JavaScript Interview Questions & Answers

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1. What are the possible ways to create objects in JavaScript

There are many ways to create objects in javascript as below

i. **Object constructor:**

The simplest way to create an empty object is using the Object constructor. Currently this approach is not recommended.

```
var object = new Object();
```

ii. **Object's create method:**

The create method of Object creates a new object by passing the prototype object as a parameter

```
var object = Object.create(null);
```

iii. **Object literal syntax:**

The object literal syntax (or object initializer), is a comma-separated set of name-value pairs wrapped in curly braces.

```
var object = {
     name: "Sudheer"
     age: 34
};

Object literal property values can be of any data type, including array, fu
```

Note: This is an easiest way to create an object

iv. **Function constructor:**

Create any function and apply the new operator to create object instances,

```
function Person(name) {
  this.name = name;
  this.age = 21;
}
var object = new Person("Sudheer");
```

v. **Function constructor with prototype:**

This is similar to function constructor but it uses prototype for their properties and methods,

```
function Person() {}
Person.prototype.name = "Sudheer";
var object = new Person();
```

This is equivalent to an instance created with an object create method with a function prototype and then call that function with an instance and parameters as arguments.

```
function func {};

new func(x, y, z);
```

(OR)

```
// Create a new instance using function prototype.
var newInstance = Object.create(func.prototype)

// Call the function
var result = func.call(newInstance, x, y, z),

// If the result is a non-null object then use it otherwise just use the ne
console.log(result && typeof result === 'object' ? result : newInstance);
```

vi. **ES6 Class syntax:**

ES6 introduces class feature to create the objects

```
class Person {
  constructor(name) {
    this.name = name;
  }
}

var object = new Person("Sudheer");
```

vii. **Singleton pattern:**

A Singleton is an object which can only be instantiated one time. Repeated calls to its constructor return the same instance and this way one can ensure that they don't accidentally create multiple instances.

```
var object = new (function () {
  this.name = "Sudheer";
})();
```

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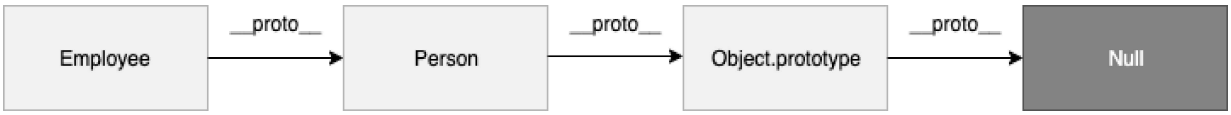
2. What is a prototype chain

Prototype chaining is used to build new types of objects based on existing ones. It is similar to inheritance in a class based language.

The prototype on object instance is available through **Object.getPrototypeOf(object)** or ****proto**** property whereas prototype on constructors function is available through **Object.prototype**.



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3. What is the difference between Call, Apply and Bind

The difference between Call, Apply and Bind can be explained with below examples,

Call: The call() method invokes a function with a given `this` value and arguments provided one by one

```
var employee1 = { firstName: "John", lastName: "Rodson" };
var employee2 = { firstName: "Jimmy", lastName: "Baily" };

function invite(greeting1, greeting2) {
  console.log(
    greeting1 + " " + this.firstName + " " + this.lastName + ", " + greeting2
  );
}

invite.call(employee1, "Hello", "How are you?"); // Hello John Rodson, How are y
invite.call(employee2, "Hello", "How are you?"); // Hello Jimmy Baily, How are y
```

Apply: Invokes the function with a given `this` value and allows you to pass in arguments as an array

```
var employee1 = { firstName: "John", lastName: "Rodson" };
var employee2 = { firstName: "Jimmy", lastName: "Baily" };

function invite(greeting1, greeting2) {
  console.log(
    greeting1 + " " + this.firstName + " " + this.lastName + ", " + greeting2
  );
}

invite.apply(employee1, ["Hello", "How are you?"]); // Hello John Rodson, How ar
invite.apply(employee2, ["Hello", "How are you?"]); // Hello Jimmy Baily, How ar
```

bind: returns a new function, allowing you to pass any number of arguments

```
var employee1 = { firstName: "John", lastName: "Rodson" };
var employee2 = { firstName: "Jimmy", lastName: "Baily" };

function invite(greeting1, greeting2) {
  console.log(
    greeting1 + " " + this.firstName + " " + this.lastName + ", " + greeting2
  );
}

var inviteEmployee1 = invite.bind(employee1);
var inviteEmployee2 = invite.bind(employee2);
inviteEmployee1("Hello", "How are you?"); // Hello John Rodson, How are you?
inviteEmployee2("Hello", "How are you?"); // Hello Jimmy Baily, How are you?
```

Call and apply are pretty interchangeable. Both execute the current function immediately. You need to decide whether it's easier to send in an array or a comma separated list of arguments. You can remember by treating Call is for **comma** (separated list) and Apply is for **Array**.

Whereas Bind creates a new function that will have `this` set to the first parameter passed to bind().

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4. What is JSON and its common operations

JSON is a text-based data format following JavaScript object syntax, which was popularized by `Douglas Crockford` . It is useful when you want to transmit data across a network and it is basically just a text file with an extension of .json, and a MIME type of application/json

Parsing: Converting a string to a native object

```
JSON.parse(text);
```

Stringification: converting a native object to a string so it can be transmitted across the network

```
JSON.stringify(object);
```

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5. What is the purpose of the array slice method

The **slice()** method returns the selected elements in an array as a new array object. It selects the elements starting at the given start argument, and ends at the given optional end argument without including the last element. If you omit the second argument then it selects till the end.

Some of the examples of this method are,

```
let arrayIntegers = [1, 2, 3, 4, 5];
let arrayIntegers1 = arrayIntegers.slice(0, 2); // returns [1,2]
let arrayIntegers2 = arrayIntegers.slice(2, 3); // returns [3]
let arrayIntegers3 = arrayIntegers.slice(4); //returns [5]
```

Note: Slice method won't mutate the original array but it returns the subset as a new array.

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6. What is the purpose of the array splice method

The **splice()** method is used either adds/removes items to/from an array, and then returns the removed item. The first argument specifies the array position for insertion or deletion whereas the optional second argument indicates the number of elements to be deleted. Each additional argument is added to the array.

Some of the examples of this method are,

```
let arrayIntegersOriginal1 = [1, 2, 3, 4, 5];
let arrayIntegersOriginal2 = [1, 2, 3, 4, 5];
let arrayIntegersOriginal3 = [1, 2, 3, 4, 5];

let arrayIntegers1 = arrayIntegersOriginal1.splice(0, 2); // returns [1, 2]; ori
let arrayIntegers2 = arrayIntegersOriginal2.splice(3); // returns [4, 5]; origir
let arrayIntegers3 = arrayIntegersOriginal3.splice(3, 1, "a", "b", "c"); //retur
```

Note: Splice method modifies the original array and returns the deleted array.

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7. What is the difference between slice and splice

Some of the major difference in a tabular form

Slice	Splice
Doesn't modify the original array(immutable)	Modifies the original array(mutable)
Returns the subset of original array	Returns the deleted elements as array
Used to pick the elements from array	Used to insert or delete elements to/from array

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8. How do you compare Object and Map

Objects are similar to **Maps** in that both let you set keys to values, retrieve those values, delete keys, and detect whether something is stored at a key. Due to this reason, Objects have been used as Maps historically. But there are important differences that make using a Map preferable in certain cases.

i. The keys of an Object are Strings and Symbols, whereas they can be any value for a Map, including functions, objects, and any primitive.

ii. The keys in Map are ordered while keys added to Object are not. Thus, when iterating over it, a Map object returns keys in order of insertion.

iii. You can get the size of a Map easily with the size property, while the number of properties in an Object must be determined manually.

iv. A Map is an iterable and can thus be directly iterated, whereas iterating over an Object requires obtaining its keys in some fashion and iterating over them.

v. An Object has a prototype, so there are default keys in the map that could collide with your keys if you're not careful. As of ES5 this can be bypassed by using map = Object.create(null), but this is seldom done.

vi. A Map may perform better in scenarios involving frequent addition and removal of key pairs.

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9. What is the difference between == and === operators

JavaScript provides both strict(===, !==) and type-converting(==, !=) equality comparison. The strict operators take type of variable in consideration, while non-strict operators make type correction/conversion based upon values of variables. The strict operators follow the below conditions for different types,

i. Two strings are strictly equal when they have the same sequence of characters, same length, and same characters in corresponding positions.

ii. Two numbers are strictly equal when they are numerically equal. i.e, Having the same number value. There are two special cases in this,
   a. NaN is not equal to anything, including NaN.
   b. Positive and negative zeros are equal to one another.

iii. Two Boolean operands are strictly equal if both are true or both are false.

iv. Two objects are strictly equal if they refer to the same Object.

v. Null and Undefined types are not equal with ===, but equal with ==. i.e, null===undefined --> false but null==undefined --> true

Some of the example which covers the above cases,

```
0 == false   // true
0 === false  // false
1 == "1"     // true
1 === "1"    // false
null == undefined // true
null === undefined // false
'0' == false // true
'0' === false // false
[]==[] or []===[] //false, refer different objects in memory
{}=={} or {}==={} //false, refer different objects in memory
```

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10. What are lambda or arrow functions

An arrow function is a shorter syntax for a function expression and does not have its own **this, arguments, super, or new.target**. These functions are best suited for non-method functions, and they cannot be used as constructors.

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11. What is a first class function

In Javascript, functions are first class objects. First-class functions means when functions in that language are treated like any other variable.

For example, in such a language, a function can be passed as an argument to other functions, can be returned by another function and can be assigned as a value to a variable. For example, in the below example, handler functions assigned to a listener

```
const handler = () => console.log("This is a click handler function");
document.addEventListener("click", handler);
```

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12. What is a first order function

First-order function is a function that doesn't accept another function as an argument and doesn't return a function as its return value.

```
const firstOrder = () => console.log("I am a first order function!");
```

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13. What is a higher order function

Higher-order function is a function that accepts another function as an argument or returns a function as a return value or both.

```
const firstOrderFunc = () =>
  console.log("Hello, I am a First order function");
```

```
const higherOrder = (ReturnFirstOrderFunc) => ReturnFirstOrderFunc();
higherOrder(firstOrderFunc);
```

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14. What is a unary function

Unary function (i.e. monadic) is a function that accepts exactly one argument. It stands for a single argument accepted by a function.

Let us take an example of unary function,

```
const unaryFunction = (a) => console.log(a + 10); // Add 10 to the given argumer
```

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15. What is the currying function

Currying is the process of taking a function with multiple arguments and turning it into a sequence of functions each with only a single argument. Currying is named after a mathematician **Haskell Curry**. By applying currying, a n-ary function turns it into a unary function.

Let's take an example of n-ary function and how it turns into a currying function,

```
const multiArgFunction = (a, b, c) => a + b + c;
console.log(multiArgFunction(1, 2, 3)); // 6

const curryUnaryFunction = (a) => (b) => (c) => a + b + c;
curryUnaryFunction(1); // returns a function: b => c =>  1 + b + c
curryUnaryFunction(1)(2); // returns a function: c => 3 + c
curryUnaryFunction(1)(2)(3); // returns the number 6
```

Curried functions are great to improve **code reusability** and **functional composition**.

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16. What is a pure function

A **Pure function** is a function where the return value is only determined by its arguments without any side effects. i.e, If you call a function with the same arguments 'n' number of times and 'n' number of places in the application then it will always return the same value.

Let's take an example to see the difference between pure and impure functions,

```
//Impure
let numberArray = [];
const impureAddNumber = (number) => numberArray.push(number);
//Pure
const pureAddNumber = (number) => (argNumberArray) =>
  argNumberArray.concat([number]);

//Display the results
console.log(impureAddNumber(6)); // returns 1
console.log(numberArray); // returns [6]
console.log(pureAddNumber(7)(numberArray)); // returns [6, 7]
console.log(numberArray); // returns [6]
```

As per the above code snippets, the **Push** function is impure itself by altering the array and returning a push number index independent of the parameter value. . Whereas **Concat** on the other hand takes the array and concatenates it with the other array producing a whole new array without side effects. Also, the return value is a concatenation of the previous array.

Remember that Pure functions are important as they simplify unit testing without any side effects and no need for dependency injection. They also avoid tight coupling and make it harder to break your application by not having any side effects. These principles are coming together with **Immutability** concept of ES6 by giving preference to **const** over **let** usage.

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17. What is the purpose of the let keyword

The `let` statement declares a **block scope local variable**. Hence the variables defined with let keyword are limited in scope to the block, statement, or expression on which it is used. Whereas variables declared with the `var` keyword used to define a variable globally, or locally to an entire function regardless of block scope.

Let's take an example to demonstrate the usage,

```
let counter = 30;
if (counter === 30) {
  let counter = 31;
  console.log(counter); // 31
}
console.log(counter); // 30 (because the variable in if block won't exist here)
```

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18. What is the difference between let and var

You can list out the differences in a tabular format

var	let
It is been available from the beginning of JavaScript	Introduced as part of ES6
It has function scope	It has block scope
Variables will be hoisted	Hoisted but not initialized

Let's take an example to see the difference,

```
function userDetails(username) {
  if (username) {
    console.log(salary); // undefined due to hoisting
    console.log(age); // ReferenceError: Cannot access 'age' before initializati
    let age = 30;
    var salary = 10000;
  }
  console.log(salary); //10000 (accessible to due function scope)
  console.log(age); //error: age is not defined(due to block scope)
}
userDetails("John");
```

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19. What is the reason to choose the name let as a keyword

`let` is a mathematical statement that was adopted by early programming languages like **Scheme** and **Basic**. It has been borrowed from dozens of other languages that use `let` already as a traditional keyword as close to `var` as possible.

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20. How do you redeclare variables in switch block without an error

If you try to redeclare variables in a `switch block` then it will cause errors because there is only one block. For example, the below code block throws a syntax error as below,

```
let counter = 1;
switch (x) {
  case 0:
    let name;
    break;

  case 1:
    let name; // SyntaxError for redeclaration.
    break;
}
```

To avoid this error, you can create a nested block inside a case clause and create a new block scoped lexical environment.

```
let counter = 1;
switch (x) {
  case 0: {
    let name;
    break;
  }
  case 1: {
    let name; // No SyntaxError for redeclaration.
    break;
  }
}
```

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21. What is the Temporal Dead Zone

The Temporal Dead Zone is a behavior in JavaScript that occurs when declaring a variable with the let and const keywords, but not with var. In ECMAScript 6, accessing a `let` or `const` variable before its declaration (within its scope) causes a ReferenceError. The time span when that happens, between the creation of a variable's binding and its declaration, is called the temporal dead zone.

Let's see this behavior with an example,

```
function somemethod() {
  console.log(counter1); // undefined
  console.log(counter2); // ReferenceError
  var counter1 = 1;
  let counter2 = 2;
}
```

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22. What is IIFE(Immediately Invoked Function Expression)

IIFE (Immediately Invoked Function Expression) is a JavaScript function that runs as soon as it is defined. The signature of it would be as below,

```
(function () {
  // logic here
})();
```

The primary reason to use an IIFE is to obtain data privacy because any variables declared within the IIFE cannot be accessed by the outside world. i.e, If you try to access variables with IIFE then it throws an error as below,

```
(function () {
  var message = "IIFE";
  console.log(message);
})();
console.log(message); //Error: message is not defined
```

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23. How do you decode or encode a URL in JavaScript?

`encodeURI()` function is used to encode an URL. This function requires a URL string as a parameter and return that encoded string. `decodeURI()` function is used to decode an URL. This function requires an encoded URL string as parameter and return that decoded string.

Note: If you want to encode characters such as `/ ? : @ & = + $ #` then you need to use `encodeURIComponent()`.

```
let uri = "employeeDetails?name=john&occupation=manager";
let encoded_uri = encodeURI(uri);
let decoded_uri = decodeURI(encoded_uri);
```

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24. What is memoization

Memoization is a programming technique which attempts to increase a function's performance by caching its previously computed results. Each time a memoized function is called, its parameters are used to index the cache. If the data is present, then it can be returned, without executing the entire function. Otherwise the function is executed and then the result is added to the cache. Let's take an example of adding function with memoization,

```
const memoizAddition = () => {
  let cache = {};
  return (value) => {
    if (value in cache) {
      console.log("Fetching from cache");
      return cache[value]; // Here, cache.value cannot be used as property name
    } else {
      console.log("Calculating result");
      let result = value + 20;
      cache[value] = result;
      return result;
    }
  };
};
// returned function from memoizAddition
const addition = memoizAddition();
console.log(addition(20)); //output: 40 calculated
console.log(addition(20)); //output: 40 cached
```

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25. What is Hoisting

Hoisting is a JavaScript mechanism where variables, function declarations and classes are moved to the top of their scope before code execution. Remember that JavaScript only hoists declarations, not initialisation. Let's take a simple example of variable hoisting,

```
console.log(message); //output : undefined
var message = "The variable Has been hoisted";
```

The above code looks like as below to the interpreter,

```
var message;
console.log(message);
message = "The variable Has been hoisted";
```

In the same fashion, function declarations are hoisted too

```
message("Good morning"); //Good morning

function message(name) {
  console.log(name);
}
```

This hoisting makes functions to be safely used in code before they are declared.

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26. What are classes in ES6

In ES6, Javascript classes are primarily syntactic sugar over JavaScript's existing prototype-based inheritance. For example, the prototype based inheritance written in function expression as below,

```
function Bike(model, color) {
  this.model = model;
  this.color = color;
}

Bike.prototype.getDetails = function () {
  return this.model + " bike has" + this.color + " color";
};
```

Whereas ES6 classes can be defined as an alternative

```
class Bike {
  constructor(color, model) {
    this.color = color;
```

```
    this.model = model;
  }

  getDetails() {
    return this.model + " bike has" + this.color + " color";
  }
}
```

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27. What are closures

A closure is the combination of a function and the lexical environment within which that function was declared. i.e, It is an inner function that has access to the outer or enclosing function's variables. The closure has three scope chains

i. Own scope where variables defined between its curly brackets
ii. Outer function's variables
iii. Global variables

Let's take an example of closure concept,

```
function Welcome(name) {
  var greetingInfo = function (message) {
    console.log(message + " " + name);
  };
  return greetingInfo;
}
var myFunction = Welcome("John");
myFunction("Welcome "); //Output: Welcome John
myFunction("Hello Mr."); //output: Hello Mr.John
```

As per the above code, the inner function(i.e, greetingInfo) has access to the variables in the outer function scope(i.e, Welcome) even after the outer function has returned.

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28. What are modules

Modules refer to small units of independent, reusable code and also act as the foundation of many JavaScript design patterns. Most of the JavaScript modules export an object literal, a function, or a constructor

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29. Why do you need modules

Below are the list of benefits using modules in javascript ecosystem

i. Maintainability
ii. Reusability
iii. Namespacing

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30. What is scope in javascript

Scope is the accessibility of variables, functions, and objects in some particular part of your code during runtime. In other words, scope determines the visibility of variables and other resources in areas of your code.

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31. What is a service worker

A Service worker is basically a script (JavaScript file) that runs in the background, separate from a web page and provides features that don't need a web page or user interaction. Some of the major features of service workers are Rich offline experiences(offline first web application development), periodic background syncs, push notifications, intercept and handle network requests and programmatically managing a cache of responses.

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32. How do you manipulate DOM using a service worker

Service worker can't access the DOM directly. But it can communicate with the pages it controls by responding to messages sent via the `postMessage` interface, and those pages can manipulate the DOM.

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33. How do you reuse information across service worker restarts

The problem with service worker is that it gets terminated when not in use, and restarted when it's next needed, so you cannot rely on global state within a service worker's `onfetch` and `onmessage` handlers. In this case, service workers will have access to IndexedDB API in order to persist and reuse across restarts.

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34. What is IndexedDB

IndexedDB is a low-level API for client-side storage of larger amounts of structured data, including files/blobs. This API uses indexes to enable high-performance searches of this data.

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35. What is web storage

Web storage is an API that provides a mechanism by which browsers can store key/value pairs locally within the user's browser, in a much more intuitive fashion than using cookies. The web storage provides two mechanisms for storing data on the client.

i. **Local storage:** It stores data for current origin with no expiration date.
ii. **Session storage:** It stores data for one session and the data is lost when the browser tab is closed.

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36. What is a post message

Post message is a method that enables cross-origin communication between Window objects.(i.e, between a page and a pop-up that it spawned, or between a page and an iframe embedded within it). Generally, scripts on different pages are allowed to access each other if and only if the pages follow same-origin policy(i.e, pages share the same protocol, port number, and host).

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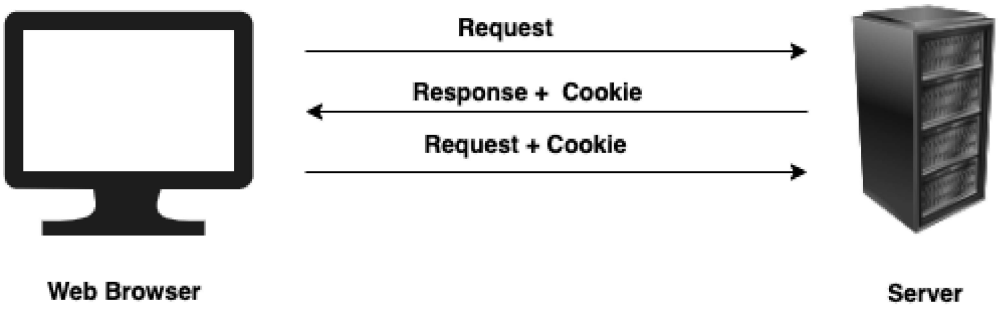
37. What is a Cookie

A cookie is a piece of data that is stored on your computer to be accessed by your browser. Cookies are saved as key/value pairs. For example, you can create a cookie named username as below,

```
document.cookie = "username=John";
```



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38. Why do you need a Cookie

Cookies are used to remember information about the user profile(such as username). It basically involves two steps,

i. When a user visits a web page, the user profile can be stored in a cookie.
ii. Next time the user visits the page, the cookie remembers the user profile.

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39. What are the options in a cookie

There are few below options available for a cookie,

i. By default, the cookie is deleted when the browser is closed but you can change this behavior by setting expiry date (in UTC time).

```
document.cookie = "username=John; expires=Sat, 8 Jun 2019 12:00:00 UTC";
```

i. By default, the cookie belongs to a current page. But you can tell the browser what path the cookie belongs to using a path parameter.

```
document.cookie = "username=John; path=/services";
```

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40. How do you delete a cookie

You can delete a cookie by setting the expiry date as a passed date. You don't need to specify a cookie value in this case. For example, you can delete a username cookie in the current page as below.

```
document.cookie =
  "username=; expires=Fri, 07 Jun 2019 00:00:00 UTC; path=/;";
```

Note: You should define the cookie path option to ensure that you delete the right cookie. Some browsers doesn't allow to delete a cookie unless you specify a path parameter.

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41. What are the differences between cookie, local storage and session storage

Below are some of the differences between cookie, local storage and session storage,

Feature	Cookie	Local storage	Session storage
Accessed on client or server side	Both server-side & client-side	client-side only	client-side only
Lifetime	As configured using Expires option	until deleted	until tab is closed
SSL support	Supported	Not supported	Not supported
Maximum data size	4KB	5 MB	5MB

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42. What is the main difference between localStorage and sessionStorage

LocalStorage is the same as SessionStorage but it persists the data even when the browser is closed and reopened(i.e it has no expiration time) whereas in sessionStorage data gets cleared when the page session ends.

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43. How do you access web storage

The Window object implements the `WindowLocalStorage` and `WindowSessionStorage` objects which has `localStorage` (window.localStorage) and `sessionStorage` (window.sessionStorage) properties respectively. These properties create an instance of the Storage object, through which data items can be set, retrieved and removed for a specific domain and storage type (session or local). For example, you can read and write on local storage objects as below

```
localStorage.setItem("logo", document.getElementById("logo").value);
localStorage.getItem("logo");
```

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44. What are the methods available on session storage

The session storage provided methods for reading, writing and clearing the session data

```
// Save data to sessionStorage
sessionStorage.setItem("key", "value");

// Get saved data from sessionStorage
let data = sessionStorage.getItem("key");

// Remove saved data from sessionStorage
sessionStorage.removeItem("key");

// Remove all saved data from sessionStorage
sessionStorage.clear();
```

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45. What is a storage event and its event handler

The StorageEvent is an event that fires when a storage area has been changed in the context of another document. Whereas onstorage property is an EventHandler for processing storage events. The syntax would be as below

```
window.onstorage = functionRef;
```

Let's take the example usage of onstorage event handler which logs the storage key and it's values

```
window.onstorage = function (e) {
  console.log(
    "The " +
      e.key +
      " key has been changed from " +
      e.oldValue +
      " to " +
      e.newValue +
      "."
  );
};
```

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46. Why do you need web storage

Web storage is more secure, and large amounts of data can be stored locally, without affecting website performance. Also, the information is never transferred to the server. Hence this is a more recommended approach than Cookies.

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47. How do you check web storage browser support

You need to check browser support for localStorage and sessionStorage before using web storage,

```
if (typeof Storage !== "undefined") {
  // Code for localStorage/sessionStorage.
} else {
  // Sorry! No Web Storage support..
}
```

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48. How do you check web workers browser support

You need to check browser support for web workers before using it

```
if (typeof Worker !== "undefined") {
  // code for Web worker support.
} else {
```

```
  // Sorry! No Web Worker support..
}
```

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49. Give an example of a web worker

You need to follow below steps to start using web workers for counting example

i. Create a Web Worker File: You need to write a script to increment the count value. Let's name it as counter.js

```
let i = 0;

function timedCount() {
  i = i + 1;
  postMessage(i);
  setTimeout("timedCount()", 500);
}

timedCount();
```

Here postMessage() method is used to post a message back to the HTML page

i. Create a Web Worker Object: You can create a web worker object by checking for browser support. Let's name this file as web_worker_example.js

```
if (typeof w == "undefined") {
  w = new Worker("counter.js");
}
```

and we can receive messages from web worker

```
w.onmessage = function (event) {
  document.getElementById("message").innerHTML = event.data;
};
```

i. Terminate a Web Worker: Web workers will continue to listen for messages (even after the external script is finished) until it is terminated. You can use the terminate() method to terminate listening to the messages.

```
w.terminate();
```

i. Reuse the Web Worker: If you set the worker variable to undefined you can reuse the code

```
w = undefined;
```

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50. What are the restrictions of web workers on DOM

WebWorkers don't have access to below javascript objects since they are defined in an external files

i. Window object
ii. Document object
iii. Parent object

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51. What is a promise

A promise is an object that may produce a single value some time in the future with either a resolved value or a reason that it's not resolved(for example, network error). It will be in one of the 3 possible states: fulfilled, rejected, or pending.

The syntax of Promise creation looks like below,

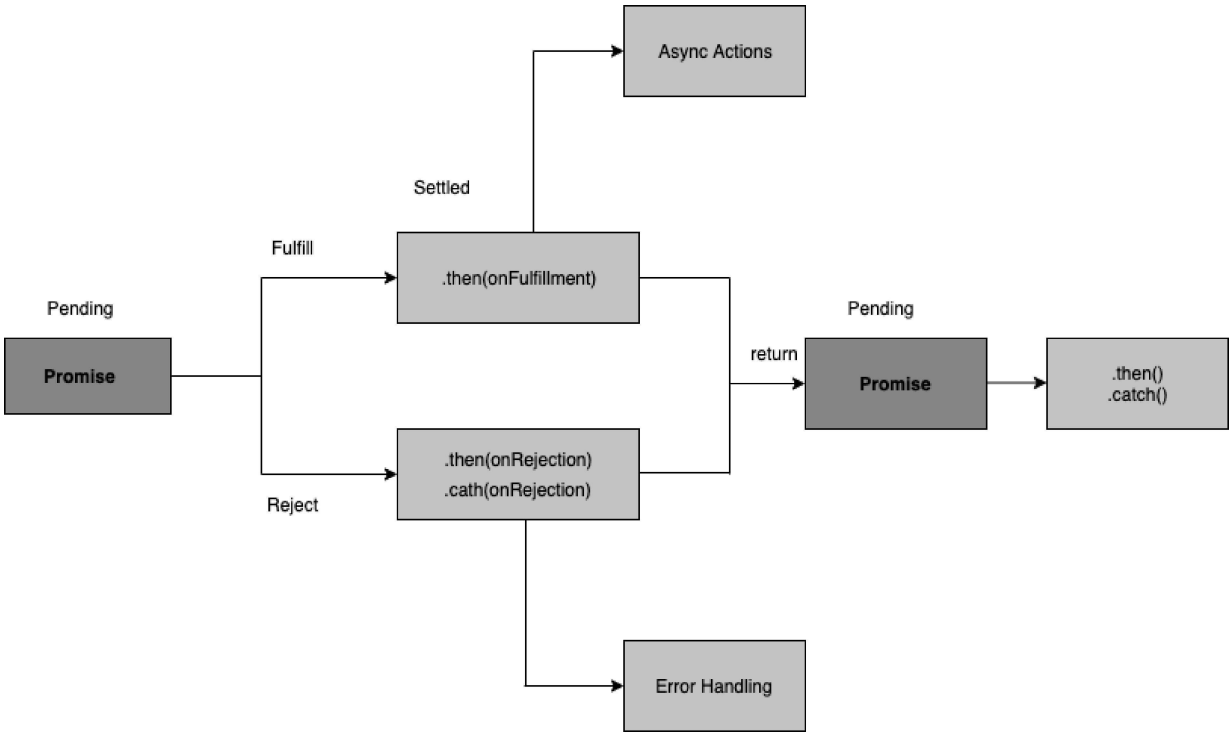
```
const promise = new Promise(function (resolve, reject) {
  // promise description
});
```

The usage of a promise would be as below,

```
const promise = new Promise(
  (resolve) => {
    setTimeout(() => {
      resolve("I'm a Promise!");
    }, 5000);
  },
  (reject) => {}
);

promise.then((value) => console.log(value));
```

The action flow of a promise will be as below,



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52. Why do you need a promise

Promises are used to handle asynchronous operations. They provide an alternative approach for callbacks by reducing the callback hell and writing the cleaner code.

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53. What are the three states of promise

Promises have three states:

i. **Pending:** This is an initial state of the Promise before an operation begins
ii. **Fulfilled:** This state indicates that the specified operation was completed.
iii. **Rejected:** This state indicates that the operation did not complete. In this case an error value will be thrown.

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54. What is a callback function

A callback function is a function passed into another function as an argument. This function is invoked inside the outer function to complete an action. Let's take a simple example of how to use callback function

```
function callbackFunction(name) {
  console.log("Hello " + name);
}

function outerFunction(callback) {
  let name = prompt("Please enter your name.");
  callback(name);
}

outerFunction(callbackFunction);
```

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55. Why do we need callbacks

The callbacks are needed because javascript is an event driven language. That means instead of waiting for a response javascript will keep executing while listening for other events. Let's take an example with the first function invoking an API call(simulated by setTimeout) and the next function which logs the message.

```
function firstFunction() {
  // Simulate a code delay
  setTimeout(function () {
    console.log("First function called");
  }, 1000);
}
function secondFunction() {
  console.log("Second function called");
}
firstFunction();
secondFunction();

Output;
// Second function called
// First function called
```

As observed from the output, javascript didn't wait for the response of the first function and the remaining code block got executed. So callbacks are used in a way to make sure that certain code doesn't execute until the other code finishes execution.

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56. What is a callback hell

Callback Hell is an anti-pattern with multiple nested callbacks which makes code hard to read and debug when dealing with asynchronous logic. The callback hell looks like below,

```
async1(function(){
    async2(function(){
        async3(function(){
            async4(function(){
                ....
            });
        });
    });
});
```

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57. What are server-sent events

Server-sent events (SSE) is a server push technology enabling a browser to receive automatic updates from a server via HTTP connection without resorting to polling. These are a one way communications channel - events flow from server to client only. This has been used in Facebook/Twitter updates, stock price updates, news feeds etc.

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58. How do you receive server-sent event notifications

The EventSource object is used to receive server-sent event notifications. For example, you can receive messages from server as below,

```
if (typeof EventSource !== "undefined") {
  var source = new EventSource("sse_generator.js");
  source.onmessage = function (event) {
    document.getElementById("output").innerHTML += event.data + "<br>";
  };
}
```

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59. How do you check browser support for server-sent events

You can perform browser support for server-sent events before using it as below,

```
if (typeof EventSource !== "undefined") {
  // Server-sent events supported. Let's have some code here!
} else {
  // No server-sent events supported
}
```

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60. What are the events available for server sent events

Below are the list of events available for server sent events

Event	Description
onopen	It is used when a connection to the server is opened
onmessage	This event is used when a message is received
onerror	It happens when an error occurs

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61. What are the main rules of promise

A promise must follow a specific set of rules,

i. A promise is an object that supplies a standard-compliant `.then()` method
ii. A pending promise may transition into either fulfilled or rejected state
iii. A fulfilled or rejected promise is settled and it must not transition into any other state.
iv. Once a promise is settled, the value must not change.

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62. What is callback in callback

You can nest one callback inside in another callback to execute the actions sequentially one by one. This is known as callbacks in callbacks.

```
loadScript("/script1.js", function (script) {
  console.log("first script is loaded");

  loadScript("/script2.js", function (script) {
    console.log("second script is loaded");

    loadScript("/script3.js", function (script) {
      console.log("third script is loaded");
      // after all scripts are loaded
    });
  });
});
```

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63. What is promise chaining

The process of executing a sequence of asynchronous tasks one after another using promises is known as Promise chaining. Let's take an example of promise chaining for calculating the final result,

```
new Promise(function (resolve, reject) {
  setTimeout(() => resolve(1), 1000);
})
  .then(function (result) {
    console.log(result); // 1
    return result * 2;
  })
  .then(function (result) {
    console.log(result); // 2
    return result * 3;
  })
  .then(function (result) {
    console.log(result); // 6
    return result * 4;
  });
```

In the above handlers, the result is passed to the chain of .then() handlers with the below work flow,

i. The initial promise resolves in 1 second,

ii. After that `.then` handler is called by logging the result(1) and then return a promise with the value of result * 2.

iii. After that the value passed to the next `.then` handler by logging the result(2) and return a promise with result * 3.

iv. Finally the value passed to the last `.then` handler by logging the result(6) and return a promise with result * 4.

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64. What is promise.all

Promise.all is a promise that takes an array of promises as an input (an iterable), and it gets resolved when all the promises get resolved or any one of them gets rejected. For example, the syntax of promise.all method is below,

```
Promise.all([Promise1, Promise2, Promise3]) .then(result) => {   console.log(res
```

Note: Remember that the order of the promises(output the result) is maintained as per input order.

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65. What is the purpose of the race method in promise

Promise.race() method will return the promise instance which is firstly resolved or rejected. Let's take an example of race() method where promise2 is resolved first

```
var promise1 = new Promise(function (resolve, reject) {
  setTimeout(resolve, 500, "one");
});
var promise2 = new Promise(function (resolve, reject) {
  setTimeout(resolve, 100, "two");
});

Promise.race([promise1, promise2]).then(function (value) {
  console.log(value); // "two" // Both promises will resolve, but promise2 is fa
});
```

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66. What is a strict mode in javascript

Strict Mode is a new feature in ECMAScript 5 that allows you to place a program, or a function, in a "strict" operating context. This way it prevents certain actions from being taken and throws more exceptions. The literal expression `"use strict";` instructs the browser to use the javascript code in the Strict mode.

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67. Why do you need strict mode

Strict mode is useful to write "secure" JavaScript by notifying "bad syntax" into real errors. For example, it eliminates accidentally creating a global variable by throwing an error and also throws an error for assignment to a non-writable property, a getter-only property, a non-existing property, a non-existing variable, or a non-existing object.

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68. How do you declare strict mode

The strict mode is declared by adding "use strict"; to the beginning of a script or a function. If declared at the beginning of a script, it has global scope.

```
"use strict";
x = 3.14; // This will cause an error because x is not declared
```

and if you declare inside a function, it has local scope

```
x = 3.14; // This will not cause an error.
myFunction();

function myFunction() {
  "use strict";
  y = 3.14; // This will cause an error
}
```

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69. What is the purpose of double exclamation

The double exclamation or negation(!!) ensures the resulting type is a boolean. If it was falsey (e.g. 0, null, undefined, etc.), it will be false, otherwise, true. For example, you can test IE version using this expression as below,

```
let isIE8 = false;
isIE8 = !!navigator.userAgent.match(/MSIE 8.0/);
console.log(isIE8); // returns true or false
```

If you don't use this expression then it returns the original value.

```
console.log(navigator.userAgent.match(/MSIE 8.0/)); // returns either an Array c
```

Note: The expression !! is not an operator, but it is just twice of ! operator.

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70. What is the purpose of the delete operator

The delete keyword is used to delete the property as well as its value.

```
var user = { name: "John", age: 20 };
delete user.age;

console.log(user); // {name: "John"}
```

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71. What is the typeof operator

You can use the JavaScript typeof operator to find the type of a JavaScript variable. It returns the type of a variable or an expression.

```
typeof "John Abraham"; // Returns "string"
typeof (1 + 2); // Returns "number"
```

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72. What is undefined property

The undefined property indicates that a variable has not been assigned a value, or not declared at all. The type of undefined value is undefined too.

```
var user; // Value is undefined, type is undefined
console.log(typeof user); //undefined
```

Any variable can be emptied by setting the value to undefined.

```
user = undefined;
```

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73. What is null value

The value null represents the intentional absence of any object value. It is one of JavaScript's primitive values. The type of null value is object. You can empty the variable by setting the value to null.

```
var user = null;
console.log(typeof user); //object
```

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74. What is the difference between null and undefined

Below are the main differences between null and undefined,

Null	Undefined
It is an assignment value which indicates that variable points to no object.	It is not an assignment value where a variable has been declared but has not yet been assigned a value.
Type of null is object	Type of undefined is undefined
The null value is a primitive value that represents the null, empty, or non-existent reference.	The undefined value is a primitive value used when a variable has not been assigned a value.
Indicates the absence of a value for a variable	Indicates absence of variable itself
Converted to zero (0) while performing primitive operations	Converted to NaN while performing primitive operations

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75. What is eval

The eval() function evaluates JavaScript code represented as a string. The string can be a JavaScript expression, variable, statement, or sequence of statements.

```
console.log(eval("1 + 2")); //  3
```

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76. What is the difference between window and document

Below are the main differences between window and document,

Window	Document
It is the root level element in any web page	It is the direct child of the window object. This is also known as Document Object Model(DOM)
By default window object is available implicitly in the page	You can access it via window.document or document.
It has methods like alert(), confirm() and properties like document, location	It provides methods like getElementById, getElementsByTagName, createElement etc

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77. How do you access history in javascript

The window.history object contains the browser's history. You can load previous and next URLs in the history using back() and next() methods.

```
function goBack() {
  window.history.back();
}
function goForward() {
  window.history.forward();
}
```

Note: You can also access history without window prefix.

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78. How do you detect caps lock key turned on or not

The `mouseEvent getModifierState()` is used to return a boolean value that indicates whether the specified modifier key is activated or not. The modifiers such as CapsLock, ScrollLock and NumLock are activated when they are clicked, and deactivated when they are clicked again.

Let's take an input element to detect the CapsLock on/off behavior with an example,

```
<input type="password" onmousedown="enterInput(event)" />

<p id="feedback"></p>

<script>
  function enterInput(e) {
    var flag = e.getModifierState("CapsLock");
    if (flag) {
      document.getElementById("feedback").innerHTML = "CapsLock activated";
    } else {
      document.getElementById("feedback").innerHTML =
        "CapsLock not activated";
    }
  }
</script>
```

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79. What is isNaN

The isNaN() function is used to determine whether a value is an illegal number (Not-a-Number) or not. i.e, This function returns true if the value equates to NaN. Otherwise it returns false.

```
isNaN("Hello"); //true
isNaN("100"); //false
```

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80. What are the differences between undeclared and undefined variables

Below are the major differences between undeclared(not defined) and undefined variables,

undeclared	undefined
These variables do not exist in a program and are not declared	These variables declared in the program but have not assigned any value
If you try to read the value of an undeclared variable, then a runtime error is encountered	If you try to read the value of an undefined variable, an undefined value is returned.

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81. What are global variables

Global variables are those that are available throughout the length of the code without any scope. The var keyword is used to declare a local variable but if you omit it then it will become global variable

```
msg = "Hello"; // var is missing, it becomes global variable
```

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82. What are the problems with global variables

The problem with global variables is the conflict of variable names of local and global scope. It is also difficult to debug and test the code that relies on global variables.

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83. What is NaN property

The NaN property is a global property that represents "Not-a-Number" value. i.e, It indicates that a value is not a legal number. It is very rare to use NaN in a program but it can be used as return value for few cases

```
Math.sqrt(-1);
parseInt("Hello");
```

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84. What is the purpose of isFinite function

The isFinite() function is used to determine whether a number is a finite, legal number. It returns false if the value is +infinity, -infinity, or NaN (Not-a-Number), otherwise it returns true.

```
isFinite(Infinity); // false
isFinite(NaN); // false
isFinite(-Infinity); // false

isFinite(100); // true
```

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85. What is an event flow

Event flow is the order in which event is received on the web page. When you click an element that is nested in various other elements, before your click actually reaches its destination, or target element, it must trigger the click event for each of its parent elements first, starting at the top with the global window object. There are two ways of event flow

i. Top to Bottom(Event Capturing)
ii. Bottom to Top (Event Bubbling)

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86. What is event bubbling

Event bubbling is a type of event propagation where the event first triggers on the innermost target element, and then successively triggers on the ancestors (parents) of the target element in the same nesting hierarchy till it reaches the outermost DOM element.

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87. What is event capturing

Event capturing is a type of event propagation where the event is first captured by the outermost element, and then successively triggers on the descendants (children) of the target element in the same nesting hierarchy till it reaches the innermost DOM element.

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88. How do you submit a form using JavaScript

You can submit a form using `document.forms[0].submit()` . All the form input's information is submitted using onsubmit event handler

```
function submit() {
  document.forms[0].submit();
}
```

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89. How do you find operating system details

The window.navigator object contains information about the visitor's browser OS details. Some of the OS properties are available under platform property,

```
console.log(navigator.platform);
```

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90. What is the difference between document load and DOMContentLoaded events

The `DOMContentLoaded` event is fired when the initial HTML document has been completely loaded and parsed, without waiting for assets(stylesheets, images, and subframes) to finish loading. Whereas The load event is fired when the whole page has loaded, including all dependent resources(stylesheets, images).

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91. What is the difference between native, host and user objects

`Native objects` are objects that are part of the JavaScript language defined by the ECMAScript specification. For example, String, Math, RegExp, Object, Function etc core objects defined in the ECMAScript spec. `Host objects` are objects provided by the browser or runtime environment (Node). For example, window, XmlHttpRequest, DOM nodes etc are considered as host objects. `User objects` are objects defined in the javascript code. For example, User objects created for profile information.

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92. What are the tools or techniques used for debugging JavaScript code

You can use below tools or techniques for debugging javascript

i. Chrome Devtools
ii. debugger statement
iii. Good old console.log statement

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93. What are the pros and cons of promises over callbacks

Below are the list of pros and cons of promises over callbacks,

Pros:

i. It avoids callback hell which is unreadable
ii. Easy to write sequential asynchronous code with .then()
iii. Easy to write parallel asynchronous code with Promise.all()
iv. Solves some of the common problems of callbacks(call the callback too late, too early, many times and swallow errors/exceptions)

Cons:

i. It makes little complex code
ii. You need to load a polyfill if ES6 is not supported

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94. What is the difference between an attribute and a property

Attributes are defined on the HTML markup whereas properties are defined on the DOM. For example, the below HTML element has 2 attributes type and value,

```
<input type="text" value="Name:">
```

You can retrieve the attribute value as below,

```
const input = document.querySelector("input");
console.log(input.getAttribute("value")); // Good morning
console.log(input.value); // Good morning
```

And after you change the value of the text field to "Good evening", it becomes like

```
console.log(input.getAttribute("value")); // Good evening
console.log(input.value); // Good evening
```

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95. What is same-origin policy

The same-origin policy is a policy that prevents JavaScript from making requests across domain boundaries. An origin is defined as a combination of URI scheme, hostname, and port number. If you enable this policy then it prevents a malicious script on one page from obtaining access to sensitive data on another web page using Document Object Model(DOM).

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96. What is the purpose of void 0

Void(0) is used to prevent the page from refreshing. This will be helpful to eliminate the unwanted side-effect, because it will return the undefined primitive value. It is commonly used for HTML documents that use href="JavaScript:Void(0);" within an `<a>` element. i.e, when you click a link, the browser loads a new page or refreshes the same page. But this behavior will be prevented using this expression. For example, the below link notify the message without reloading the page

```
<a href="JavaScript:void(0);" onclick="alert('Well done!')">
  Click Me!
</a>
```

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97. Is JavaScript a compiled or interpreted language

JavaScript is an interpreted language, not a compiled language. An interpreter in the browser reads over the JavaScript code, interprets each line, and runs it. Nowadays modern browsers use a technology known as Just-In-Time (JIT) compilation, which compiles JavaScript to executable bytecode just as it is about to run.

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98. Is JavaScript a case-sensitive language

Yes, JavaScript is a case sensitive language. The language keywords, variables, function & object names, and any other identifiers must always be typed with a consistent capitalization of letters.

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99. Is there any relation between Java and JavaScript

No, they are entirely two different programming languages and have nothing to do with each other. But both of them are Object Oriented Programming languages and like many other languages, they follow similar syntax for basic features(if, else, for, switch, break, continue etc).

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100. What are events

Events are "things" that happen to HTML elements. When JavaScript is used in HTML pages, JavaScript can `react` on these events. Some of the examples of HTML events are,

i. Web page has finished loading
ii. Input field was changed
iii. Button was clicked

Let's describe the behavior of click event for button element,

```
<!doctype html>
<html>
 <head>
   <script>
     function greeting() {
```

```
        alert('Hello! Good morning');
      }
    </script>
  </head>
  <body>
    <button type="button" onclick="greeting()">Click me</button>
  </body>
</html>
```

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101. Who created javascript

JavaScript was created by Brendan Eich in 1995 during his time at Netscape Communications. Initially it was developed under the name `Mocha`, but later the language was officially called `LiveScript` when it first shipped in beta releases of Netscape.

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102. What is the use of preventDefault method

The preventDefault() method cancels the event if it is cancelable, meaning that the default action or behaviour that belongs to the event will not occur. For example, prevent form submission when clicking on submit button and prevent opening the page URL when clicking on hyperlink are some common use cases.

```
document
  .getElementById("link")
  .addEventListener("click", function (event) {
    event.preventDefault();
  });
```

Note: Remember that not all events are cancelable.

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103. What is the use of stopPropagation method

The stopPropagation method is used to stop the event from bubbling up the event chain. For example, the below nested divs with stopPropagation method prevents default event propagation when clicking on nested div(Div1)

```
<p>Click DIV1 Element</p>
<div onclick="secondFunc()">DIV 2
  <div onclick="firstFunc(event)">DIV 1</div>
</div>

<script>
function firstFunc(event) {
  alert("DIV 1");
  event.stopPropagation();
}

function secondFunc() {
  alert("DIV 2");
}
</script>
```

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104. What are the steps involved in return false usage

The return false statement in event handlers performs the below steps,

i. First it stops the browser's default action or behaviour.
ii. It prevents the event from propagating the DOM
iii. Stops callback execution and returns immediately when called.

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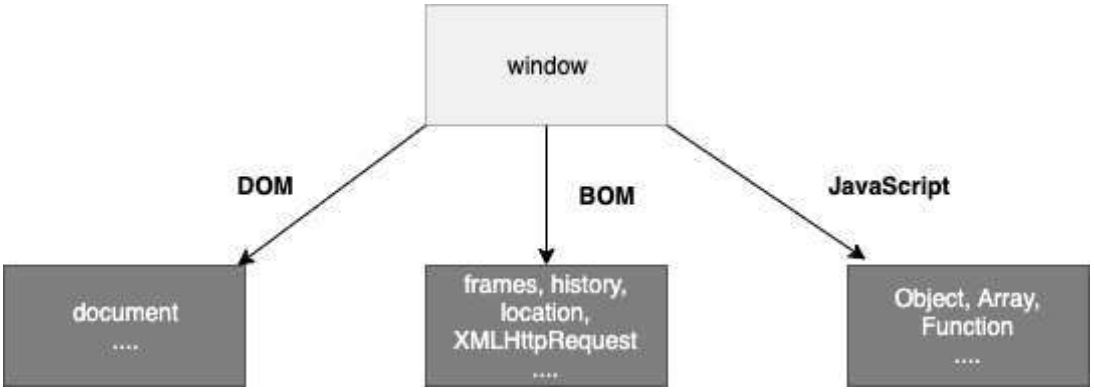
105. What is BOM

The Browser Object Model (BOM) allows JavaScript to "talk to" the browser. It consists of the objects navigator, history, screen, location and document which are children of the window. The Browser Object Model is not standardized and can change based on different browsers.



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106. What is the use of setTimeout

The setTimeout() method is used to call a function or evaluate an expression after a specified number of milliseconds. For example, let's log a message after 2 seconds using setTimeout method,

```
setTimeout(function () {
  console.log("Good morning");
}, 2000);
```

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107. What is the use of setInterval

The setInterval() method is used to call a function or evaluate an expression at specified intervals (in milliseconds). For example, let's log a message after 2 seconds using setInterval method,

```
setInterval(function () {
  console.log("Good morning");
}, 2000);
```

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108. Why is JavaScript treated as Single threaded

JavaScript is a single-threaded language. Because the language specification does not allow the programmer to write code so that the interpreter can run parts of it in parallel in multiple threads or processes. Whereas languages like java, go, C++ can make multi-threaded and multi-process programs.

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109. What is an event delegation

Event delegation is a technique for listening to events where you delegate a parent element as the listener for all of the events that happen inside it.

For example, if you wanted to detect field changes in inside a specific form, you can use event delegation technique,

```
var form = document.querySelector("#registration-form");

// Listen for changes to fields inside the form
form.addEventListener(
  "input",
  function (event) {
    // Log the field that was changed
    console.log(event.target);
  },
  false
);
```

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110. What is ECMAScript

ECMAScript is the scripting language that forms the basis of JavaScript. ECMAScript standardized by the ECMA International standards organization in the ECMA-262 and ECMA-402 specifications. The first edition of ECMAScript was released in 1997.

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111. What is JSON

JSON (JavaScript Object Notation) is a lightweight format that is used for data interchanging. It is based on a subset of JavaScript language in the way objects are built in JavaScript.

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112. What are the syntax rules of JSON

Below are the list of syntax rules of JSON

i. The data is in name/value pairs
ii. The data is separated by commas
iii. Curly braces hold objects
iv. Square brackets hold arrays

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113. What is the purpose JSON stringify

When sending data to a web server, the data has to be in a string format. You can achieve this by converting JSON object into a string using stringify() method.

```
var userJSON = { name: "John", age: 31 };
var userString = JSON.stringify(userJSON);
console.log(userString); //"{"name":"John","age":31}"
```

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114. How do you parse JSON string

When receiving the data from a web server, the data is always in a string format. But you can convert this string value to a javascript object using parse() method.

```
var userString = '{"name":"John","age":31}';
var userJSON = JSON.parse(userString);
console.log(userJSON); // {name: "John", age: 31}
```

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115. Why do you need JSON

When exchanging data between a browser and a server, the data can only be text. Since JSON is text only, it can easily be sent to and from a server, and used as a data format by any programming language.

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116. What are PWAs

Progressive web applications (PWAs) are a type of mobile app delivered through the web, built using common web technologies including HTML, CSS and JavaScript. These PWAs are deployed to servers, accessible through URLs, and indexed by search engines.

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117. What is the purpose of clearTimeout method

The clearTimeout() function is used in javascript to clear the timeout which has been set by setTimeout()function before that. i.e, The return value of setTimeout() function is stored in a variable and it's passed into the clearTimeout() function to clear the timer.

For example, the below setTimeout method is used to display the message after 3 seconds. This timeout can be cleared by the clearTimeout() method.

```
<script>
var msg;
function greeting() {
   alert('Good morning');
}
function start() {
  msg =setTimeout(greeting, 3000);

}

function stop() {
    clearTimeout(msg);
}
</script>
```

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118. What is the purpose of clearInterval method

The clearInterval() function is used in javascript to clear the interval which has been set by setInterval() function. i.e, The return value returned by setInterval() function is stored in a variable and it's passed into the clearInterval() function to clear the interval.

For example, the below setInterval method is used to display the message for every 3 seconds. This interval can be cleared by the clearInterval() method.

```
<script>
var msg;
function greeting() {
   alert('Good morning');
}
function start() {
  msg = setInterval(greeting, 3000);

}

function stop() {
```

```
    clearInterval(msg);
}
</script>
```

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119. How do you redirect new page in javascript

In vanilla javascript, you can redirect to a new page using the `location` property of window object. The syntax would be as follows,

```
function redirect() {
  window.location.href = "newPage.html";
}
```

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120. How do you check whether a string contains a substring

There are 3 possible ways to check whether a string contains a substring or not,

i. **Using includes:** ES6 provided `String.prototype.includes` method to test a string contains a substring

```
var mainString = "hello",
  subString = "hell";
mainString.includes(subString);
```

i. **Using indexOf:** In an ES5 or older environment, you can use `String.prototype.indexOf` which returns the index of a substring. If the index value is not equal to -1 then it means the substring exists in the main string.

```
var mainString = "hello",
  subString = "hell";
mainString.indexOf(subString) !== -1;
```

i. **Using RegEx:** The advanced solution is using Regular expression's test method(`RegExp.test`), which allows for testing for against regular expressions

```
var mainString = "hello",
  regex = /hell/;
regex.test(mainString);
```

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121. How do you validate an email in javascript

You can validate an email in javascript using regular expressions. It is recommended to do validations on the server side instead of the client side. Because the javascript can be disabled on the client side.

```
function validateEmail(email) {
  var re =
    /^(([^<>()\[\]\\.,;:\s@"]+(\.[^<>()\[\]\\.,;:\s@"]+)*)|(".+"))@((\[[0-9]{1,3
  return re.test(String(email).toLowerCase());
}
```

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The above regular expression accepts unicode characters.

122. How do you get the current url with javascript

You can use `window.location.href` expression to get the current url path and you can use the same expression for updating the URL too. You can also use `document.URL` for read-only purposes but this solution has issues in FF.

```
console.log("location.href", window.location.href); // Returns full URL
```

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123. What are the various url properties of location object

The below `Location` object properties can be used to access URL components of the page,

i. href - The entire URL
ii. protocol - The protocol of the URL
iii. host - The hostname and port of the URL
iv. hostname - The hostname of the URL
v. port - The port number in the URL
vi. pathname - The path name of the URL

vii. search - The query portion of the URL

viii. hash - The anchor portion of the URL

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124. How do get query string values in javascript

You can use URLSearchParams to get query string values in javascript. Let's see an example to get the client code value from URL query string,

```
const urlParams = new URLSearchParams(window.location.search);
const clientCode = urlParams.get("clientCode");
```

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125. How do you check if a key exists in an object

You can check whether a key exists in an object or not using three approaches,

i. **Using in operator:** You can use the in operator whether a key exists in an object or not

```
"key" in obj;
```

and If you want to check if a key doesn't exist, remember to use parenthesis,

```
!("key" in obj);
```

i. **Using hasOwnProperty method:** You can use `hasOwnProperty` to particularly test for properties of the object instance (and not inherited properties)

```
obj.hasOwnProperty("key"); // true
```

i. **Using undefined comparison:** If you access a non-existing property from an object, the result is undefined. Let's compare the properties against undefined to determine the existence of the property.

```
const user = {
  name: "John",
};
```

```
console.log(user.name !== undefined); // true
console.log(user.nickName !== undefined); // false
```

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126. How do you loop through or enumerate javascript object

You can use the `for-in` loop to loop through javascript object. You can also make sure that the key you get is an actual property of an object, and doesn't come from the prototype using `hasOwnProperty` method.

```
var object = {
  k1: "value1",
  k2: "value2",
  k3: "value3",
};

for (var key in object) {
  if (object.hasOwnProperty(key)) {
    console.log(key + " -> " + object[key]); // k1 -> value1 ...
  }
}
```

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127. How do you test for an empty object

There are different solutions based on ECMAScript versions

i. **Using Object entries(ECMA 7+):** You can use object entries length along with constructor type.

```
Object.entries(obj).length === 0 && obj.constructor === Object; // Since date ob
```

i. **Using Object keys(ECMA 5+):** You can use object keys length along with constructor type.

```
Object.keys(obj).length === 0 && obj.constructor === Object; // Since date objec
```

i. **Using for-in with hasOwnProperty(Pre-ECMA 5):** You can use a for-in loop along with hasOwnProperty.

```
function isEmpty(obj) {
  for (var prop in obj) {
    if (obj.hasOwnProperty(prop)) {
      return false;
    }
  }

  return JSON.stringify(obj) === JSON.stringify({});
}
```

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128. What is an arguments object

The arguments object is an Array-like object accessible inside functions that contains the values of the arguments passed to that function. For example, let's see how to use arguments object inside sum function,

```
function sum() {
  var total = 0;
  for (var i = 0, len = arguments.length; i < len; ++i) {
    total += arguments[i];
  }
  return total;
}

sum(1, 2, 3); // returns 6
```

Note: You can't apply array methods on arguments object. But you can convert into a regular array as below.

```
var argsArray = Array.prototype.slice.call(arguments);
```

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129. How do you make first letter of the string in an uppercase

You can create a function which uses a chain of string methods such as charAt, toUpperCase and slice methods to generate a string with the first letter in uppercase.

```
function capitalizeFirstLetter(string) {
  return string.charAt(0).toUpperCase() + string.slice(1);
```

```
}
```

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130. What are the pros and cons of for loop

The for-loop is a commonly used iteration syntax in javascript. It has both pros and cons

Pros

i. Works on every environment
ii. You can use break and continue flow control statements

Cons

i. Too verbose
ii. Imperative
iii. You might face one-by-off errors

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131. How do you display the current date in javascript

You can use `new Date()` to generate a new Date object containing the current date and time. For example, let's display the current date in mm/dd/yyyy

```
var today = new Date();
var dd = String(today.getDate()).padStart(2, "0");
var mm = String(today.getMonth() + 1).padStart(2, "0"); //January is 0!
var yyyy = today.getFullYear();

today = mm + "/" + dd + "/" + yyyy;
document.write(today);
```

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132. How do you compare two date objects

You need to use date.getTime() method to compare date values instead of comparison operators (==, !=, ===, and !== operators)

```
var d1 = new Date();
var d2 = new Date(d1);
console.log(d1.getTime() === d2.getTime()); //True
console.log(d1 === d2); // False
```

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133. How do you check if a string starts with another string

You can use ECMAScript 6's `String.prototype.startsWith()` method to check if a string starts with another string or not. But it is not yet supported in all browsers. Let's see an example to see this usage,

```
"Good morning".startsWith("Good"); // true
"Good morning".startsWith("morning"); // false
```

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134. How do you trim a string in javascript

JavaScript provided a trim method on string types to trim any whitespaces present at the beginning or ending of the string.

```
"  Hello World   ".trim(); //Hello World
```

If your browser(<IE9) doesn't support this method then you can use below polyfill.

```
if (!String.prototype.trim) {
  (function () {
    // Make sure we trim BOM and NBSP
    var rtrim = /^[\s\uFEFF\xA0]+|[\s\uFEFF\xA0]+$/g;
    String.prototype.trim = function () {
      return this.replace(rtrim, "");
    };
  })();
}
```

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135. How do you add a key value pair in javascript

There are two possible solutions to add new properties to an object. Let's take a simple object to explain these solutions.

```
var object = {
  key1: value1,
  key2: value2,
};
```

i. **Using dot notation:** This solution is useful when you know the name of the property

```
object.key3 = "value3";
```

i. **Using square bracket notation:** This solution is useful when the name of the property is dynamically determined.

```
obj["key3"] = "value3";
```

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136. Is the !-- notation represents a special operator

No,that's not a special operator. But it is a combination of 2 standard operators one after the other,

i. A logical not (!)
ii. A prefix decrement (--)

At first, the value decremented by one and then tested to see if it is equal to zero or not for determining the truthy/falsy value.

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137. How do you assign default values to variables

You can use the logical or operator `||` in an assignment expression to provide a default value. The syntax looks like as below,

```
var a = b || c;
```

As per the above expression, variable 'a 'will get the value of 'c' only if 'b' is falsy (if is null, false, undefined, 0, empty string, or NaN), otherwise 'a' will get the value of 'b'.

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138. How do you define multiline strings

You can define multiline string literals using the '\' character followed by line terminator.

```
var str =
  "This is a \
very lengthy \
sentence!";
```

But if you have a space after the '\' character, the code will look exactly the same, but it will raise a SyntaxError.

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139. What is an app shell model

An application shell (or app shell) architecture is one way to build a Progressive Web App that reliably and instantly loads on your users' screens, similar to what you see in native applications. It is useful for getting some initial HTML to the screen fast without a network.

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140. Can we define properties for functions

Yes, We can define properties for functions because functions are also objects.

```
fn = function (x) {
  //Function code goes here
};

fn.name = "John";

fn.profile = function (y) {
  //Profile code goes here
};
```

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141. What is the way to find the number of parameters expected by a function

You can use `function.length` syntax to find the number of parameters expected by a function. Let's take an example of `sum` function to calculate the sum of numbers,

```
function sum(num1, num2, num3, num4) {
  return num1 + num2 + num3 + num4;
}
sum.length; // 4 is the number of parameters expected.
```

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142. What is a polyfill

A polyfill is a piece of JS code used to provide modern functionality on older browsers that do not natively support it. For example, Silverlight plugin polyfill can be used to mimic the functionality of an HTML Canvas element on Microsoft Internet Explorer 7.

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143. What are break and continue statements

The break statement is used to "jump out" of a loop. i.e, It breaks the loop and continues executing the code after the loop.

```
for (i = 0; i < 10; i++) {
  if (i === 5) {
    break;
  }
  text += "Number: " + i + "<br>";
}
```

The continue statement is used to "jump over" one iteration in the loop. i.e, It breaks one iteration (in the loop), if a specified condition occurs, and continues with the next iteration in the loop.

```
for (i = 0; i < 10; i++) {
  if (i === 5) {
    continue;
  }
```

```
  text += "Number: " + i + "<br>";
}
```

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144. What are js labels

The label statement allows us to name loops and blocks in JavaScript. We can then use these labels to refer back to the code later. For example, the below code with labels avoids printing the numbers when they are same,

```
var i, j;

loop1: for (i = 0; i < 3; i++) {
  loop2: for (j = 0; j < 3; j++) {
    if (i === j) {
      continue loop1;
    }
    console.log("i = " + i + ", j = " + j);
  }
}

// Output is:
//   "i = 1, j = 0"
//   "i = 2, j = 0"
//   "i = 2, j = 1"
```

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145. What are the benefits of keeping declarations at the top

It is recommended to keep all declarations at the top of each script or function. The benefits of doing this are,

i. Gives cleaner code
ii. It provides a single place to look for local variables
iii. Easy to avoid unwanted global variables
iv. It reduces the possibility of unwanted re-declarations

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146. What are the benefits of initializing variables

It is recommended to initialize variables because of the below benefits,

i. It gives cleaner code
ii. It provides a single place to initialize variables
iii. Avoid undefined values in the code

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147. What are the recommendations to create new object

It is recommended to avoid creating new objects using `new Object()`. Instead you can initialize values based on it's type to create the objects.

i. Assign {} instead of new Object()
ii. Assign "" instead of new String()
iii. Assign 0 instead of new Number()
iv. Assign false instead of new Boolean()
v. Assign [] instead of new Array()
vi. Assign /()/ instead of new RegExp()
vii. Assign function (){} instead of new Function()

You can define them as an example,

```
var v1 = {};
var v2 = "";
var v3 = 0;
var v4 = false;
var v5 = [];
var v6 = /()/;
var v7 = function () {};
```

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148. How do you define JSON arrays

JSON arrays are written inside square brackets and arrays contain javascript objects. For example, the JSON array of users would be as below,

```
"users":[
  {"firstName":"John", "lastName":"Abrahm"},
  {"firstName":"Anna", "lastName":"Smith"},
```

```
  {"firstName":"Shane", "lastName":"Warn"}
]
```

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149. How do you generate random integers

You can use Math.random() with Math.floor() to return random integers. For example, if you want generate random integers between 1 to 10, the multiplication factor should be 10,

```
Math.floor(Math.random() * 10) + 1; // returns a random integer from 1 to 10
Math.floor(Math.random() * 100) + 1; // returns a random integer from 1 to 100
```

Note: Math.random() returns a random number between 0 (inclusive), and 1 (exclusive)

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150. Can you write a random integers function to print integers with in a range

Yes, you can create a proper random function to return a random number between min and max (both included)

```
function randomInteger(min, max) {
  return Math.floor(Math.random() * (max - min + 1)) + min;
}
randomInteger(1, 100); // returns a random integer from 1 to 100
randomInteger(1, 1000); // returns a random integer from 1 to 1000
```

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151. What is tree shaking

Tree shaking is a form of dead code elimination. It means that unused modules will not be included in the bundle during the build process and for that it relies on the static structure of ES2015 module syntax,(i.e. import and export). Initially this has been popularized by the ES2015 module bundler `rollup` .

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152. What is the need of tree shaking

Tree Shaking can significantly reduce the code size in any application. i.e, The less code we send over the wire the more performant the application will be. For example, if we just want to create a "Hello World" Application using SPA frameworks then it will take around a few MBs, but by tree shaking it can bring down the size to just a few hundred KBs. Tree shaking is implemented in Rollup and Webpack bundlers.

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153. Is it recommended to use eval

No, it allows arbitrary code to be run which causes a security problem. As we know that the eval() function is used to run text as code. In most of the cases, it should not be necessary to use it.

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154. What is a Regular Expression

A regular expression is a sequence of characters that forms a search pattern. You can use this search pattern for searching data in a text. These can be used to perform all types of text search and text replace operations. Let's see the syntax format now,

```
/pattern/modifiers;
```

For example, the regular expression or search pattern with case-insensitive username would be,

```
/John/i;
```

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155. What are the string methods available in Regular expression

Regular Expressions has two string methods: search() and replace(). The search() method uses an expression to search for a match, and returns the position of the match.

```
var msg = "Hello John";
var n = msg.search(/John/i); // 6
```

The replace() method is used to return a modified string where the pattern is replaced.

```
var msg = "Hello John";
var n = msg.replace(/John/i, "Buttler"); // Hello Buttler
```

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156. What are modifiers in regular expression

Modifiers can be used to perform case-insensitive and global searches. Let's list down some of the modifiers,

Modifier	Description
i	Perform case-insensitive matching
g	Perform a global match rather than stops at first match
m	Perform multiline matching

Let's take an example of global modifier,

```
var text = "Learn JS one by one";
var pattern = /one/g;
var result = text.match(pattern); // one,one
```

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157. What are regular expression patterns

Regular Expressions provide a group of patterns in order to match characters. Basically they are categorized into 3 types,

i. **Brackets:** These are used to find a range of characters. For example, below are some use cases,
   a. [abc]: Used to find any of the characters between the brackets(a,b,c)
   b. [0-9]: Used to find any of the digits between the brackets
   c. (a|b): Used to find any of the alternatives separated with |

ii. **Metacharacters:** These are characters with a special meaning For example, below are some use cases,
   a. \d: Used to find a digit

b. \s: Used to find a whitespace character

c. \b: Used to find a match at the beginning or ending of a word

iii. **Quantifiers:** These are useful to define quantities For example, below are some use cases,

a. n+: Used to find matches for any string that contains at least one n

b. n*: Used to find matches for any string that contains zero or more occurrences of n

c. n?: Used to find matches for any string that contains zero or one occurrences of n

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158. What is a RegExp object

RegExp object is a regular expression object with predefined properties and methods. Let's see the simple usage of RegExp object,

```
var regexp = new RegExp("\\w+");
console.log(regexp);
// expected output: /\w+/
```

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159. How do you search a string for a pattern

You can use the test() method of regular expression in order to search a string for a pattern, and return true or false depending on the result.

```
var pattern = /you/;
console.log(pattern.test("How are you?")); //true
```

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160. What is the purpose of exec method

The purpose of exec method is similar to test method but it executes a search for a match in a specified string and returns a result array, or null instead of returning true/false.

```
var pattern = /you/;
console.log(pattern.exec("How are you?")); //["you", index: 8, input: "How are y
```

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161. How do you change the style of a HTML element

You can change inline style or classname of a HTML element using javascript

i. **Using style property:** You can modify inline style using style property

```
document.getElementById("title").style.fontSize = "30px";
```

i. **Using ClassName property:** It is easy to modify element class using className property

```
document.getElementById("title").className = "custom-title";
```

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162. What would be the result of 1+2+'3'

The output is going to be `33`. Since `1` and `2` are numeric values, the result of the first two digits is going to be a numeric value `3`. The next digit is a string type value because of that the addition of numeric value `3` and string type value `3` is just going to be a concatenation value `33`.

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163. What is a debugger statement

The debugger statement invokes any available debugging functionality, such as setting a breakpoint. If no debugging functionality is available, this statement has no effect. For example, in the below function a debugger statement has been inserted. So execution is paused at the debugger statement just like a breakpoint in the script source.

```
function getProfile() {
  // code goes here
  debugger;
```

```
  // code goes here
}
```

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164. What is the purpose of breakpoints in debugging

You can set breakpoints in the javascript code once the debugger statement is executed and the debugger window pops up. At each breakpoint, javascript will stop executing, and let you examine the JavaScript values. After examining values, you can resume the execution of code using the play button.

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165. Can I use reserved words as identifiers

No, you cannot use the reserved words as variables, labels, object or function names. Let's see one simple example,

```
var else = "hello"; // Uncaught SyntaxError: Unexpected token else
```

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166. How do you detect a mobile browser

You can use regex which returns a true or false value depending on whether or not the user is browsing with a mobile.

```
window.mobilecheck = function () {
  var mobileCheck = false;
  (function (a) {
    if (
      /(android|bb\d+|meego).+mobile|avantgo|bada\/|blackberry|blazer|compal|ela
        a
      ) ||
      /1207|6310|6590|3gso|4thp|50[1-6]i|770s|802s|a wa|abac|ac(er|oo|s\-)|ai(ko
        a.substr(0, 4)
      )
    )
      mobileCheck = true;
  })(navigator.userAgent || navigator.vendor || window.opera);
  return mobileCheck;
};
```

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167. How do you detect a mobile browser without regexp

You can detect mobile browsers by simply running through a list of devices and checking if the useragent matches anything. This is an alternative solution for RegExp usage,

```
function detectmob() {
  if (
    navigator.userAgent.match(/Android/i) ||
    navigator.userAgent.match(/webOS/i) ||
    navigator.userAgent.match(/iPhone/i) ||
    navigator.userAgent.match(/iPad/i) ||
    navigator.userAgent.match(/iPod/i) ||
    navigator.userAgent.match(/BlackBerry/i) ||
    navigator.userAgent.match(/Windows Phone/i)
  ) {
    return true;
  } else {
    return false;
  }
}
```

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168. How do you get the image width and height using JS

You can programmatically get the image and check the dimensions(width and height) using Javascript.

```
var img = new Image();
img.onload = function () {
  console.log(this.width + "x" + this.height);
};
img.src = "http://www.google.com/intl/en_ALL/images/logo.gif";
```

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169. How do you make synchronous HTTP request

Browsers provide an XMLHttpRequest object which can be used to make synchronous HTTP requests from JavaScript

```
function httpGet(theUrl) {
  var xmlHttpReq = new XMLHttpRequest();
  xmlHttpReq.open("GET", theUrl, false); // false for synchronous request
  xmlHttpReq.send(null);
  return xmlHttpReq.responseText;
}
```

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170. How do you make asynchronous HTTP request

Browsers provide an XMLHttpRequest object which can be used to make asynchronous HTTP requests from JavaScript by passing the 3rd parameter as true.

```
function httpGetAsync(theUrl, callback) {
  var xmlHttpReq = new XMLHttpRequest();
  xmlHttpReq.onreadystatechange = function () {
    if (xmlHttpReq.readyState == 4 && xmlHttpReq.status == 200)
      callback(xmlHttpReq.responseText);
  };
  xmlHttp.open("GET", theUrl, true); // true for asynchronous
  xmlHttp.send(null);
}
```

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171. How do you convert date to another timezone in javascript

You can use the toLocaleString() method to convert dates in one timezone to another. For example, let's convert current date to British English timezone as below,

```
console.log(event.toLocaleString("en-GB", { timeZone: "UTC" })); //29/06/2019, 0
```

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172. What are the properties used to get size of window

You can use innerWidth, innerHeight, clientWidth, clientHeight properties of windows, document element and document body objects to find the size of a window. Let's use them combination of these properties to calculate the size of a window or document,

```
var width =
  window.innerWidth ||
  document.documentElement.clientWidth ||
  document.body.clientWidth;

var height =
  window.innerHeight ||
  document.documentElement.clientHeight ||
  document.body.clientHeight;
```

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173. What is a conditional operator in javascript

The conditional (ternary) operator is the only JavaScript operator that takes three operands which acts as a shortcut for if statements.

```
var isAuthenticated = false;
console.log(
  isAuthenticated ? "Hello, welcome" : "Sorry, you are not authenticated"
); //Sorry, you are not authenticated
```

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174. Can you apply chaining on conditional operator

Yes, you can apply chaining on conditional operators similar to if ... else if ... else if ... else chain. The syntax is going to be as below,

```
function traceValue(someParam) {
  return condition1
    ? value1
    : condition2
    ? value2
    : condition3
    ? value3
    : value4;
}
```

```
// The above conditional operator is equivalent to:

function traceValue(someParam) {
  if (condition1) {
    return value1;
  } else if (condition2) {
    return value2;
  } else if (condition3) {
    return value3;
  } else {
    return value4;
  }
}
```

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175. What are the ways to execute javascript after page load

You can execute javascript after page load in many different ways,

i. **window.onload:**

```
window.onload = function ...
```

i. **document.onload:**

```
document.onload = function ...
```

i. **body onload:**

```
<body onload="script();">
```

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176. What is the difference between proto and prototype

The `__proto__` object is the actual object that is used in the lookup chain to resolve methods, etc. Whereas `prototype` is the object that is used to build `__proto__` when you create an object with new

```
new Employee().__proto__ === Employee.prototype;
new Employee().prototype === undefined;
```

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177. Give an example where do you really need semicolon

It is recommended to use semicolons after every statement in JavaScript. For example, in the below case it throws an error ".. is not a function" at runtime due to missing semicolon.

```
// define a function
var fn = (function () {
  //...
})(
  // semicolon missing at this line

  // then execute some code inside a closure
  function () {
    //...
  }
)();
```

and it will be interpreted as

```
var fn = (function () {
  //...
})(function () {
  //...
})();
```

In this case, we are passing the second function as an argument to the first function and then trying to call the result of the first function call as a function. Hence, the second function will fail with a "... is not a function" error at runtime.

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178. What is a freeze method

The **freeze()** method is used to freeze an object. Freezing an object does not allow adding new properties to an object,prevents from removing and prevents changing the enumerability, configurability, or writability of existing properties. i.e, It returns the passed object and does not create a frozen copy.

```
const obj = {
  prop: 100,
```

```
};

Object.freeze(obj);
obj.prop = 200; // Throws an error in strict mode

console.log(obj.prop); //100
```

Note: It causes a TypeError if the argument passed is not an object.

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179. What is the purpose of freeze method

Below are the main benefits of using freeze method,

i. It is used for freezing objects and arrays.
ii. It is used to make an object immutable.

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180. Why do I need to use freeze method

In the Object-oriented paradigm, an existing API contains certain elements that are not intended to be extended, modified, or re-used outside of their current context. Hence it works as the `final` keyword which is used in various languages.

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181. How do you detect a browser language preference

You can use navigator object to detect a browser language preference as below,

```
var language =
  (navigator.languages && navigator.languages[0]) || // Chrome / Firefox
  navigator.language || // All browsers
  navigator.userLanguage; // IE <= 10

console.log(language);
```

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182. How to convert string to title case with javascript

Title case means that the first letter of each word is capitalized. You can convert a string to title case using the below function,

```
function toTitleCase(str) {
  return str.replace(/\w\S*/g, function (txt) {
    return txt.charAt(0).toUpperCase() + txt.substr(1).toLowerCase();
  });
}
toTitleCase("good morning john"); // Good Morning John
```

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183. How do you detect javascript disabled in the page

You can use the `<noscript>` tag to detect javascript disabled or not. The code block inside `<noscript>` gets executed when JavaScript is disabled, and is typically used to display alternative content when the page generated in JavaScript.

```
<script type="javascript">
    // JS related code goes here
</script>
<noscript>
    <a href="next_page.html?noJS=true">JavaScript is disabled in the page. Pleas
</noscript>
```

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184. What are various operators supported by javascript

An operator is capable of manipulating(mathematical and logical computations) a certain value or operand. There are various operators supported by JavaScript as below,

i. **Arithmetic Operators:** Includes + (Addition),– (Subtraction), * (Multiplication), / (Division), % (Modulus), + + (Increment) and – – (Decrement)
ii. **Comparison Operators:** Includes = =(Equal),!= (Not Equal), ===(Equal with type), > (Greater than),> = (Greater than or Equal to),< (Less than),<= (Less than or Equal to)
iii. **Logical Operators:** Includes &&(Logical AND),||(Logical OR),!(Logical NOT)
iv. **Assignment Operators:** Includes = (Assignment Operator), += (Add and Assignment Operator), – = (Subtract and Assignment Operator), *= (Multiply and

Assignment), /= (Divide and Assignment), %= (Modules and Assignment)

v. **Ternary Operators:** It includes conditional(: ?) Operator

vi. **typeof Operator:** It uses to find type of variable. The syntax looks like `typeof variable`

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185. What is a rest parameter

Rest parameter is an improved way to handle function parameters which allows us to represent an indefinite number of arguments as an array. The syntax would be as below,

```
function f(a, b, ...theArgs) {
  // ...
}
```

For example, let's take a sum example to calculate on dynamic number of parameters,

```
function total(…args){
let sum = 0;
for(let i of args){
sum+=i;
}
return sum;
}
console.log(fun(1,2)); //3
console.log(fun(1,2,3)); //6
console.log(fun(1,2,3,4)); //13
console.log(fun(1,2,3,4,5)); //15
```

Note: Rest parameter is added in ES2015 or ES6

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186. What happens if you do not use rest parameter as a last argument

The rest parameter should be the last argument, as its job is to collect all the remaining arguments into an array. For example, if you define a function like below it doesn't make any sense and will throw an error.

```
function someFunc(a,…b,c){
//You code goes here
return;
}
```

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187. What are the bitwise operators available in javascript

Below are the list of bitwise logical operators used in JavaScript

i. Bitwise AND (&)
ii. Bitwise OR (|)
iii. Bitwise XOR (^)
iv. Bitwise NOT (~)
v. Left Shift (<<)
vi. Sign Propagating Right Shift (>>)
vii. Zero fill Right Shift (>>>)

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188. What is a spread operator

Spread operator allows iterables(arrays / objects / strings) to be expanded into single arguments/elements. Let's take an example to see this behavior,

```
function calculateSum(x, y, z) {
  return x + y + z;
}

const numbers = [1, 2, 3];

console.log(calculateSum(...numbers)); // 6
```

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189. How do you determine whether object is frozen or not

Object.isFrozen() method is used to determine if an object is frozen or not.An object is frozen if all of the below conditions hold true,

i. If it is not extensible.
ii. If all of its properties are non-configurable.
iii. If all its data properties are non-writable. The usage is going to be as follows,

```
const object = {
  property: "Welcome JS world",
};
Object.freeze(object);
console.log(Object.isFrozen(object));
```

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190. How do you determine two values same or not using object

The Object.is() method determines whether two values are the same value. For example, the usage with different types of values would be,

```
Object.is("hello", "hello"); // true
Object.is(window, window); // true
Object.is([], []); // false
```

Two values are the same if one of the following holds:

i. both undefined
ii. both null
iii. both true or both false
iv. both strings of the same length with the same characters in the same order
v. both the same object (means both object have same reference)
vi. both numbers and both +0 both -0 both NaN both non-zero and both not NaN and both have the same value.

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191. What is the purpose of using object is method

Some of the applications of Object's `is` method are follows,

i. It is used for comparison of two strings.
ii. It is used for comparison of two numbers.
iii. It is used for comparing the polarity of two numbers.
iv. It is used for comparison of two objects.

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192. How do you copy properties from one object to other

You can use the Object.assign() method which is used to copy the values and properties from one or more source objects to a target object. It returns the target object which has properties and values copied from the target object. The syntax would be as below,

```
Object.assign(target, ...sources);
```

Let's take example with one source and one target object,

```
const target = { a: 1, b: 2 };
const source = { b: 3, c: 4 };

const returnedTarget = Object.assign(target, source);

console.log(target); // { a: 1, b: 3, c: 4 }

console.log(returnedTarget); // { a: 1, b: 3, c: 4 }
```

As observed in the above code, there is a common property(`b`) from source to target so it's value has been overwritten.

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193. What are the applications of assign method

Below are the some of main applications of Object.assign() method,

i. It is used for cloning an object.
ii. It is used to merge objects with the same properties.

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194. What is a proxy object

The Proxy object is used to define custom behavior for fundamental operations such as property lookup, assignment, enumeration, function invocation, etc. The syntax would be as follows,

```
var p = new Proxy(target, handler);
```

Let's take an example of proxy object,

```
var handler = {
  get: function (obj, prop) {
    return prop in obj ? obj[prop] : 100;
  },
};

var p = new Proxy({}, handler);
p.a = 10;
p.b = null;

console.log(p.a, p.b); // 10, null
console.log("c" in p, p.c); // false, 100
```

In the above code, it uses `get` handler which define the behavior of the proxy when an operation is performed on it

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195. What is the purpose of seal method

The **Object.seal()** method is used to seal an object, by preventing new properties from being added to it and marking all existing properties as non-configurable. But values of present properties can still be changed as long as they are writable. Let's see the below example to understand more about seal() method

```
const object = {
  property: "Welcome JS world",
};
Object.seal(object);
object.property = "Welcome to object world";
console.log(Object.isSealed(object)); // true
delete object.property; // You cannot delete when sealed
console.log(object.property); //Welcome to object world
```

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196. What are the applications of seal method

Below are the main applications of Object.seal() method,

i. It is used for sealing objects and arrays.
ii. It is used to make an object immutable.

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197. What are the differences between freeze and seal methods

If an object is frozen using the Object.freeze() method then its properties become immutable and no changes can be made in them whereas if an object is sealed using the Object.seal() method then the changes can be made in the existing properties of the object.

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198. How do you determine if an object is sealed or not

The Object.isSealed() method is used to determine if an object is sealed or not. An object is sealed if all of the below conditions hold true

i. If it is not extensible.
ii. If all of its properties are non-configurable.
iii. If it is not removable (but not necessarily non-writable). Let's see it in the action

```
const object = {
  property: "Hello, Good morning",
};

Object.seal(object); // Using seal() method to seal the object

console.log(Object.isSealed(object)); // checking whether the object is sealed o
```

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199. How do you get enumerable key and value pairs

The Object.entries() method is used to return an array of a given object's own enumerable string-keyed property [key, value] pairs, in the same order as that provided by a for...in loop. Let's see the functionality of object.entries() method in an example,

```
const object = {
  a: "Good morning",
```

```
  b: 100,
};

for (let [key, value] of Object.entries(object)) {
  console.log(`${key}: ${value}`); // a: 'Good morning'
  // b: 100
}
```

Note: The order is not guaranteed as object defined.

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200. What is the main difference between Object.values and Object.entries method

The Object.values() method's behavior is similar to Object.entries() method but it returns an array of values instead [key,value] pairs.

```
const object = {
  a: "Good morning",
  b: 100,
};

for (let value of Object.values(object)) {
  console.log(`${value}`); // 'Good morning'
  100;
}
```

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201. How can you get the list of keys of any object

You can use the `Object.keys()` method which is used to return an array of a given object's own property names, in the same order as we get with a normal loop. For example, you can get the keys of a user object,

```
const user = {
  name: "John",
  gender: "male",
  age: 40,
};

console.log(Object.keys(user)); //['name', 'gender', 'age']
```

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202. How do you create an object with prototype

The Object.create() method is used to create a new object with the specified prototype object and properties. i.e, It uses an existing object as the prototype of the newly created object. It returns a new object with the specified prototype object and properties.

```
const user = {
  name: "John",
  printInfo: function () {
    console.log(`My name is ${this.name}.`);
  },
};

const admin = Object.create(user);

admin.name = "Nick"; // Remember that "name" is a property set on "admin" but nc

admin.printInfo(); // My name is Nick
```

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203. What is a WeakSet

WeakSet is used to store a collection of weakly(weak references) held objects. The syntax would be as follows,

```
new WeakSet([iterable]);
```

Let's see the below example to explain it's behavior,

```
var ws = new WeakSet();
var user = {};
ws.add(user);
ws.has(user); // true
ws.delete(user); // removes user from the set
ws.has(user); // false, user has been removed
```

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204. What are the differences between WeakSet and Set

The main difference is that references to objects in Set are strong while references to objects in WeakSet are weak. i.e, An object in WeakSet can be garbage collected if there is no other reference to it. Other differences are,

i. Sets can store any value Whereas WeakSets can store only collections of objects
ii. WeakSet does not have size property unlike Set
iii. WeakSet does not have methods such as clear, keys, values, entries, forEach.
iv. WeakSet is not iterable.

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205. List down the collection of methods available on WeakSet

Below are the list of methods available on WeakSet,

i. add(value): A new object is appended with the given value to the weakset
ii. delete(value): Deletes the value from the WeakSet collection.
iii. has(value): It returns true if the value is present in the WeakSet Collection, otherwise it returns false.

Let's see the functionality of all the above methods in an example,

```
var weakSetObject = new WeakSet();
var firstObject = {};
var secondObject = {};
// add(value)
weakSetObject.add(firstObject);
weakSetObject.add(secondObject);
console.log(weakSetObject.has(firstObject)); //true
weakSetObject.delete(secondObject);
```

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206. What is a WeakMap

The WeakMap object is a collection of key/value pairs in which the keys are weakly referenced. In this case, keys must be objects and the values can be arbitrary values. The syntax is looking like as below,

```
new WeakMap([iterable]);
```

Let's see the below example to explain it's behavior,

```
var ws = new WeakMap();
var user = {};
ws.set(user);
ws.has(user); // true
ws.delete(user); // removes user from the map
ws.has(user); // false, user has been removed
```

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207. What are the differences between WeakMap and Map

The main difference is that references to key objects in Map are strong while references to key objects in WeakMap are weak. i.e, A key object in WeakMap can be garbage collected if there is no other reference to it. Other differences are,

i. Maps can store any key type Whereas WeakMaps can store only collections of key objects
ii. WeakMap does not have size property unlike Map
iii. WeakMap does not have methods such as clear, keys, values, entries, forEach.
iv. WeakMap is not iterable.

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208. List down the collection of methods available on WeakMap

Below are the list of methods available on WeakMap,

i. set(key, value): Sets the value for the key in the WeakMap object. Returns the WeakMap object.
ii. delete(key): Removes any value associated to the key.
iii. has(key): Returns a Boolean asserting whether a value has been associated to the key in the WeakMap object or not.
iv. get(key): Returns the value associated to the key, or undefined if there is none. Let's see the functionality of all the above methods in an example,

```
var weakMapObject = new WeakMap();
var firstObject = {};
var secondObject = {};
// set(key, value)
weakMapObject.set(firstObject, "John");
```