1. Introduction

- In the previous lectures, arithmetic, assignment, and comparison operators were discussed.
- This lecture covers:
    - **Logical Operators** (`&&`, `||`, `!`)
    - **Type Operator** (`typeof`)
    - **Ternary Operator** (`? :`)

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2. Logical Operators

a) Logical AND (`&&`)

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

Example:

```
let x = 78;
let y = 89;

console.log(x > 10 && y < 100); // true (both conditions true)
console.log(x > 100 && y < 100); // false (one false → result false)
console.log(x > 100 && y > 100); // false (both false)
```

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- ✅ Result is **true only if both conditions are true**.

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b) Logical OR (`||`)

- **Definition:** Returns `true` if **any one condition is true**.

Example:

```
console.log(x > 10 || y < 100); // true (at least one true)
console.log(x > 100 || y < 100); // true (second condition true)
console.log(x > 100 || y > 100); // false (both false)
```

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- ✅ Result is **false only if both conditions are false**.

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c) Logical NOT (`!`)

- **Definition:** Negates a condition. Converts `true` → `false` and `false` → `true`.

Example:

```
let x = 8;

console.log(x == 8);    // true
console.log(!(x == 8)); // false

console.log(x != 8);    // false
console.log(!(x != 8)); // true
```

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- ✅ NOT operator flips the Boolean result.

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3. Type Operator

`typeof`

- Used to find the data type of a variable.

Example:

```
let x = 78;
console.log(typeof x); // "number"
```

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- ✅ Helps in identifying variable types (`string`, `number`, `boolean`, etc.).

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4. Ternary Operator (`? :`)

Definition:

- Shorthand way of writing conditional statements (`if...else`).

Syntax:

```
condition ? expressionIfTrue : expressionIfFalse
```

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Example:

```
let age = 20;
```

```
let result = (age > 18) ? "Person is adult" : "Not an adult";
console.log(result); // "Person is adult"
```

- ✅ Executes the first expression if condition is true, otherwise executes the second.

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5. Key Takeaways

- **Logical AND (`&&`)** → True only if both conditions are true.
- **Logical OR (`||`)** → True if at least one condition is true.
- **Logical NOT (`!`)** → Negates Boolean results.
- **Typeof Operator** → Tells the type of a variable.
- **Ternary Operator (`? :`)** → Concise form of `if...else`.