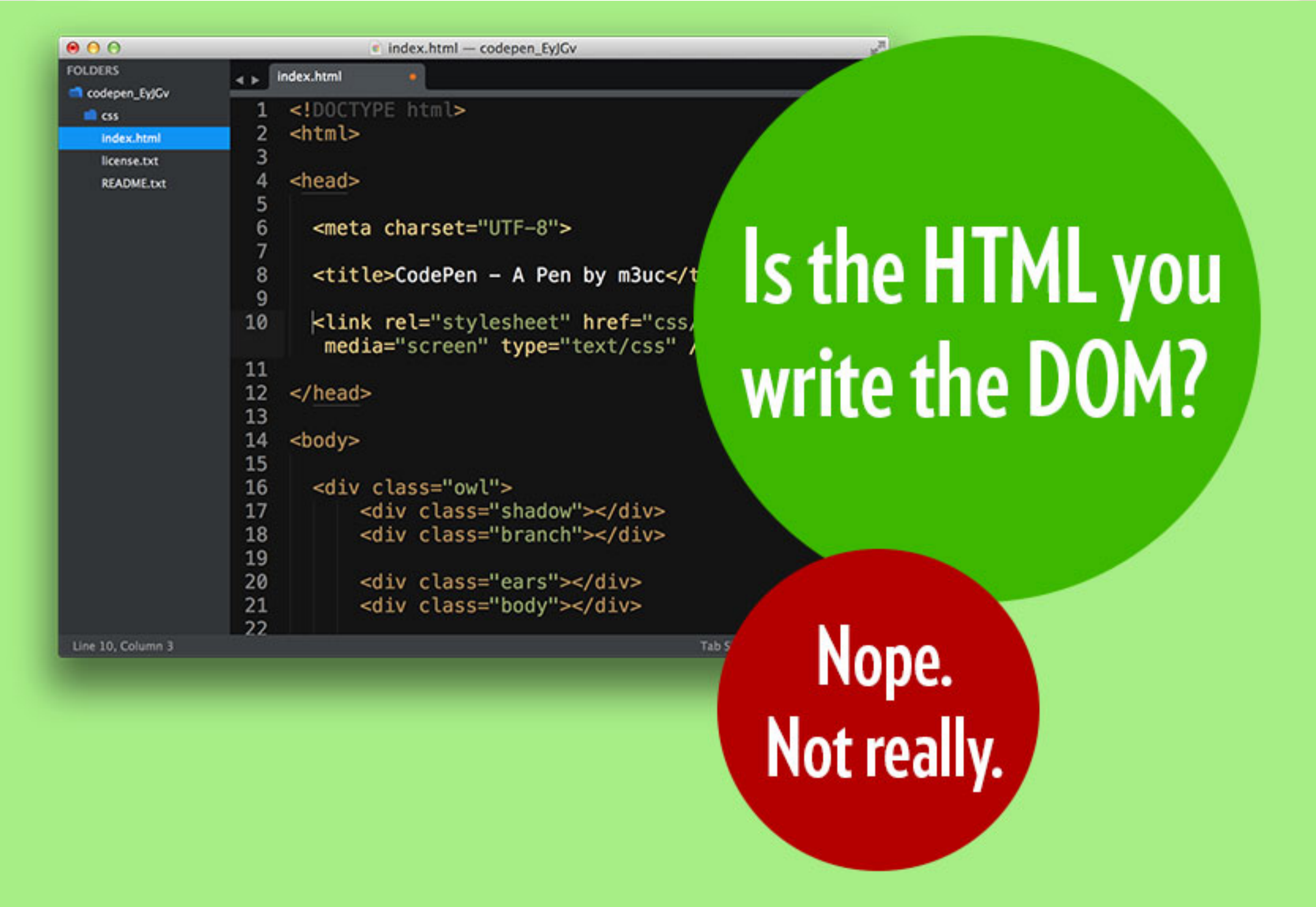
WEB-BASED SYSTEMS

IS 323

>> JavaScript: Document Object Model

(c) Dr. Mohammed Misbhauddin

WHAT IS DOM?



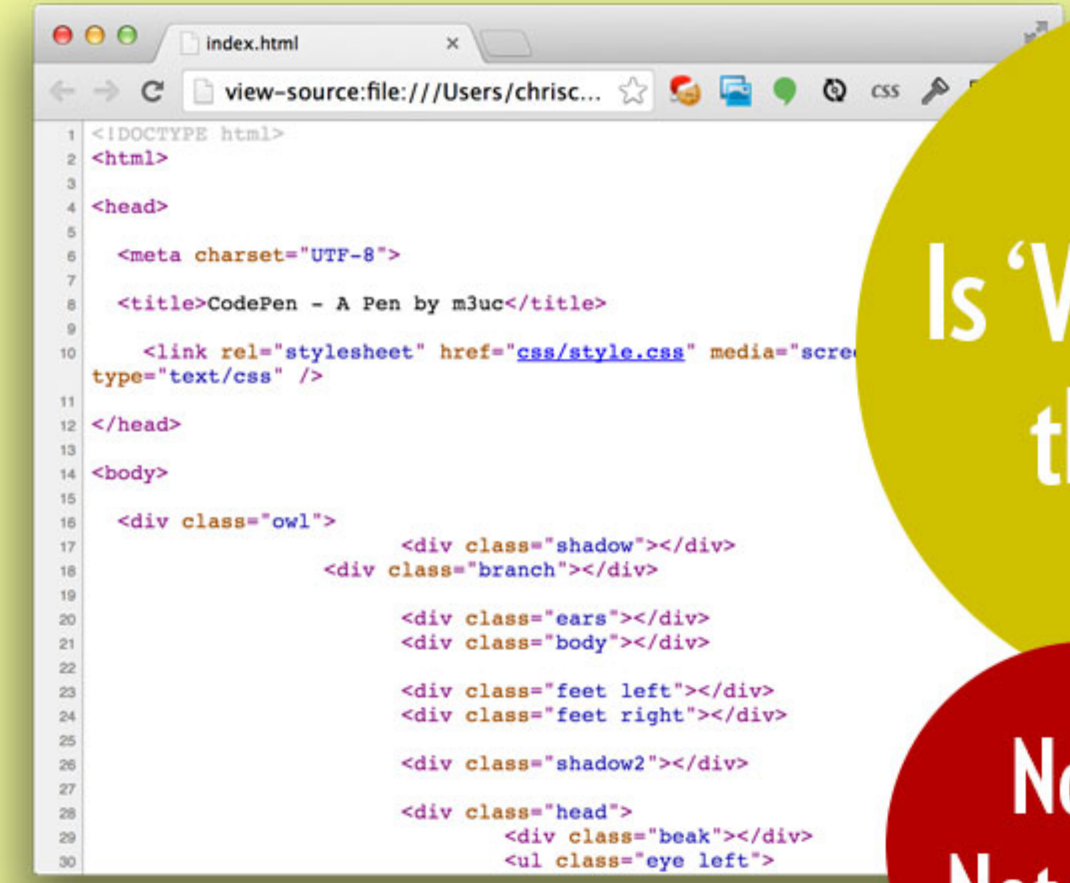
```
<!DOCTYPE html>
<html>

<head>

  <meta charset="UTF-8">

  <title>CodePen - A Pen by m3uc</t

  <link rel="stylesheet" href="css/
   media="screen" type="text/css" /

</head>

<body>

  <div class="owl">
      <div class="shadow"></div>
      <div class="branch"></div>

      <div class="ears"></div>
      <div class="body"></div>
```

Is the HTML you write the DOM?

Nope. Not really.

NO

HTML you write is parsed by the browser and turned into the DOM



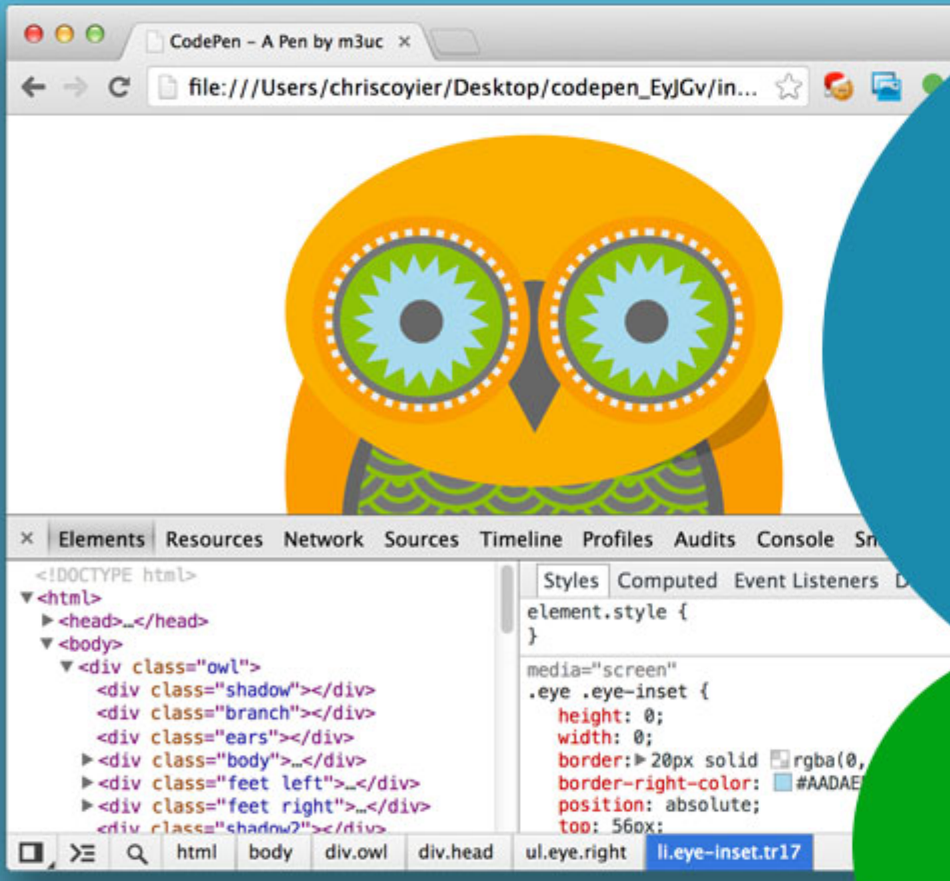
```
<!DOCTYPE html>
<html>

<head>

  <meta charset="UTF-8">

  <title>CodePen - A Pen by m3uc</title>

    <link rel="stylesheet" href="css/style.css" media="scre
type="text/css" />

</head>

<body>

  <div class="owl">
                        <div class="shadow"></div>
                  <div class="branch"></div>

                        <div class="ears"></div>
                        <div class="body"></div>

                        <div class="feet left"></div>
                        <div class="feet right"></div>

                        <div class="shadow2"></div>

                        <div class="head">
                                <div class="beak"></div>
                                <ul class="eye left">
```

Is 'View Source' the DOM?

Nope. Not really.

NO

View Source just shows you the HTML that makes up that page.
It's probably the exact HTML that you wrote



```
<!DOCTYPE html>
▼<html>
  ▶<head>…</head>
  ▼<body>
    ▼<div class="owl">
        <div class="shadow"></div>
        <div class="branch"></div>
        <div class="ears"></div>
      ▶<div class="body">…</div>
      ▶<div class="feet left">…</div>
      ▶<div class="feet right">…</div>
        <div class="shadow2"></div>
```

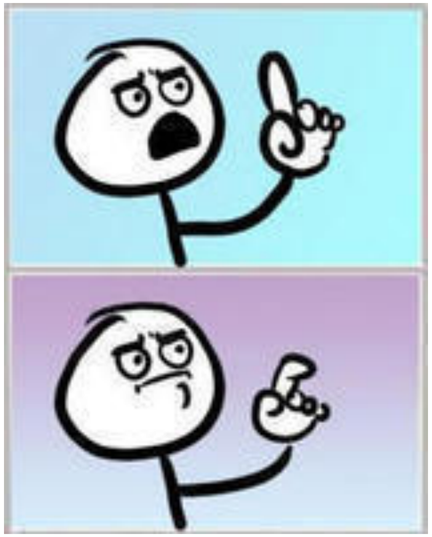
```
element.style {
}
media="screen"
.eye .eye-inset {
   height: 0;
   width: 0;
   border:▶ 20px solid rgba(0,
   border-right-color: #AADAE
   position: absolute;
   top: 56px;
```

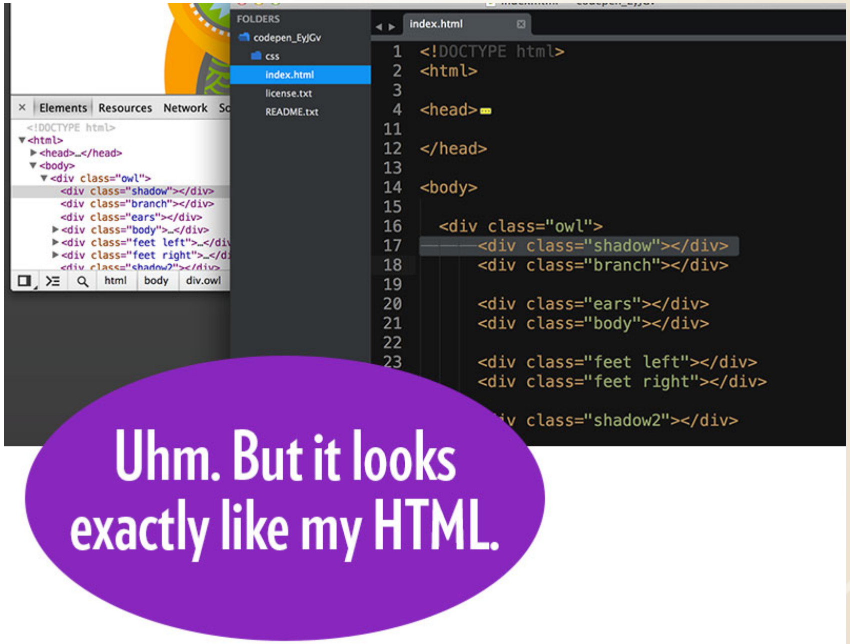
Is the code in DevTools the DOM?

Yep! Kinda.

YES

But................





```
<!DOCTYPE html>
▼<html>
  ▶<head>…</head>
  ▼<body>
    ▼<div class="owl">
        <div class="shadow"></div>
        <div class="branch"></div>
        <div class="ears"></div>
      ▶<div class="body">…</div>
      ▶<div class="feet left">…</div
      ▶<div class="feet right">…</di
        <div class="shadow2"></div>
```

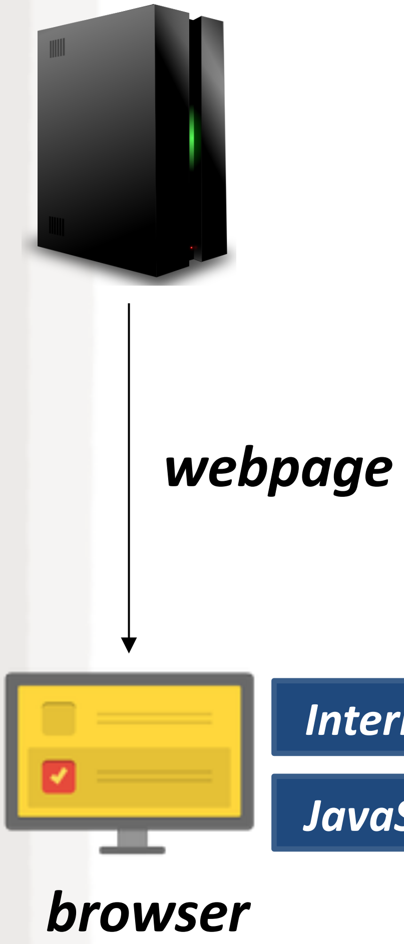
```
<!DOCTYPE html>
<html>

<head>

</head>

<body>

  <div class="owl">
    <div class="shadow"></div>
    <div class="branch"></div>

    <div class="ears"></div>
    <div class="body"></div>

    <div class="feet left"></div>
    <div class="feet right"></div>

     iv class="shadow2"></div>
```

Uhm. But it looks exactly like my HTML.

When is the DOM different than the HTML?

- There are mistakes in your HTML and the browser has fixed them
  - I told you browsers are intelligent
- Example
  - Try creating a table element without the thead and tbody
  - See what happens

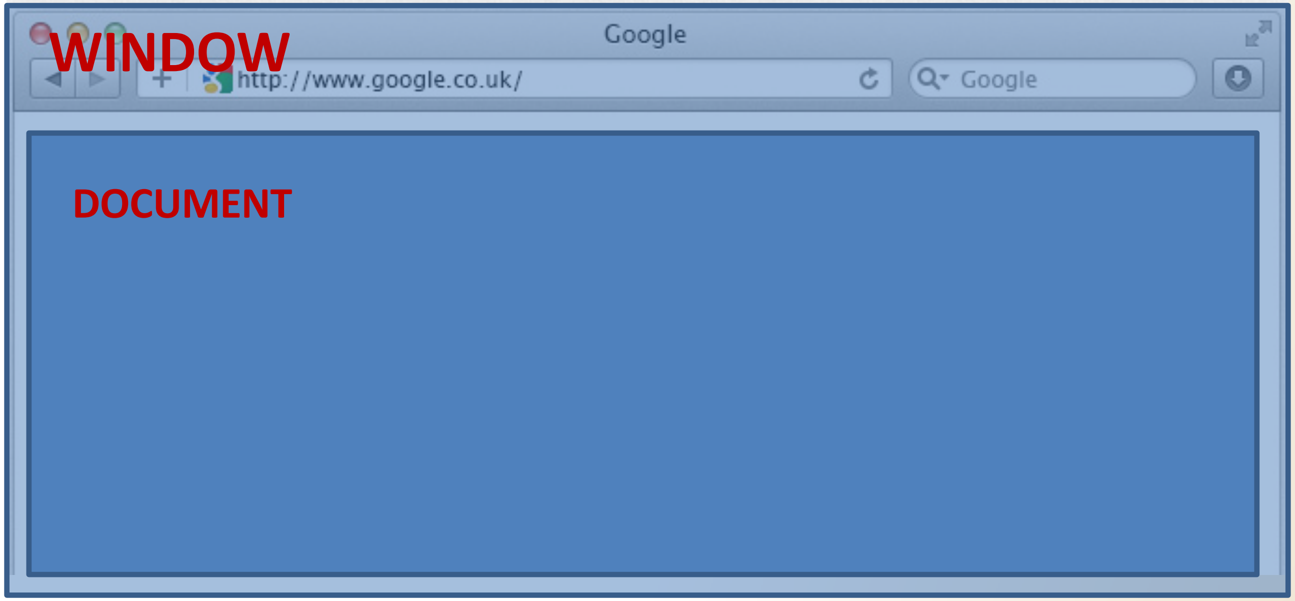
- When a browser reads an HTML file, it creates a tree-like structure of nodes
- Each node is an HTML element
- The document is also referred to as the **Document Object Model** or **DOM**



Internal Rendering Engine — Converts the page into a DOM

JavaScript Interpreter — Performs actions on the DOM

When the browser loads a web page, it creates two important things, named window and document



Everything you do with JavaScript in the browser happens inside the window.

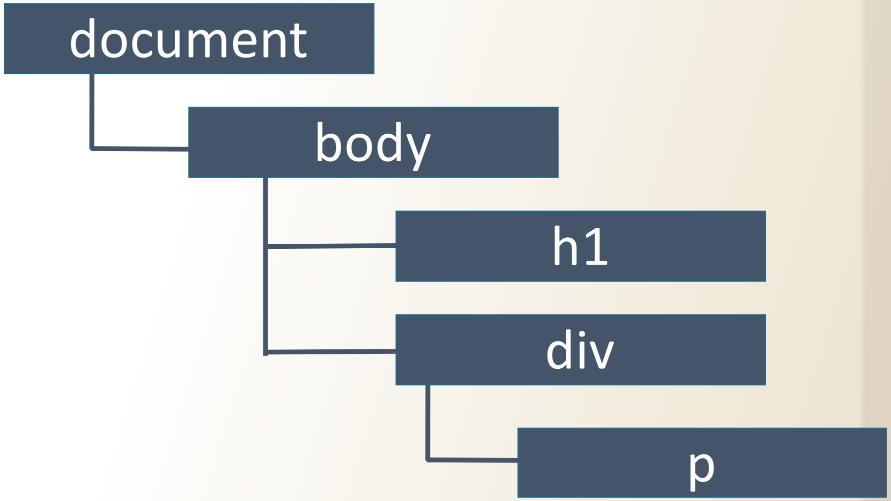
What is an Object?

- The **window** and the **document** are what are referred to as objects
- Objects are **containers for data** and can perform specific actions for that particular object
- There are many objects built into the browser environment and JavaScript itself
- You can even create your own objects using JavaScript *(as we did in the last class)*

DOM – Basic Only

```
<!DOCTYPE html>
<html>
  <head>
      <title> Test Page </title>
  </head>
  <body>
    <h1>This is a sample heading</h1>
    <div>
      <p>This is a paragraph </p>
    </div>
  </body>
</html>
```

Sample HTML Page

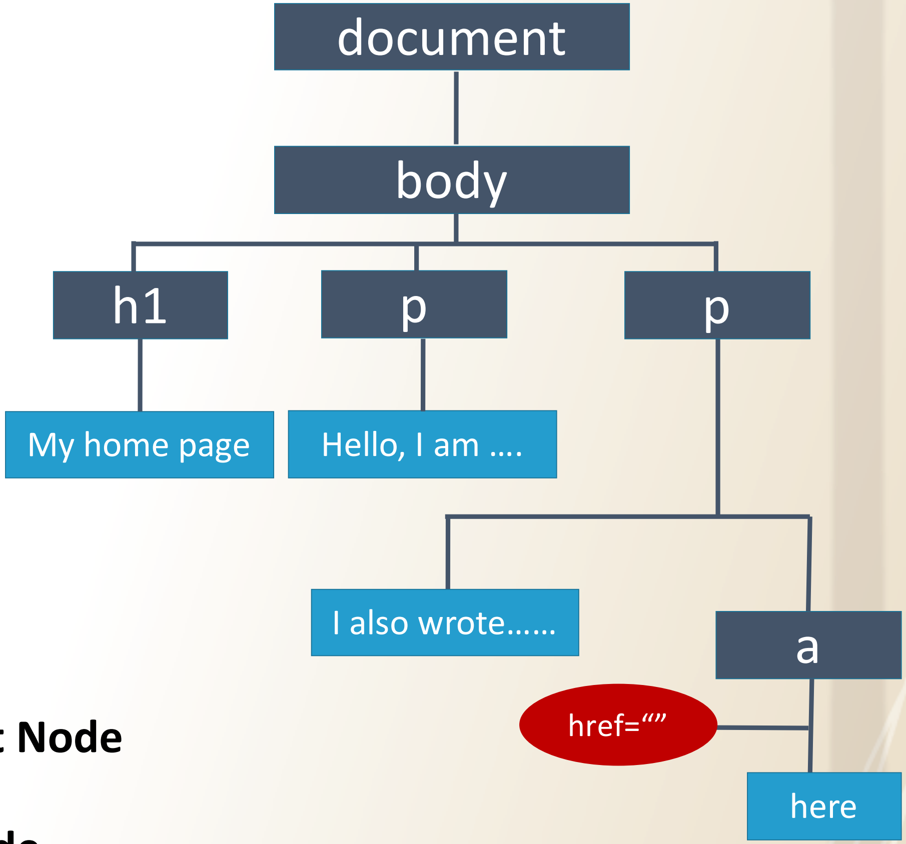


DOM Representation

http://www.kfu.edu.sa/ccsit/is/web-based-systems

DOM with Node Types

```
<!DOCTYPE html>
<html>
   <head>
      <title>My home page</title>
   </head>
   <body>
      <h1>My home page</h1>
      <p>Hello, I am Marijn and this is my home
            page.</p>
      <p>I also wrote a book! Read it
          <a href="http://eloquentjavascript.net">
               here</a>
      </p>
   </body>
</html>
```



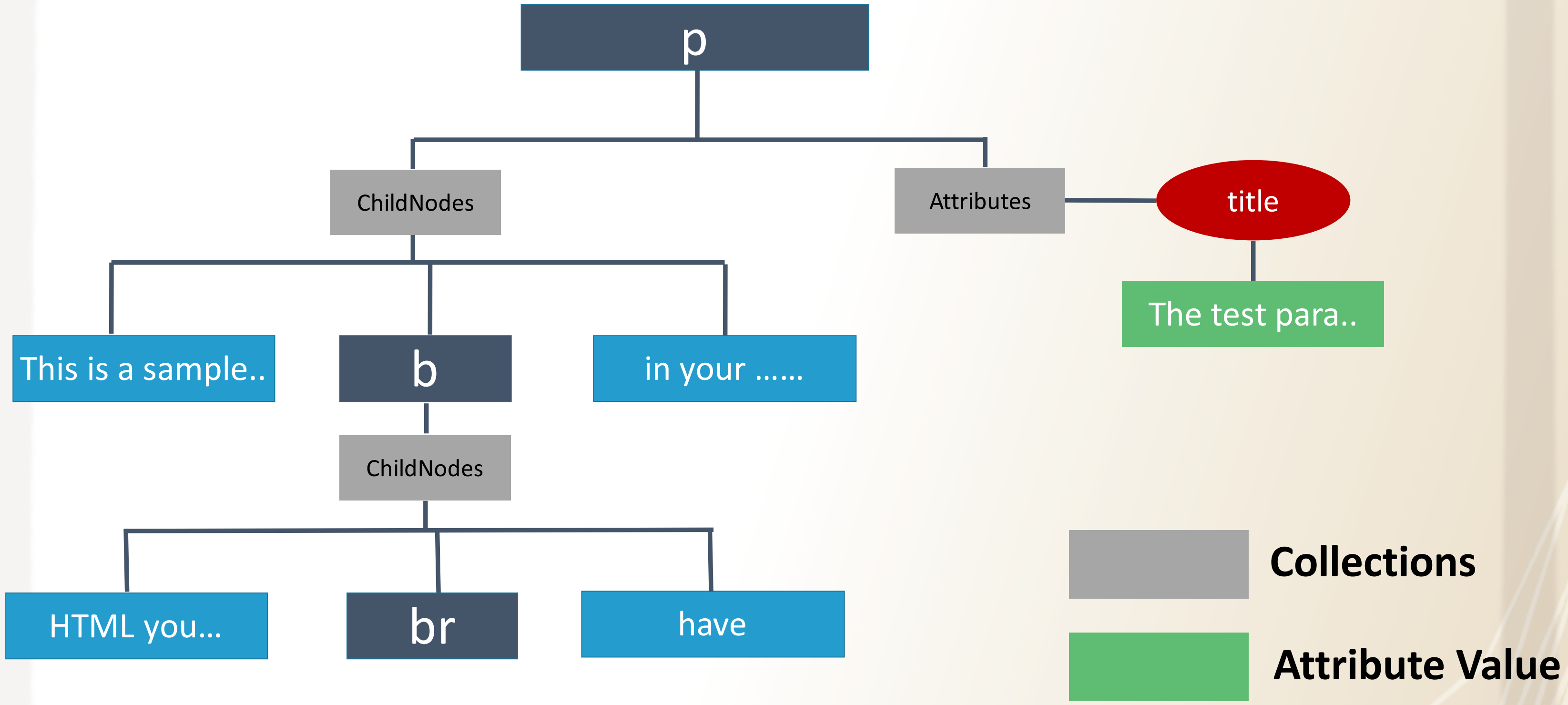
■ Element Node

🟦 Text Node

🔴 Attribute Node

Document Object Model - Actual

<p title="The test paragraph">This is a sample of some <b>HTML you might <br>have</b> in your document</p>

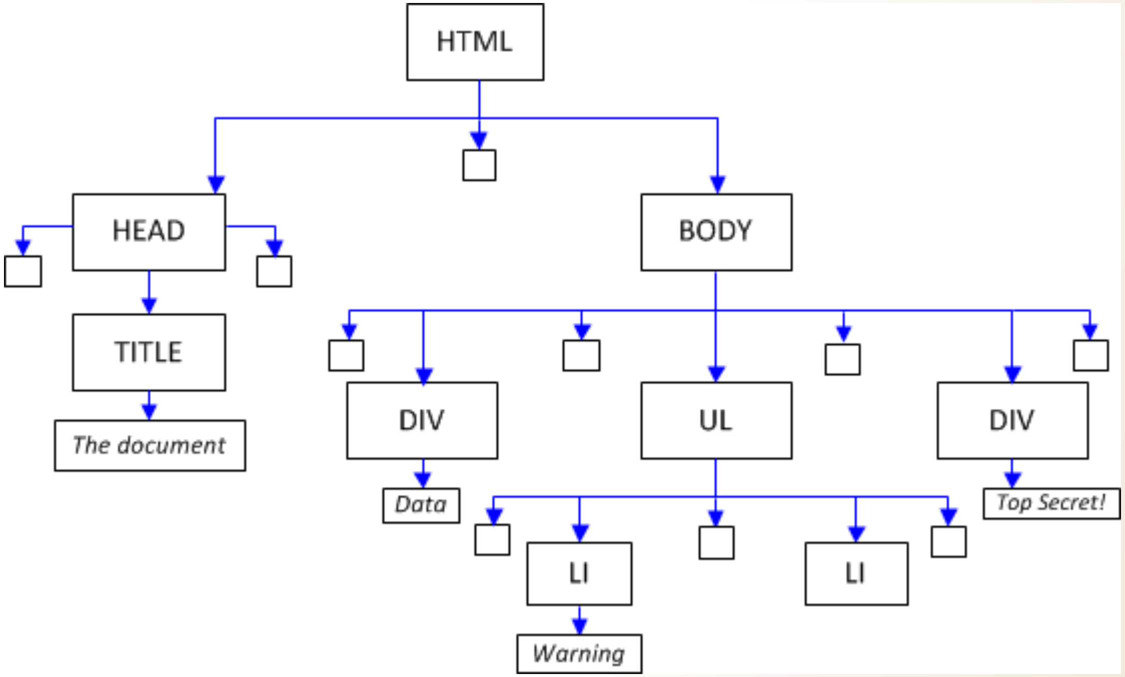


Parts of the DOM tree

- Known as nodes
- Different types of nodes
  - Element Nodes
    - P, BR, B
  - Text Nodes
    - Text strings inside of an element
  - Collections
    - ChildNodes, attributes
  - Attribute Nodes
    - Attribute name and value

White Space Nodes

- Whitespace symbols in the HTML are recognized as the text and become text nodes



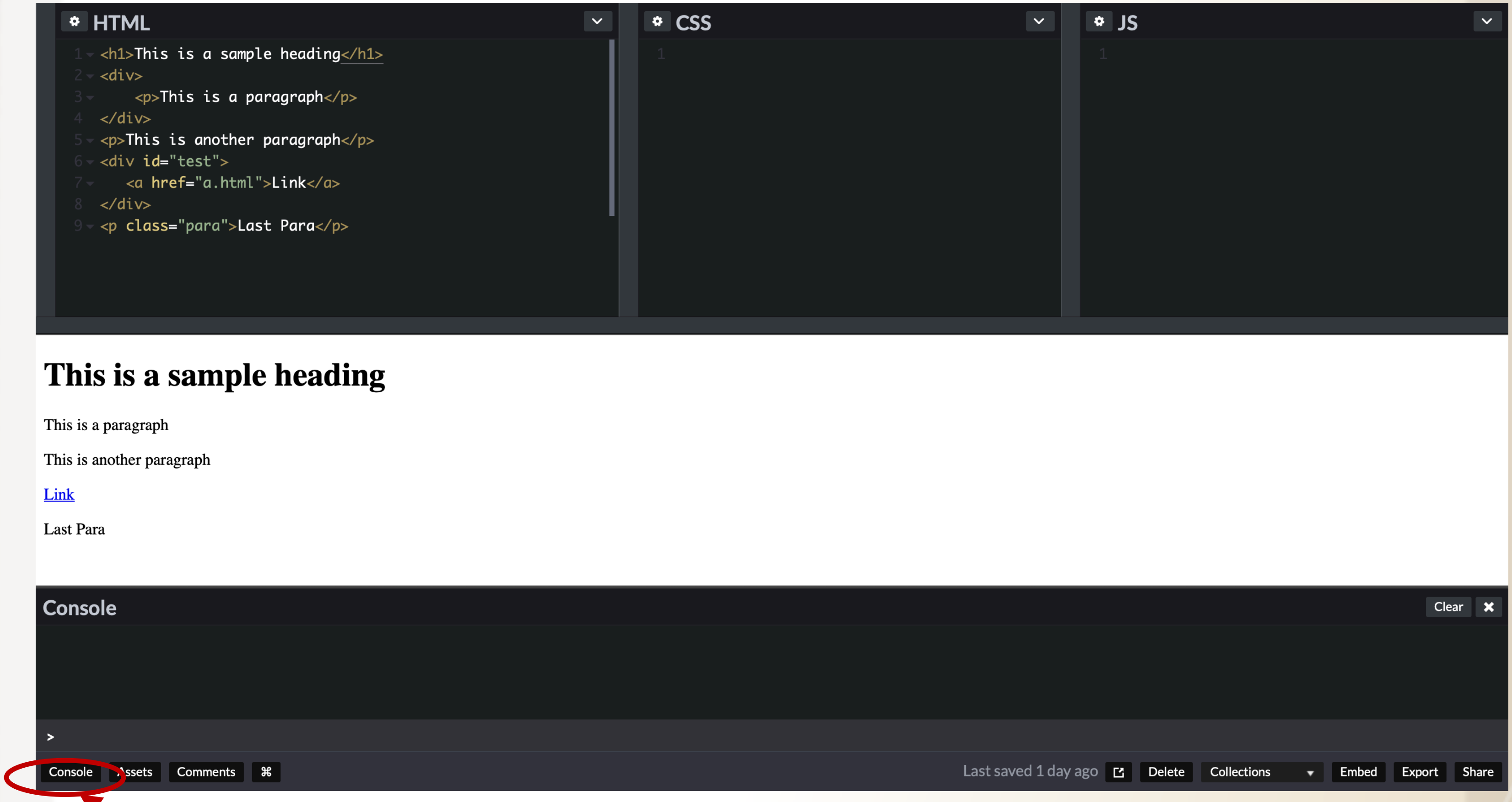
If you do not want any whitespace nodes

<!DOCTYPE HTML><html><head><title>Title</title></head><body></body></html>

TRAVERSING THE DOM

Practice Setup

- Please open browser
- Go this Link **https://codepen.io/drmisbha/pen/LqWdJm**
  - (The link is on the Class JS Website)
- Open Console as shown in the next slide



```html
<h1>This is a sample heading</h1>
<div>
    <p>This is a paragraph</p>
</div>
<p>This is another paragraph</p>
<div id="test">
   <a href="a.html">Link</a>
</div>
<p class="para">Last Para</p>
```

This is a sample heading

This is a paragraph

This is another paragraph

Link

Last Para

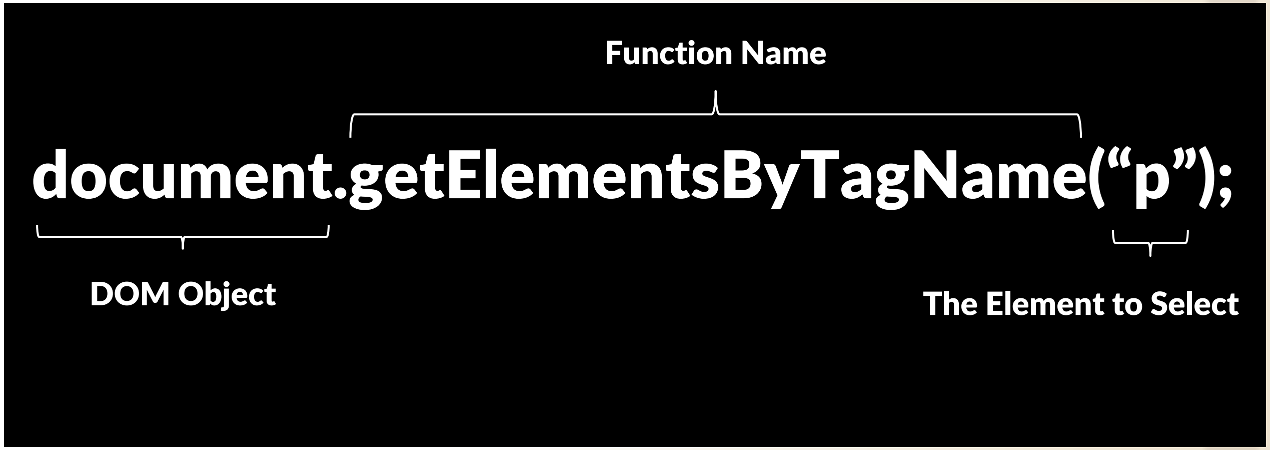
CLICK THIS BUTTON TO OPEN CONSOLE

Select a Node

- Three ways
  - Using the Tag Name (Element Name)
  - Using an ID
  - Using the Class Name

BY TAG NAME

Note: Tag name is the name of the element in HTML



```
document.getElementsByTagName("p");
```

Function Name

DOM Object

The Element to Select

This functions returns an array. Can you guess why?

```
<!DOCTYPE html>
<html>
    <head>
          <title> Test Page </title>
    </head>
    <body>
        <h1>This is a sample heading</h1>
        <div>
            <p>This is a paragraph </p>
        </div>
       <p>This is another paragraph</p>
       <div id="test">
            <a href="a.html">Link</a>
       </div>
       <p class="para">Last Para</p>
    </body>
</html>
```

h[0]

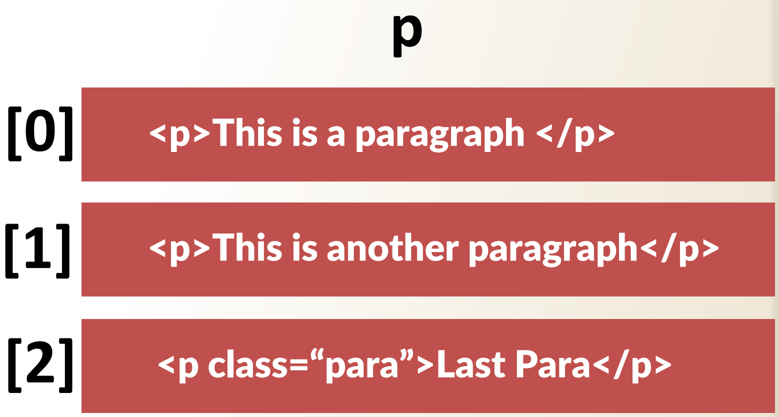
<h1>This is a sample heading</h1>

CONSOLE

```
<script>
       var h = document.getElementsByTagName("h1");
  </script>
```

http://www.kfu.edu.sa/ccsit/is/web-based-systems

```
<!DOCTYPE html>
<html>
    <head>
        <title> Test Page </title>
    </head>
    <body>
        <h1>This is a sample heading</h1>
        <div>
            <p>This is a paragraph </p>
        </div>
       <p>This is another paragraph</p>
       <div id=“test”>
            <a href=“a.html”>Link</a>
       </div>
       <p class=“para”>Last Para</p>
    </body>
</html>
```



p

[0] <p>This is a paragraph </p>

[1] <p>This is another paragraph</p>

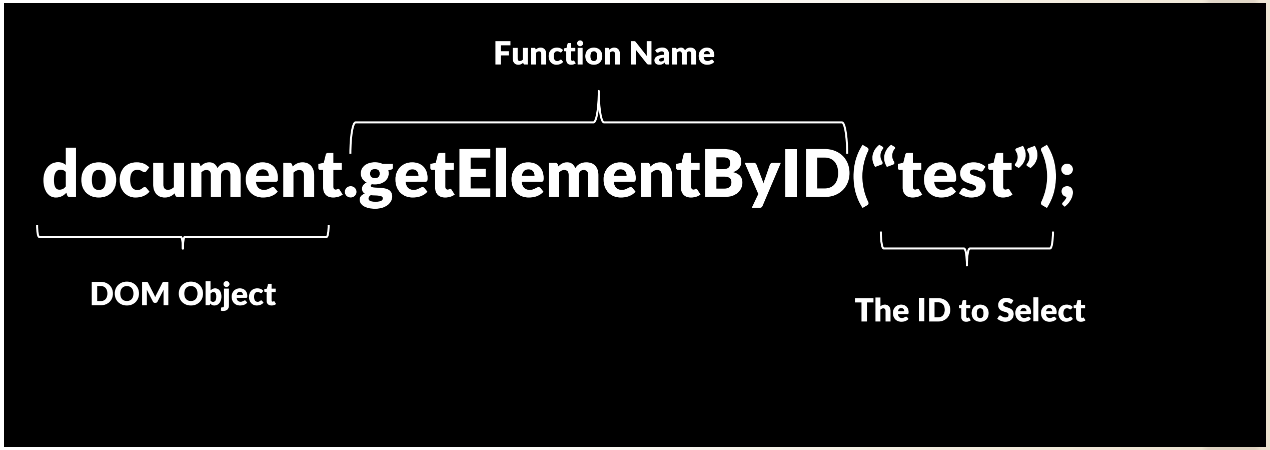
[2] <p class=“para”>Last Para</p>

CONSOLE

```
<script>
        var p = document.getElementsByTagName(“p”);
  </script>
```

BY ID NAME

Note: id is an attribute that can be used to assign a unique name to the element



```
document.getElementByID("test");
```

This functions returns a single element. Can you guess why?

```
<!DOCTYPE html>
<html>
    <head>
         <title> Test Page </title>
    </head>
    <body>
        <h1>This is a sample heading</h1>
        <div>
            <p>This is a paragraph </p>
        </div>
       <p>This is another paragraph</p>
       <div id="test">
            <a href="a.html">Link</a>
       </div>
       <p class="para">Last Para</p>
    </body>
</html>
```

id

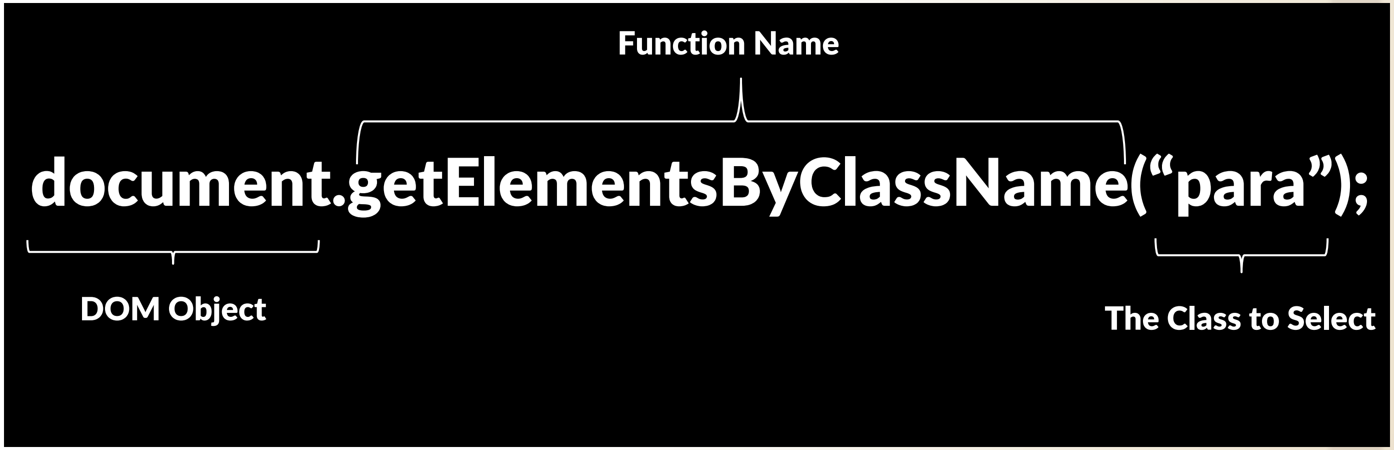
```
<div id="test">
        <a href="a.html">Link</a>
 </div>
```

CONSOLE

```
<script>
        var id = document.getElementByID("test");
  </script>
```

BY CLASS NAME

Note: Class is an attribute that is shared by elements to group them together



Function Name

```
document.getElementsByClassName(“para”);
```

DOM Object

The Class to Select

This functions returns an array. Can you guess why?

```
<!DOCTYPE html>
<html>
    <head>
          <title> Test Page </title>
    </head>
    <body>
        <h1>This is a sample heading</h1>
        <div>
            <p>This is a paragraph </p>
        </div>
       <p>This is another paragraph</p>
       <div id=“test”>
            <a href=“a.html”>Link</a>
       </div>
       <p class=“para”>Last Para</p>
    </body>
</html>
```

p[0]

`<p class=“para”>Last Para</p>`

CONSOLE

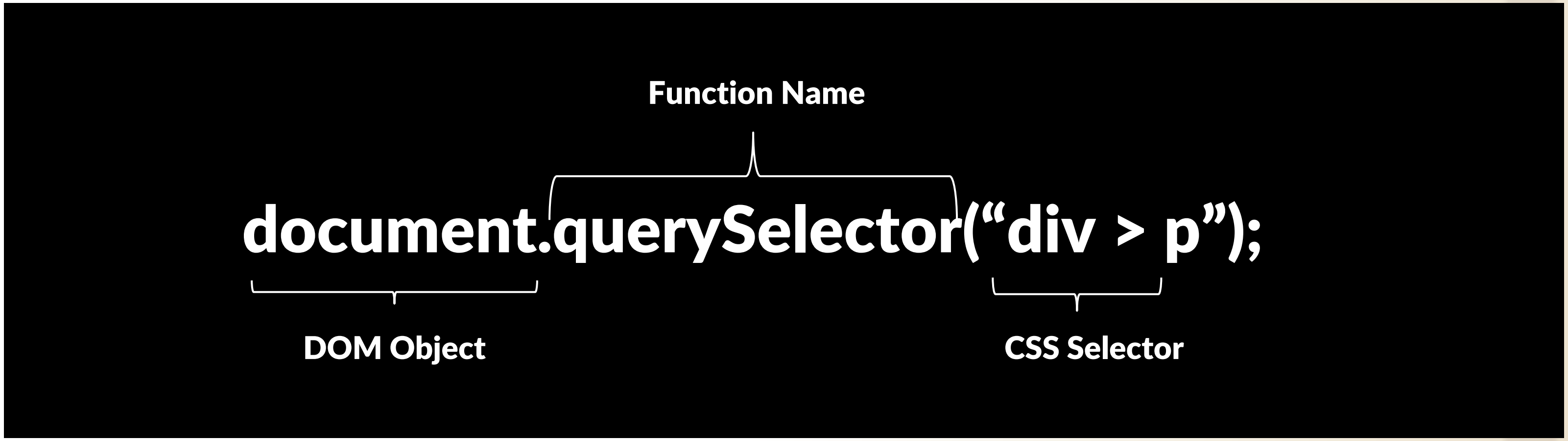
```
<script>
    var c = document.getElemenstByClassName(“para”);
 </script>
```

CSS Selector-based Node Selection

- What if we can use the selectors that we used in CSS to select Elements?
- CSS Selector-based Methods allow us to do exactly that.
- Two Methods
  – querySelector()
  – querySelectorAll()

querySelector()

Note: Used when we want it to return one element only



Function Name

```
document.querySelector("div > p");
```

DOM Object

CSS Selector

This functions returns one element only.

```
<!DOCTYPE html>
<html>
    <head>
          <title> Test Page </title>
    </head>
    <body>
        <h1>This is a sample heading</h1>
        <div>
            <p>This is a paragraph </p>
        </div>
       <p>This is another paragraph</p>
       <div id="test">
            <a href="a.html">Link</a>
       </div>
       <p class="para">Last Para</p>
    </body>
</html>
```

p

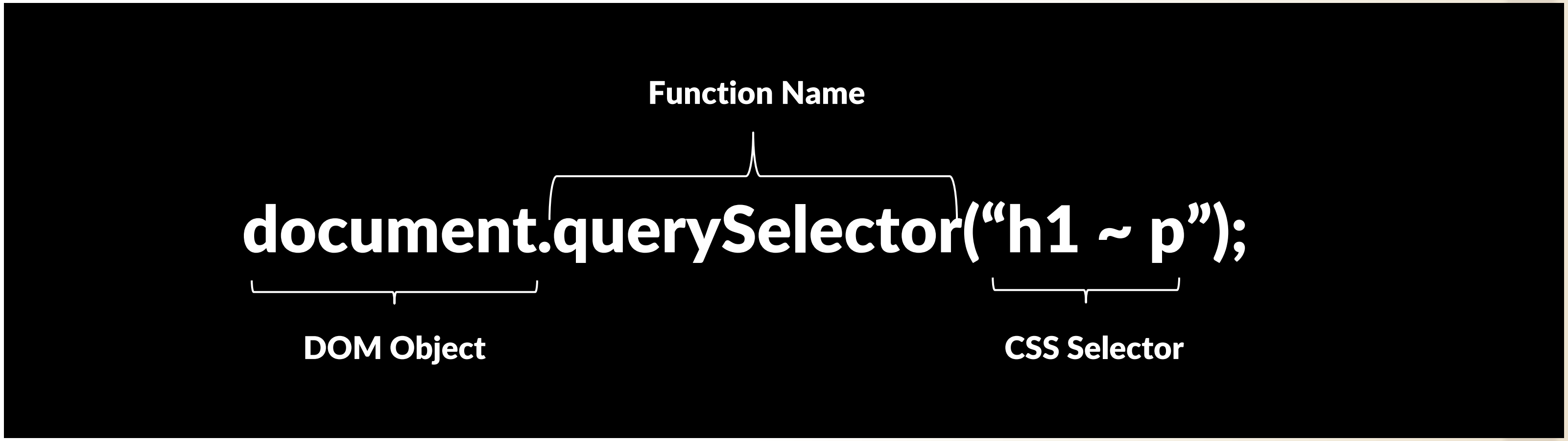
<p>This is a paragraph </p>

CONSOLE

```
<script>
        var p = document.querySelector("div > p");
  </script>
```

querySelectorAll()

Note: Used when we it to return more than one element



Function Name

document.querySelector(“h1 ~ p”);

DOM Object

CSS Selector

This functions returns an array of elements

```
<!DOCTYPE html>
<html>
    <head>
        <title> Test Page </title>
    </head>
    <body>
        <h1>This is a sample heading</h1>
        <div>
            <p>This is a paragraph </p>
        </div>
       <p>This is another paragraph</p>
       <div id="test">
            <a href="a.html">Link</a>
       </div>
       <p class="para">Last Para</p>
    </body>
</html>
```

p

[0]	<p>This is another paragraph</p>
[1]	<p class="para">Last Para</p>

CONSOLE

```
<script>
      var p = document.querySelectorAll("h1 ~  p");
 </script>
```

Summary

- Document Object Model (DOM)
  - Document Object
  - Nodes in the DOM
    - Element Nodes
    - Text Nodes
    - Attribute Nodes
    - Collections (ChildNodes, attributes, children)
    - White Space Nodes
- DOM Traversal
  - Basic Methods
    - getElementByID()
    - getElementsByTagName()
    - getElementsByClassName()
  - CSS Selector-based Methods
    - querySelector()
    - querySelectorAll()