

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>		'	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  **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
true && false	false
'true	
!true	false
!0	true

!""abc"	true
""	

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