Strings

Strings

Strings are useful for holding data that can be represented in text form.

String is a sequence of characters enclosed in

- Single quotes (`''`)
- Double quotes (`""`)
- Backticks (`` ` ` ``)

```
let str1 = 'Hello';     // Single quotes
let str2 = "World";     // Double quotes
let str3 = `JavaScript`; // Template literal (ES6) - Backticks
```

Strings Creation

1. String Literals

```
let message = "Hello, JavaScript!";

console.log(message.indexOf("JavaScript")); // 7
console.log(message.indexOf("Hello")); // 0
console.log(message.indexOf("!"));  // 17
console.log(typeof message);     // string
```

2. The `String` Constructor

```
let strObj = new String("Hello"); // Creates a String object
```

```
console.log(typeof strObj); // object
```

String Methods

1. Length → Properties

```
let text = "Hello World";
console.log(text.length); // 11
```

2. Accessing Characters in a string

```
let text = "Hello World";

console.log(text[0]);     // 'H'
console.log(text.charAt(1)); // 'e'
```

3. Changing Case in a string

```
let text = "Hello World";

console.log(text.toUpperCase()); // "HELLO WORLD"
console.log(text.toLowerCase()); // "hello world"
```

4. Finding Substrings in a string

```
let text = "Hello World";

console.log(text.indexOf("World"));  // 6 (first occurrence)
console.log(text.lastIndexOf("o"));  // 7 (last occurrence)
console.log(text.includes("Hello")); // true
console.log(text.startsWith("Hell"));// true
console.log(text.endsWith("World")); // true
```

5. Extracting Substrings in a string

```
let text = "Hello World";

console.log(text.slice(0, 5));   // "Hello" (start, end)
console.log(text.substring(6, 11)); // "World" (start, end)
console.log(text.substr(6, 5));  // "World" (start, length)
```

6. Replacing

```
let str = "  JavaScript is great!";

console.log(str); // "  JavaScript is great!"
console.log(str.replace("great", "awesome")); // "JavaScript is awesome!"
```

7. Trimming

```
let str = "  JavaScript is great!  ";

console.log(str.trim());  // "JavaScript is great!" (removes spaces)
console.log(str.trimStart()); // "JavaScript is great!  "
console.log(str.trimEnd());   // "  JavaScript is great!"
```

8. Splitting → The `split()` method divides a string into an array based on a **separator**.

```
// string.split(separator, limit)

let text = "Hello World! JavaScript is awesome.";
let words = text.split(" ");

console.log(text); // "Hello World! JavaScript is awesome."
console.log(words); // ["Hello", "World!", "JavaScript", "is", "awesome."]

// Splitting with a Limit
let text = "red-blue-green-yellow";
```

```
let colors = text.split("-", 2);
console.log(colors); // Output: [ 'red', 'blue' ]

// Splitting a String by Comma
let data = "apple,banana,grape,orange";
let fruits = data.split(",");
console.log(fruits); // Output: [ 'apple', 'banana', 'grape', 'orange' ]


// Splitting Each Character
let word = "JavaScript";
let letters = word.split("");
console.log(letters); // Output: [ 'J', 'a', 'v', 'a', 'S', 'c', 'r', 'i', 'p', 't' ]
```

9. Joining [String Concatenation]

```
let words = "apple,banana,orange";
let joinedStr = words
  .split(",") // Convert string to an array - ["apple", "banana", "orange"]
  .join(" - ")


console.log(joinedStr); // "apple - banana - orange"
```

10. Repeating Strings

```
console.log("Ha".repeat(3)); // "HaHaHa"
```

11. Concatenation

```
// Using + (Concatenation Operator)
let firstName = "Sandeep";
let lastName = "Patel";

let fullName = firstName + " " + lastName; // Concatination
```

```
console.log(fullName); // Sandeep Patel

// Using concat() Method
console.log(firstName.concat(" ", lastName)); //Sandeep Patel

// Template Literals
let myName = "Sandy";
let age = 20;

let greeting = `My name is ${myName} and I am ${age} years old.`;
console.log(greeting); // My name is Sandy and I am 20 years old.
```

Immutable Nature of Strings

Strings in JavaScript are **immutable**, meaning they **cannot be changed** once created.

```
let text = "Hello";
text[0] = "M"; // ❌ Won't change
console.log(text); // "Hello"

// If you want to modify a string, you need to create a new string.

text = text + " World";  // This creates a new string
console.log(text);  // Output: "Hello World"

text = "M" + text.slice(1);
console.log(text); // "Mello"
```