Cheatsheet: Arrays and Objects in JavaScript

JavaScript Array and Objects	Description	Code Example
Array declaration	Arrays in JavaScript are ordered, meaning that the elements are stored in a specific sequence.	`const fruits = ["apple", "banana", "cherry"];`
Array Indexing	Arrays are zero-indexed, meaning the first element is at index 0, the second at index 1, and so on.	`const fruits = ["apple", "banana", "cherry"];` `const firstFruit = fruits[0]; // "apple"` `const secondFruit = fruits[1]; // "banana"`
Array Length	The length property is used to determine the number of items present in an array.	`const fruits = ["apple", "banana", "cherry"];` `const numFruits = fruits.length; // 3` `console.log(numFruits);`
Array Mutability	Arrays in JavaScript are mutable, meaning you can change, add, or remove elements after the array is created.	`const fruits = ["apple", "banana", "cherry"];` `fruits[2] = "strawberry"; // Modifying an element` `fruits[3] = "Kiwi"; // Adding an element`
push method	Adds one or more elements to the end of an array.	`const fruits = ["apple", "banana"];` `fruits.push("orange", "strawberry");` `console.log(fruits)`
pop method	Removes the last element from an array and returns it.	`const fruits = ["apple", "banana", "orange"];` `const removedFruit = fruits.pop();` `console.log('Fruits are',fruits)` `console.log('Removed fruits are',removedFruit)`

shift methods	Removes the first element from an array and returns it.	`Removes the first element from an array and returns it.`
unshift method	Adds one or more elements to the beginning of an array and returns it.	`const fruits = ["banana", "orange"];` `fruits.unshift("apple", "strawberry");` `console.log(fruits);`
splice method	Changes the contents of an array by removing, replacing, or adding elements at a specified position.	`const fruits = ["apple", "banana", "cherry"];` `fruits.splice(1, 1, "grape"); // Replace the second element with "grape"` `console.log(fruits)`
concat method	The concat method in JavaScript arrays combines arrays in sequence, creating a new array containing the elements of the original arrays in the order they were concatenated.	`const fruits = ["apple", "banana"];` `const additionalFruits = ["orange", "strawberry"];` `const combinedFruits = fruits.concat(additionalFruits);` `console.log('combinedFruits are', combinedFruits)`
slice method	Returns a shallow copy of a portion of an array into a new array.	`const fruits = ["apple", "banana", "cherry", "orange"];` `const slicedFruits = fruits.slice(1, 3); // Creates a new array with elements from index 1 to 2 (not in` `console.log('slicedFruits are',slicedFruits)`
indexOf method	This method is used to find the index of a specified element within an array. It returns the index of the first occurrence of the element in the array, or -1 if the element is not found.	`const fruits = ["apple", "banana", "cherry", "banana"];` `const index = fruits.indexOf("banana"); // Returns 1 (the first occurrence of "banana")` `console.log('Index of banana is', index)`
reverse method	The reverse method reverses the order of elements in an array, effectively reversing the array in place.	`const fruits = ["apple", "banana", "cherry"];` `fruits.reverse(); // Reverses the order of the array` `console.log(fruits)`

sort method	The sort method is used to sort the elements of an array in place and returns the sorted array. By default, it sorts elements as strings and in lexicographic order.	`const numbers = [4, 2, 8, 6, 1,10];` `numbers.sort(); // Sorts as strings: [1,10, 2, 4, 6, 8]` `numbers.sort((a, b) => a - b); // Sorts as numbers: [1, 2, 4, 6, 8]` `console.log(numbers)`
Array iteration	A for loop can be used to iterate through the elements of an array to access and manipulate each item in the array.	`const fruits = ['apple', 'banana', 'cherry', 'date'];` `for (let i = 0; i < fruits.length; i++) {` `  console.log(fruits[i]);` `}`
forEach	The forEach method iterates through an array and applies a provided function to each element.	`function sendWelcomeEmail(email) {` `  console.log(`Welcome email sent to ${email}`);` `}` `const users = [` `  { name: 'Alice', email: 'alice@example.com' },` `  { name: 'Bob', email: 'bob@example.com' },` `  { name: 'Charlie', email: 'charlie@example.com' },` `];` `users.forEach((user) => {` `  sendWelcomeEmail(user.email);` `});`
map method	The map method creates a new array by applying a provided function to each element in the original array.	`const products = [` `  { name: 'Laptop', price: 1000 },` `  { name: 'Smartphone', price: 500 },` `  { name: 'Tablet', price: 300 },` `];` `products.map((product) => {` `  console.log(`The price of ${product.name} is $${product.price}`);` `});`
filter method	The filter method creates a new array containing elements that pass a specified condition. It's useful for extracting specific data from an array.	`const products = [` `  { name: 'Laptop', price: 1000 },` `  { name: 'Smartphone', price: 500 },` `  { name: 'Tablet', price: 300 },` `  { name: 'Monitor', price: 250 },` `  { name: 'Keyboard', price: 50 },` `];` `function filterProductsByPriceRange(products, minPrice, maxPrice) {` `  return products.filter((product) => product.price >= minPrice && product.price <= maxPrice);` `}` `const minPrice = 100;  // Minimum price threshold` `const maxPrice = 500;  // Maximum price threshold` `const filteredProducts = filterProductsByPriceRange(products, minPrice, maxPrice);` `filteredProducts.forEach((product) => {` `  console.log(`${product.name} is of $${product.price}`);`

		});
reduce method	The reduce method allows you to reduce an array to a single value by applying a function to each element. It's excellent for aggregating data.	const orderPrices = [50, 30, 25, 40, 15]; const totalOrderValue = orderPrices.reduce((total, price) => total + price, 0); console.log('The total value of order is ', totalOrderValue)
find method	The find method returns the first element in an array that satisfies a specified condition. It's useful for searching for specific data.	const employees = [{ id: 1, name: 'Alice', Eid: 'EMP001', 'Contact details': 'alice@example.com', Role: 'Manager', Des { id: 2, name: 'Bob', Eid: 'EMP002', 'Contact details': 'bob@example.com', Role: 'Engineer', Design { id: 3, name: 'Charlie', Eid: 'EMP003', 'Contact details': 'charlie@example.com', Role: 'Analyst',]; const employee = employees.find((e) => e.id === 2); console.log(`Details of the employee\nname: ${employee.name}\nEid: ${employee.Eid}\nContact details: ${
2D Array	A 2D array can be created by initializing an array of arrays.	const grid = [[1, 2, 3], [4, 5, 6], [7, 8, 9]];
Access 2D Array	To access a specific element in a 2D array, you need to provide both row and column indices.	for (let i = 0; i < grid.length; i++) { for (let j = 0; j < grid[i].length; j++) { console.log(`Element at (${i}, ${j}): ${grid[i][j]}`); } }
2D array to book seat	You can create a booking system using 2D array.	<!DOCTYPE html> <html> <head> <style> /* CSS for styling the seats */ .seating-chart { display: grid; grid-template-columns: repeat(3, 70px); gap: 10px; justify-content: center; } .seat { width: 70px; height: 40px; text-align: center; line-height: 40px; border: 1px solid #ccc;

```
            cursor: pointer;
        }
        .booked {
            background-color: #FF0000; /* Red */
            cursor: not-allowed;
            color: white; /* Set the text color to white for booked seats */
        }
        .available {
            background-color: #7FFF00; /* Light Green */
        }
        .select-button {
            width: 100%;
            padding: 10px;
            margin: 10px;
            background-color: #007BFF; /* Blue */
            color: white;
            border: none;
            cursor: pointer;
        }
    </style>
</head>
<body>
    <h2>Movie Theater Seating</h2>
    <div id="seating-chart" class="seating-chart">
        <div class="seat available" onclick="bookSeat(0, 0)">A1</div>
        <div class="seat available" onclick="bookSeat(0, 1)">A2</div>
        <div class="seat available" onclick="bookSeat(0, 2)">A3</div>
        <div class="seat available" onclick="bookSeat(1, 0)">B1</div>
        <div class="seat available" onclick="bookSeat(1, 1)">B2</div>
        <div class="seat available" onclick="bookSeat(1, 2)">B3</div>
        <div class="seat available" onclick="bookSeat(2, 0)">C1</div>
        <div class="seat available" onclick="bookSeat(2, 1)">C2</div>
        <div class="seat available" onclick="bookSeat(2, 2)">C3</div>
    </div>
    <button class="select-button" onclick="bookRandomSeat()">Select Random Seat</button>
    <script>
        // JavaScript for booking seats
        const theaterSeats = [
            ['X', 'O', 'X'],
            ['O', 'X', 'O'],
            ['X', 'O', 'X']
        ];
        function bookSeat(row, col) {
            if (theaterSeats[row][col] === 'O') {
                theaterSeats[row][col] = 'X';
                updateSeatStatus(row, col, 'booked');
                alert(`Seat ${String.fromCharCode(65 + row)}${col + 1} is booked.`);
            } else {
                alert(`Seat ${String.fromCharCode(65 + row)}${col + 1} is already taken.`);
            }
        }
        function updateSeatStatus(row, col, status) {
            const seats = document.getElementsByClassName('seat');
            const index = row * 3 + col;
            seats[index].classList.remove('available', 'booked');
            seats[index].classList.add(status);
        }
        function bookRandomSeat() {
            const availableSeats = [];
            for (let row = 0; row < theaterSeats.length; row++) {
                for (let col = 0; col < theaterSeats[row].length; col++) {
                    if (theaterSeats[row][col] === 'O') {
                        availableSeats.push({ row, col });
                    }
                }
            }
            if (availableSeats.length > 0) {
                const randomIndex = Math.floor(Math.random() * availableSeats.length);
                const { row, col } = availableSeats[randomIndex];
                bookSeat(row, col);
            } else {
                alert('All seats are already booked.');
            }
        }
    </script>
</body>
</html>
```

Classes	Classes are a way to create blueprint or templates for objects. They define the structure and behavior of objects of that class.	`class Person { constructor(firstName, lastName) { this.firstName = firstName; this.lastName = lastName; } getFullName() { return ${this.firstName} ${this.lastName}; } }`

		`` // Creating an instance of the Person class const person1 = new Person("John", "Doe"); console.log(person1.getFullName()); // Output: "John Doe" ```
Constructor Objects	Objects are instances of classes or can be created as standalone objects without a class. They can have properties and methods.	``` class Car { constructor(make, model, year) { this.make = make; this.model = model; this.year = year; } startEngine() { console.log(`The ${this.make} ${this.model}'s engine is running.`); } } const myCar = new Car("Toyota", "Camry", 2022); myCar.startEngine(); // Output: "The Toyota Camry's engine is running." ```
Object Literals	Object literals are a way to create ad-hoc objects without defining a class.	``` const person = { firstName: "Alice", lastName: "Johnson", getFullName: function() { return `${this.firstName} ${this.lastName}`; } }; console.log(person.getFullName()); // Output: "Alice Johnson" ```
Function Constructor	A function constructor is a regular JavaScript function that is used to create and initialize objects. It's a convention to name function constructors with an initial capital letter.	``` function Car(make, model) { this.make = make; this.model = model; } const car1 = new Car("Toyota", "Camry"); const car2 = new Car("Honda", "Civic"); console.log('Car1 details are', car1); console.log('Car2 details are', car2); ```

. (Dot) Notation	Dot notation is a way to access object properties.	`const person = {` `  firstName: "John",` `  lastName: "Doe",` `  age: 30` `};` `console.log(person.firstName); // Output: "John"` `console.log(person.lastName);  // Output: "Doe"` `console.log(person.age);  // Output: 30`
Bracket Notation	Bracket notation is a way to access object properties, especially useful when property names contain special characters or spaces.	`const person = {` `  "first name": "John",` `  "last name": "Doe",` `  age: 30` `};` `console.log(person["first name"]); // Output: "John"` `console.log(person["last name"]);  // Output: "Doe"` `console.log(person["age"]);  // Output: 30`
Arrays of Objects	An array of objects in JavaScript is a collection of multiple objects stored within a single array container.	`const students = [` `  { name: "Alice", age: 25 },` `  { name: "Bob", age: 22 },` `  { name: "Charlie", age: 28 }` `];`
Access Array of Objects	You can access elements within an array of objects using the array index and using dot notation.	`const students = [` `  { name: "Alice", age: 25 },` `  { name: "Bob", age: 22 },` `  { name: "Charlie", age: 28 }` `];` `console.log(students[0].name); // Output: "Alice"` `console.log(students[2].age);  // Output: 28`
Iterating Through an Array of Objects	Iteration of objects through arrays include for loops and array methods.	`const students = [` `  { name: "Alice", age: 25 },` `  { name: "Bob", age: 22 },` `  { name: "Charlie", age: 28 }` `];` `for (let i = 0; i < students.length; i++) {` `  console.log(students[i].name);` `}`

Adding Objects	You can add new objects to the array using the push method.	`//Adding Elements` `const students = [` `  { name: "Alice", age: 25 },` `  { name: "Bob", age: 22 },` `  { name: "Charlie", age: 28 }` `];` `students.push({ name: "David", age: 20 });  // Add a new student` `console.log('After using push method ');` `console.log(students);`
Removing Objects	You can remove objects using the pop method.	`//Removing Elements` `const students = [` `  { name: "Alice", age: 25 },` `  { name: "Bob", age: 22 },` `  { name: "Charlie", age: 28 }` `];` `const removedStudent = students.pop();      // Remove the last student` `console.log('After using pop method ');` `console.log(students);`
Filtering and Mapping Arrays of Objects	You can filter and transform arrays of objects using array methods like filter and map.	`const students = [` `  { name: "Alice", age: 25 },` `  { name: "Bob", age: 22 },` `  { name: "Charlie", age: 28 }` `];` `const adults = students.filter(student => student.age >= 23);  // Filter students who are 18 or oldercc` `const studentNames = students.map(student => student.name);   // Create an array of student names` `console.log(‘Using Filter Method’);` `console.log(adults);` `console.log(‘Using Map Method’` `console.log(studentNames);`
Mapping Arrays of Objects	You can traverse and transform arrays of objects using array method like map.	`const employees = [` `  { name: "Alice", age: 35 },` `  { name: "Bob", age: 32 },` `  { name: "Charlie", age: 38 }` `];` `const employee = employees.map((employee) => {` `return employee});` `console.log(employee);`
Searching for Objects	You can search for objects within an array of objects using array methods like find.	`const employees = [` `  { name: "Alice", age: 35 },` `  { name: "Bob", age: 32 },` `  { name: "Charlie", age: 38 }` `];` `const employee = employees.find(employee => employee.name === "Charlie");` `console.log(employee.age);`

Nested Array of objects	An array of objects is used to store and organize data in a way that allows you to access and manipulate the information easily.	`let arrayOfObjects = [{ name: 'John', age: 25, hobbies: ['Reading', 'Traveling'], address: { street: '123 Main St', city: 'New York', zip: '10001' } }, { name: 'Alice', age: 30, skills: ['JavaScript', 'React', 'Node.js'], projects: [{ title: 'Project A', completed: true }, { title: 'Project B', completed: false }] }, { title: 'Special Object', data: [1, 2, 3], metadata: { key: 'value' } }, { // An object with no specific properties }, { anotherObject: true, nestedArrays: [[1, 2, 3], ['a', 'b', 'c']], additionalProperty: 'Extra' }];`
Access Nested Array-Code Above	Using . dot operator elements of nested array can be accesed, which has been described in just above code.	`// Accessing properties of the first object console.log(arrayOfObjects[0].name); // Output: John console.log(arrayOfObjects[0].hobbies[0]); // Output: Reading // Accessing properties of the second object console.log(arrayOfObjects[1].skills[2]); // Output: Node.js console.log(arrayOfObjects[1].projects[0].title); // Output: Project A // Accessing properties of the third object console.log(arrayOfObjects[2].metadata.key); // Output: value // Accessing properties of the fourth object console.log(arrayOfObjects[3]); // Output: {} // Accessing properties of the fifth object console.log(arrayOfObjects[4].anotherObject); // Output: true console.log(arrayOfObjects[4].additionalProperty); // Output: Extra`
Strings	Strings are data type in JavaScript used to represent text. They can contain letters, numbers, symbols, and whitespace characters.	`const message = "This is a message.";`
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	can contain letters, numbers, symbols, and whitespace characters.	
template literals	Template literals in JavaScript are strings allowing embedded expressions, denoted by backticks (), enabling easy multiline strings and interpolation of variables using ${}`.	`const fullName = `${firstName} ${lastName}`;`
String Concatenation	The concatenation operator + in JavaScript is used to combine (join) two or more strings together to create a single, longer string.	`const firstName='Peter';` `const greeting = 'Hello, ' + firstName + '!';` `console.log(greeting);`
String Length	To determine the length of a string, length property can be used.	`const message1 = "This is a message.";` `const Stringlength1 = message1.length;` `const message2 = "Thisisamessage";` `const Stringlength2 = message2.length;` `console.log(Stringlength1);` `console.log(Stringlength2)`
Accessing Characters	Individual characters within a string can be accessed using bracket notation and a zero-based index.	`const text = "JavaScript";` `const firstCharacter = text[0];`
toLowerCase and toUpperCase	JavaScript provides methods to change the case of a string into lowercase and uppercase.	`const text = "Hello, World!";` `const lowercaseText = text.toLowerCase(); // "hello, world!"` `const uppercaseText = text.toUpperCase(); // "HELLO, WORLD!"` `console.log('The lowercase  for text is ',lowercaseText);` `console.log('The uppercase  for text is ',uppercaseText);`
indexOf() method	indexOf returns the index of the first occurrence of a specified substring within a string. It returns -1 if the substring is not found.	`const sentence = "The quick brown fox jumps over the lazy dog.";` `const indexOfFox = sentence.indexOf("fox"); // 16` `console.log(indexOfFox);`

includes() method	includes returns a boolean indicating whether a specified substring is found within a string, returning true if found and false if not.	`const sentence = "The quick brown fox jumps over the lazy dog.";` `const hasFox = sentence.includes("fox"); // true` `console.log(hasFox);`
substring() methods	substring extracts characters from a string between two specified indices. It means extracting a substring from the text starting at index 0 and ending at index 5 (excluding index 5).	`const text = "Hello, World!";` `const subText1 = text.substring(0, 5); // "Hello"` `console.log(subText1);`
slice() method	slice extracts a section of a string and returns it as a new string, specifying the start and end positions. It means extracting a substring from the text starting at index 7 until the end of the string.	`const text = "Hello, World!";` `const subText2 = text.slice(7);  // "World!"` `console.log(subText2);`
substr() method	substr extracts a specified number of characters from a string, starting at a specified index.It means extracting a substring from the text starting at the 7th index and including 5 characters.	`const text = "Hello, World!";` `const subText3 = text.substr(7, 5);  // "World"` `console.log(subText3);`
Replacing Substrings	The replace method allows you to replace substrings with new values.	`const text = "Hello, World!";` `const updatedText = text.replace("World", "Universe");` `console.log(updatedText);`
Splitting Strings	You can split a string into an array of substrings using the split method.	`const csvData = "Alice,25,New York;Bob,30,Los Angeles;Charlie,28,Chicago";` `const peopleArray = csvData.split(';');` `console.log(peopleArray);`

trim()method	The trim method removes leading and trailing whitespace from a string.	`const text = "   Trim me!   ";` `console.log(text.length);` `const trimmedText = text.trim();` `console.log(trimmedText.length);`
round(), ceil() and floor() Math Methods	round() rounds a number to the nearest integer. ceil() rounds a number up to the nearest integer. floor() rounds a number down to the nearest integer.	`const number = 3.6;` `const rounded = Math.round(number); // Round to nearest integer: 4` `const ceil = Math.ceil(number);   // Round up: 4` `const floor = Math.floor(number);   // Round down: 3`
pow(), sqrt() and log() Math Methods	pow() raises a number to a specified exponent. sqrt() returns the square root of a number. log() returns the natural logarithm (base e) of a number.	`const base = 2;` `const exponent = 3;` `const power = Math.pow(base, exponent); // Power: 8` `const squareRoot = Math.sqrt(base);     // Square Root: 1.41421356237` `const naturalLog = Math.log(base);      // Natural Logarithm: 0.69314718056`
random() Method	The random() method in JavaScript generates a pseudo-random floating-point number between 0 (inclusive) and n (exclusive).	`<!DOCTYPE html>` `<html>` `<head>` `  <title>Random Quote Generator</title>` `</head>` `<body>` `  <h1>Random Quote Generator</h1>` `  <p id="quoteDisplay"></p>` `  <button onclick="generateRandomQuote()">Get Quote</button>` `  <script>` `  const quotes = [` `  "Life is what happens when you're busy making other plans. - John Lennon",` `  "The only way to do great work is to love what you do. - Steve Jobs",` `  "In three words, I can sum up everything I've learned about life: it goes on. - Robert Frost",` `  "Don't count the days, make the days count. - Muhammad Ali",` `  "The only thing we have to fear is fear itself. - Franklin D. Roosevelt",` `  "To be yourself in a world that is constantly trying to make you something else is the greatest a` `  ];` `  function generateRandomQuote() {` `  const randomIndex = Math.floor(Math.random() * quotes.length); // Generate a random index` `  const randomQuote = quotes[randomIndex]; // Get a random quote` `  document.getElementById("quoteDisplay").textContent = randomQuote;` `  }` `  </script>` `</body>` `</html>`
Date Object	Date objects are used to represent specific moments in time.	`const currentDate = new Date(); // Current date and time` `const specificDate = new Date(2023, 0, 15); // January 15, 2023` `const fromMilliseconds = new Date(1672569600000); // From milliseconds since the epoch`

Retrieving Date	Date objects provide access to individual components of a date, such as year, month, day, and hour.	`const date = new Date();` `const year = date.getFullYear();  // Current year` `const month = date.getMonth();  // Current month (0-11)` `const day = date.getDate();  // Day of the month (1-31)` `const hours = date.getHours();  // Hours (0-23)` `const minutes = date.getMinutes();  // Minutes (0-59)` `const seconds = date.getSeconds();  // Seconds (0-59)`
toLocaleDateString() and toLocaleTimeString()	toLocaleDateString() to converts a date to a string representing the date portion according to the locale's formatting conventions. toLocaleTimeString() to converts a date to a string representing the time portion according to the locale's formatting conventions.	`const date = new Date();` `const formattedDate = date.toLocaleDateString(); // "11/15/2023"` `const formattedTime = date.toLocaleTimeString(); // "1:30:45 PM"`
Date Arithmetic	Date objects allow for various date arithmetic operations, including adding and subtracting time intervals.	`const date = new Date();` `date.setFullYear(2024); // Set the year to 2024` `date.setDate(date.getDate() + 7); // Add 7 days` `const futureDate = new Date();` `futureDate.setDate(futureDate.getDate() + 30); // Date 30 days from now`
setTimeout() Method	The setTimeout function schedules the execution of a function after a specified delay in milliseconds:	`setTimeout(function() {` `  console.log("This message appears after a delay.");` `}, 2000); // Displayed after a 2-second delay`
setInterval	setInterval repeatedly executes a function at a specified interval.	`let count = 0;` `const intervalId = setInterval(function() {` `  console.log("Count: " + count);` `  count++;` `  if (count > 5) {` `  clearInterval(intervalId); // Stop after 6 iterations` `  }` `}, 1000); // Displayed every second.`


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