Basic JavaScript Concepts

1. Data Types

- Primitive: String, Number, Boolean, Undefined, Null, BigInt, Symbol
- Non-Primitive: Object (includes Array, Function, etc.)

2. Variable Declarations

- var, let, const
  - var: Function-scoped, can be re-declared.
  - let: Block-scoped, cannot be re-declared.
  - const: Block-scoped, immutable bindings.

3. Hoisting

- Variables and functions are hoisted to the top of their scope during execution.

4. Functions

- Regular functions: function name() { }
- Arrow functions: const func = () => { }

5. Control Flow

- if-else, switch, for, while, do-while

6. Closures

- A closure is the combination of a function and its lexical environment.

7. Promises & Async/Await

- Handling asynchronous code.

8. ES6+ Features

- Destructuring, Template Literals, Default Parameters, Spread/Rest Operators, Modules (import/export).

Array Practice Examples

1. Find the Largest Number in an Array

```
const largestNumber = (arr) => Math.max(...arr);
console.log(largestNumber([1, 2, 3, 4, 5])); // Output: 5
```

2. Reverse an Array

```
const reverseArray = (arr) => arr.reverse();
console.log(reverseArray([1, 2, 3])); // Output: [3, 2, 1]
```

3. Check if an Array Contains a Specific Value

```
const containsValue = (arr, value) => arr.includes(value);
console.log(containsValue([1, 2, 3], 2)); // Output: true
```

4. Remove Duplicates from an Array

```
const removeDuplicates = (arr) => [...new Set(arr)];
console.log(removeDuplicates([1, 2, 2, 3, 4, 4])); // Output: [1, 2, 3, 4]
```

5. Find the Sum of All Elements in an Array

```
const sumArray = (arr) => arr.reduce((sum, num) => sum + num, 0);
console.log(sumArray([1, 2, 3, 4])); // Output: 10
```

6. Flatten a Nested Array

```
const flattenArray = (arr) => arr.flat(Infinity);
console.log(flattenArray([1, [2, [3, 4]]])); // Output: [1, 2, 3, 4]
```

7. Find Intersection of Two Arrays

```
const arrayIntersection = (arr1, arr2) => arr1.filter((value) => arr2.includes(value));
console.log(arrayIntersection([1, 2, 3], [2, 3, 4])); // Output: [2, 3]
```

String Practice Examples

1. Reverse a String

```
const reverseString = (str) => str.split('').reverse().join('');
console.log(reverseString("hello")); // Output: "olleh"
```

2. Check if a String is a Palindrome

```
const isPalindrome = (str) => {
    const reversed = str.split('').reverse().join('');
    return str === reversed;
};
console.log(isPalindrome("radar")); // Output: true
```

3. Count the Number of Vowels in a String

```
const countVowels = (str) => (str.match(/[aeiou]/gi) || []).length;
console.log(countVowels("hello world")); // Output: 3
```

4. Find the First Non-Repeating Character

```
const firstNonRepeatingChar = (str) => {
    for (let char of str) {
        if (str.indexOf(char) === str.lastIndexOf(char)) return char;
```

```
    }
    return null;
};
console.log(firstNonRepeatingChar("swiss")); // Output: "w"
```

5. Check if Two Strings are Anagrams

```
const areAnagrams = (str1, str2) => {
    const format = (str) => str.split('').sort().join('');
    return format(str1) === format(str2);
};
console.log(areAnagrams("listen", "silent")); // Output: true
```

6. Find the Longest Word in a String

```
const longestWord = (sentence) => {
    const words = sentence.split(' ');
    return words.reduce((longest, word) => word.length > longest.length ? word : longest, "");
};
console.log(longestWord("I love JavaScript programming")); // Output: "JavaScript"
```

7. Replace All Spaces in a String with a Specific Character

```
const replaceSpaces = (str, char) => str.split(' ').join(char);
console.log(replaceSpaces("hello world", "-")); // Output: "hello-world"
```

8. Find the Frequency of Characters in a String

```
const charFrequency = (str) => {
    const freq = {};
    for (let char of str) {
```

```
        freq[char] = (freq[char] || 0) + 1;
    }
    return freq;
};
console.log(charFrequency("hello")); // Output: { h: 1, e: 1, l: 2, o: 1 }
```

Interview-Oriented Mixed Examples

1. Fibonacci Sequence

```
const fibonacci = (n) => {
    const seq = [0, 1];
    for (let i = 2; i < n; i++) seq.push(seq[i - 1] + seq[i - 2]);
    return seq;
};
console.log(fibonacci(5)); // Output: [0, 1, 1, 2, 3]
```

2. Factorial of a Number

```
const factorial = (n) => (n <= 1 ? 1 : n * factorial(n - 1));
console.log(factorial(5)); // Output: 120
```

3. Check if a Number is Prime

```
const isPrime = (n) => {
    if (n < 2) return false;
    for (let i = 2; i <= Math.sqrt(n); i++) {
        if (n % i === 0) return false;
    }
    return true;
};
```

```
console.log(isPrime(7)); // Output: true
```

4. Generate a Random String

```
const randomString = (length) => {
    const chars = 'ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz0123456789';
    return Array.from({ length }, () => chars.charAt(Math.floor(Math.random() * chars.length))).join('');
};
console.log(randomString(8)); // Example Output: "A1b2C3d4"
```

5. Sort an Array of Strings Alphabetically

```
const sortStrings = (arr) => arr.sort((a, b) => a.localeCompare(b));
console.log(sortStrings(["banana", "apple", "cherry"])); // Output: ["apple", "banana", "cherry"]
```