

Logical operators (&&, ||, !)

Sure! Let's break down the **Logical Operators** in JavaScript in detail. These are used to combine or manipulate Boolean (true/false) values — and they are super useful in conditions (`if` , `while` , etc.).

Logical Operators in JavaScript

Operator	Name	Description	Example	Result
<code>&&</code>	Logical AND	Returns <code>true</code> if both operands are true	<code>true && true</code>	<code>true</code>
<code>,</code>		<code>,</code>	Logical OR	Returns <code>true</code> if at least one is true
<code>!</code>	Logical NOT	Inverts the Boolean value	<code>!true</code>	<code>false</code>

✓ 1. Logical AND (`&&`)

- Returns `true` **only if both** conditions are true.

```
true && true    // true
true && false   // false
false && false  // false
```

Example:

```
let age = 20;
if (age > 18 && age < 25) {
  console.log("You are a young adult.");
}
```

- ✓ && also works with non-Boolean values (short-circuiting):

```
console.log('Hello' && 0);    // 0
console.log(10 && 'JavaScript'); // 'JavaScript'
```

- If the first value is **falsy**, it returns that.
- Otherwise, it returns the second value.

✓ 2. Logical OR (||)

- Returns **true** if at least one condition is true.

```
true || false  // true
false || false // false
```

Example:

```
let isAdmin = false;
let isOwner = true;

if (isAdmin || isOwner) {
  console.log("Access granted.");
}
```

- ✓ || short-circuits too:

```
console.log(0 || 'Hello'); // 'Hello'
console.log('' || 'JS');   // 'JS'
```

- Returns the **first truthy** value.
- If none are truthy, returns the last falsy value.

✓ 3. Logical NOT (!)

- Reverses the Boolean value.

```
!true // false
!false // true
```

Example:

```
let isLoggedIn = false;

if (!isLoggedIn) {
  console.log("Please log in.");
}
```

✅ Double NOT (!!) is used to convert values to Boolean:

```
console.log(!!'Hello'); // true
console.log(!!0); // false
```

🧠 Truthy and Falsy Quick Recap

Falsy values in JavaScript:

false, 0, "", null, undefined, NaN

Everything else is **truthy**.

🖋️ Summary

Expression	Result
<code>true && false</code>	<code>false</code>
<code>`true`</code>	
<code>!true</code>	<code>false</code>
<code>!0</code>	<code>true</code>

!!"abc"	true
!!	

Let me know if you want practical use-cases, real-world examples, or quiz questions to test your understanding!