JavaScript

Notes

INDEX

INTRODUCTION

What is JavaScript ?

JavaScript is a dynamic computer programming language. It is lightweight and most commonly used as a part of web pages, whose implementations allow client-side script to interact with the user and make dynamic pages. It is an interpreted programming language with object-oriented capabilities (oops).

JavaScript was first known as LiveScript, but Netscape changed its name to JavaScript, possibly because of the excitement being generated by Java. JavaScript made its first appearance in Netscape 2.0 in 1995 with the name LiveScript. The general-purpose core of the language has been embedded in Netscape, Internet Explorer, and other web browsers.

The ECMA-262 Specification defined a standard version of the core JavaScript language.

- JavaScript is a lightweight, interpreted programming language.
- Designed for creating network-centric applications.
- Complementary to and integrated with Java.
- Complementary to and integrated with HTML.
- Open and cross-platform

USES OF JAVASCRIPT

- JavaScript is used to create interactive websites. It is mainly used for:
- Client-side validation

- java is user friendly. A user can changes in program on run time.
- Dynamic drop-down menus
- Displaying date and time
- Displaying popup windows and dialog boxes (like alert dialog box, confirm dialog box and prompt dialog box)
- Displaying clocks etc.

Places to put js

- Between the body tag of html
- Between the head tag of html
- In .js file (external java Script)

DIFFERENT WAYS TO   DISPLAY DATA IN JAVASCRIPT:

- Writing into the HTML output using document.write().
- Writing into an HTML element, using innerHTML.
- Writing into an alert box, using window.alert().
- Writing into the browser console, using console.log().

1.DOCUMENT.WRITE():

```
<html>

<body>

<script type="text/javascript">

document.write("JavaScript is a simple language for learners");

</script>

</body>

</html>
```

- The script tag specifies that we are using JavaScript.
- The text/javascript is the content type that provides information to the browser about the data.
- The document.write() function is used to display dynamic content through JavaScript. We will learn about document object in detail later.

2.USING INNERHTML

JavaScript can use the document.getElementById(id) method.

The id attribute defines the HTML element. The innerHTML property defines the HTML content:

```
<!DOCTYPE html>
<html>
<body>
<p id="abc"></p>
<script>
document.getElementById("abc").innerHTML = 12 + 10;

Or

document.getElementById("con").innerHTML = “hello Genext”;
</script>
</body>
</html>
```

3.USINGWINDOW.ALERT()

You can use an alert box to display data:

```
<script>
alert(‘hello’);
</script>
```

4 Console

```
<script>
console.log(‘hello’); or console.warn(“Hello”);
</script>
```

All the modern browsers come with built-in support for JavaScript. Frequently, you may need to enable or disable this support manually. This chapter explains the procedure of enabling and disabling JavaScript support in your browsers: Internet Explorer, Firefox, chrome, and Opera.

JavaScript in Internet Explorer

Here are simple steps to turn on or turn off JavaScript in your Internet Explorer −

- Follow **Tools → Internet Options** from the menu.
- Select **Security** tab from the dialog box.
- Click the **Custom Level** button.
- Scroll down till you find **Scripting** option.

- Select *Enable* radio button under **Active scripting**.
- Finally click OK and come out

To disable JavaScript support in your Internet Explorer, you need to select **Disable** radio button under **Active scripting**.

JavaScript in Firefox

Here are the steps to turn on or turn off JavaScript in Firefox −

- Open a new tab → type **about: config** in the address bar.
- Then you will find the warning dialog. Select **I'll be careful, I promise!**
- Then you will find the list of **configure options** in the browser.
- In the search bar, type **javascript.enabled**.
- There you will find the option to enable or disable javascript by right-clicking on the value of that option → **select toggle**.

If javascript.enabled is true; it converts to false upon clicking **toogle**. If javascript is disabled; it gets enabled upon clicking toggle.

JavaScript in Chrome

Here are the steps to turn on or turn off JavaScript in Chrome −

- Click the Chrome menu at the top right hand corner of your browser.
- Select **Settings**.
- Click **Show advanced settings** at the end of the page.
- Under the **Privacy** section, click the Content settings button.
- In the "Javascript" section, select "Do not allow any site to run JavaScript" or "Allow all sites to run JavaScript (recommended)".

JavaScript in Opera

Here are the steps to turn on or turn off JavaScript in Opera −

- Follow **Tools** → **Preferences** from the menu.
- Select **Advanced** option from the dialog box.
- Select **Content** from the listed items.
- Select **Enable JavaScript** checkbox.
- Finally click OK and come out.

To disable JavaScript support in your Opera, you should not select the **Enable JavaScript checkbox**.

Warning for Non-JavaScript Browsers

If you have to do something important using JavaScript, then you can display a warning message to the user using **<noscript>** tags.

You can add a **noscript** block immediately after the script block as follows –

```
<html>
<body>
```

```
<scriptlanguage="javascript"type="text/javascript">
<!--
        document.write("Hello World!")
//-->
</script>

<noscript>
      Sorry...JavaScript is needed to go ahead.
</noscript>
</body>
</html>
```

Now, if the user's browser does not support JavaScript or JavaScript is not enabled, then the message from </noscript> will be displayed on the screen.

Variables

Variables are container for storing the data value.

A JavaScript variable is simply a name of storage location.

There are some rules while declaring a JavaScript variable (also known as identifiers).

- Name must start with a letter (a to z or A to Z), underscore(_), or dollar($) sign.
- After first letter we can use digits (0 to 9), for example value1.
- JavaScript variables are case sensitive, for example x and X are different variables.

EXAMPLE:

```
<script>
var x = 10;
var y = 20;
var z=x+y;
document.write(z);
</script>
```

```
<!DOCTYPE html>
<html>
<head>
<meta charset="utf-8">
<meta name="viewport" content="width=device-width, initial-scale=1">
<title></title>
</head>
<body>
<h1 id="abc"> Hello Genext </h1>
<script type="text/javascript">
    var x = prompt("Enter the First Value");
    var y = prompt("Enter Second Value");
    z  = x+y;
```

```
	document.getElementById('abc').innerHTML = "The C value Is = " + z;
</script>
</body>
</html>
```

```
<!DOCTYPE html>
<html>
<head>
<meta charset="utf-8">
<meta name="viewport" content="width=device-width, initial-scale=1">
<title></title>
</head>
<body>
<h1 id="abc"> Hello Genext </h1>
<script type="text/javascript">
	var x = parseInt(prompt("Enter the First Value"));
	var y = parseInt(prompt("Enter Second Value"));
	z  = x+y;

	document.getElementById('abc').innerHTML = "The C value Is = " + z;
</script>
</body>
</html>
```

```
<!DOCTYPE html>
<html>
<head>
<meta charset="utf-8">
<meta name="viewport" content="width=device-width, initial-scale=1">
<title></title>
</head>
```

```
<body>
<h1 id="abc"> Hello Genext </h1>

<script type="text/javascript">
        var x = parseInt(prompt("Enter the First Value"));
        var y = parseInt(prompt("Enter Second Value"));
        z  = x+y;
          document.write("<br>" +z);
        z  = x-y;
          document.write("<br>" +z);
        z  = x*y;
          document.write("<br>" +z);
        z  = x/y;
          document.write("<br>" +z);
        z  = x%y;
          document.write("<br>" +z);
</script>
</body>
</html>
```

```
<!DOCTYPE html>
<html>
<head>
<meta charset="utf-8">
<meta name="viewport" content="width=device-width, initial-scale=1">
<title></title>
</head>
<body>
<h1 id="abc"> Hello Genext </h1>
```

```
    <script type="text/javascript">
        var x = parseInt(prompt("Enter the First Value"));
        var y = parseInt(prompt("Enter Second Value"));
          document.write("<br>" + (x+y));
          document.write("<br>" + (x-y));
          document.write("<br>" + (x*y));
          document.write("<br>" + (x/y));
          document.write("<br>" + (x%y));
    </script>

    </body>
    </html>
```

In JavaScript, the equal sign (=) is an "assignment" operator, not an "equal to" operator.

The "equal to" operator is written like == in JavaScript.

Swapping Using Third Variable

```
<!DOCTYPE html>
<html>
<head>
<meta charset="utf-8">
<meta name="viewport" content="width=device-width, initial-scale=1">
<title></title>
</head>
<body>
<h1 id="abc"> Hello Genext </h1>
<script type="text/javascript">
    var x = parseInt(prompt("Enter the First Value"));
```

```
        var y = parseInt(prompt("Enter Second Value"));
         z = x;
         x = y;
         y = z;
         document.write(" After Swap x is = " + x);
         document.write("<br> After Swap y is = " + y);
</script>
</body></html>
```

Without Using third variable

```
<!DOCTYPE html>
<html>
<head>
<meta charset="utf-8">
<meta name="viewport" content="width=device-width, initial-scale=1">
<title></title>
</head>
<body>
<h1 id="abc"> Hello Genext </h1>
<script type="text/javascript">
        var x = parseInt(prompt("Enter the First Value"));
        var y = parseInt(prompt("Enter Second Value"));
         x = x + y;
         y = x - y;
         x = x - y;
         document.write(" After Swap x is = " + x);
         document.write("<br> After Swap y is = " + y);
</script>
</body>
</html>
```

Single line swapping:-

```
<!DOCTYPE html>
<html>
<head>
<meta charset="utf-8">
<meta name="viewport" content="width=device-width, initial-scale=1">
<title></title>
</head>
<body>
<script type="text/javascript">
  var a = parseInt(prompt("Enter First Val"));
  var b = parseInt(prompt("Enter Second Val"));

      a = a + b - (b = a);

      document.write("<br> After Swap A is = " + a);
      document.write("<br> After Swap B is = " + b);

</script>
</body>
</html>
```

JAVASCRIPT DATA TYPE

JavaScript provides different data types to hold different types of values. There are two types of data types in JavaScript.

- Primitive data type
- Non-primitive (reference) data type

JavaScript primitive data types

There are five types of primitive data types in JavaScript. They are as follows:

DATA TYPES	
String	Represent sequence of character.”genext”
Number	Represent value.100
Boolean	Represent value either true or false
Undefined	Represent undefined value

Null	Represent null;no value at all

JavaScript non-primitive data types:

The non-primitive data types are as follows:

DATA TYPES	
Object	Represent instance through which we can access member.
Array	Represent group of similar values.
REGEXP	Represent regular expression.

JavaScript is a dynamic type language, means you don't need to specify type of the variable because it is dynamically used by JavaScript engine. You need to use var here to specify the data type. It can hold any type of values such as numbers, strings etc.

For example:

var a=40; //holding number

var b="Rahul"; //holding string

- Strings are written inside double or single quotes. Numbers are written without quotes.
- If you put a number in quotes, it will be treated as a text string.
- One Statement, Many Variables.
- You can declare many variables in one statement.
- "Start the statement with var and 'separate' the variables by comma and End by ; ".

  var employee = "nitya", job = "faculty", salary = 20000;

```
<script>
        var employee = "nitya",job = "faculty",salary = 50000;
        document.write(salary, employee, job);
</script>
```

JAVASCRIPT OPERATORS

JavaScript operators are symbols that are used to perform operations on operands.

Types of Operator:

- Arithmetic operator
- Relational/comparison operator

- Logical operator
- Assignment operator

Arithmetic Operators

Arithmetic operators are used to perform arithmetic operations on the operands. The following operators are known as JavaScript arithmetic operators.

Operator	Description	Example
+	Addition	30+20=50
-	Subtraction	30-20=10
*	Multiplication	10*30=300
/	Divide	30/10=3
%	Modulus(Remainder)	30%10=0
++	Increment	Var a=10;a++; Now, a=11
--	Decrement	Var a=10;a--; Now a=9

```
<html>
<body>

<scripttype="text/javascript">
<!--
var a =33;
var b =10;
var c ="Test";
var linebreak ="<br />";

        document.write("a + b = ");
        result = a + b;
        document.write(result);
        document.write(linebreak);

        document.write("a - b = ");
        result = a - b;
        document.write(result);
        document.write(linebreak);

        document.write("a / b = ");
        result = a / b;
        document.write(result);
        document.write(linebreak);

        document.write("a % b = ");
        result = a % b;
        document.write(result);
        document.write(linebreak);

        document.write("a + b + c = ");
        result = a + b + c;
        document.write(result);
        document.write(linebreak);

        a =++a;
        document.write("++a = ");
        result =++a;
        document.write(result);
        document.write(linebreak);

        b =--b;
        document.write("--b = ");
        result =--b;
        document.write(result);
        document.write(linebreak);
//-->
</script>

    Set the variables to different values and then try...
</body>
</html>
```

COMPARISON OPERATOR

Comparison Operator compares the two operands.

Operator	Description	Example
==	Is equal to only check value not data types	10==20=false
===	Identical (equal value and equal data type)	Type also check
!=	Not equal to	10!=20 true
!==	not equal value or not equal type	
>	Greater than	10>5 true
<	Less than	10<5 false
>=	Greater than and equals to	10>=10 true
<=	Less than and equal to	10<=10 true

```
<html>
<body>
<scripttype="text/javascript">
<!--
var a =10;
var b =20;
var linebreak ="<br />";

        document.write("(a == b) => ");
        result =(a == b);
        document.write(result);
        document.write(linebreak);
        document.write("(a < b) => ");
        result =(a < b);
        document.write(result);
        document.write(linebreak);

        document.write("(a > b) => ");
        result =(a > b);
        document.write(result);
        document.write(linebreak);

        document.write("(a != b) => ");
        result =(a != b);
        document.write(result);
        document.write(linebreak);

        document.write("(a >= b) => ");
        result =(a >= b);
        document.write(result);
        document.write(linebreak);

        document.write("(a <= b) => ");
        result =(a <= b);
        document.write(result);
        document.write(linebreak);
//-->
</script>
    Set the variables to different values and different operators and then try...
</body>
</html>
```

LOGICAL OPERATOR

Operator	Description	Example
&&	Logical AND(Both True)	(10>20&& 10>5)=false
||	Logical OR(Any One or Both)	(10>20 || 10>5)=true
!	Logical NOT (First True second False)	!(10==20) = true

- The AND operator (&&) returns true if both expressions are true, otherwise it returns false.
- The OR operator (||) returns true if one or both expressions are true, otherwise it returns false.
- The NOT operator (!) returns true for false statements and false for true statements.

```
<html>
<body>
```

```
<scripttype="text/javascript">
<!--
var a =true;
var b =false;
var linebreak ="<br />";

        document.write("(a && b) => ");
        result =(a && b);
        document.write(result);
        document.write(linebreak);

        document.write("(a || b) => ");
        result =(a || b);
        document.write(result);
        document.write(linebreak);

        document.write("!(a && b) => ");
        result =(!(a && b));
        document.write(result);
        document.write(linebreak);
//-->
</script>
<p>Set the variables to different values and different operators and then try...</p>
</body>
</html>
```

ASSIGNMENT OPERATOR

Assignment operators assign values to JavaScript variables.

Operator	Description	Example
=	Assign	x=10

+=	Add and assign	var a=20;
		a+=10;
		Now a = 30

-=	Sub and assign	Var a=10;
		a-=20;
		Now a=-10

*=	Multiply and assign	Var a=10;
		a*=10;
		Now a=100

/=	Divide and assign	var a=10; a/=2; Now a = 5
%=	Modulus and assign	var a=11; a%=2; Now a = 1

```
<html>
<body>
<scripttype="text/javascript">
```

```
<!--
var a =33;
var b =10;
var linebreak ="<br />";

        document.write("Value of a => (a = b) => ");
        result =(a = b);
        document.write(result);
        document.write(linebreak);

        document.write("Value of a => (a += b) => ");
        result =(a += b);
        document.write(result);
        document.write(linebreak);

        document.write("Value of a => (a -= b) => ");
        result =(a -= b);
        document.write(result);
        document.write(linebreak);

        document.write("Value of a => (a *= b) => ");
        result =(a *= b);
        document.write(result);
        document.write(linebreak);

        document.write("Value of a => (a /= b) => ");
        result =(a /= b);
        document.write(result);
        document.write(linebreak);

        document.write("Value of a => (a %= b) => ");
        result =(a %= b);
        document.write(result);
        document.write(linebreak);
//-->
</script>
<p>Set the variables to different values and different operators and then try...</p>
</body>
</html>
```

```
<!DOCTYPE html>
<html>
<head>
<meta charset="utf-8">
<meta name="viewport" content="width=device-width, initial-scale=1">
<title></title>
</head>
<body>
```

```
<h1 id="abc"> Hello Genext </h1>
<script type="text/javascript">
       var a=10,b=2;
      var c = a ** b;
       document.write(c);
</script>
</body>
</html>
```

Miscellaneous Operator, Ternary Operator

We will discuss two operators here that are quite useful in JavaScript: the **conditional operator** (? :) and the **typeof operator**.

Conditional Operator (? :)

The conditional operator first evaluates an expression for a true or false value and then executes one of the two given statements depending upon the result of the evaluation.

Sr.No.	Operator and Description
1	**? : (Conditional)** If Condition is true? Then value X : Otherwise value Y

Example

Try the following code to understand how the Conditional Operator works in JavaScript.

```
<html>
<body>
<scripttype="text/javascript">
<!--
var a =10;
var b =20;
var linebreak ="<br />";

         document.write ("((a > b) ? 100 : 200) => ");
         result =(a > b)?100:200;
         document.write(result);
         document.write(linebreak);

         document.write ("((a < b) ? 100 : 200) => ");
         result =(a < b)?100:200;
         document.write(result);
         document.write(linebreak);
```

```
//-->
</script>
<p>Set the variables to different values and different operators and then try...</p>
</body>
</html>
```

typeof Operator

The **typeof** operator is a unary operator that is placed before its single operand, which can be of any type. Its value is a string indicating the data type of the operand.

The *typeof* operator evaluates to "number", "string", or "boolean" if its operand is a number, string, or boolean value and returns true or false based on the evaluation.

Here is a list of the return values for the **typeof** Operator.

Type	String Returned by typeof
Number	"number"
String	"string"
Boolean	"boolean"
Object	"object"
Function	"function"
Undefined	"undefined"
Null	"object"

```
<html>
<body>
<scripttype="text/javascript">
<!--
var a =10;
var b ="String";
var linebreak ="<br />";

        result =(typeof b =="string"?"B is String":"B is Numeric");
        document.write("Result => ");
        document.write(result);
        document.write(linebreak);

        result =(typeof a =="string"?"A is String":"A is Numeric");
        document.write("Result => ");
        document.write(result);
        document.write(linebreak);
//-->
</script>
<p>Set the variables to different values and different operators and then try...</p>
</body>
</html>
```

CONDITIONAL STATEMENTS

The JavaScript if-else statement is used to execute the code whether condition is true or false. There are three forms of if statement in JavaScript.

- If Statement
- If else statement
- Nested if (if inside the if)
- if else if statement

IF STATEMENT

It evaluates the content only if expression is true. The signature of JavaScript if statement is given below.

```
if(expression)
{
    //content to be evaluated
}
```

```
<!DOCTYPE html>
<html>
<head>
<meta charset="utf-8">
<meta name="viewport" content="width=device-width, initial-scale=1">
<title></title>
</head>
```

```
<body>
<h1 id="abc"> Hello Genext </h1>
<script type="text/javascript">
        var a = 10,b=20;
        if(a>b)
        {
            alert("A is Greater");
        }
        if(b>a)
        {
           alert("B IS Greater");
        }
        if(a==b)
        {
           alert("Both are Same");
        }

</script>
</body>
</html>
```

Output:

JAVASCRIPT IF...ELSE STATEMENT

It evaluates the content whether condition is true of false. The syntax of JavaScript if-else statement is given below.

Syntax:

```
if(expression){

//content to be evaluated if condition is true

}

else{

//content to be evaluated if condition is false

}
```

Example:

```
<script>

var a=20;

if(a%2==0){
```

```
document.write("a is even number");

}

else{

document.write("a is odd number");

}

</script>
```

Output:a is even

JAVASCRIPT IF...ELSE IF STATEMENT

It evaluates the content only if expression is true from several expressions. The signature of JavaScript if else if statement is given below.

```
if(expression1){

//content to be evaluated if expression1 is true

}

else if(expression2){

//content to be evaluated if expression2 is true

}

else{

//content to be evaluated if no expression is true

}
```

Example:

```
<script>
var a=20;
if(a==10)
{
document.write("a is equal to 10");
}
else if(a==15)
{
document.write("a is equal to 15");
}
else if(a==20){
document.write("a is equal to 20");
}
Else
{
  document.write("a is not equal to 10, 15 or 20");
}
</script>
```

Output:a is equal to 20

```
<!DOCTYPE html>
<html>
<head>
<meta charset="utf-8">
<meta name="viewport" content="width=device-width, initial-scale=1">
<title></title>
</head>
<body>
<script type="text/javascript">
var a = parseInt(prompt("Enter the val of A"));
var b = parseInt(prompt("Enter the val of B"));
var c = parseInt(prompt("Enter the val of C"));

if(a>b)
{
if(a>c)
{
document.write("A");
}
else
{
document.write("C")
}
}
else
{
if(b>c)
{
document.write("B");
}
       else
{
document.write("C");
}
}
</script>
</body>
</html>
```

```
<!DOCTYPE html>
<html>
<head>
<meta charset="utf-8">
<meta name="viewport" content="width=device-width, initial-scale=1">
<title></title>
</head>
<body>
<script type="text/javascript">
                                        var a = parseInt(prompt("Enter the val of A"));
                                        var b = parseInt(prompt("Enter the val of B"));
                                        var c = parseInt(prompt("Enter the val of C"));
                                                if(a>b && a>c)
                                        {
                                                document.write("A");
                                        }
else if(b>c&& b>a)
                                                {
                                                        document.write("B");
                                                }
                                                Else if(c>b && c>a)
                                                {
                                                        document.write("C");
                                                }
                                                Else
                                                {
                                                  Document.write("May be two or three val are
equal")
                                        </script>

</body>
</html>
```

____

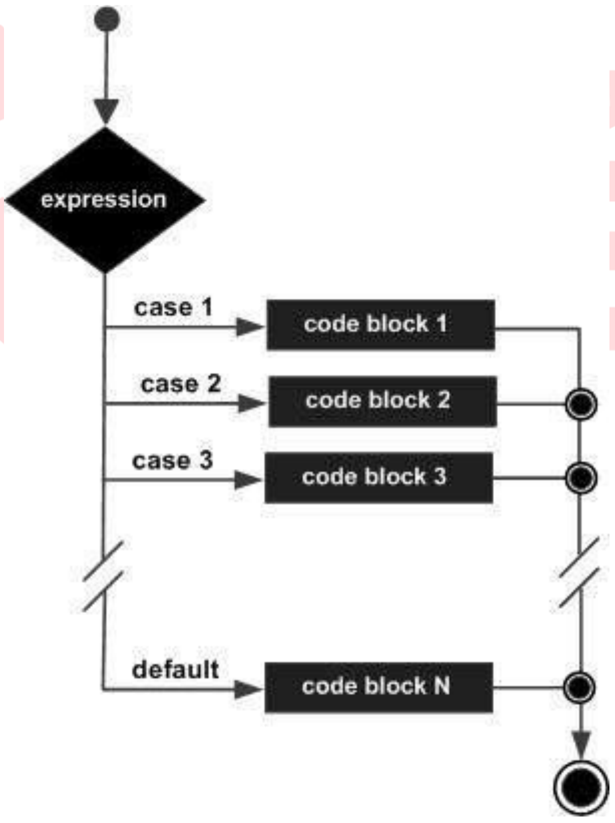
Ternary Operators:-

```
<!DOCTYPE html>
<html>
<head>
        <meta charset="utf-8">
        <meta name="viewport" content="width=device-width, initial-scale=1">
        <title></title>
</head>
```

```
<body>
        <script type="text/javascript">
                var a = parseInt(prompt("Enter the val of A"));
                var b = parseInt(prompt("Enter the val of B"));

                a > b ? document.write("A") : document.write("B");
        </script>

</body>
</html>
```

JAVASCRIPT SWITCH

The JavaScript switch statement is used to execute one code from multiple expressions. It is just like else if statement that we have learned in previous page. But it is convenient than if..else..if because it can be used with numbers, characters etc.



```
switch (expression) {
  case condition 1: statement(s)
  break;

  case condition 2: statement(s)
  break;
  ...
  case condition n: statement(s)
  break;

  default: statement(s)
}
```

Example:

```
<script>
		var grade='A';
		var result;
				switch(grade)
						{
						case 'A':
						result="A Grade";
						break;
						case 'B':
						result="B Grade";
						break;
						case 'C':
						result="C Grade";
						break;
						default:
						result="No Grade";
						}
document.write(result);
</script>
```

Output: A Grade

```
<!DOCTYPE html>
<html>
<head>
<meta charset="utf-8">
<meta name="viewport" content="width=device-width, initial-scale=1">
<title></title>
</head>
<body>
<script type="text/javascript">
  var a = 21, b=5;
  var ch=parseInt(prompt("press 1 for Add, 2 For Sub, 3 for Mul, 4 for Div"));

 switch(ch)
 {
```

```
                    case 1:
                      document.write("Add is = " + (a+b));
                      break;

                    case 2:
                      document.write("Sub is = " + (a-b));
                      break;

                    case 3:
                      document.write("Mul is = " + (a*b));
                      break;

                    case 4:
                      document.write("Div is = " + (a/b));
                      break;

                    default:
                      document.write("Wrong case entered");
            }
</script>
</body>
</html>
```

JAVASCRIPT LOOP

A loop is a control flow statement for specifying iteration, which allows code to be executed repeatedly.

Types of Loop:

There are two types of loop
(i) Entry Controlled (while , for)
(ii) Exit Controlled (do while)

1.WHILE LOOP

The while loop loops through a block of code as long as a specified condition is true.

Syntax:

while (**condition**)

{

code block to be executed

inc/dec;

}

Example:

```
<script>
var i=1;
while (i<=15)
{
  document.write(i + "<br/>");
i++;
}
</script>e
```

Output:

```
11
12
```

```
13
14
15
```

DO WHILE LOOP

The do..while loop is similar to the while loop with one important difference. The body of do...while loop is executed once, before checking the test expression. Hence, the do...while loop is executed at least once.

Syntax:

```
do{
   code to be executed
}while (condition);
```

Example:

```
<script>
Vari=21;
do{
document.write(i + "<br/>");
i++;
}while (i<=25);
</script>
```

Output:

```
2122232425
```

FOR LOOP

Loops through a block of code a number of times.

The syntax of for loop is given below.

```
for (initialization; condition; increment)
{
   code to be executed
}
```

Example:

```
<!DOCTYPE html>
<html>
<head>
        <meta charset="utf-8">
        <meta name="viewport" content="width=device-width, initial-scale=1">
        <title></title>
</head>
```

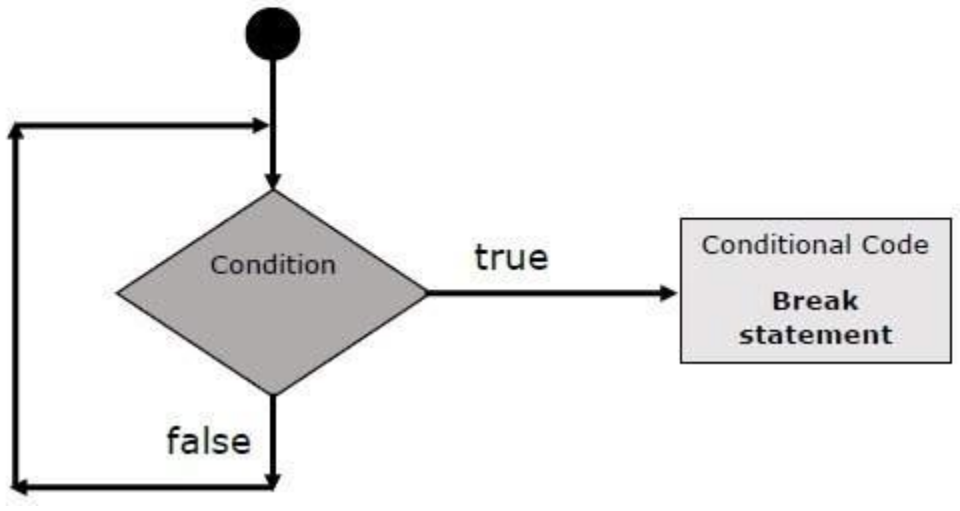
```
<body>
<script type="text/javascript">
          var i;
            for(i=1; i<=10; i++)
            {
                  document.write("<br> Monika");
                    or
document.write("<br>" + i);
            }
</script>
</body>
</html>
```

The break Statement

The **break** statement, which was briefly introduced with the *switch* statement, is used to exit a loop early, breaking out of the enclosing curly braces.

Flow Chart

The flow chart of a break statement would look as follows −



Example

The following example illustrates the use of a **break** statement with a while loop. Notice how the loop breaks out early once **x** reaches 5 and reaches to **document.write (..)** statement just below to the closing curly brace −

```
<html>
<body>
```

```
<scripttype="text/javascript">
<!--
var x =1;
        document.write("Entering the loop<br /> ");

while(x <20){
if(x ==5){
break;// breaks out of loop completely
}
          x = x +1;
          document.write( x +"<br />");
}
        document.write("Exiting the loop!<br /> ");
//-->
</script>

<p>Set the variable to different value and then try...</p>
</body>
</html>
```

Output

```
Entering the loop
2
3
4
5
Exiting the loop!
Set the variable to different value and then try...
```

We already have seen the usage of **break** statement inside **a switch** statement.

The continue Statement

The **continue** statement tells the interpreter to immediately start the next iteration of the loop and skip the remaining code block. When a **continue** statement is encountered, the program flow moves to the loop check expression immediately and if the condition remains true, then it starts the next iteration, otherwise the control comes out of the loop.

Example

This example illustrates the use of a **continue** statement with a while loop. Notice how the **continue** statement is used to skip printing when the index held in variable **x** reaches 5 −

```
<html>
<body>
<scripttype="text/javascript">
<!--
var x =1;
          document.write("Entering the loop<br /> ");

while(x <10){
```

```
            x = x +1;

if(x ==5){
continue;// skip rest of the loop body
}
            document.write( x +"<br />");
}
          document.write("Exiting the loop!<br /> ");
//-->
</script>
<p>Set the variable to different value and then try...</p>
</body>
</html>
```

Output

```
Entering the loop
2
3
4
6
7
8
9
10
Exiting the loop!
Set the variable to different value and then try...
```

JAVASCRIPT FUNCTIONS

JavaScript functions are used to perform operations. We can call JavaScript function many times to reuse the code.

Advantage of JavaScript function:

There are mainly two advantages of JavaScript functions.

- **Code reusability**: We can call a function several times so it save coding.
- **Less coding:** It makes our program compact. We don’t need to write many lines of code each time to perform a common task.

Syntax of declaring function :

```
function functionName([arg1, arg2, ...argN]){
 //code to be executed
}
```

Example:

```
<html>
<head>
<scripttype="text/javascript">
function sayHello(){
        document.write ("Hello there!");
}
</script>

</head>

<body>
<p>Click the following button to call the function</p>
<form>
<inputtype="button"onclick="sayHello()"value="Say Hello">
</form>
<p>Use different text in write method and then try...</p>
</body>
</html>
```

JAVASCRIPT FUNCTION ARGUMENTS

We can call function by passing arguments.

Example of one argument:

```
<html>
<head>
<scripttype="text/javascript">
function sayHello(name, age){
        document.write (name +" is "+ age +" years old.");
}
</script>
</head>

<body>
<p>Click the following button to call the function</p>
<form>
<inputtype="button"onclick="sayHello('Zara',7)"value="Say Hello">
</form>
<p>Use different parameters inside the function and then try...</p>
</body>
</html>
```

FUNCTION WITH RETURN VALUE

We can call function that returns a value and use it in our program. Let's see the example of function that returns value.

```
<html>
<head>
<scripttype="text/javascript">
function concatenate(first, last){
var full;
          full = first + last;
return full;
}
function secondFunction(){
var result;
          result = concatenate('Zara','Ali');
          document.write (result );
}
</script>
</head>

<body>
<p>Click the following button to call the function</p>
<form>
<inputtype="button"onclick="secondFunction()"value="Call Function">
</form>
<p>Use different parameters inside the function and then try...</p>
</body>
</html>
```

Examples:-

```
<!DOCTYPE html>
<html>
<head>
<meta charset="utf-8">
<meta name="viewport" content="width=device-width, initial-scale=1">
<title></title>
<script type="text/javascript">
 function check()
 {
var x = document.getElementById('pwd');
if(x.type=== "password")
{
x.type = "text";
}
else
{
x.type = "password";
}
}
</script>
</head>
```

```
<body>
<form>
<input type="password" name="pwd" id="pwd"><br><br>
<input type="checkbox" name="chk" onclick="check()"> Show Password
</form>
</body>
</html>
```

Example – 2

```
<!DOCTYPE html>
<html>
<head>
<meta charset="utf-8">
<meta name="viewport" content="width=device-width, initial-scale=1">
<title></title>
<script type="text/javascript">
 function validate()
{
var name = document.facebook.fname.value;
var password = document.facebook.pwd.value;

if(name == "")
{
document.getElementById('error').innerHTML = "Name Can't Be Blank";
return false;
}
if(password.length<8)
{
alert("password must be 8 character long");
return false;
}
 }
</script>
</head>
<body>
<form name="facebook" method="get" action="first.html" onsubmit=" return validate();">
<input type="text" name="fname" placeholder="Enter Name"><span
id="error"></span><br><br>
<input type="password" name="pwd"><br><br>
<input type="submit" name="submit" value="Register">
</form>
</body>
```

</html>

Eample – 3:-

```
<!DOCTYPE html>

<html>

<head>

<meta charset="utf-8">

<meta name="viewport" content="width=device-width, initial-scale=1">

<title></title>

<style type="text/css">

#error{ color: red; }

</style>

<script type="text/javascript">

function validate()

{

var x = document.facebook.fname.value;


if(isNaN(x) || x=="")

{

                                        document.getElementById('error').innerHTML="Enter
Numeric value only";

return false;

}

else

{

return true;

}

                                         }

</script>

</head>
```

```
<body>

<form name="facebook" method="get" action="first.html" onsubmit=" return validate();">

<input type="text" name="fname" placeholder="Enter contact"><span
id="error"></span><br><br>

<input type="submit" name="submit" value="Register">

</form>

</body>

</html>
```

Default parameter

```
<!DOCTYPE html>
<html>
<body>

<p>Setting a default value to a function parameter (y = 2).</p>
<p id="demo"></p>

<script>
function myFunction(x, y = 2) {
  return x * y;
}
document.getElementById("demo").innerHTML = myFunction(4);
</script>


</body>
</html>
```

Anonymous Function

Anonymous Function is a function that does not have any name associated with it. Normally we use the *function* keyword before the function name to define a function in JavaScript, however, in anonymous functions in JavaScript, we use only the *function* keyword without the function name.
An anonymous function is not accessible after its initial creation, it can only be accessed by a variable it is stored in as a *function as a value*. An anonymous function can also have multiple arguments, but only one expression.

```
function() {
    // Function Body
 }
```

The below examples demonstrate anonymous functions.

Example 1: In this example, we define an anonymous function that prints a message to the console. The function is then stored in the *greet* variable. We can call the function by invoking *greet().*

- Javascript

```
<script>
vargreet = function() {
    console.log("Welcome to CrystalItSoft!");
};
greet();
</script>
```

Output:

```
Welcome to CrystalItSoft!
```

Example 2: In this example, we pass arguments to the anonymous function.

- Javascript

```
<script>
vargreet = function(platform) {
    console.log("Welcome to ", platform);
};
greet("CrystalItSoft!");
</script>
```

Output:

```
Welcome to CrystalItSoft!
```

As JavaScript supports Higher-Order Functions, we can also pass anonymous functions as parameters into another function.

Example 3: In this example, we pass an anonymous function as a callback function to the *setTimeout()* method. This executes this anonymous function 2000ms later.

- Javascript

```
<script>
setTimeout(function() {
    console.log("Welcome to CrystalItSoft!");
}, 2000);
</script>
```

Output:

```
Welcome to CrystalItSoft!
```

Another use case of anonymous functions is to invoke the function immediately after initialization, this is also known as *Self Executing Function*. This can be done by adding parenthesis we can immediately execute the anonymous function.

Example 4: In this example, we have created a self-executing function.

- Javascript

```
<script>
(function() {
    console.log("Welcome to CrystalItSoft!");
})();
</script>
```

Immediately Invoked Function Expressions or IIFEs

```
// Regular Function.
function Greet()
{
        console.log("Welcome to GFG!");
};
// Execution of Regular Function.
Greet();
____________________
// IIFE creation and execution.
(function() { console.log("Welcome to GFG!"); })();
```

____

JAVASCRIPT OBJECTS

A java Script object is an entity having state and behavior (properties and method). For example: car, pen, bike, chair, glass, keyboard, monitor etc.

JavaScript is an object-based language. Everything is an object in JavaScript.

Creating Objects in JavaScript

- By object literal
- By creating instance of Object directly (using new keyword)

JavaScript Object by object literal

The syntax of creating object using object literal is given below:
object={property1:value1,property2:value2.....propertyN:valueN}

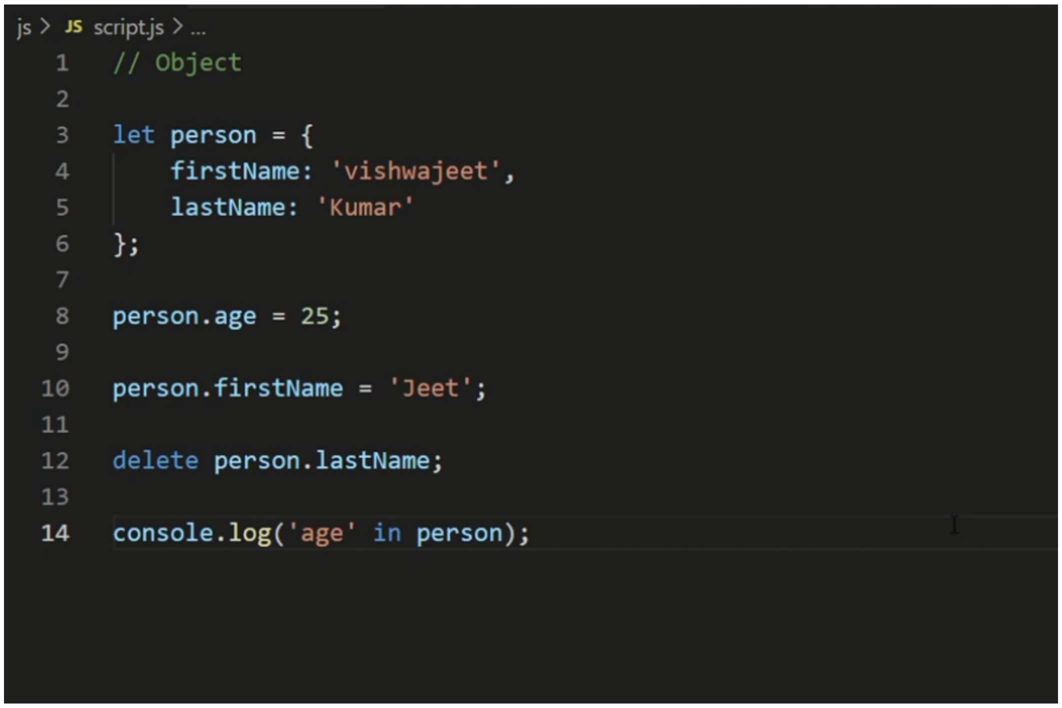
Example:

```
<script>
emp={id:102,name:"Shyam Kumar",salary:40000}
document.write(emp.id+" "+emp.name+" "+emp.salary);
</script>
```

2) BY CREATING INSTANCE OF OBJECT

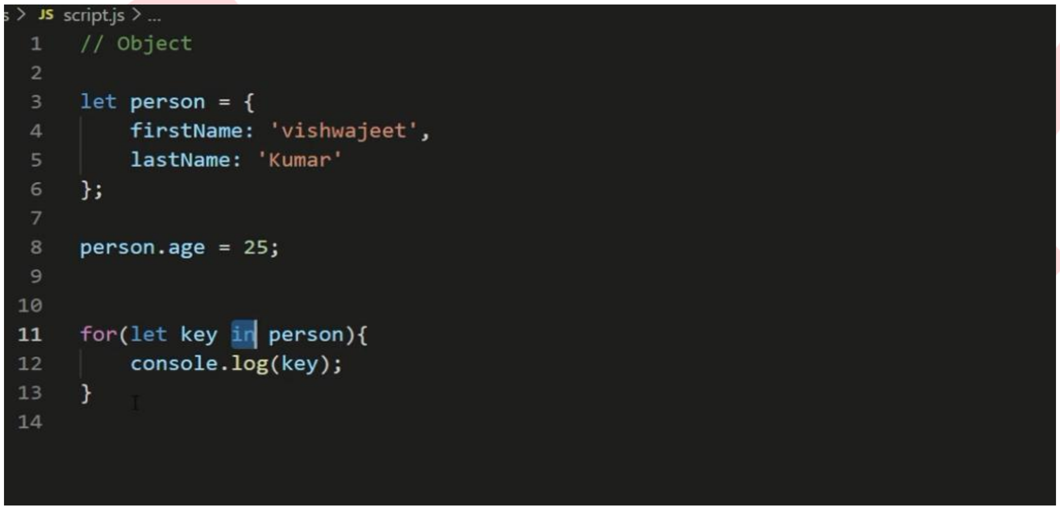
The syntax of creating object directly is given below:
Var objectname=new Object ();
Here, new keyword is used to create object.
Example:

```
<Script>
var  emp=new Object ();

emp.id=101;
emp.name=”NATASHA";
emp.salary=50000;

Document. Write (emp.id+" "+emp.name+" "+emp.salary);

</script>
```



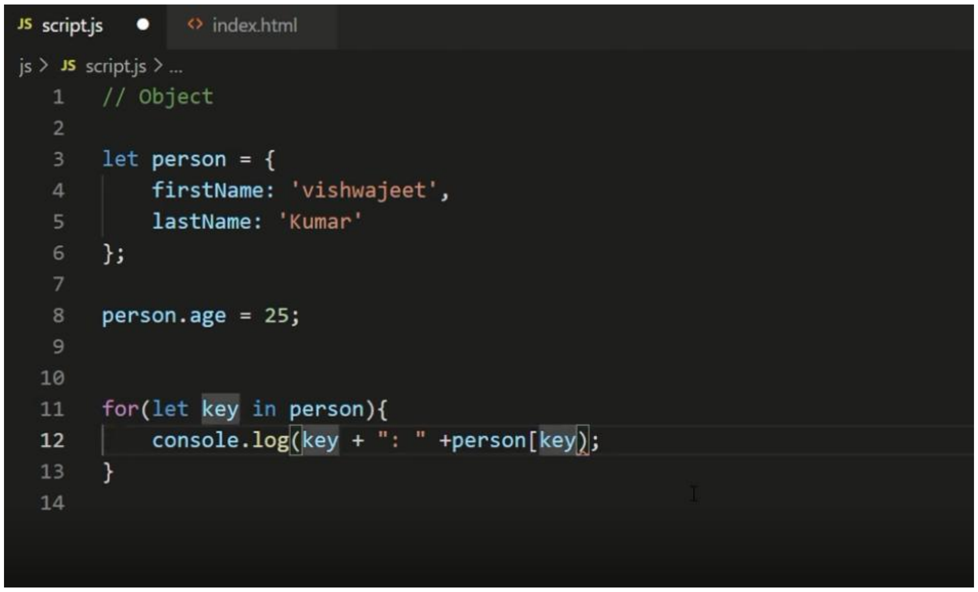
js > JS script.js > ...

```
// Object

let person = {
    firstName: 'vishwajeet',
    lastName: 'Kumar'
};

person.age = 25;

person.firstName = 'Jeet';

delete person.lastName;

console.log('age' in person);
```



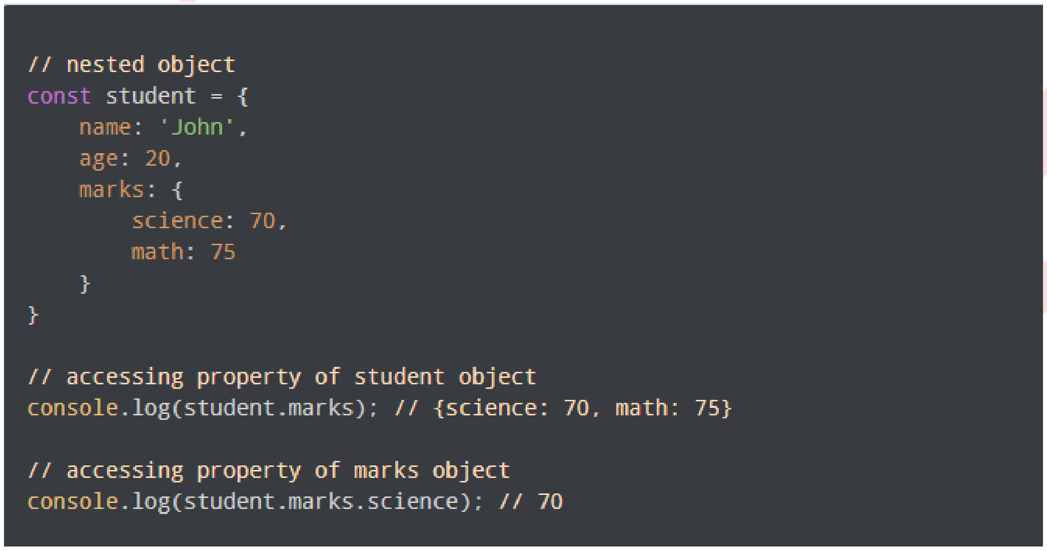
s > JS script.js > ...

```
// Object

let person = {
    firstName: 'vishwajeet',
    lastName: 'Kumar'
};

person.age = 25;


for(let key in person){
    console.log(key);
}

```

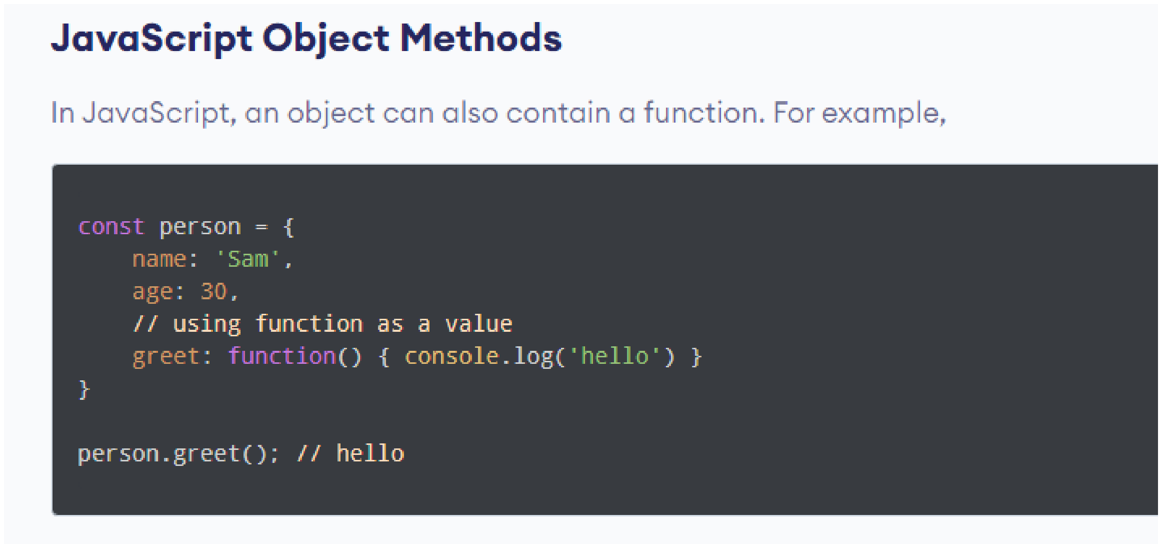


```javascript
// Object

let person = {
    firstName: 'vishwajeet',
    lastName: 'Kumar'
};

person.age = 25;


for(let key in person){
    console.log(key + ": " +person[key]);
}

```

NESTED OBJECT



```javascript
// nested object
const student = {
    name: 'John',
    age: 20,
    marks: {
        science: 70,
        math: 75
    }
}

// accessing property of student object
console.log(student.marks); // {science: 70, math: 75}

// accessing property of marks object
console.log(student.marks.science); // 70
```

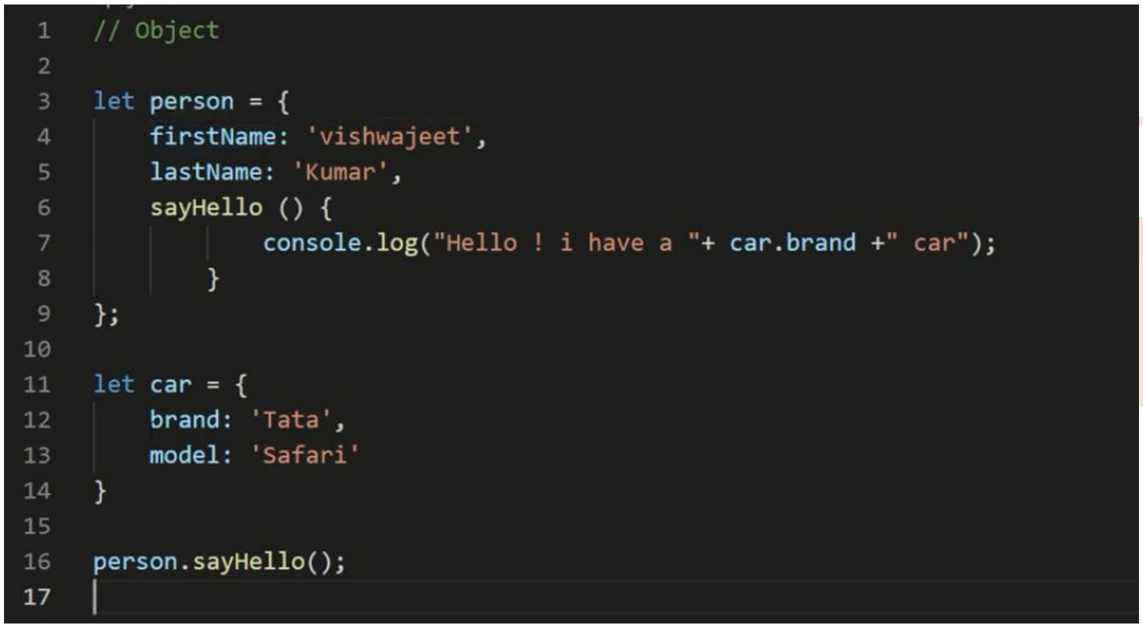


JavaScript Object Methods

In JavaScript, an object can also contain a function. For example,

```
const person = {
    name: 'Sam',
    age: 30,
    // using function as a value
    greet: function() { console.log('hello') }
}

person.greet(); // hello
```

This Key use in Object



```
// Object

let person = {
    firstName: 'vishwajeet',
    lastName: 'Kumar',
    sayHello () {
            console.log("Hello ! i have a "+ car.brand +" car");
        }
};

let car = {
    brand: 'Tata',
    model: 'Safari'
}

person.sayHello();
```

JavaScript Accessors (Getters and Setters)

```
// Create an object:
const person = {
  firstName: "Shaban",
  lastName: "Kumar Gupta",
  language: "english",
  get abc()

{
    return this.lastName;
  }
};
```

```
// Display data from the object using a getter:
document.getElementById("demo").innerHTML = person.abc;
```

```
const person = {
  firstName: "John",
  lastName: "Doe",
  language: "",
  set lang(lang) {
    this.language = lang;
  }
};

// Set an object property using a setter:
person.lang = "english";

// Display data from the object:
document.getElementById("demo").innerHTML = person.language;
```

JavaScript Function or Getter?

```
// Normal function

const person = {
  firstName: "Monika",
  lastName: "Yadav",
  fullName: function() {
    return this.firstName + " " + this.lastName;
  }
};

// Display data from the object using a method:
document.getElementById("demo").innerHTML = person.fullName();
```

```
// Get Function

const person = {
  firstName: "John",
  lastName: "Doe",
  get fullName() {
    return this.firstName + " " + this.lastName;
  }
};

// Display data from the object using a getter:
document.getElementById("demo").innerHTML = person.fullName;
```

Constructor Object In Javascript

```
<!DOCTYPE html>
<html>
<body>
<h2>JavaScript Object Constructors</h2>
<p id="demo"></p>
<script>
// Constructor function for Person objects
function Person(first, last, age, eye) {
  this.firstName = first;
  this.lastName = last;
  this.age = age;
  this.eyeColor = eye;
}
// Create a Person object
const myFather = new Person("crystal", "Genext", 50, "blue");
// Display age
document.getElementById("demo").innerHTML =
"My father is " + myFather.age + ".";
</script>
</body>
</html>
```

```
<!DOCTYPE html>
<html>
<body>
<h2>JavaScript Object Constructors</h2>
<p id="demo"></p>
<script>
// Constructor function for Person objects
function Person(first, last, age, eye) {
  this.firstName = first;
  this.lastName = last;
  this.age = age;
  this.eyeColor = eye;
  this.nationality = "English";
}
// Create 2 Person objects
const myFather = new Person("John", "Doe", 50, "blue");
const myMother = new Person("Sally", "Rally", 48, "green");
// Display nationality
document.getElementById("demo").innerHTML =
"My father is " + myFather.nationality + ". My mother is " + myMother.nationality;
</script>
```

```
</body>
</html>
```

Using the prototype Property

The JavaScript `prototype` property allows you to add new properties to object constructors:

```
<!DOCTYPE html>
<html>
<body>

<h2>JavaScript Objects</h2>
<p>The prototype property allows you to add new methods to objects constructors:</p>
<p id="demo"></p>
<script>
function Person(first, last, age, eye) {
  this.firstName = first;
  this.lastName = last;
  this.age = age;
  this.eyeColor = eye;
}
Person.prototype.nationality = "English";

const myFather = new Person("John", "Doe", 50, "blue");
document.getElementById("demo").innerHTML =
"The nationality of my father is " + myFather.nationality;
</script>

</body>

</html>
```

JAVASCRIPT ARRAY

JavaScript array is an object that represents a collection of similar type of elements.

- By array literal
- By creating instance of Array directly (using new keyword)

1) **JavaScript array literal**

The syntax of creating array using array literal is given below:
Var arrayname=[value1,value2.....valueN];

```
<script>
var i;
var emp=["Sanjana","kratika","nitya"];

for (i=0;i<emp.length;i++)
{
document.write(emp[i] + "<br/>");
}
</script>
```

2) **JavaScript Array directly (new keyword)**

The syntax of creating array directly is given below:

Var array name=new Array();

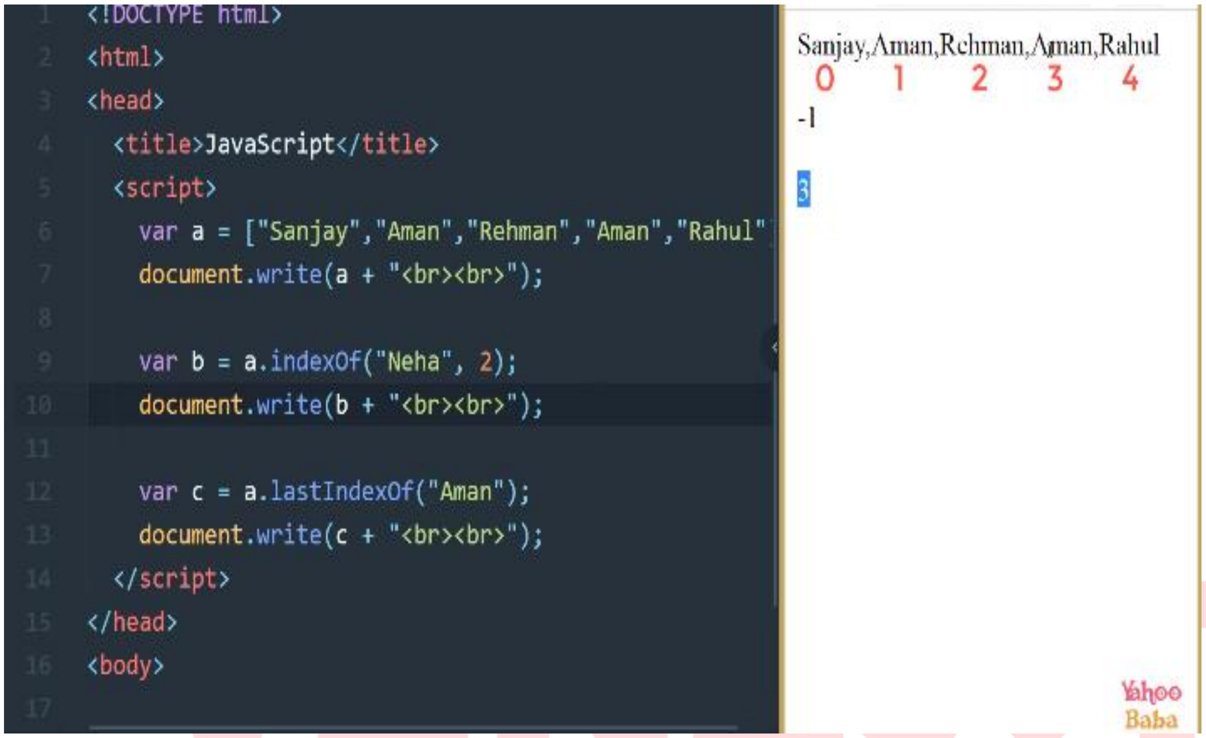
Here, new keyword is used to create instance of array.

Example:

```
<script>
var i;
var emp = new Array();
emp[0] = "Arun";
emp[1] = "Varun";
emp[2] = "John";

for (i=0;i<emp.length;i++)
{
document.write(emp[i] + "<br>");
}
</script>
```

```
<!DOCTYPE html>
<html>
<head>
        <meta charset="utf-8">
        <meta name="viewport" content="width=device-width, initial-scale=1">
        <title></title>

</head>
<body>

<script type="text/javascript">

   let emp = ["Akash","Pranav","preshit"," Aditya ", " Kapil ", "Nazim ", " Jitendra ", "
Harshit " ];

   emp[2] = " Nishant";

   emp.push("Preshit");
   // Insert element at the end of  array

   emp.unshift("Abu");
   // Insert element at the Begining of array

   emp.pop();
   // Remove last element

   emp.shift();
   // remove start element

   emp.splice(2,4);
   //  remove the certain element  like (start, end)

   for(i=0;i<emp.length;i++)
   {
    document.write("<br>" + emp[i]);
   }


</script>

</body>
</html>
```

INdexOf



```
<!DOCTYPE html>
<html>
<head>
  <title>JavaScript</title>
  <script>
    var a = ["Sanjay","Aman","Rehman","Aman","Rahul"
    document.write(a + "<br><br>");

    var b = a.indexOf("Neha", 2);
    document.write(b + "<br><br>");

    var c = a.lastIndexOf("Aman");
    document.write(c + "<br><br>");
  </script>
</head>
<body>
```

```
Sanjay,Aman,Rehman,Aman,Rahul
 0     1     2     3     4
-1

3
```

JAVASCRIPT DATE OBJECT

The JavaScript date object can be used to get year, month and day. You can display a timer on the webpage by the help of JavaScript date object.
JavaScript Date Methods
The important methods of date object are as follows:

Method	Description
getFullYear()	Return the yr. in 4digit.EX.2017
getMonth()	Return the month in 2 digit. EX.0to 11.
getMonth()+1	Return th month in 2 digit. (upto 12)
getDate()	Returns the date in1-2 digit from 1 to 31
getDay()	Returns the day of week in 1 digit 0 to 6
getHours()	Returns all the element having the given name value
getMinutes()	Returns all the element having the given

	class name.
getSeconds()	Returns all the element having the given class name.
getMilliseconds	Returns all the element having the given tag name

Date example:

```
<html>
<body>
Current Date and Time: <span id="txt"></span>
<script>
var today=new Date();
document.getElementById('txt').innerHTML=today;
</script>
</body>
</html>
```

JavaScript Current Time Example

```
<html>
<body>
Current Time: <span id="txt"></span>
<script>
var today=new Date();
var h=today.getHours();
var m=today.getMinutes();
var s=today.getSeconds();
document.getElementById('txt').innerHTML=h+":"+m+":"+s;
</script>
</body>

</html>
```

JAVASCRIPT MATH OBJECT

The JavaScript math object provides several constants and methods to perform mathematical operation.

- **Math.sqrt(n)**

The JavaScript math.sqrt(n) method returns the square root of the given number.

Example

```
<!DOCTYPE html>
<html>
<body>
Square Root of 17 is: <span id="p1"></span>
<script>
document.getElementById('p1').innerHTML=Math.sqrt(17);
</script>
</body>
</html>
```

OUTPUT: Square Root of 17 is: 4.123105625617661

Math.random()

The JavaScript Math.random() method returns the random number between 0 to 1.

Example:

```
<html>
<body>
Random Number is: <span id="p2"></span>
<script>
document.getElementById('p2').innerHTML=Math.random();
</script>
</body>
</html>
```

OUTPUT: Random Number is: 0.7202219589284733

Math.pow(m,n)

The JavaScript math.pow(m,n) method returns the m to the power of n that is mn.

Example:

```
<html>
<body>
3 to the power of 4 is: <span id="p3"></span>
<script>
document.getElementById('p3').innerHTML=Math.pow(3,4);
</script>
</body>
</html>
```

OUTPUT: 3 to the power of 4 is: 81

Math.floor(n)

The JavaScript math.floor(n) method returns the lowest integer for the given number. For example 3 for 3.7, 5 for 5.9 etc.

Example:

```
<!DOCTYPE html>
<html>
<body>
Floor of 4.6 is: <span id="p4"></span>
<script>
document.getElementById('p4').innerHTML=Math.floor(4.6);
</script>
</body>
</html>
```

Math.ceil(n)

The JavaScript math.ceil(n) method returns the largest integer for the given number. For example 4 for 3.7, 6 for 5.9 etc.

```
<!DOCTYPE html>
<html>
<body>
Ceil of 4.6 is: <span id="p5"></span>
<script>
document.getElementById('p5').innerHTML=Math.ceil(4.6);
</script>
</body>
</html>
```

Math.round(n)

The JavaScript math.round(n) method returns the rounded integer nearest for the given number. If fractional part is equal or greater than 0.5, it goes to upper value 1 otherwise lower value 0. For example 4 for 3.7, 3 for 3.3, 6 for 5.9 etc.

Example:

```
<!DOCTYPE html>
<html>
<body>
Round of 4.3 is: <span id="p6"></span><br>
Round of 4.7 is: <span id="p7"></span>
<script>
document.getElementById('p6').innerHTML=Math.round(4.3);
document.getElementById('p7').innerHTML=Math.round(4.7);
</script>
</body>
</html>
```

Output:

```
Round of 4.3 is: 4
Round of 4.7 is: 5
```

Math.abs(n)

The JavaScript math.abs(n) method returns the absolute value for the given number. For example 4 for -4, 6.6 for -6.6 etc.

Example:

```
<!DOCTYPE html>
<html>
<body>
Absolute value of -4 is: <span id="p8"></span>
<script>
document.getElementById('p8').innerHTML=Math.abs(-4);
</script>
</body>
</html>
```

WINDOW OBJECT

The window object represents a window in browser. An object of window is created automatically by the browser.

Window is the object of browser, it is not the object of javascript. The javascript objects are string, array, date etc.

Methods of window object

The important methods of window object are as follows:

Method	Description
Alert()	Display a alert box containing msg with ok button.
Confirm()	displays the confirm dialog box containing message with ok

	and cancel button.
Prompt()	displays a dialog box to get input from the user.
Open()	Open the new window
Close()	Close the current window
setTimeout(fuction(){} , time)	performs action after specified time like calling function, evaluating expressions etc.

Example of alert() in javascript

It displays alert dialog box. It has message and ok button.

```
<script type="text/javascript">
function abc(){
alert("Hello Alert Box");
}
</script>
<input type="button" value="click" onclick="abc()"/>
```

Example of confirm() in javascript

It displays the confirm dialog box. It has message with ok and cancel buttons.

```
<script type="text/javascript">
function abc()
{
var v= confirm("Are u sure?");
        if(v==true)
                {
                alert("ok");
                }
                else
                {
                alert("cancel");
                }

}
</script>
<input type="button" value="delete" onclick="abc()"/>
```

Example of prompt()

It displays prompt dialog box for input. It has message and textfield.

```
<script type="text/javascript">
function msg()
```

```
{
        var name= prompt("Who are you?");
        alert("I am "+name);
  }
</script>
<input type="button" value="click" onclick="msg()"/>
```

Example of open()

It displays the content in a new window.

```
<script type="text/javascript">
function msg()
{
open("http://www.genextcomputer.com/");
}
</script>


<input type="button" value="genext" onclick="msg()"/>
```

Example of setTimeout()

It performs its task after the given milliseconds.

```
<script type="text/javascript">
function msg(){
setTimeout(
function(){
alert("Welcome to Javatpoint after 2 seconds")
},2000);
  }
</script>
<input type="button" value="click" onclick="msg()"/>
```

VALIDATION

It is important to validate the form submitted by the user because it can have inappropriate values. So validation is must.

The JavaScript provides you the facility the validate the form on the client side so processing will be fast than server-side validation.

In this example, we are going to validate the name and password. The name can’t be empty and password can’t be less than 6 characters long.

```
<html>
<body>
<script>
function validateform()
{
var name=document.myform.name.value;
var password=document.myform.password.value;
  if (name==null || name==""){
alert("Name can't be blank");
  return false;
}else if(password.length<6){
alert("Password must be at least 6 characters long.");
  return false;
  }
}
</script>
<body>
<form name="myform" method="post" action="#" onsubmit="return validateform()" >
Name: <input type="text" name="name"><br/>
Password: <input type="password" name="password"><br/>
<input type="submit" value="register">
</form>
</body>
</html>
```

JavaScript Retype Password Validation

```
<!DOCTYPE html>
<html>
<head>
<script type="text/javascript">
function matchpass(){
var firstpassword=document.f1.password.value;
var secondpassword=document.f1.password2.value;
if(firstpassword==secondpassword)
{
```

```
return true;
}
Else
{
alert("password must be same!");
return false;
}
}
</script>
</head>
<body>
<form name="f1" action="#" onsubmit="return matchpass()">
Password:<input type="password" name="password" /><br/>
Re-enter Password:<input type="password" name="password2"/><br/>
<input type="submit">
</form>
</body>
</html>
```

Dom In java script

(document object model)

```
<!DOCTYPE html>
<html>
<body>
<h1>The Document Object</h1>
<h2>The getElementsByClassName() Method</h2>
<p>Change the text of the first element with class="example":</p>

<div class="example">Element1</div>
<div class="example">Element2</div>
<script>
const collection = document.getElementsByClassName("example");
collection[0].innerHTML = "Hello World!";
</script>

</body>
</html>
```

```
<!DOCTYPE html>
<html>
<head>
<style>
.example {
  border: 1px solid black;
  padding 8px;
}
</style>
</head>
<body>

<h1>The Document Object</h1>
<h2>The getElementsByClassName() Method</h2>

<p>Change the background color of all elements with class="example":</p>

<div class="example">
A div with class="example"
</div>
<br>
<div class="example">
A div with class="example"
</div>

<p class="example">
A p element with class="example".
</p>

<p>A <span class="example">span</span> element with class="example".</p>

<script>
const collection = document.getElementsByClassName("example");
for (let i = 0; i < collection.length; i++) {
  collection[i].style.backgroundColor = "red";
}
</script>

</body>
</html>
```

GetelementsByTagName

```
<!DOCTYPE html>
<html>
<body>

<h1>The Document Object</h1>
<h2>The getElementsByTagName() Method</h2>

<p>This is a p element</p>
<p>This is also a p element.</p>
<p>This is also a p element.
Change the background color of all p elements in this document:</p>

<script>
const collection = document.getElementsByTagName("P");
for (let i = 0; i < collection.length; i++) {
  collection[i].style.backgroundColor = "red";
}
</script>
</body>
</html>
```

Create Element

```
<!DOCTYPE html>
<html>
<body>

<h1>The Document Object</h1>
<h2>The createElement() Method</h2>

<p>Create a p element with some text:</p>

<script>
// Create element:
const para = document.createElement("p");

para.innerText = "This is a paragraph.";
```

```
// Append to body:
document.body.appendChild(para);
</script>

</body>
</html>
```

QuerySelector

```
<!DOCTYPE html>
<html>
<body>

<h1>The Document Object</h1>
<h2>The querySelector() Method</h2>

<p>Change the text of the element with id="demo":</p>
<p id="demo">This is a p element with id="demo".</p>

<script>
document.querySelector("#demo").innerHTML = "Hello World!";
</script>
</body>
</html>
```

//Create Element and Append Element

```
<!DOCTYPE html>
<html>
<body>
<h1>The Element Object</h1>
<h2>The appendChild() Method</h2>

<ul id="myList">
<li>Genext</li>
<li>IICA</li>
</ul>

<p>Click "Append" to append an item to the end of the list:</p>
```

```
<button onclick="myFunction()">Append</button>

<script>
function myFunction() {

// Create an "li" node:
const node = document.createElement("li");

// Create a text node:
const textnode = document.createTextNode("Crystal");

// Append the text node to the "li" node:
node.appendChild(textnode);

// Append the "li" node to the list:
document.getElementById("myList").appendChild(node);
}
</script>

</body>
</html>
```

Move item one list to other list

```
<!DOCTYPE html>
<html>
<body>

<h1>The Element Object</h1>
<h2>The appendChild() Method</h2>

<ul id="myList1">
<li>IICA</li>
<li>RCA</li>
</ul>
<ul id="myList2">
<li>Genext</li>
<li>Crystal</li>
</ul>

<p>Click "Move" to move an item from one list to another:</p>

<button onclick="myFunction()">Move</button>
```

```
<script>
function myFunction() {
  const node = document.getElementById("myList2").lastElementChild;

  document.getElementById("myList1").appendChild(node);
}
</script>

</body>
</html>
```

Insert Before

```
<!DOCTYPE html>
<html>
<body>
<h1>The Element Object</h1>
<h2>The insertBefore() Method</h2>

<ul id="myList">
<li>Genext</li>
<li>Crystal</li>
</ul>

<script>
// Create a "li" element:
const newNode = document.createElement("li");
// Create a text node:
const textNode = document.createTextNode("Rca");
// Append text node to "li" element:
newNode.appendChild(textNode);

// Insert before existing child:
const list = document.getElementById("myList");
list.insertBefore(newNode, list.children[1]);
</script>

</body>
</html>
```

Remove child element

```
<!DOCTYPE html>
<html>
<body>
<h1>The Element Object</h1>
<h2>The removeChild() Method</h2>

<p>Click "Remove" to remove the first item from the list:</p>
<button onclick="myFunction()">Remove</button>

<ul id="myList">
<li>Genext</li>
<li>IICA</li>
<li>Crystal</li>
</ul>

<script>
function myFunction() {
  const list = document.getElementById("myList");
  list.removeChild(list.firstElementChild);
}
</script>

</body>
</html>
```

```
<!DOCTYPE html>
<html>
<body>
<h1>The Element Object</h1>
<h2>The removeChild() Method</h2>

<p>Click "Remove" to remove the first child (index 0)</p>
<button onclick="myFunction()">Remove</button>

<ul id="myList">
<li>Genext</li>
<li>RCA</li>
<li>IICA</li>
</ul>


<script>
function myFunction() {
  const list = document.getElementById("myList");

  if (list.hasChildNodes())
```

```
 {
   list.removeChild(list.children[2]);
  }
}
</script>

</body>
</html>
```

Clone Element

```
<!DOCTYPE html>
<html>
<body>
<h1>The Element Object</h1>
<h2>The cloneNode() Method</h2>
<button onclick="myFunction()">Copy</button>
<p>Click "Copy" to copy the "demo" element, including all its attributes and child elements, and append
it to the document.</p>

<div id="demo" style="border:1px solid black;background-color:pink">
<p style="color:red; padding:10px">A p element</p>
<p style="color:green; padding:10px ">A p element</p>
<p style="color:blue; padding:10px ">A p element</p>
</div>

<script>
function myFunction() {
  const node = document.getElementById("demo");
  const clone = node.cloneNode(true);
  document.body.appendChild(clone);
}
</script>

</body>
</html>
```

HTML DOM Element replaceChild()

```
<!DOCTYPE html>
<html>
<body>
<h1>The Element Object</h1>
<h2>The replaceChild() Method</h2>

<ul id="myList">
```

```
<li>Genext</li>
<li>Crystal</li>
<li>IICA</li>
</ul>

<p>Click "Replace" to replace the first item in the the list.</p>

<button onclick="myFunction()">"Replace"</button>

<p>This example replaces the Text node "Coffee" with a Text node "Water". Replacing the entire li
element is also an alternative.</p>

<script>
function myFunction() {
// Select first child element:
const element = document.getElementById("myList").children[0];

// Create a new text node:
const newNode = document.createTextNode("Water");

// Replace the text node:
element.replaceChild(newNode, element.childNodes[0]);
}
</script>

</body>
</html>
```

HTML DOM Element insertAdjacentElement()

```
<!DOCTYPE html>
<html>
<body>
<h1>The Element Object</h1>
<h2>The insertAdjacentElement() Method</h2>

<button onclick="myFunction()">Move</button>
<p>Click "Move" to insert the red span after the header.</p>

<span id="mySpan" style="color:red">My span</span>
<h2 id="myH2">My Header</h2>

<script>
function myFunction() {
  const span = document.getElementById("mySpan");
  const h2 = document.getElementById("myH2");
  h2.insertAdjacentElement("afterend", span);
}
</script>

</body>
</html>
```

```
<!DOCTYPE html>
<html>
<body>
<h1>The Element Object</h1>
<h2>The insertAdjacentElement() Method</h2>

<button onclick="myFunction()">Move</button>
<p>Click "Move" to insert the red span before the header:</p>

<h2 id="myH2">My Header</h2>
<p><span style="color:red">My span</span></p>

<script>
function myFunction() {
  const span = document.getElementsByTagName("span")[0];
  const h2 = document.getElementById("myH2");
  h2.insertAdjacentElement("beforebegin", span);
}
</script>

</body>
</html>
```

JavaScript Events

The change in the state of an object is known as an **Event**. In html, there are various events which represents that some activity is performed by the user or by the browser. When javascript code is included in HTML, js react over these events and allow the execution. This process of reacting over the events is called **Event Handling**. Thus, js handles the HTML events via **Event Handlers**.

For example, when a user clicks over the browser, add js code, which will execute the task to be performed on the event.

Some of the HTML events and their event handlers are:

Mouse events:

Event Performed	Event Handler	Description
click	onclick	When mouse click on an element
mouseover	onmouseover	When the cursor of the mouse comes over the element
mouseout	onmouseout	When the cursor of the mouse leaves an element
mousedown	onmousedown	When the mouse button is pressed over the element
mouseup	onmouseup	When the mouse button is released over the element
mousemove	onmousemove	When the mouse movement takes place.

Keyboard events:

Event Performed	Event Handler	Description
Keydown & Keyup	onkeydown & onkeyup	When the user press and then release the key

Form events:

Event Performed	Event Handler	Description
Focus	onfocus	When the user focuses on an element
submit	onsubmit	When the user submits the form
Blur	onblur	When the focus is away from a form element
change	onchange	When the user modifies or changes the value of a form element

Window/Document events

Event Performed	Event Handler	Description
Load	onload	When the browser finishes the loading of the page
unload	onunload	When the visitor leaves the current webpage, the browser unloads it
Resize	onresize	When the visitor resizes the window of the browser

Dom Events

```
<!DOCTYPE html>
<html>
<head>
<title>JS Mouse Events - Button Demo</title>
</head>
<body>
<button id="btn">Click me with any mouse button: left, right, middle, ...</button>
<p id="message"></p>
<script>
    let btn = document.querySelector('#btn');

    // disable context menu when right-mouse clicked
    btn.addEventListener('contextmenu', (e) => {

        e.preventDefault();
    });

    // show the mouse event message
    btn.addEventListener('mouseup', (e) => {
        let msg = document.querySelector('#message');
        switch (e.button) {
            case 0:
                msg.textContent = 'Left mouse button clicked.';
                break;
            case 1:
                msg.textContent = 'Middle mouse button clicked.';
                break;
            case 2:
                msg.textContent = 'Right mouse button clicked.';
                break;
            default:
                msg.textContent = `Unknown mouse button code: ${event.button}`;
        }
    });
</script>
</body>
</html>
```

```
<!DOCTYPE html>
<html>
<body>

<h2>JavaScript HTML Events</h2>
<h2 onclick="this.innerHTML='Ooops!'">Click on this text!</h2>

</body>
</html>
```

```
<!DOCTYPE html>
<html>
<body>
<h1 id="h4" onmouseover="handle(event)">Mouse Over Here !!</h1>
<h1 id="h2" onclick="handle(event)">Click Here !!</h1>
<h1 id="h3" ondblclick="handle(event)">Double Click Here !!</h1>

<script type="text/javascript">
   function handle(e) {
     alert(e.type);
   }
</script>
</body>
</html>
```

---

https://www.w3schools.com/jsref/obj_mouseevent.asp
online show all events.

Adding the addEventListener Method

You can also add event listeners using a method called addEventListener. The **EventTarget.addEventListener()** method adds the specified EventListener-compatible object to the list of event listeners for the specified event type on the **EventTarget** on which it is called.

```
<!DOCTYPE html>
<html>
<body>
<button id="eventBtn">Try it</button>
<p id="display"></p>
<script>
  document.getElementById("eventBtn").addEventListener("click", myFunction);
  function myFunction() {
    document.getElementById("display").innerHTML = "Its Worked !!";
  }
</script>
</body>
</html>
```

Remove eventlistner

```
<!DOCTYPE html>
<html>
<head>
<meta charset=utf-8 />
<title>Events in JavaScript: Removing event listeners</title>
</head>
<body>
<button id="element">Click Me</button>

<script>
  var element = document.getElementById('element');

function callback() {
  alert('Hello once');
  element.removeEventListener('click', callback);
}
```

```
// Add listener
element.addEventListener('click', callback);
</script>

</body>
</html>
```

Event with anonymous function

```
<!DOCTYPE html>
<html>
<head>
<meta charset=utf-8 />
<title>Events in JavaScript: Removing event listeners</title>
</head>
<body>
<button id="element">Click Me</button>
<script>
var user = {
 firstname: ‘genext’,
 greeting: function(){
   alert('My name is ' + this.firstname);
 }
};

// Call the method with the correct
// context inside an anonymouse function
element.addEventListener('click', function() {
  user.greeting();
});
</script>
</body>
</html>
```

Bind Function

```
<!DOCTYPE html>
<html>
<head>
<meta charset=utf-8 />
<title>Events in JavaScript: Preserving callback context using bind</title>
</head>
```

```
<body>
<button id="element">Click Me</button>

<script>
        var element = document.getElementById('element');

var user = {
 firstname: 'Bob',
 greeting: function(){
   alert('My name is ' + this.firstname);
 }
};

// Overwrite the original function with
// a new function with its execution
// context 'bound' to the user object
user.greeting = user.greeting.bind(user);

// Add the bound function as the callback
element.addEventListener('click', user.greeting);
</script>
</body>
</html>
```

Page Load event

```
<!DOCTYPE html>
<html>
<body onload="myFunction()">

<h1>Hello World!</h1>

<script>
function myFunction() {
  alert("Page is loaded");
}
</script>

</body>
</html>
```

```
<!DOCTYPE html>
<html>
<body>

<img src="pic.jpg" onload="loadImage()" width="100" height="132">

<script>
function loadImage() {
  alert("Image is loaded");
}
</script>

</body>
</html>
```

Scroll Event

```
<!DOCTYPE html>
<html>
<head>
<style>
div {
  border: 1px solid black;
  width: 200px;
  height: 100px;
  overflow: scroll;
}
</style>
</head>
<body>
<h1>The onscroll Event</h1>
<p>Try the scrollbar in div.</p>

<div onscroll="myFunction()">In my younger and more vulnerable years my father gave me
some advice that I've been turning over in my mind ever since.
<br><br>
'Whenever you feel like criticizing anyone,' he told me, just remember that all the people in this
world haven't had the advantages that you've had.'</div>

<p>Scrolled <span id="demo">0</span> times.</p>

<script>
```

```
let x = 0;
function myFunction() {
  document.getElementById("demo").innerHTML = x += 1;
}
</script>

</body>
</html>
```

```
<!DOCTYPE html>
<html>
<style>
.test {
  background-color: yellow;
}
</style>

<body style="font-size:20px;height:1500px">

<h1>The onscroll Event</h1>

<p id="myP" style="position:fixed">
If you scroll 50 pixels down from the top of this page, the class "test" is added to this paragraph.
Scroll up again to remove the class.</p>

<script>
window.onscroll = function() {myFunction()};

function myFunction() {
  if (document.documentElement.scrollTop > 50) {
    document.getElementById("myP").className = "test";
  } else {
    document.getElementById("myP").className = "";
  }
}
</script>

</body>
</html>
```

```
<!DOCTYPE html>
```

```
<html>
<head>
<style>
.slideUp {
  animation-name: slideUp;
  animation-name: slideUp;
  animation-duration: 1s;
  animation-duration: 1s;
  visibility: visible;
}

@keyframes slideUp {
  0% {
    opacity: 0;
    transform: translateY(70%);
  }
  100% {
    opacity: 1;
    transform: translateY(0%);
  }
}

body {height:1500px;}
.col-1 {float:left}
.col-2 {float:left;padding-left:25px;}
img {width:180px;height:100px;visibility:hidden;}
hr {margin-top:400px;}
</style>
</head>
<body>
<h1>The onscroll Event</h1>

<p>Scroll down this page.</p>
<p>When you have scrolled 350px from the top, an image will slide in.</p>

<hr>
<div class="col-1">
<img id="myImg" src="img_pulpit.jpg" width="304" height="228">
</div>

<div class="col-2">
  Just some text..
</div>
```

```
<script>
window.onscroll = function() {myFunction()};

function myFunction() {
  if (document.documentElement.scrollTop > 350) {
    document.getElementById("myImg").className = "slideUp";
  }
}
</script>

</body>
</html>
```

See Input Events Online

https://www.w3schools.com/js/js_events_examples.asp

Bubbling

The bubbling principle is simple.

When an event happens on an element, it first runs the handlers on it, then on its parent, then all the way up on other ancestors.

```
<!doctype html>
<body>
<style>
  body *
{
    margin: 10px;
    border: 1px solid blue;
  }
</style>

<form onclick="alert('form')">FORM
  <div onclick="alert('div')">DIV
    <p onclick="alert('p')">P</p>
  </div>
</form>
</body>
```

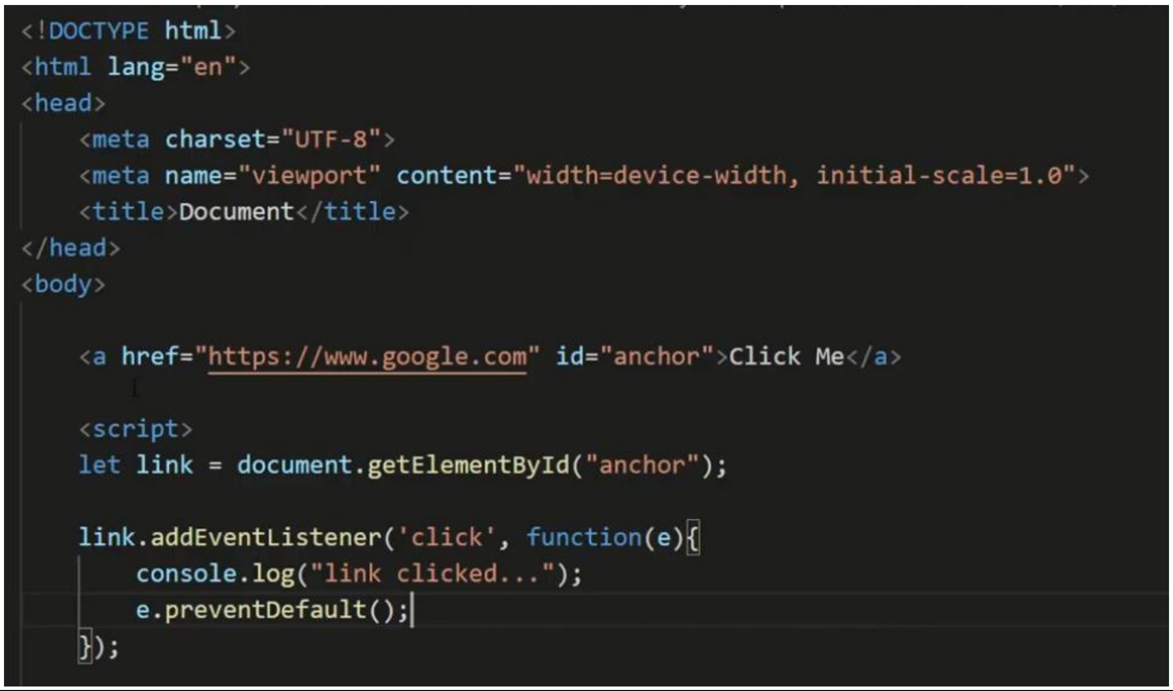
Capturing

```
<!doctype html>
<body>
<style>
  body * {
    margin: 10px;
    border: 1px solid blue;
  }
</style>

<form>FORM
  <div>DIV
    <p>P</p>
  </div>
</form>

<script>
  for(let elem of document.querySelectorAll('*')) {
    elem.addEventListener("click", e => alert(`Capturing: ${elem.tagName}`),
true);
    elem.addEventListener("click", e => alert(`Bubbling: ${elem.tagName}`));
  }
</script>
</body>
```

---

preventDefault

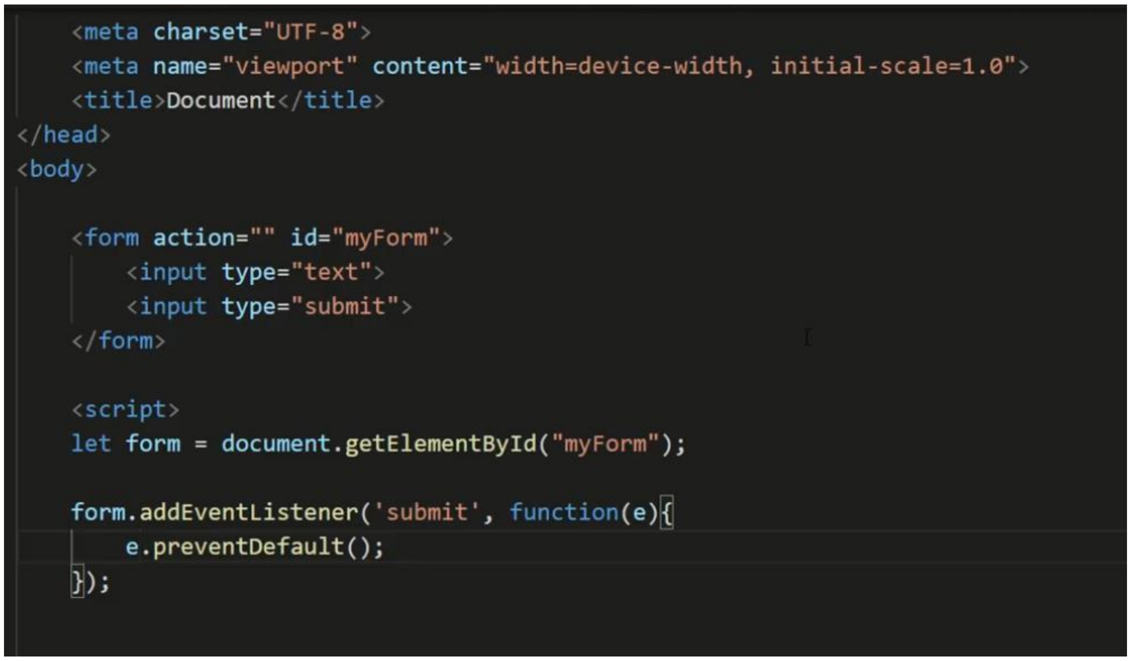
The preventDefault() method cancels the event if it is cancelable, meaning that the default action that belongs to the event will not occur.



```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Document</title>
</head>
<body>

    <a href="https://www.google.com" id="anchor">Click Me</a>

    <script>
    let link = document.getElementById("anchor");

    link.addEventListener('click', function(e){
        console.log("link clicked...");
        e.preventDefault();
    });
```

```
<!DOCTYPE html>
<html>
<body>

Try to check this box: <input type="checkbox" id="myCheckbox">

<p>Toggling a checkbox is the default action of clicking on a checkbox. The preventDefault()
method prevents this from happening.</p>

<script>
document.getElementById("myCheckbox").addEventListener("click", function(event){
  event.preventDefault()
});
</script>

</body>
</html>
```

Form Not Submit Bacause you we write preventDefault:



```
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Document</title>
</head>
<body>

    <form action="" id="myForm">
        <input type="text">
        <input type="submit">
    </form>

    <script>
    let form = document.getElementById("myForm");

    form.addEventListener('submit', function(e){
        e.preventDefault();
    });
```

JavaScript Promise and Promise Chaining

In this tutorial, you will learn about JavaScript promises and promise chaining with the help of examples.

In JavaScript, a promise is a good way to handle **asynchronous** operations. It is used to find out if the asynchronous operation is successfully completed or not.
A promise may have one of three states.

- Pending
- Fulfilled
- Rejected

A promise starts in a pending state. That means the process is not complete. If the operation is successful, the process ends in a fulfilled state. And, if an error occurs, the process ends in a rejected state.

For example, when you request data from the server by using a promise, it will be in a pending state. When the data arrives successfully, it will be in a fulfilled state. If an error occurs, then it will be in a rejected state.

Create a Promise

To create a promise object, we use the `Promise()` constructor.

```
let promise = newPromise(function(resolve, reject){
//do something
});
```

The `Promise()` constructor takes a function as an argument. The function also accepts two functions `resolve()` and `reject()`.
If the promise returns successfully, the `resolve()` function is called. And, if an error occurs, the `reject()` function is called.

Let's suppose that the program below is an asynchronous program. Then the program can be handled by using a promise.

Example 1: Program with a Promise

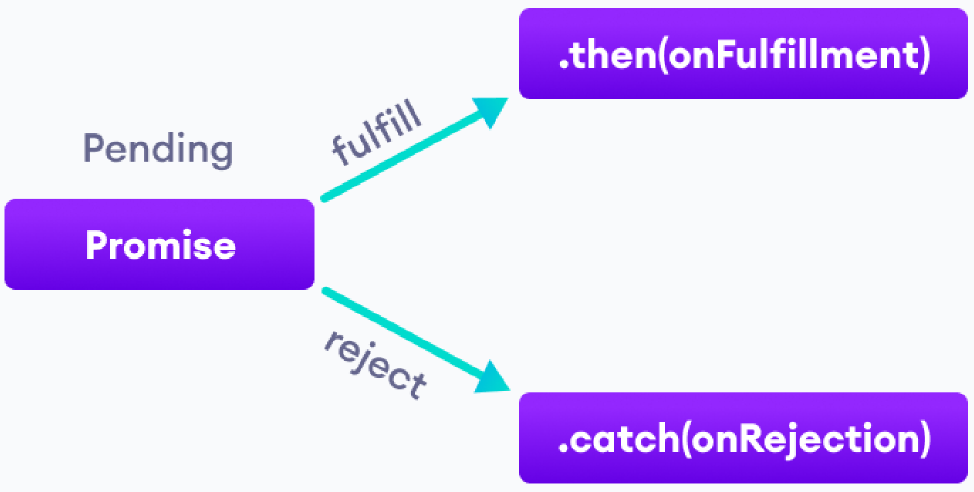
```
const count = true;

let countValue = newPromise(function (resolve, reject) {
if (count) {
        resolve("There is a count value.");
```

```
    } else {
        reject("There is no count value");
    }
});

console.log(countValue);
```
Run Code

Output

```
Promise {<resolved>: "There is a count value."}
```

In the above program, a `Promise` object is created that takes two functions: `resolve()` and `reject()`. `resolve()` is used if the process is successful and `reject()` is used when an error occurs in the promise.
The promise is resolved if the value of `count` is true.



Working of JavaScript promise

JavaScript Promise Chaining

Promises are useful when you have to handle more than one asynchronous task, one after another. For that, we use promise chaining.

You can perform an operation after a promise is resolved using methods `then()`, `catch()` and `finally()`.

JavaScript then() method

The `then()` method is used with the callback when the promise is successfully fulfilled or resolved.

The syntax of `then()` method is:

```
promiseObject.then(onFulfilled, onRejected);
```

Example 2: Chaining the Promise with then()

```
// returns a promise

let countValue = newPromise(function (resolve, reject) {
  resolve("Promise resolved");
});

// executes when promise is resolved successfully

countValue
  .then(functionsuccessValue(result) {
console.log(result);
  })

  .then(functionsuccessValue1() {
console.log("You can call multiple functions this way.");
  });
```

Run Code

Output

```
Promise resolved
You can call multiple functions this way.
```

In the above program, the `then()` method is used to chain the functions to the promise. The `then()` method is called when the promise is resolved successfully.

You can chain multiple `then()` methods with the promise.

JavaScript catch() method

The `catch()` method is used with the callback when the promise is rejected or if an error occurs. For example,

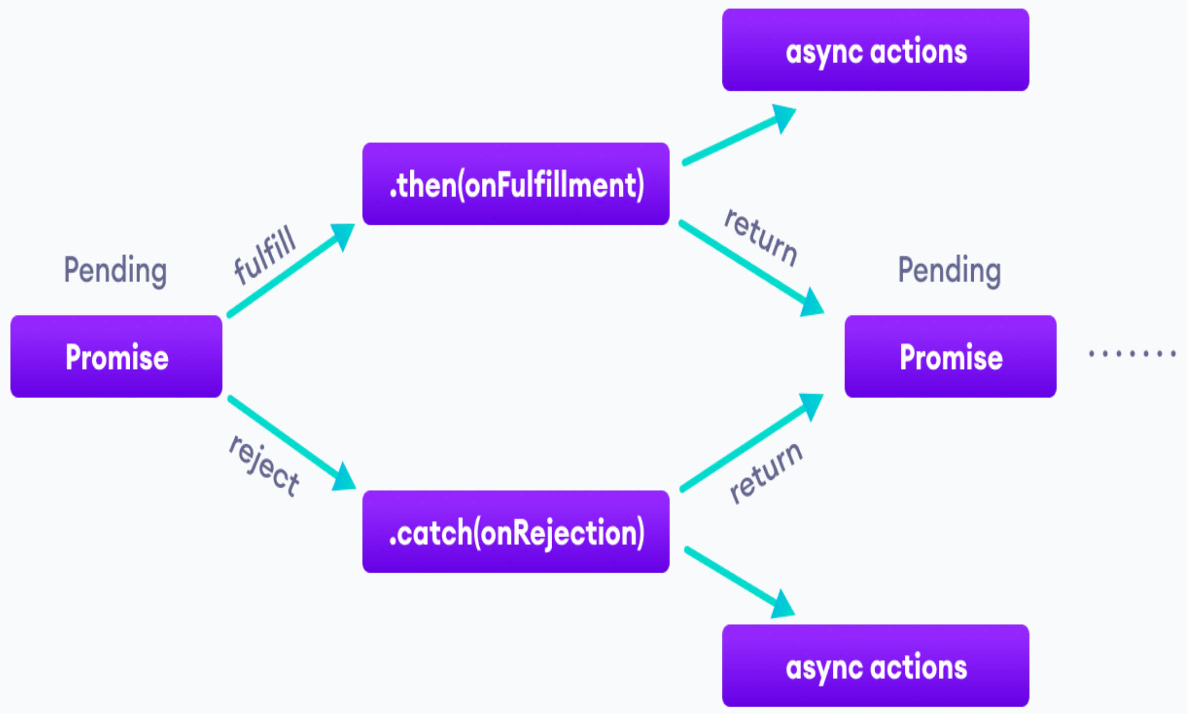
```
// returns a promise
let countValue = newPromise(function (resolve, reject) {
   reject('Promise rejected');
});

// executes when promise is resolved successfully
countValue.then(
functionsuccessValue(result) {
console.log(result);
    },
 )

// executes if there is an error
.catch(
functionerrorValue(result) {
console.log(result);
    }
);
```

Run Code

Output

```
Promise rejected
```

In the above program, the promise is rejected. And the `catch()` method is used with a promise to handle the error.



Working of JavaScript promise chaining

JavaScript Promise Versus Callback

Promises are similar to callback functions in a sense that they both can be used to handle asynchronous tasks.
JavaScript callback functions can also be used to perform synchronous tasks.

Their differences can be summarized in the following points:

JavaScript Promise

1. The syntax is user-friendly and easy to read.
2. Error handling is easier to manage.
3. **Example:**

```

api().then(function(result) {
return api2() ;
}).then(function(result2) {
return api3();
}).then(function(result3) {
// do work
}).catch(function(error) {
//handle any error that may occur before this point
```

```
});
```

JavaScript Callback

1. The syntax is difficult to understand.
2. Error handling may be hard to manage.
3. **Example:**

```

api(function(result){
    api2(function(result2){
        api3(function(result3){
// do work
if(error) {
// do something
            }
else {
// do something
            }
        });
    });
```

```
});
```

JavaScript finally() method

You can also use the `finally()` method with promises. The `finally()` method gets executed when the promise is either resolved successfully or rejected. For example,

```
// returns a promise
let countValue = newPromise(function (resolve, reject) {
// could be resolved or rejected
    resolve('Promise resolved');
});

// add other blocks of code
countValue.finally(
functiongreet() {
console.log('This code is executed.');
    }
);
```

Run Code

Output

```
This code is executed.
```

ES6 (Ecma Script)

Rest parameter

Rest parameter is an improved way to handle function parameter, allowing us to more easily handle various input as parameters in a function. The rest parameter syntax allows us to represent an indefinite number of arguments as an array. With the help of a rest parameter a function can be called with any number of arguments, no matter how it was defined. Rest parameter is added in ES2015 or ES6 which improved the ability to handle parameter.

```
// es6 rest parameter
function fun(...input)
{
        let sum = 0;
        for(let i of input)
{
                sum+=i;
        }
        return sum;
}
console.log(fun(1,2)); //3
console.log(fun(1,2,3)); //6
console.log(fun(1,2,3,4,5)); //15
```

Spread operator :- allows an iterable to expand in places where 0+ arguments are expected. It is mostly used in the variable array where there is more than 1 values are expected. It allows us the privilege to obtain a list of parameters from an array. Syntax of Spread operator is same as Rest parameter but it works completely opposite of it.

```
// normal array concat() method
let arr = [1,2,3];
let arr2 = [4,5];

arr = arr.concat(arr2);

console.log(arr); // [ 1, 2, 3, 4, 5 ]
```

```
// spread operator doing the concat job
let arr = [1,2,3];
let arr2 = [4,5];

arr = [...arr,...arr2];
console.log(arr); // [ 1, 2, 3, 4, 5 ]
```

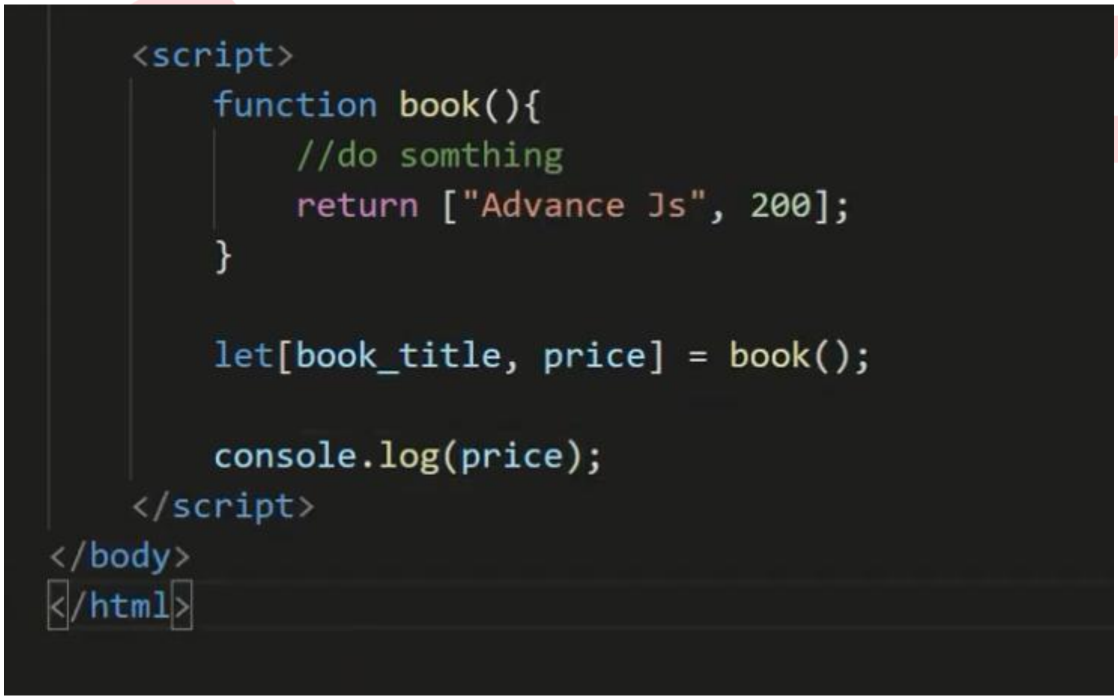
For of

```
<!DOCTYPE html>
<html>
<body>

<h1>JavaScript Statements</h1>
<h2>The for...of Loop</h2>

<p>Iterate (loop) over the values of an array:</p>

<p id="demo"></p>

<script>
let text = "";
const branch = [‘crystal’, ‘genext’, ‘iica’];

for (let x of branch)
{
  text += x + " ";
}
document.getElementById("demo").innerHTML = text;
</script>

</body>
</html>
```

Destructuring:-

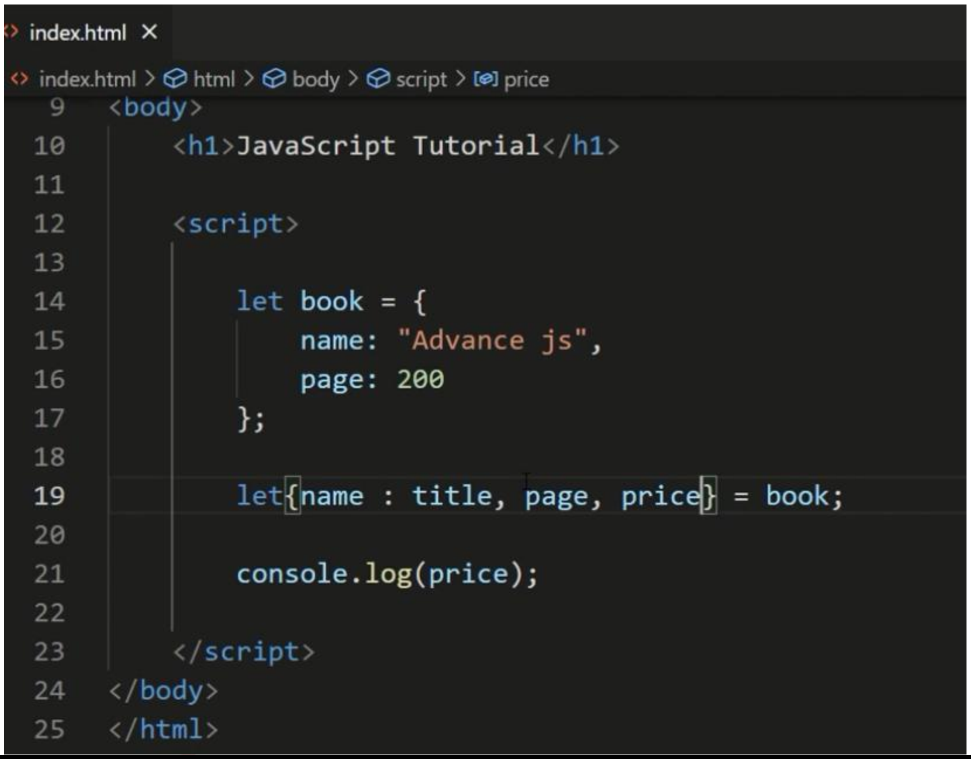
Assignment is a JavaScript expression that allows to **unpack values** from arrays, or properties from objects, into distinct variables data can be extracted from *arrays, objects, nested objects* and **assigning to variables**. In Destructuring Assignment on the left-hand side defined that which value should be unpacked from the sourced variable.

```
<script>
var names = ["alpha", "beta", "gamma", "delta"];
var [firstName, secondName] = names;
console.log(firstName);//"alpha"
console.log(secondName);//"beta"
//Both of the procedure are same
var [firstName, secondName] = ["alpha", "beta", "gamma", "delta"];

console.log(firstName);//"alpha"
console.log(secondName);//"beta
</script>
```



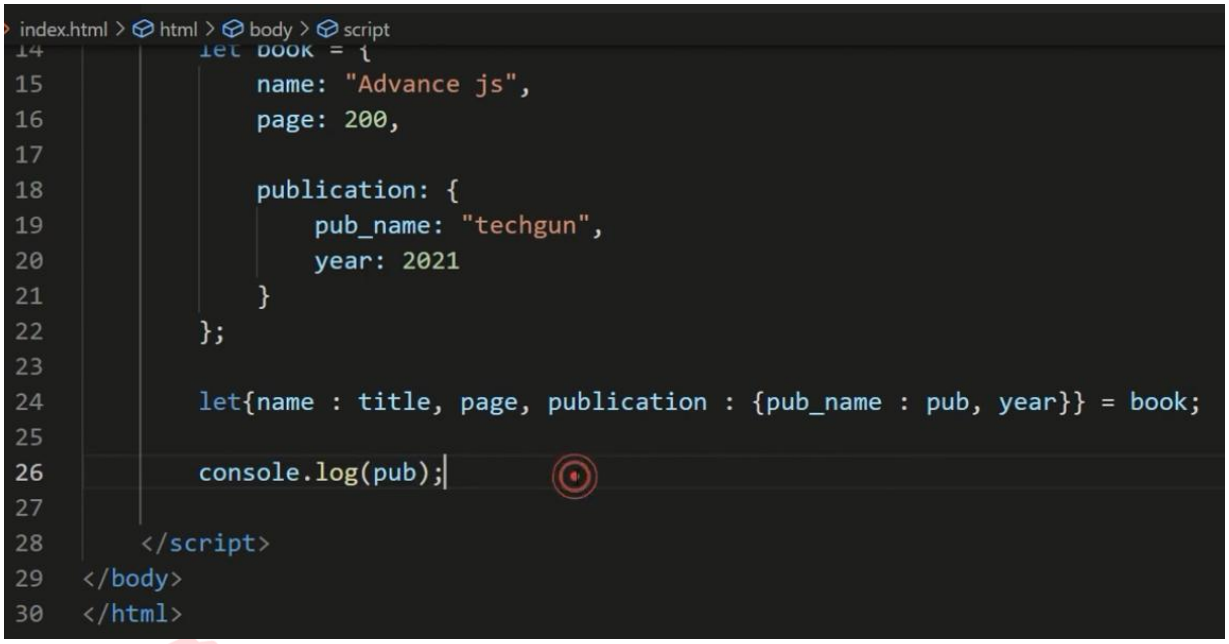
```
    <script>
        function book(){
            //do somthing
            return ["Advance Js", 200];
        }

        let[book_title, price] = book();

        console.log(price);
    </script>
</body>
</html>
```

Object destruturing



```
<body>
    <h1>JavaScript Tutorial</h1>

    <script>

        let book = {
            name: "Advance js",
            page: 200
        };

        let{name : title, page, price} = book;

        console.log(price);

    </script>
</body>
</html>
```

Nested Object destructuring:-


index.html > html > body > script

```
        let book = {
            name: "Advance js",
            page: 200,

            publication: {
                pub_name: "techgun",
                year: 2021
            }
        };

        let{name : title, page, publication : {pub_name : pub, year}} = book;

        console.log(pub);

    </script>
</body>
</html>
```

Introduction to Object Oriented Programming in JavaScript

"How Object-Oriented Programming is implemented in JavaScript? How they differ from other languages? Can you implement Inheritance in JavaScript and so on…"

There are certain features or mechanisms which makes a Language Object-Oriented like:

- **Object**
- **Classes**
- **Encapsulation**
- **Inheritance**

The characteristics of an Object are called as Property, in Object-Oriented Programming and the actions are called methods. An Object is an **instance** of a class. Objects are everywhere in JavaScript almost every element is an Object whether it is a function, array, and string.

```
//Defining object
let person = {
        first_name:'Mukul',
        last_name: 'Latiyan',

        //method
        getFunction : function(){
                return (`The name of the person is${person.first_name} ${person.last_name}`)
        },
        //object within object
        phone_number : {
                mobile:'12345',
                landline:'6789'
        }
}
console.log(person.getFunction());
console.log(person.phone_number.landline);
```

Classes– Classes are **blueprint** of an Object. A class can have many Object, because class is a **template** while Object are **instances** of the class or the concrete implementation.
Before we move further into implementation, we should know unlike other Object Oriented Language there is **no classes in JavaScript** we have only Object. To be more precise, JavaScript is a prototype based object oriented language, which means it doesn't have classes rather it define behaviors using constructor function and then reuse it using the prototype.

```
// Defining class using es6
class Vehicle {
constructor(name, maker, engine) {
        this.name = name;
        this.maker = maker;
        this.engine = engine;
}
getDetails(){
        return (`The name of the bike is ${this.name}.`)
}
}
// Making object with the help of the constructor
let bike1 = new Vehicle('Hayabusa', 'Suzuki', '1340cc');

let bike2 = new Vehicle('Ninja', 'Kawasaki', '998cc');

console.log(bike1.name); // Hayabusa
console.log(bike2.maker); // Kawasaki
console.log(bike1.getDetails());
```

Encapsulation – The process of **wrapping property and function** within a **single unit** is known as encapsulation.

```
//encapsulation example
class person{
        constructor(name,id){
                this.name = name;
```

```
		this.id = id;
	}
	add_Address(add){
		this.add = add;
	}
	getDetails(){
		console.log(`Name is ${this.name},Address is: ${this.add}`);
	}
}
let person1 = new person('Mukul',21);
person1.add_Address('Delhi');
person1.getDetails();
```

Abstraction :-

Sometimes encapsulation refers to **hiding of data** or **data Abstraction** which means representing essential features hiding the background detail. Most of the OOP languages provide access modifiers to restrict the scope of a variable, but their are no such access modifiers in JavaScript but their are certain way by which we can restrict the scope of variable within the Class/Object.

```
// Abstraction example
function person(fname,lname){
	let firstname = fname;
	let lastname = lname;

	let getDetails_noaccess = function(){
		return (`First name is: ${firstname} Last
			name is: ${lastname}`);
	}

	this.getDetails_access = function(){
		return (`First name is: ${firstname}, Last
			name is: ${lastname}`);
	}
}
let person1 = new person('Mukul','Latiyan');
console.log(person1.firstname);
console.log(person1.getDetails_noaccess);
console.log(person1.getDetails_access());
```

Inheritance –

It is a concept in which some property and methods of an Object is being used by another Object. Unlike most of the OOP languages where classes inherit classes, JavaScript Object inherits Object i.e. certain features (property and methods)of one object can be reused by other Objects.

```
//Inheritance example
class person{
        constructor(name){
                this.name = name;
        }
        //method to return the string
        toString(){
                return (`Name of person: ${this.name}`);
        }
}
class student extends person{
        constructor(name,id){
                //super keyword to for calling above class constructor
                super(name);
                this.id = id;
        }
        toString(){
                return (`${super.toString()},Student ID: ${this.id}`);
        }
}

let student1 = new student('Mukul',22);

console.log(student1.toString());
```