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# Lecture 2: Variables, Data Types & Operators in JavaScript

#### What Are Variables?

A **variable** is like a labeled box that stores information (data) you want to use later. In JavaScript, you can declare a variable using:

- var (old, avoid using now)
- let (modern, block-scoped)
- const (constant, block-scoped)

#### • Example:

javascript

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let name = "Alice";

const age = 25;

## Quick Summary:

Keyword	Can Reassign?	Scope	Use When
var	<b>~</b>	Function	Legacy code only
let	<u>~</u>	Block	Default choice
const	×	Block	For values that don't change

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#### JavaScript Data Types

JavaScript is **dynamically typed**, meaning variables don't have fixed types. A variable can store any type of data.

#### Primitive Data Types:

- 1. String "Hello"
- 2. Number 42, 3.14
- 3. Boolean true, false
- 4. Undefined declared but not assigned
- 5. **Null** explicitly "nothing"
- 6. **BigInt** large integers
- 7. **Symbol** unique identifiers

#### Non-Primitive (Reference) Data Types:

- **Object** { name: "Alice", age: 25 }
- Array [1, 2, 3]
- **Function** function greet() { ... }

#### Examples:

javascript

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let str = "Hello"; // String

let num = 10; // Number

let isValid = true; // Boolean

let value; // Undefined

let nothing = null; // Null

let user = { name: "Avi" }; // Object

let list = [1, 2, 3]; // Array



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# **Type Checking**

Use typeof to check a variable's type:

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typeof "hello"; // "string"

typeof 42; // "number"

typeof true; // "boolean"

typeof undefined; // "undefined"

typeof null; // "object" (quirk in JS)

typeof [1, 2, 3]; // "object"

# JavaScript Operators

Operators are used to perform actions like calculations, comparisons, and logical operations.

## + Arithmetic Operators:

Operator	Meaning	Example
+	Addition	2 + 3 → 5
-	Subtraction	5 - 2 <del>→</del> 3
*	Multiplication	4 * 3 → 12
/	Division	10 / 2 → 5
%	Modulus (remainder)	7 % 2 → 1
**	Exponentiation	2 ** 3 → 8

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# Assignment Operators:

Operator	Meaning	Example
=	Assign value	x = 5
+=	Add and assign	$x += 2 \rightarrow x = x + 2$
-=	Subtract and assign	x -= 2
*=	Multiply and assign	x *= 3
/=	Divide and assign	x /= 2

# **Q** Comparison Operators:

Used to compare values (returns true or false):

Operator	Description	Example
==	Equal (loose)	"5" == 5 → true
===	Strict equal (type + value)	"5" === 5 → false
!=	Not equal	3!=4 → true
!==	Strict not equal	"5" !== 5 → true
>	Greater than	10 > 5
<	Less than	2 < 4
>=, <=	Greater or equal / Less or equal	x >= y

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#### **S** Logical Operators:

Operator	Meaning	Example
&&	AND	true && false → false
I	OR	I
!	NOT	!true → false

(E)	<b>JavaScript</b>	Quirks

✓ == vs ===

javascript

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"5" == 5 // true  $\rightarrow$  only checks value

"5" === 5 // false  $\rightarrow$  checks value & type

#### ✓ Null vs Undefined

javascript

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let x; // undefined (no value assigned)

let y = null; // explicitly no value

# Mini Project: Variable Playground

Try writing this in your browser console or online editor like JSFiddle or CodePen:

javascript

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let name = "John";

let age = 30;



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#### Practice Exercises

Try solving:

- 1. Declare 3 variables: firstName, lastName, and fullName
- 2. Store your age and check if you are above 18 using comparison operators
- 3. Create a variable and increment it using += operator