and check if both are above 50.
  8. Ask the user their city and if it's "Delhi" or "Mumbai", print "Metro City".
  9. Check if a given number is divisible by both 3 and 5.
  10. Check if a password is strong ( $\text{length} \geq 8$  and contains "@").
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