

## UNIT-V - JAVA

### JavaScript

JavaScript is the world's most popular programming language.

JavaScript is the programming language of the Web.

JavaScript is easy to learn.

JavaScript is one of the **3 languages** all web developers **must** learn:

1. [HTML](#) to define the content of web pages
2. [CSS](#) to specify the layout of web pages
3. **JavaScript** to program the behavior of web pages

### JavaScript Function Objects

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In JavaScript, functions are called *Function Objects* because they *are* objects.

Just like objects, functions have properties and methods, they can be stored in a variable or an array, and be passed as arguments to other functions.

### Functions are First-Class Objects

As mentioned, functions are objects. You can work with functions as if they were objects. For example, you can assign functions to variables, to array elements, and to other objects. They can also be passed around as arguments to other functions or be returned from those functions. The only difference with objects is that functions can be called.

Let's run a small test and confirm that a function is indeed an object instance:

copy

```
function message() {  
  console.log("Greetings Linda!");  
}
```

```
console.log(typeof message); // => function
console.log(message instanceof Object); // => true
```

ex:

```
var body = "return Math.PI * radius * radius";
var circle = new Function("radius", body);

console.log(circle(5));
```

## Exception Handling in JavaScript

An exception signifies the presence of an abnormal condition which requires special operable techniques. In programming terms, an exception is the anomalous code that breaks the normal flow of the code. Such exceptions require specialized programming constructs for its execution.

### What is Exception Handling

In programming, exception handling is a process or method used for handling the abnormal statements in the code and executing them. It also enables to handle the flow control of the code/program. For handling the code, various handlers are used that process the exception and execute the code. **For example**, the Division of a non-zero value with zero will result into infinity always, and it is an exception. Thus, with the help of exception handling, it can be executed and handled.

### Types of Errors

While coding, there can be three types of errors in the code:

1. **Syntax Error:** When a user makes a mistake in the pre-defined syntax of a programming language, a syntax error may appear.
2. **Runtime Error:** When an error occurs during the execution of the program, such an error is known as Runtime error. The codes which create runtime errors are known as Exceptions. Thus, exception handlers are used for handling runtime errors.

3. **Logical Error:** An error which occurs when there is any logical mistake in the program that may not produce the desired output, and may terminate abnormally. Such an error is known as Logical error.

### JavaScript Polymorphism

The polymorphism is a core concept of an object-oriented paradigm that provides a way to perform a single action in different forms. It provides an ability to call the same method on different JavaScript objects. As JavaScript is not a type-safe language, we can pass any type of data members with the methods.

Ex: `<script>`

```
class A
{
  display()
  {
    document.writeln("A is invoked<br>");
  }
}
class B extends A
{
  display()
  {
    document.writeln("B is invoked");
  }
}
```

```
var a=[new A(), new B()]
a.forEach(function(msg)
{
  msg.display();
});
```

`</script>`

jQuery

### What is jQuery

- o jQuery is a small and lightweight JavaScript library.

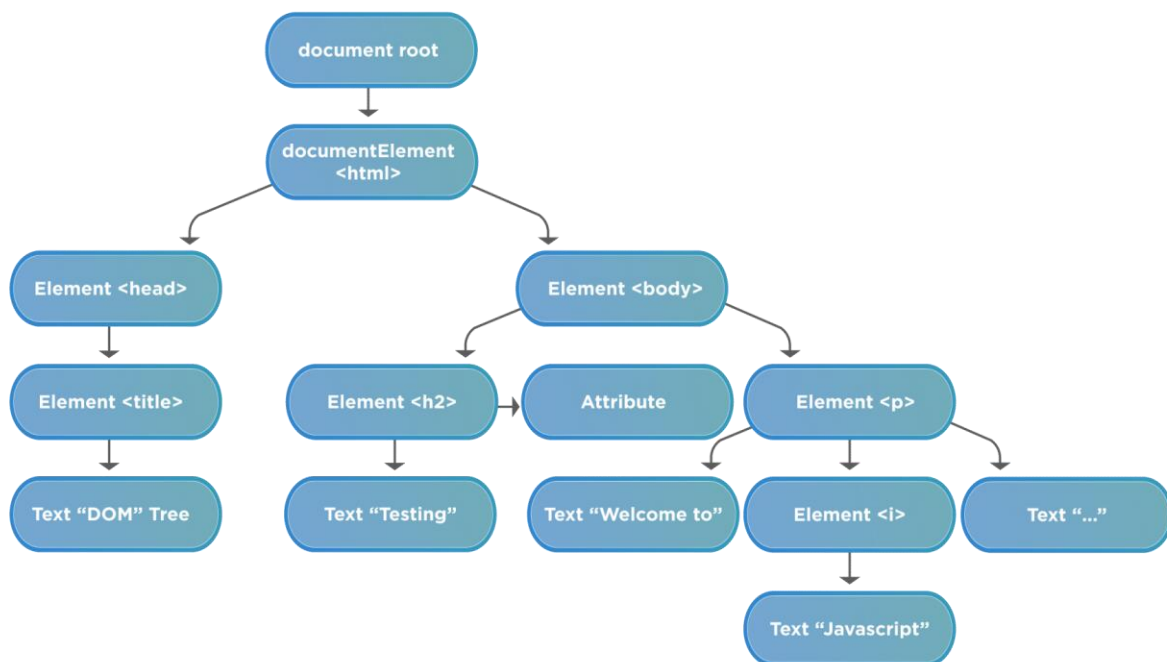
- jQuery is cross-platform.
- jQuery means "write less do more".
- jQuery simplifies AJAX call and DOM manipulation.

## How To Access Elements in the DOM

When developing a front-end application, one of the most expected things a programmer wants to do is to manipulate the document structure in some way. It happens by using the Document Object Model (*DOM*), which is a set of APIs for controlling HTML and styling information. In this article, we will cover the following details related to *DOM manipulation using JavaScript*:

### What is DOM?

*DOM* is a data representation of the objects in the HTML and XML pages. The document loaded in your browser is represented by a *document object model*. Moreover, it is a "*tree structure*" representation created by the browser that enables the HTML structure to be easily accessed by programming languages. Additionally, the DOM represents the document as nodes and objects. In this way, programming languages can connect to the page. Furthermore, a simple structure of a web page DOM will look like below:



Before starting working on the DOM, we should understand the following terminologies related to DOM:

- **Element node:** It represents any element that exists in the DOM.
- **Root node:** This is the top node in the tree, which in the case of HTML, is always the "HTML" node.
- **Child node:** This is a node that is directly inside another node. For example, `<h2>` is a child of `<body>` in the above example.
- **Descendant node:** \*This is a node that exists anywhere in the hierarchy of another node. For example, `<h2>` is a descendant of `<html>` in the above example.
- **Parent node:** This is a node that has another node inside it. For example, `<body>` is the parent node of `<h2>` in the above example.
- **Sibling nodes:** The nodes which sit on the same level in the DOM tree. For example, `<h2>` and `<p>` are siblings in the above example.
- **Text node:** This is a node that contains a text string.

As we are now clear about the fundamental terminologies used in a document, let's move to the next section to understand how the DOM elements can be accessed using JavaScript.

## javascript event handling

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.

### 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

## **AJAX Enabled Rich Internet Applications with XML and JSON**

AJAX is a new technique for creating better, faster, and more interactive web applications **with the help of XML, HTML, CSS, and Java Script**. Ajax uses XHTML for content, CSS for presentation, along with Document Object Model and JavaScript for dynamic content display.

AJAX = Asynchronous JavaScript and XML.

AJAX is **a technique for creating fast and dynamic web pages**. AJAX allows web pages to be updated asynchronously by exchanging small amounts of data with the server behind the scenes. This means that it is possible to update parts of a web page, without reloading the whole page.

Is it necessary to use XML in conjunction with JavaScript as part of AJAX?

**XML is not a requirement**. You can use XML, JSON, HTML or even plain text as the media. However, javascript knowledge is required to implement AJAX and use it correctly. 16-Sept-2009

JSON was mainly popular for Rest Web Service. AJAX message is entirely dynamic; it doesn't have any specific structure. It sends the request to the server-side through XHTML and JavaScript programming. Server-side provide responses that can be modified by the developer as per business requirement.

### **Dynamic Access and Manipulation of Web Pages using Java Script and JQuery**

December 2012. A server-side dynamic web page is **a web page whose construction is controlled by an application server processing server-side scripts**. In server-side scripting, parameters determine how the assembly of every new web page proceeds, and including the setting up of more client-side processing.

**Javascript is a vital part of dynamic content on the modern web**. From simple scripts to complex interactions that require frameworks, Javascript enhances user experiences on the web

What are examples of dynamic web pages?

#### **Dynamic site examples include:**

- E-commerce sites.
- Blogs.
- Calendars, or to-do sites.
- Any site with information that must be updated regularly.

A dynamic web page is **a web page that includes content that is updated regularly**. This type of page is often used for news sites or blogs, where new content is added frequently. Dynamic pages are also sometimes used for e-commerce sites, where the inventory or products offered may change frequently.

## **Web Speech API**

The Web Speech API **enables you to incorporate voice data into web apps**. The Web Speech API has two parts: SpeechSynthesis (Text-to-Speech), and SpeechRecognition (Asynchronous Speech Recognition.)

The free version is only useful from within Chrome. I think Android WebView cannot use it (though once it can, it will probably use the offline speech recognition in Android, though this is just an assumption). So if you want to use it from a native application, you simply cannot.

Google Cloud Speech-to-Text API is provided by Google Cloud and uses deep learning models to recognize speech. It supports a wide range of languages and **has a free tier** that allows for 60 minutes of usage per month

What is Web API? API stands for Application Programming Interface. A Web API is **an application programming interface for the Web**. A Browser API can extend the functionality of a web browser. A Server API can extend the functionality of a web server.

## **Speech Synthesis Markup Language.**

Speech Synthesis Markup Language (SSML) is **a standardized markup language that enables developers to modify Text-to-Speech (TTS) audio**. With SSML, you can control various vocal characteristics of TTS output, such as pronunciation, speech rate, and other elements, to produce a more natural-sounding voice experience

What are the uses of SSML?

**Used to customize the pitch, speaking rate, and volume of text contained by the element**. Currently the rate , pitch , and volume attributes are supported. The rate and volume attributes can be set according to the W3 specifications.

Some of the prominent examples of speech synthesizers are **Alexa, Cortana, and Google Home**.

The counterpart of the voice recognition, speech synthesis is mostly used for **translating text information into audio information and in applications such as voice-enabled services and mobile applications**.