Lecture_8

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Introduction to JavaScript

What is JavaScript?

- JavaScript is a powerful and flexible programming language for the web that is widely used to make websites interactive and dynamic. JavaScript can also be able to change or update HTML and CSS dynamically.
- JavaScript is the most popular and widely used client-side scripting
- language.
- Client-side scripting refers to scripts that run within your web browser.
- JavaScript is designed to add interactivity and dynamic effects to the web pages by manipulating the content returned from a web server.
- JavaScript is an object-oriented language, and it also has some similarities in syntax to Java programming language. But JavaScript is not related to Java in any way.

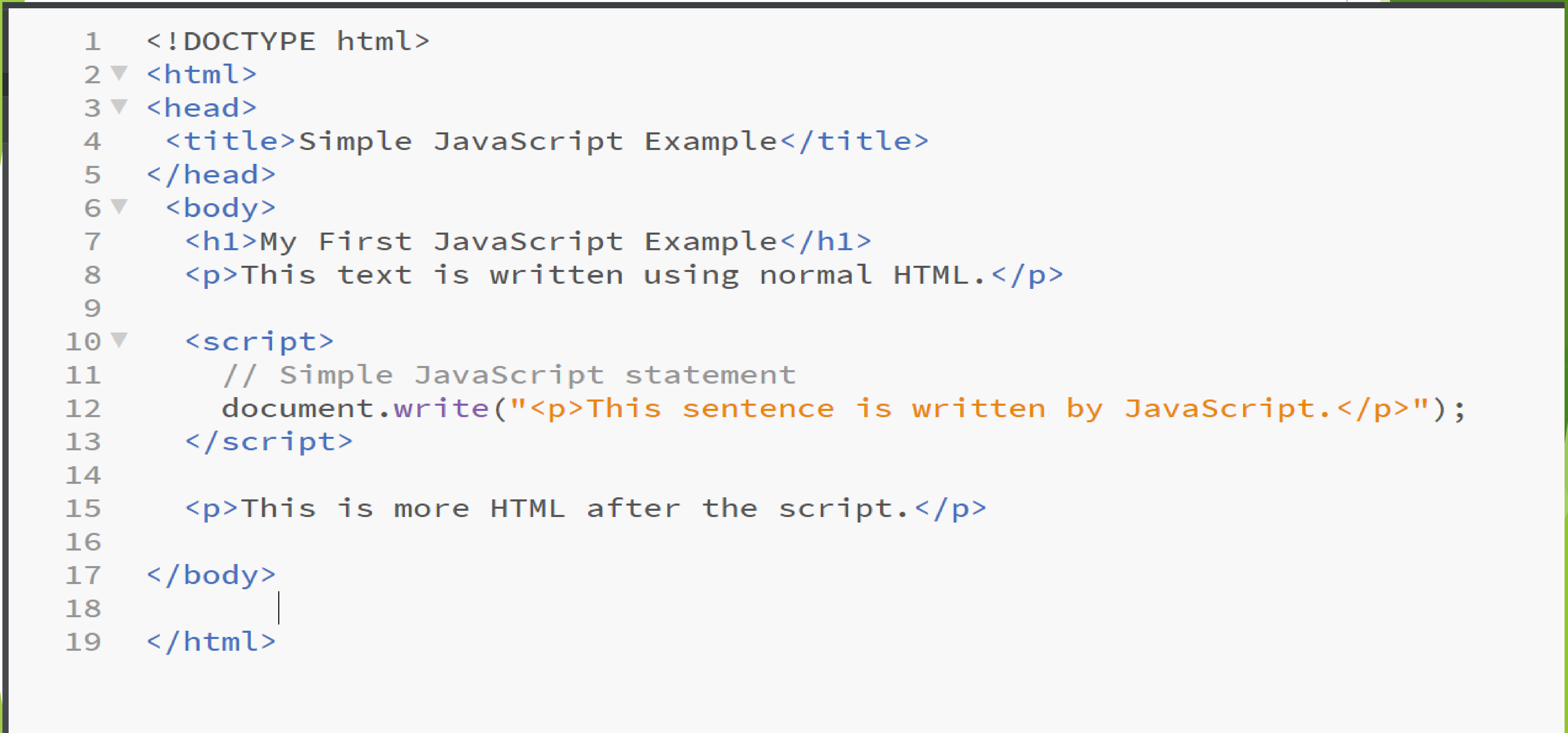
There are lot more things you can do with JavaScript.

- You can modify the content of a web page by adding or removing elements.
- You can change the style and position of the elements on a web page.
- You can monitor events like mouse click, hover, etc. and react to it.
- You can perform and control transitions and animations.
- You can create alert pop-ups to display info or warning messages to the user.
- You can validate user inputs before submitting it to the server

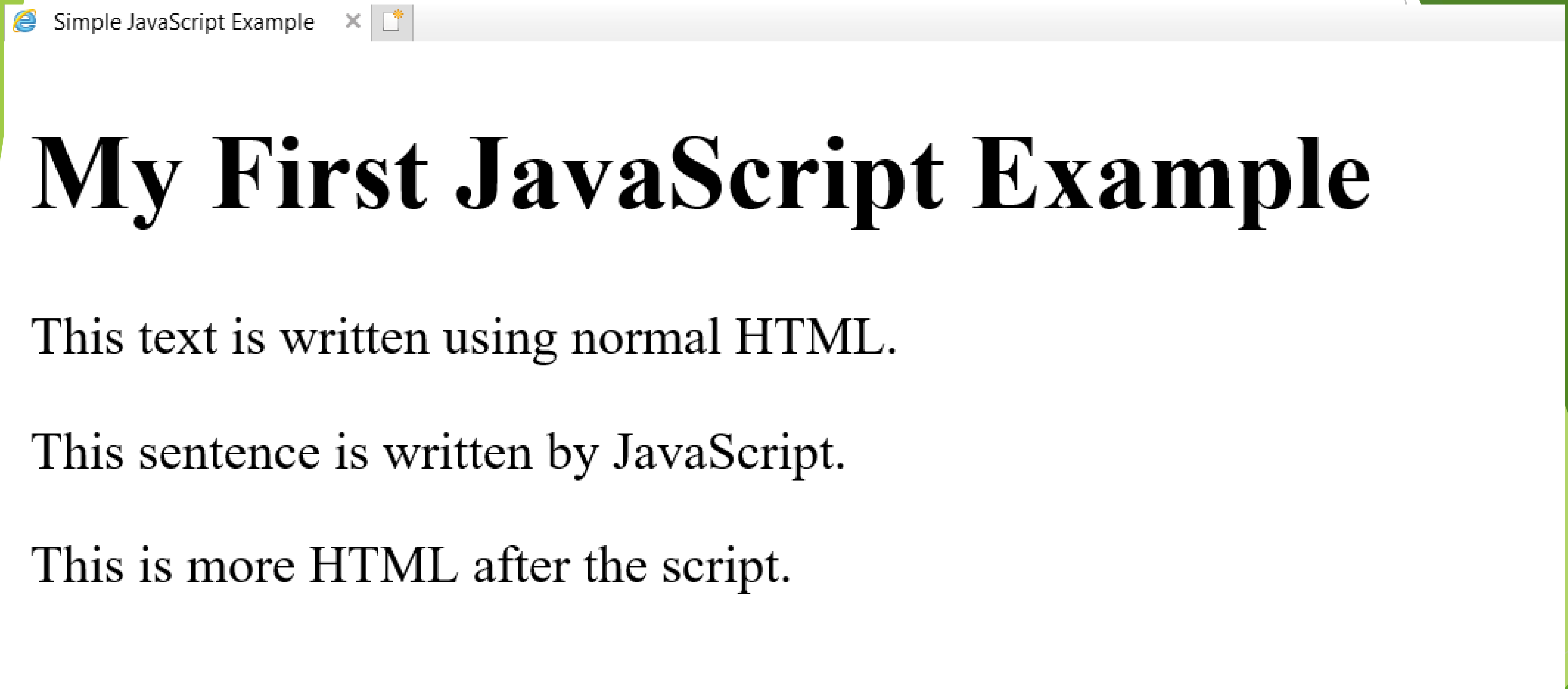
Adding JavaScript to Your Web Pages

1. Embedding the JavaScript code between a pair of <script> and </script> tag.
2. Creating an external JavaScript file with the .js extension and then load it within the page through the src attribute of the <script> tag.
3. Placing the JavaScript code directly inside an HTML tag using the special tag attributes such as onclick,onmouseover, onkeypress, onload, etc

Example for Embedding the JavaScript code between a pair of <script> and </script> tag.



```
<!DOCTYPE html>
<html>
<head>
 <title>Simple JavaScript Example</title>
</head>
 <body>
  <h1>My First JavaScript Example</h1>
  <p>This text is written using normal HTML.</p>

  <script>
    // Simple JavaScript statement
    document.write("<p>This sentence is written by JavaScript.</p>");
  </script>

  <p>This is more HTML after the script.</p>

</body>

</html>
```



My First JavaScript Example

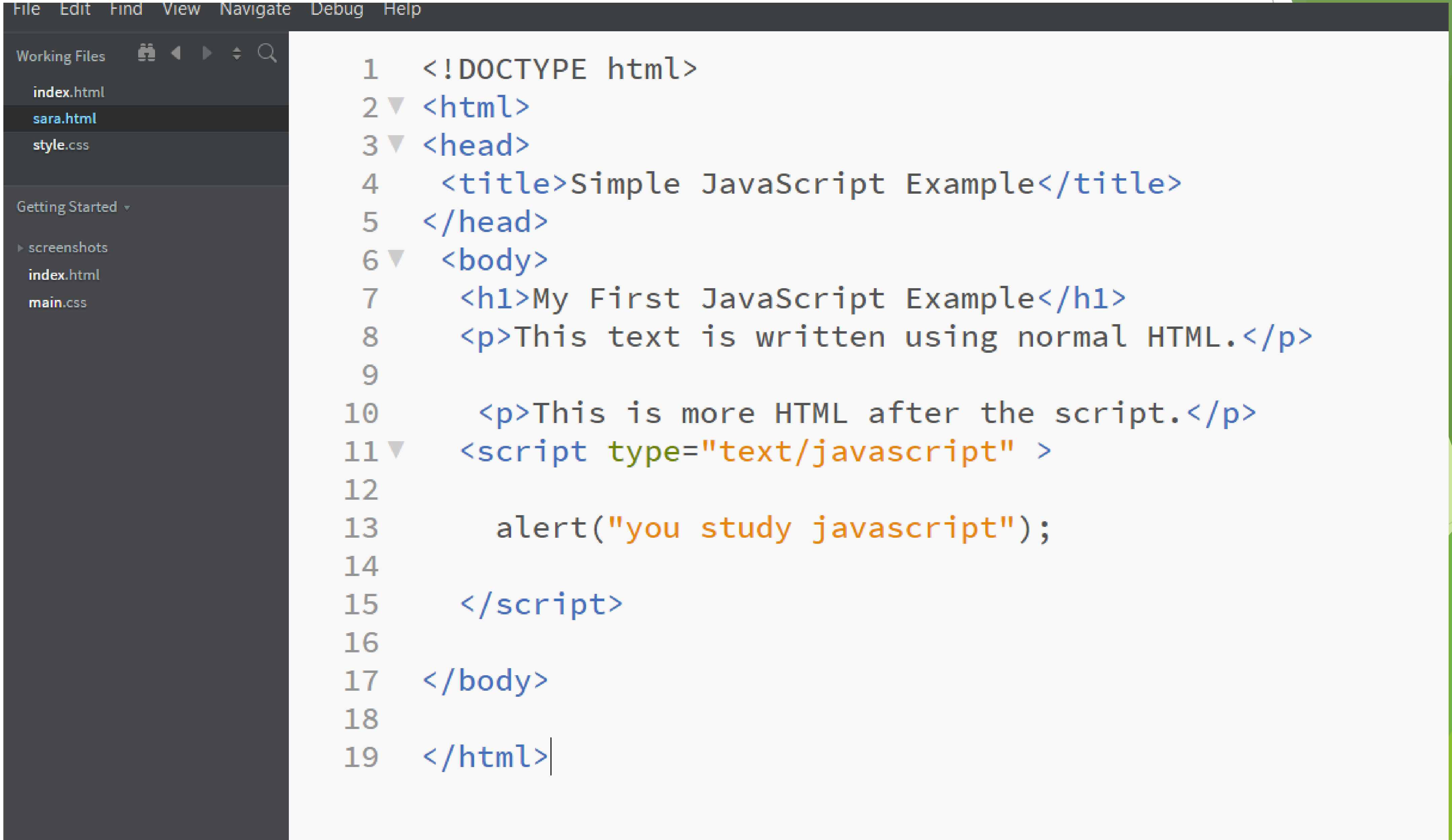
This text is written using normal HTML.

This sentence is written by JavaScript.

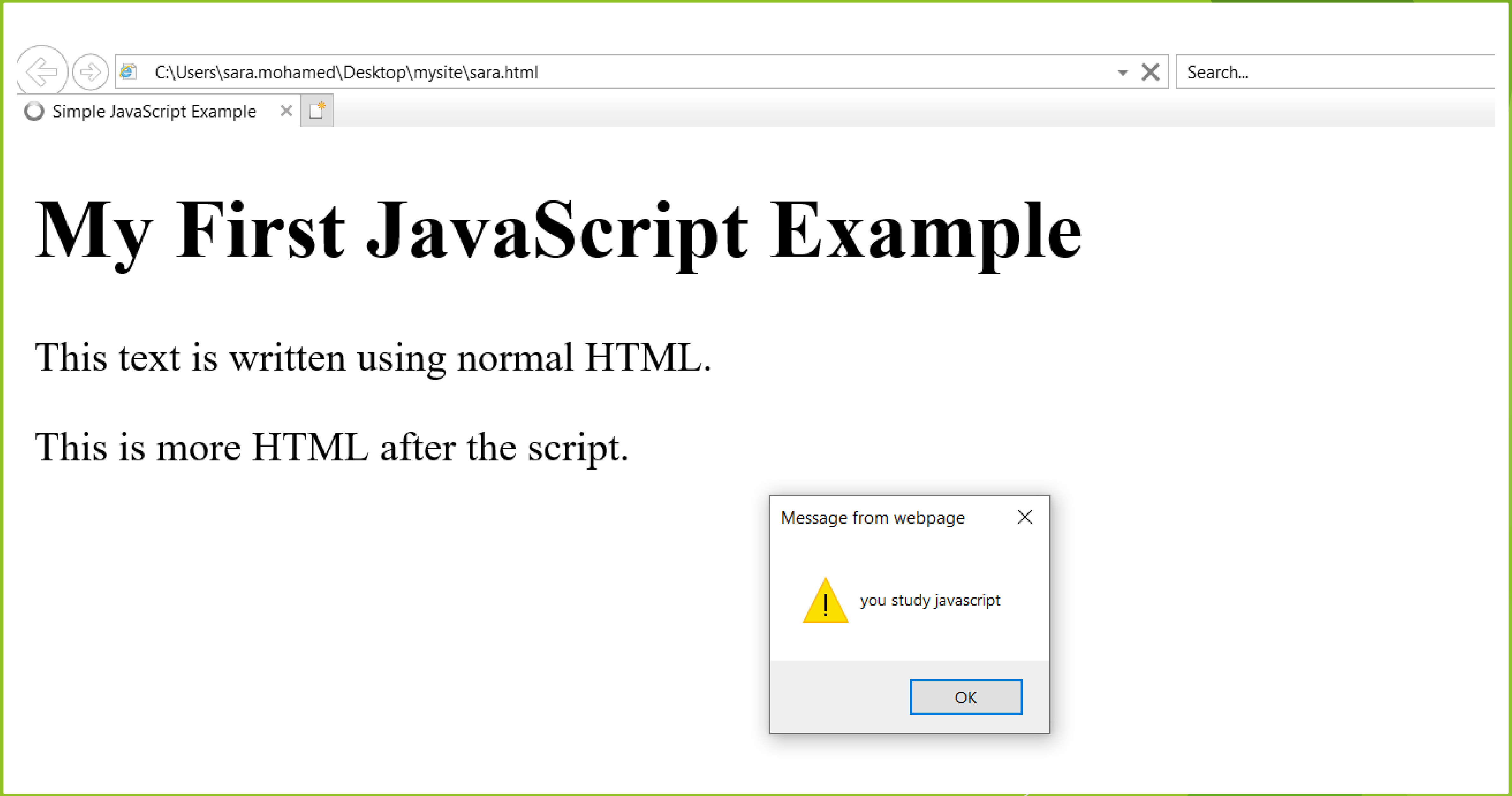
This is more HTML after the script.

Output

Example2



```
<!DOCTYPE html>
<html>
<head>
 <title>Simple JavaScript Example</title>
</head>
 <body>
  <h1>My First JavaScript Example</h1>
  <p>This text is written using normal HTML.</p>

   <p>This is more HTML after the script.</p>
  <script type="text/javascript" >

    alert("you study javascript");

  </script>

</body>

</html>
```


C:\Users\sara.mohamed\Desktop\mysite\sara.html
Search...
Simple JavaScript Example
Message from webpage
OK

My First JavaScript Example

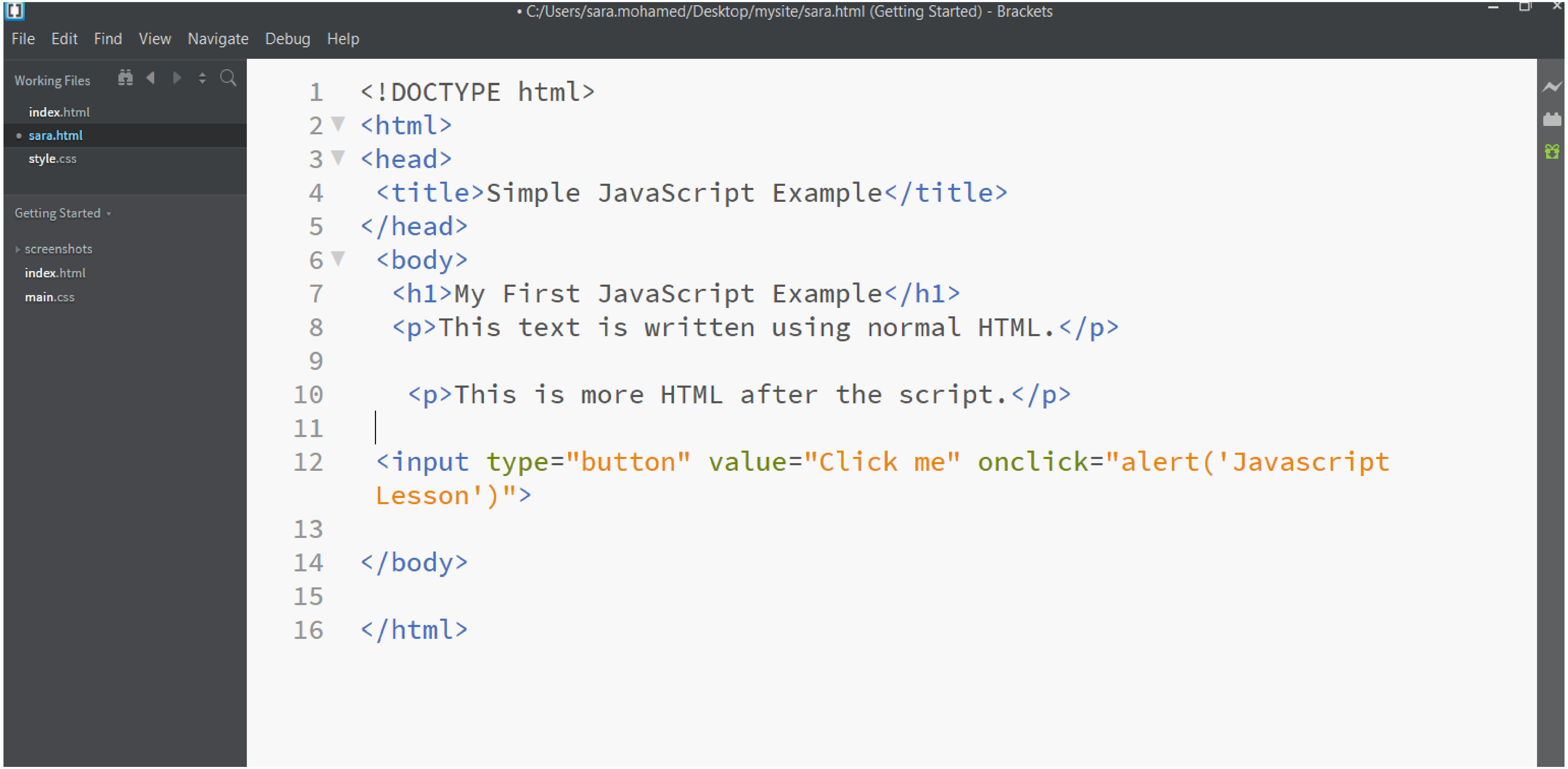
This text is written using normal HTML.

This is more HTML after the script.

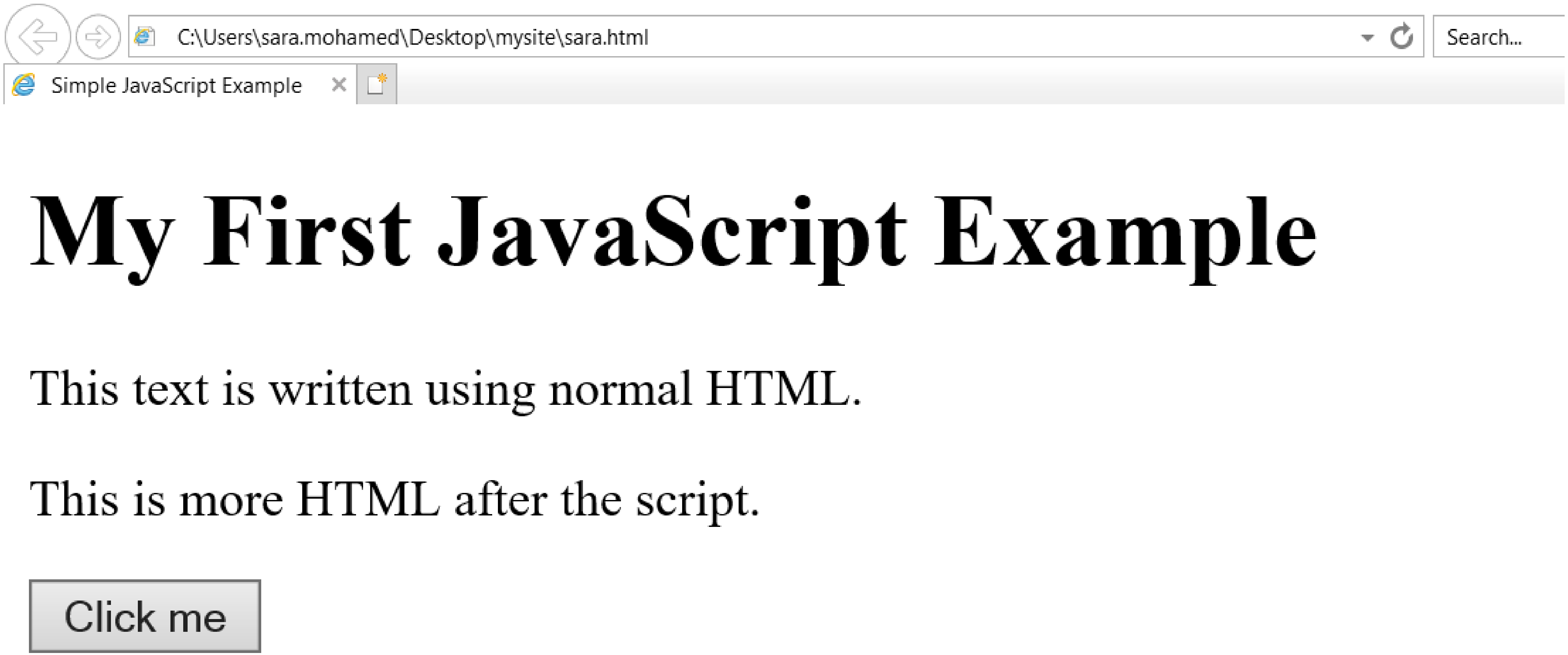
you study javascript

- Placing the JavaScript code directly inside an HTML tag

  You can also place JavaScript code inline by inserting it directly inside the HTML tag using the special tag attributes such as onclick, onmouseover, onkeypress, onload, etc.



```
<!DOCTYPE html>
<html>
<head>
 <title>Simple JavaScript Example</title>
</head>
 <body>
  <h1>My First JavaScript Example</h1>
  <p>This text is written using normal HTML.</p>

   <p>This is more HTML after the script.</p>

 <input type="button" value="Click me" onclick="alert('Javascript Lesson')">

</body>

</html>
```



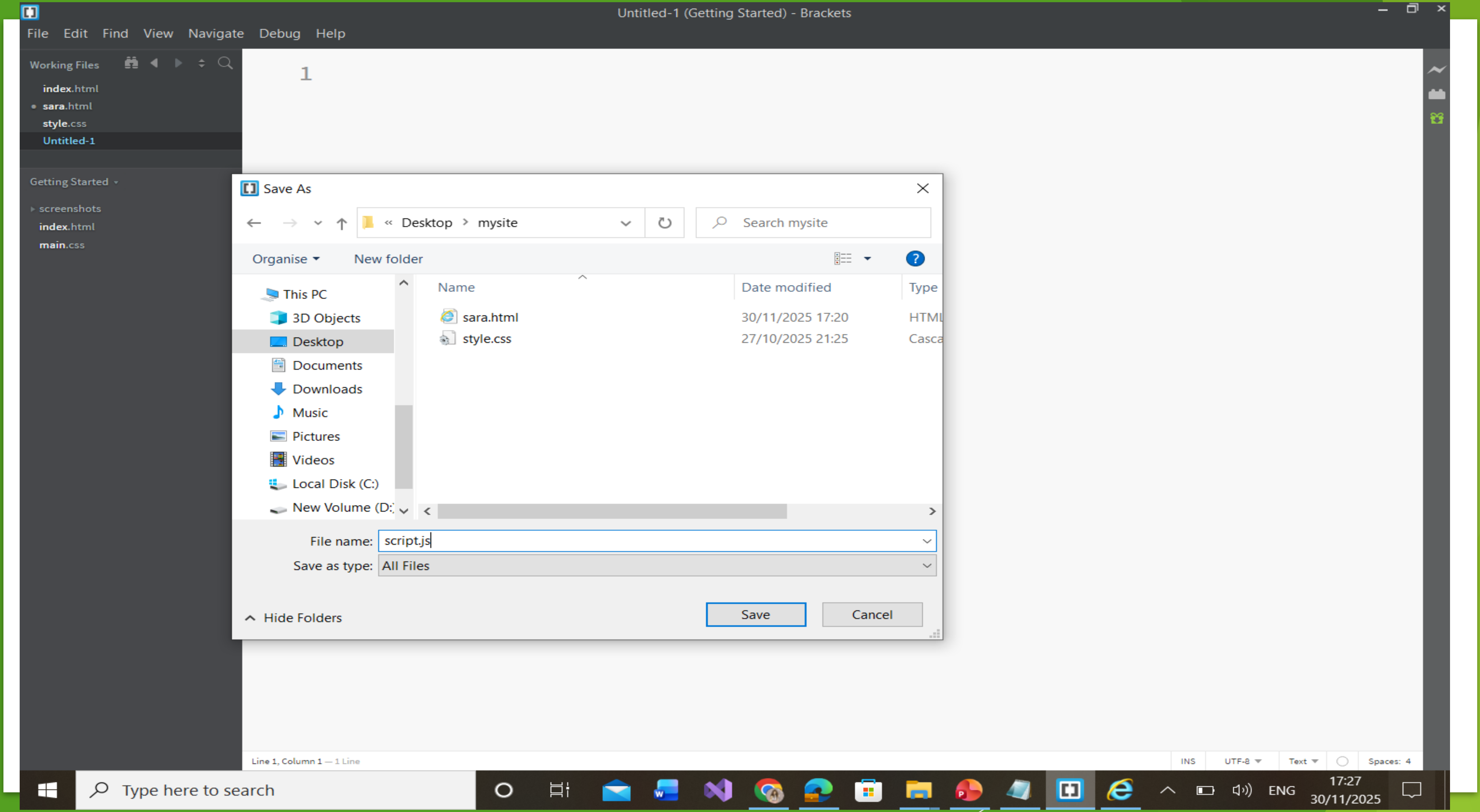
C:\Users\sara.mohamed\Desktop\mysite\sara.html
Search...
Simple JavaScript Example
Click me

My First JavaScript Example

This text is written using normal HTML.

This is more HTML after the script.

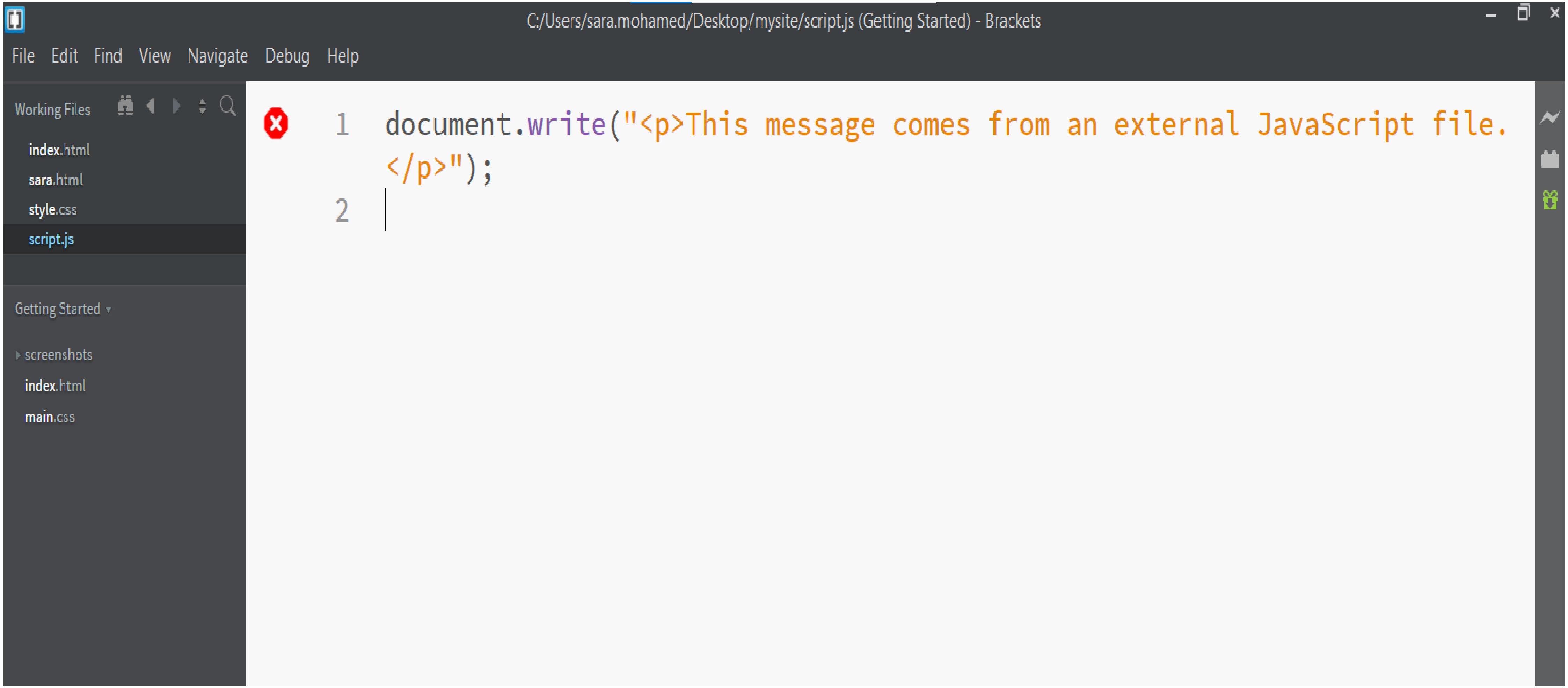
Method_3: Creating an external JavaScript file with the .js extension and then load it within the page through the src attribute of the <script> tag.



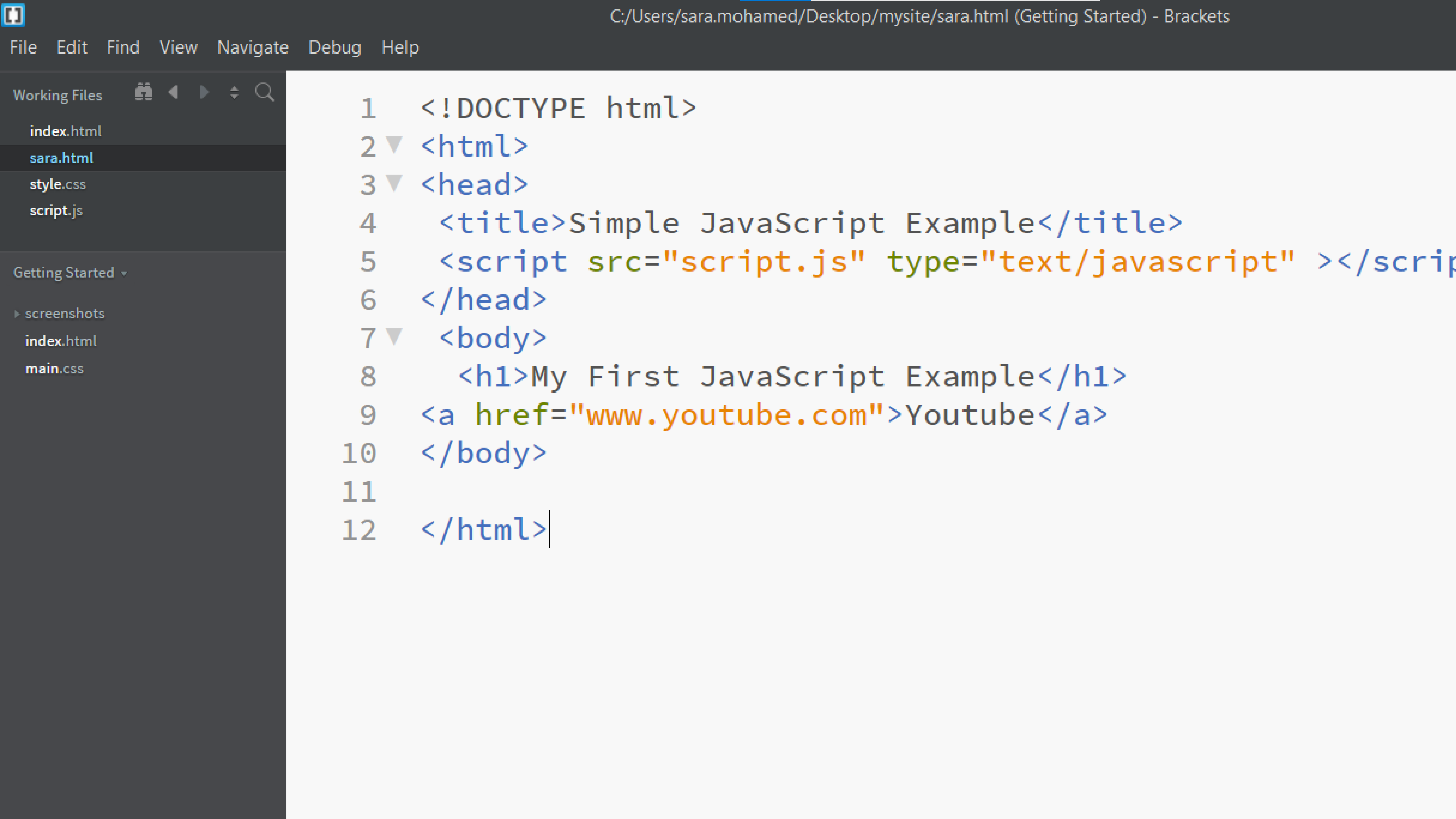
Name	Date modified	Type
sara.html	30/11/2025 17:20	HTMl
style.css	27/10/2025 21:25	Casca

File name: script.js

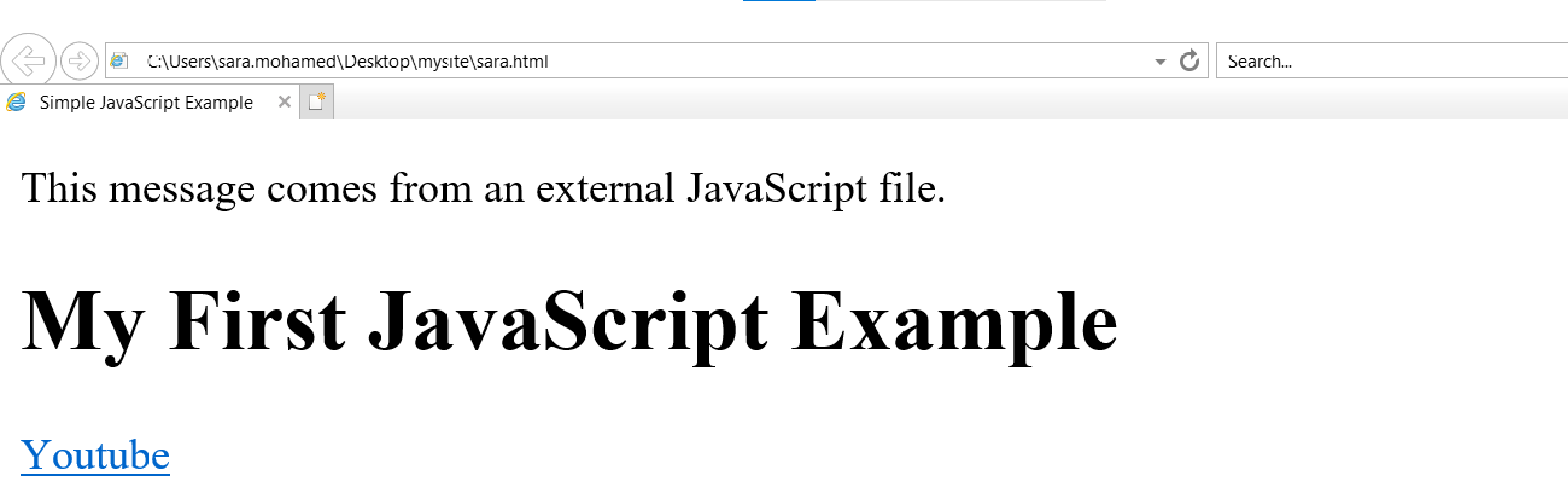
Save as type: All Files



```
document.write("<p>This message comes from an external JavaScript file.</p>");
```



```
<!DOCTYPE html>
<html>
<head>
 <title>Simple JavaScript Example</title>
 <script src="script.js" type="text/javascript" ></scrip
</head>
 <body>
  <h1>My First JavaScript Example</h1>
<a href="www.youtube.com">Youtube</a>
</body>

</html>
```


C:\Users\sara.mohamed\Desktop\mysite\sara.html
Search...
Simple JavaScript Example

This message comes from an external JavaScript file.

My First JavaScript Example

Youtube

JavaScript Variables

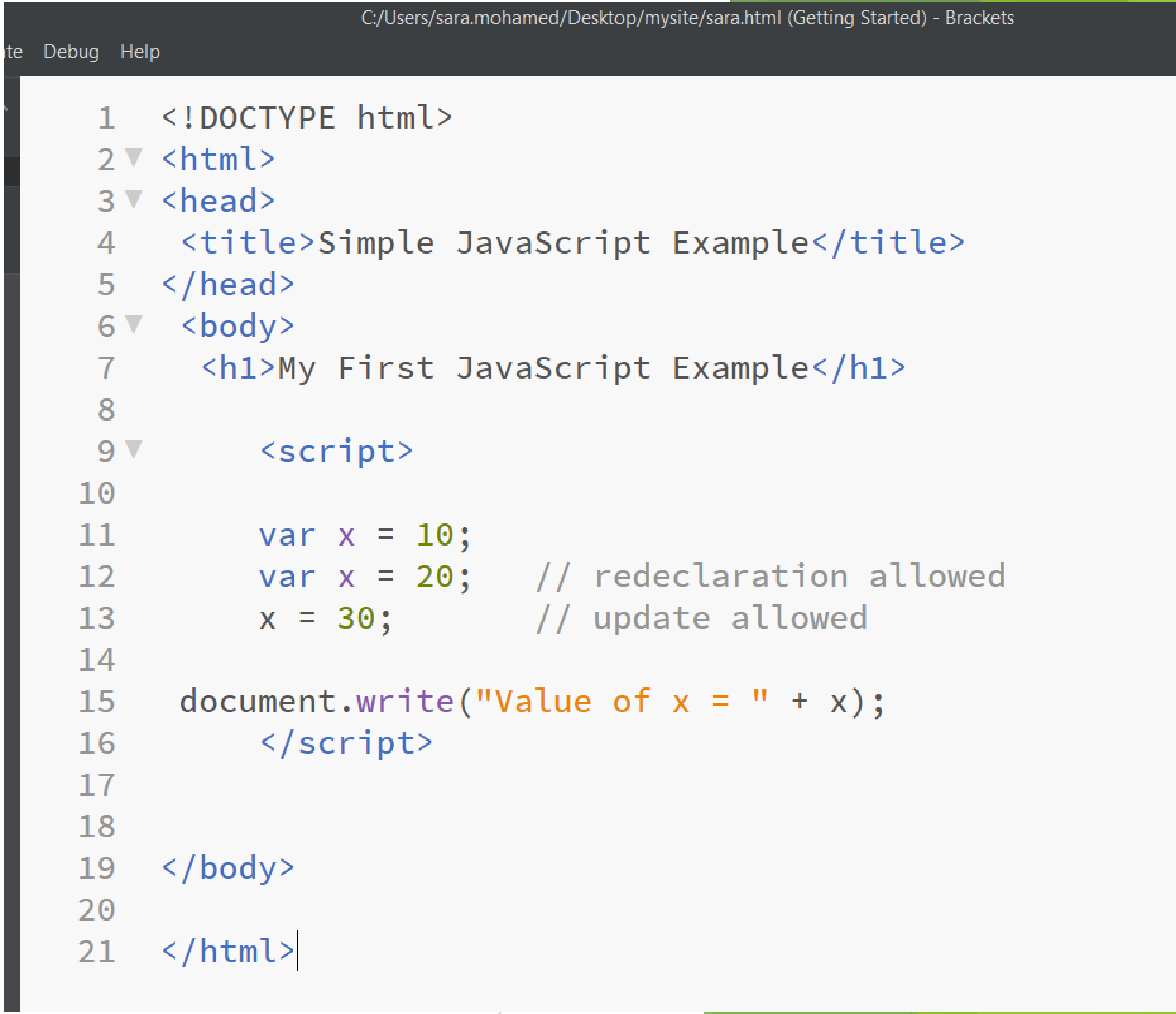
- JavaScript variables are containers for storing data in memory, allowing you to reference and manipulate it. They can be declared using var, let, or const, each with different scoping and usage rules.

Difference between var, let and const keywords in JavaScript

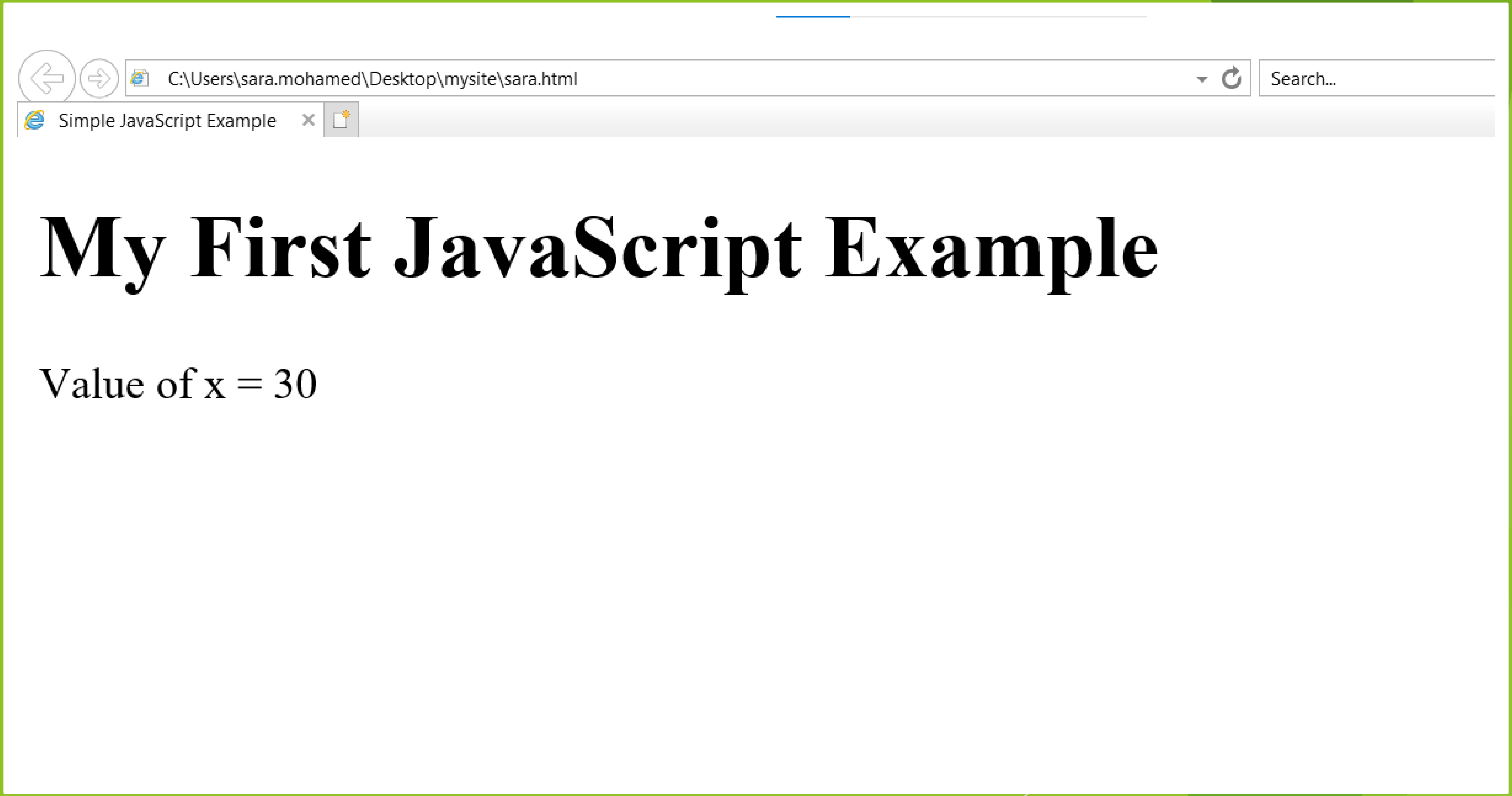
- **var:** Declares variables with function or global scope and allows re-declaration and updates within the same scope.
- **let:** Declares variables with block scope, allowing updates but not re-declaration within the same block.
- **const:** Declares block-scoped variables that cannot be reassigned after their initial assignment.

Var

- ✓ Old keyword (before 2015)
- ✓ Function-scoped
- ✓ Can be redeclared and updated.


C:/Users/sara.mohamed/Desktop/mysite/sara.html (Getting Started) - Brackets
te
Debug
Help

```
<!DOCTYPE html>
<html>
<head>
 <title>Simple JavaScript Example</title>
</head>
 <body>
  <h1>My First JavaScript Example</h1>

      <script>

      var x = 10;
      var x = 20;   // redeclaration allowed
      x = 30;       // update allowed

 document.write("Value of x = " + x);
      </script>


</body>

</html>
```

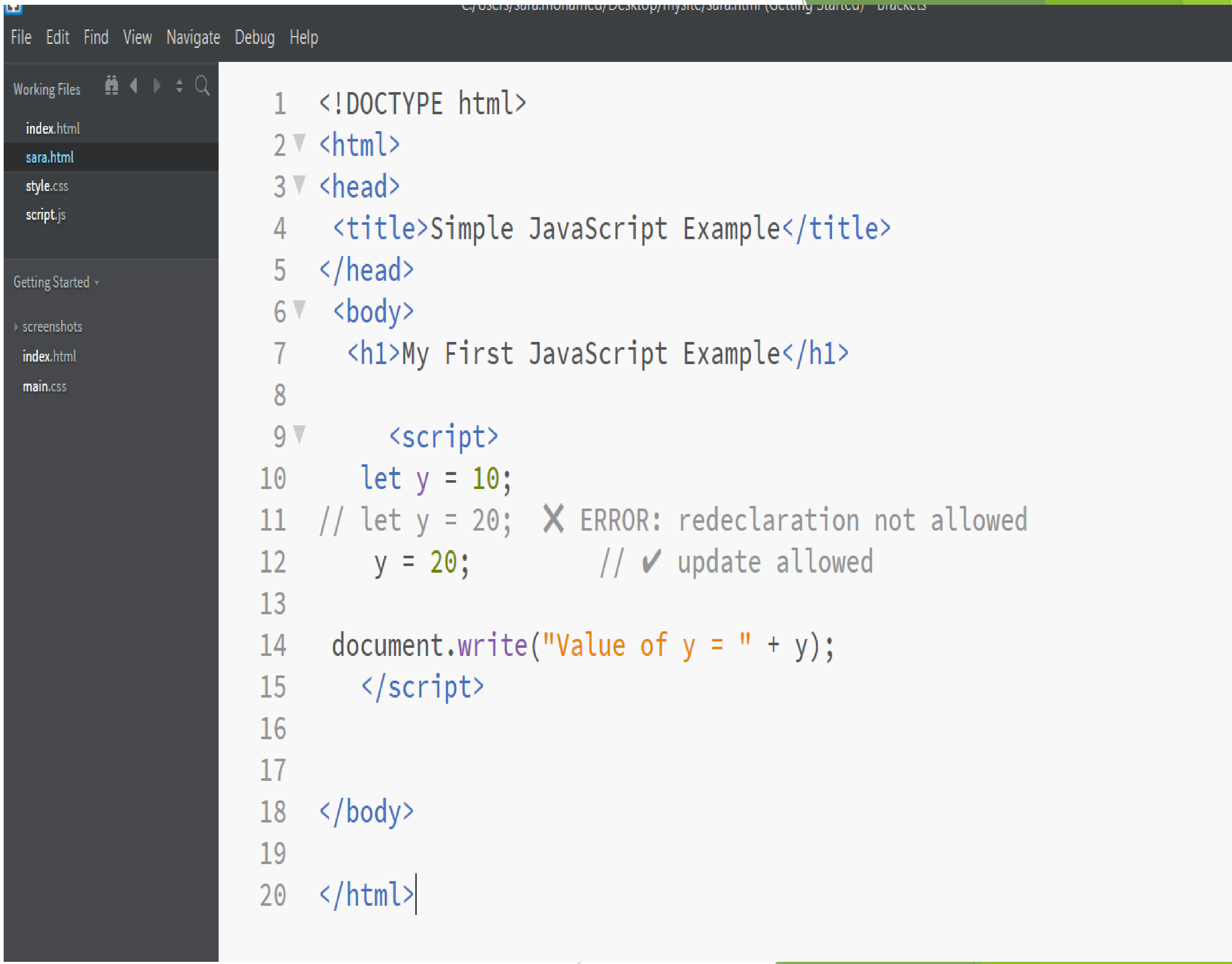

C:\Users\sara.mohamed\Desktop\mysite\sara.html
Search...
Simple JavaScript Example

My First JavaScript Example

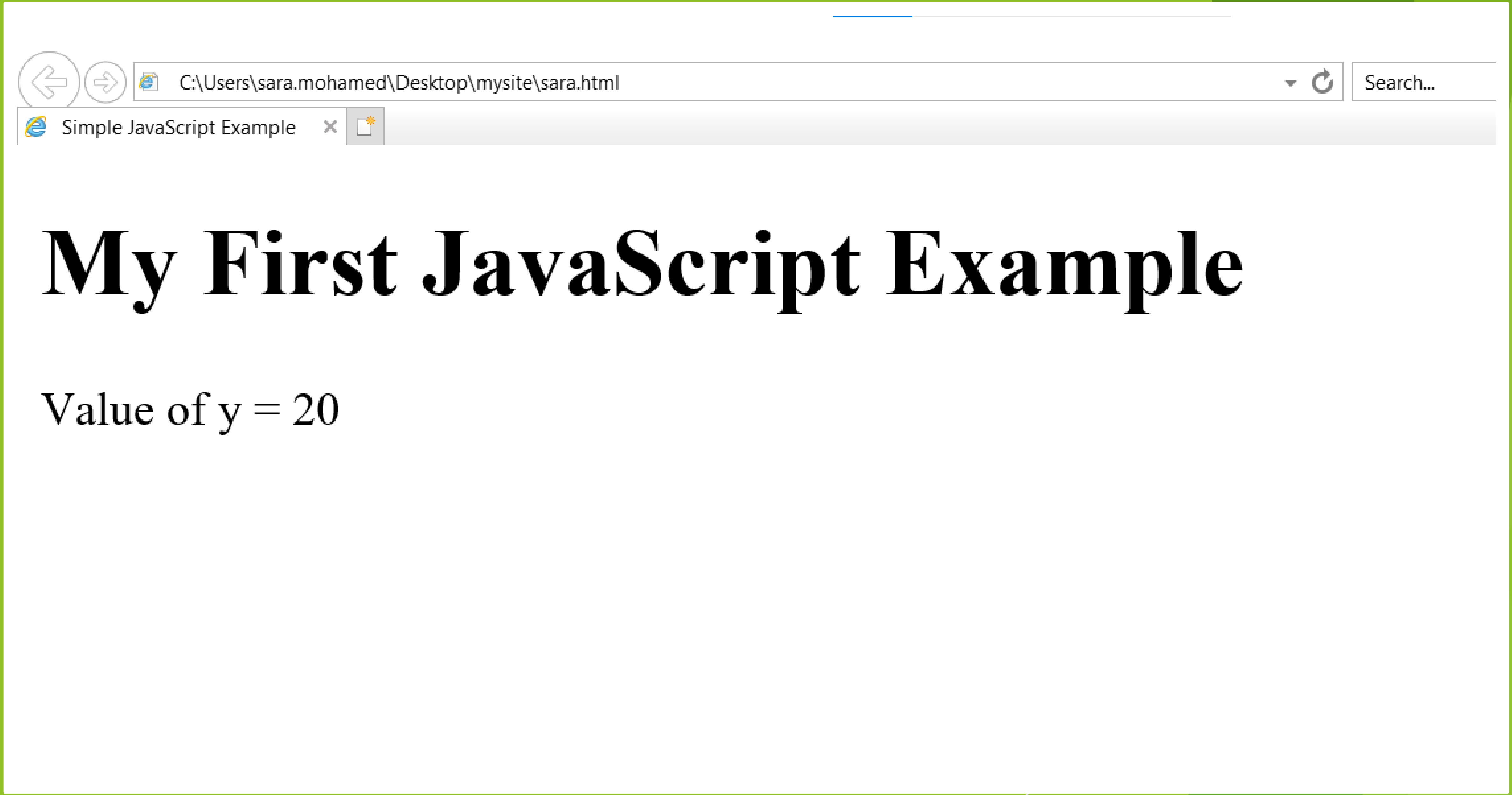
Value of x = 30

let

- ✓ Modern keyword
- ✓ Block-scoped ({ })
- ✓ Cannot be redeclared in the same block
- ✓ Can be updated

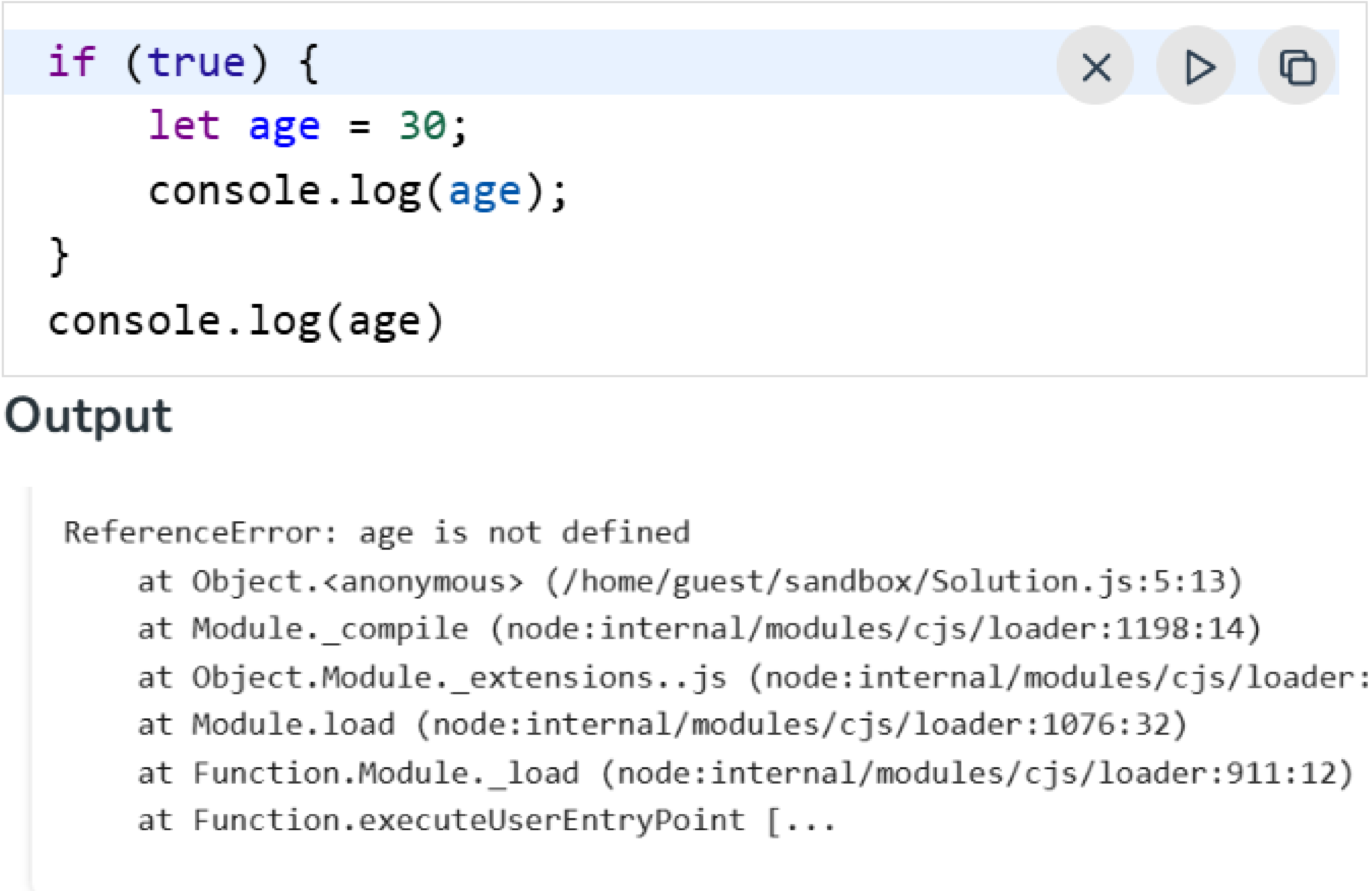

C:/Users/sara.mohamed/Desktop/mysite/sara.html (Getting Started) - Brackets
File Edit Find View Navigate Debug Help
Working Files
index.html
sara.html
style.css
script.js
Getting Started
screenshots
index.html
main.css

```
<!DOCTYPE html>
<html>
<head>
 <title>Simple JavaScript Example</title>
</head>
 <body>
  <h1>My First JavaScript Example</h1>

     <script>
   let y = 10;
// let y = 20;  ✗ ERROR: redeclaration not allowed
    y = 20;         // ✔ update allowed

 document.write("Value of y = " + y);
   </script>


</body>

</html>
```


C:\Users\sara.mohamed\Desktop\mysite\sara.html
Search...
Simple JavaScript Example

My First JavaScript Example

Value of y = 20



```
if (true) {
    let age = 30;
    console.log(age);
}
console.log(age)
```

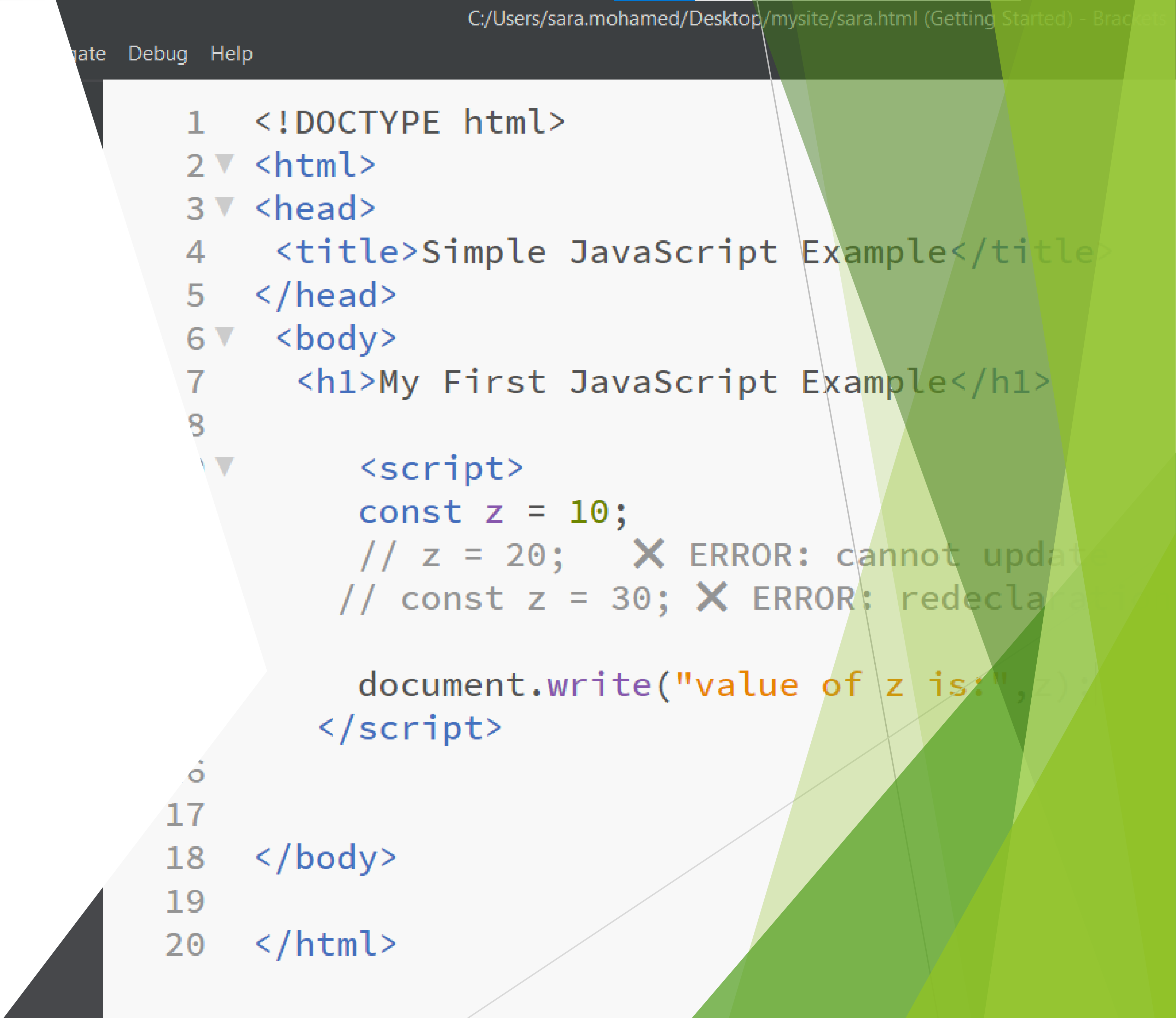
Output

```
ReferenceError: age is not defined
    at Object.<anonymous> (/home/guest/sandbox/Solution.js:5:13)
    at Module._compile (node:internal/modules/cjs/loader:1198:14)
    at Object.Module._extensions..js (node:internal/modules/cjs/loader:
    at Module.load (node:internal/modules/cjs/loader:1076:32)
    at Function.Module._load (node:internal/modules/cjs/loader:911:12)
    at Function.executeUserEntryPoint [...
```

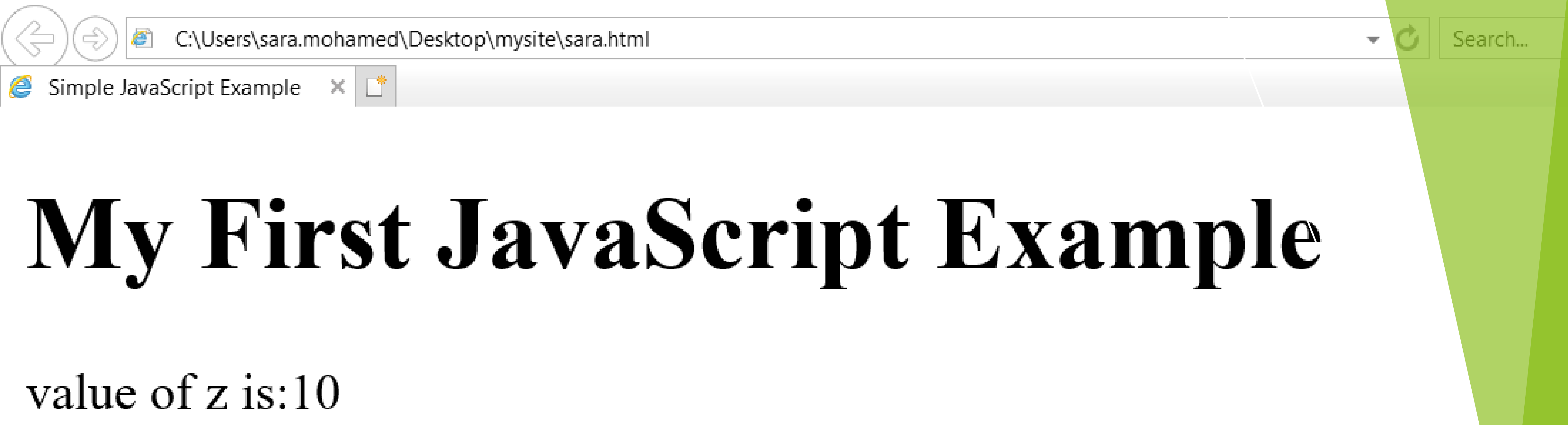
Block Scope with let

const

- ✓ Block-scoped
- ✓ Cannot be redeclared
- ✓ Cannot be updated (value stays constant)


C:/Users/sara.mohamed/Desktop/mysite/sara.html (Getting Started) - Brackets
ate
Debug
Help

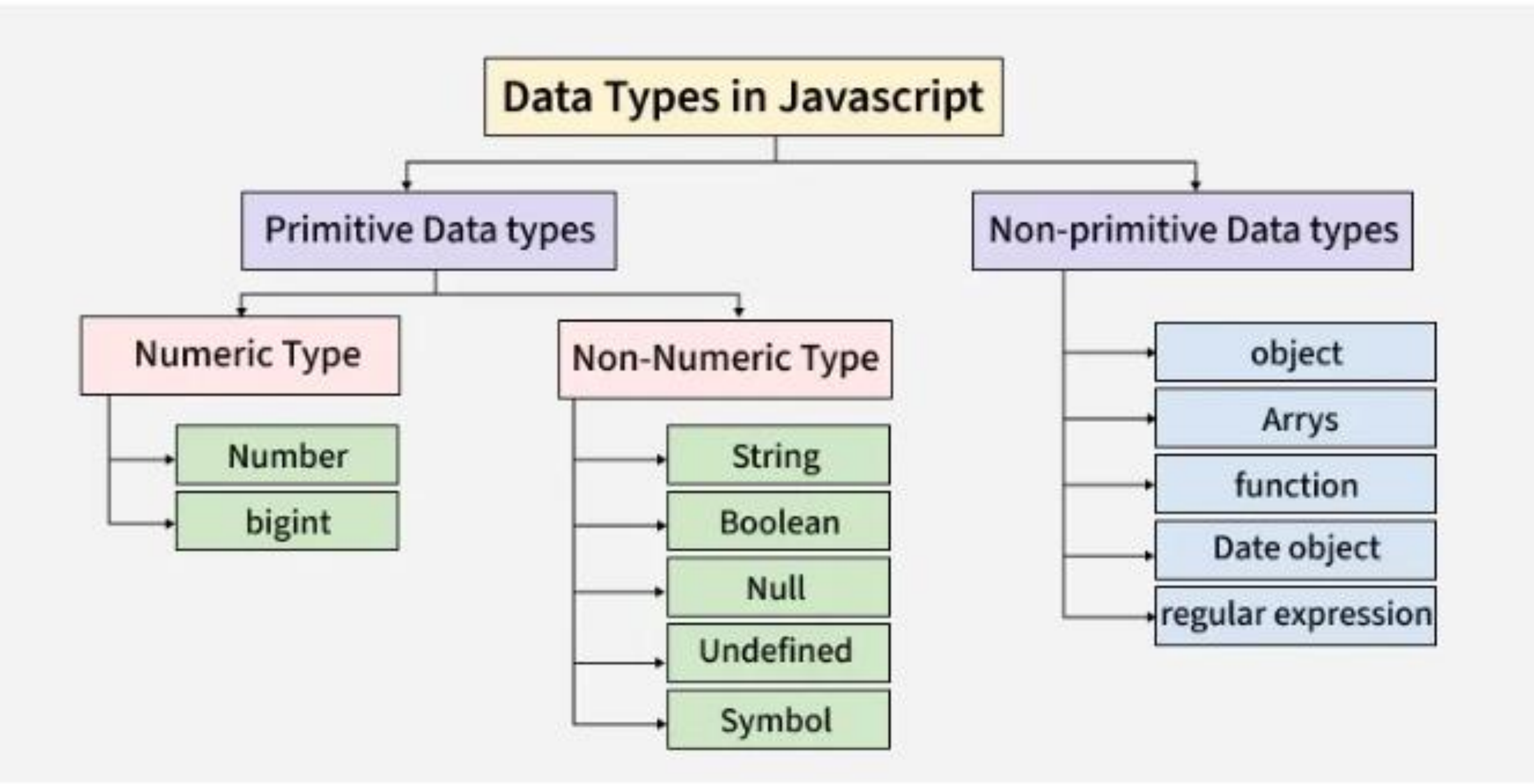
```
<!DOCTYPE html>
<html>
<head>
 <title>Simple JavaScript Example</title>
</head>
 <body>
  <h1>My First JavaScript Example</h1>

     <script>
     const z = 10;
     // z = 20;    ✕ ERROR: cannot updat
    // const z = 30; ✕ ERROR: redeclara

     document.write("value of z is:",z);
   </script>



</body>

</html>
```


C:\Users\sara.mohamed\Desktop\mysite\sara.html
Search...
Simple JavaScript Example

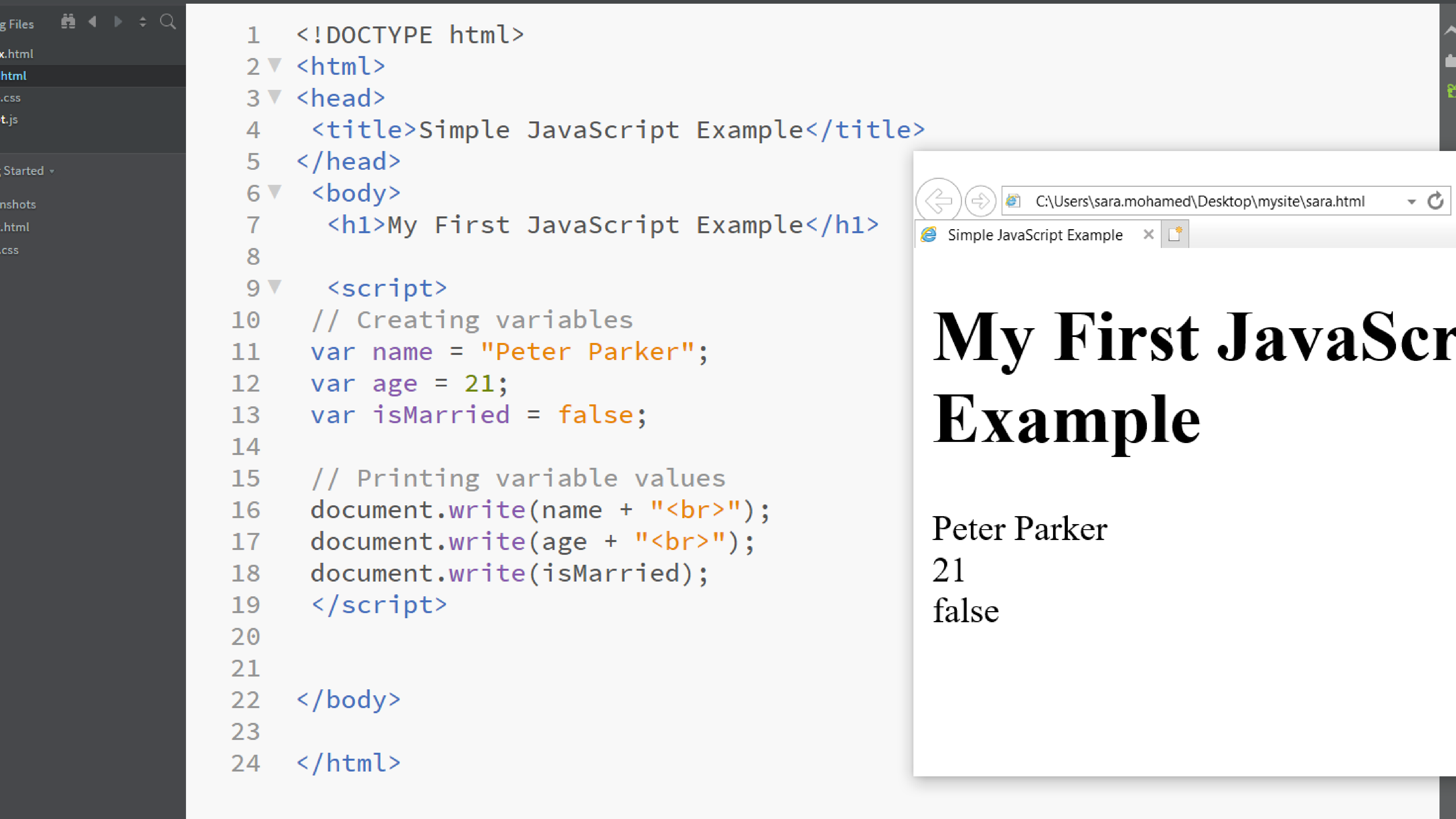
My First JavaScript Example

value of z is:10

JavaScript Data Type Categories

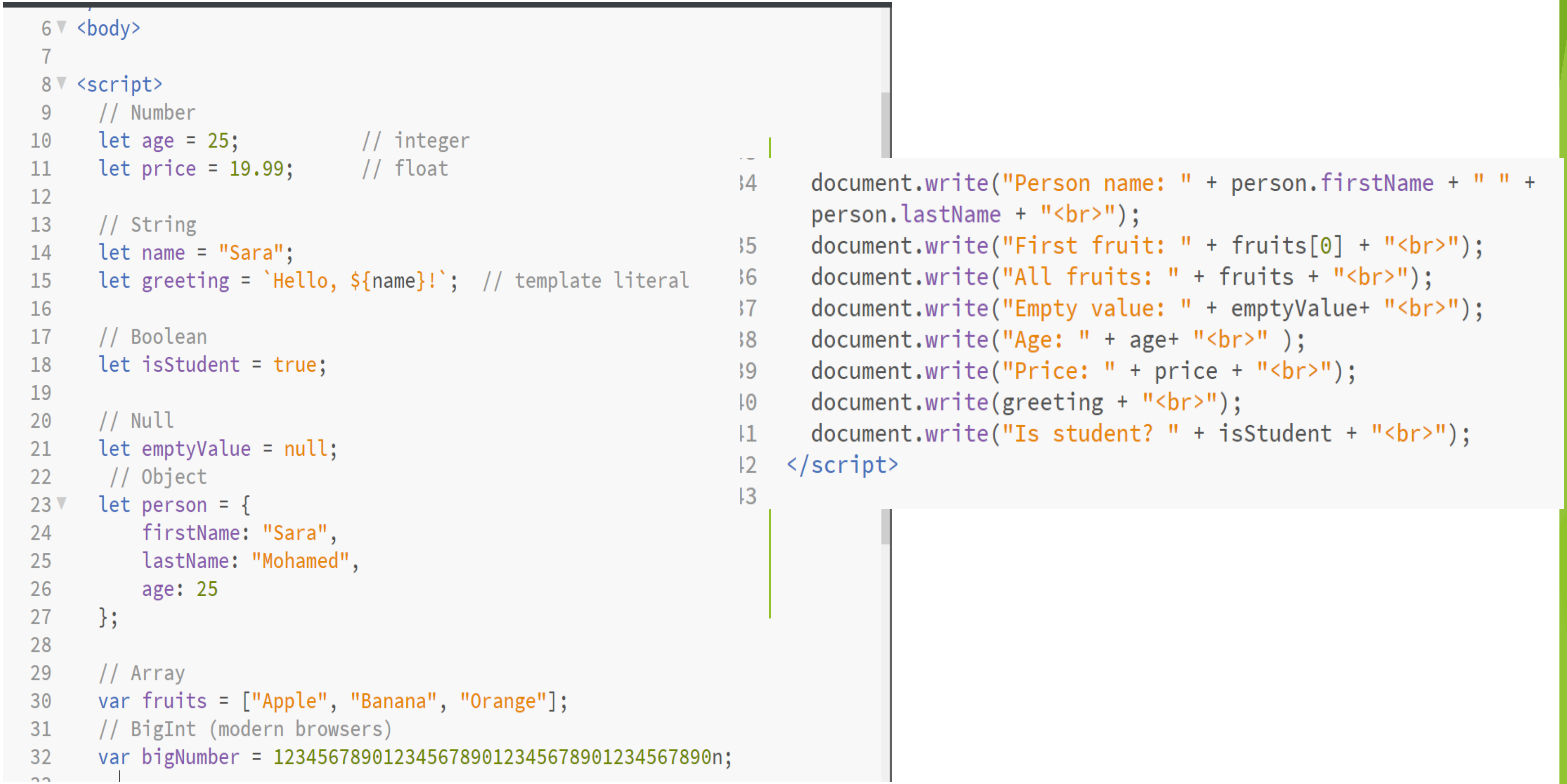


- Data Types in Javascript
  - Primitive Data types
    - Numeric Type
      - Number
      - bigint
    - Non-Numeric Type
      - String
      - Boolean
      - Null
      - Undefined
      - Symbol
  - Non-primitive Data types
    - object
    - Arrys
    - function
    - Date object
    - regular expression


g Files
x.html
html
.css
t.js
Started
nshots
.html
.css
C:\Users\sara.mohamed\Desktop\mysite\sara.html
Simple JavaScript Example

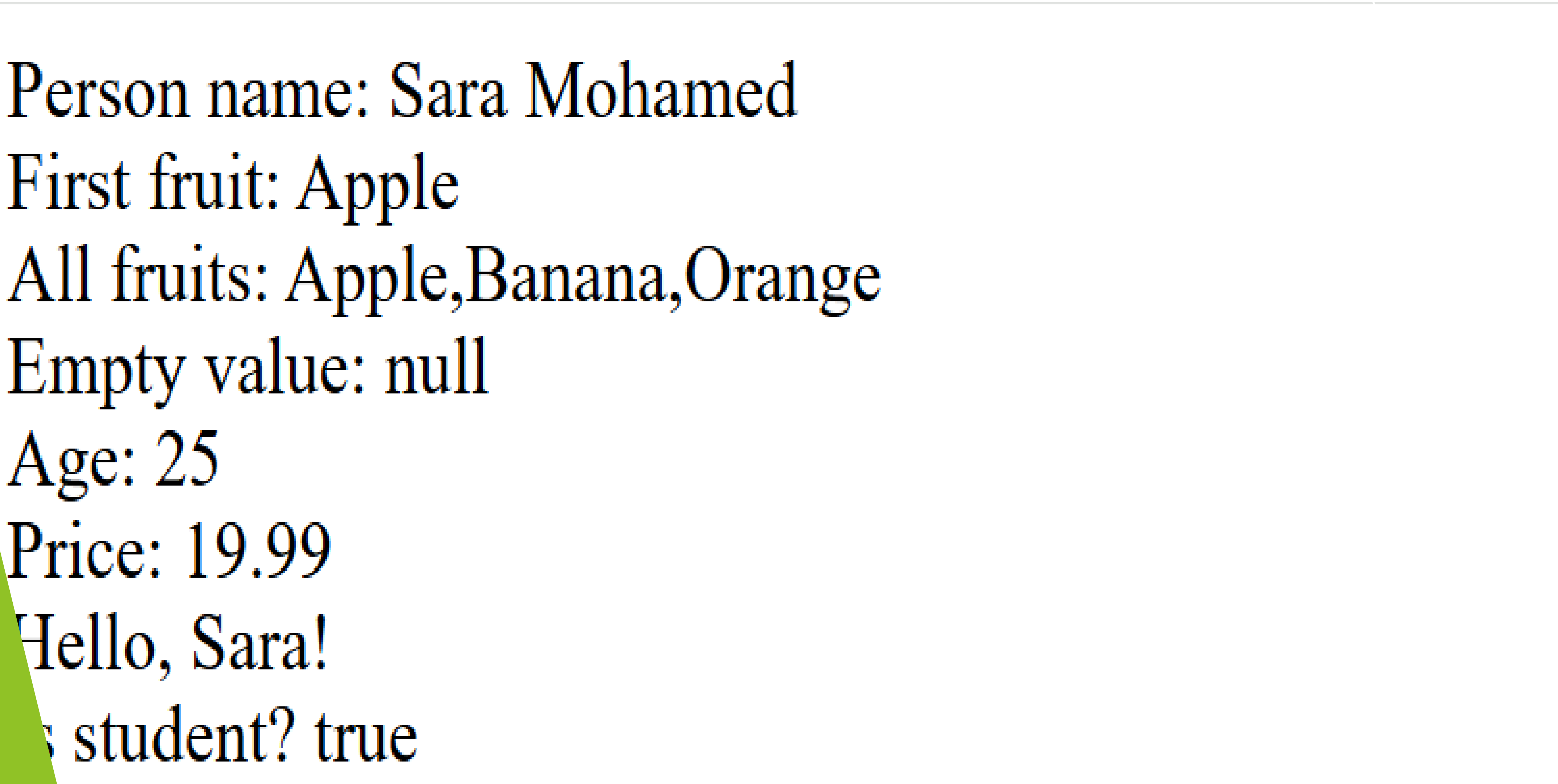
```
<!DOCTYPE html>
<html>
<head>
 <title>Simple JavaScript Example</title>
</head>
 <body>
  <h1>My First JavaScript Example</h1>

  <script>
 // Creating variables
 var name = "Peter Parker";
 var age = 21;
 var isMarried = false;

 // Printing variable values
 document.write(name + "<br>");
 document.write(age + "<br>");
 document.write(isMarried);
 </script>


</body>

</html>
```

```
My First JavaScr
Example

Peter Parker
21
false
```



```
<body>

<script>
  // Number
  let age = 25;          // integer
  let price = 19.99;      // float

  // String
  let name = "Sara";
  let greeting = `Hello, ${name}!`;  // template literal

  // Boolean
  let isStudent = true;

  // Null
  let emptyValue = null;
   // Object
  let person = {
      firstName: "Sara",
      lastName: "Mohamed",
      age: 25
  };

  // Array
  var fruits = ["Apple", "Banana", "Orange"];
  // BigInt (modern browsers)
  var bigNumber = 1234567890123456789012345678901234567890n;
```

```
  document.write("Person name: " + person.firstName + " " +
  person.lastName + "<br>");
  document.write("First fruit: " + fruits[0] + "<br>");
  document.write("All fruits: " + fruits + "<br>");
  document.write("Empty value: " + emptyValue+ "<br>");
  document.write("Age: " + age+ "<br>" );
  document.write("Price: " + price + "<br>");
  document.write(greeting + "<br>");
  document.write("Is student? " + isStudent + "<br>");
</script>
```

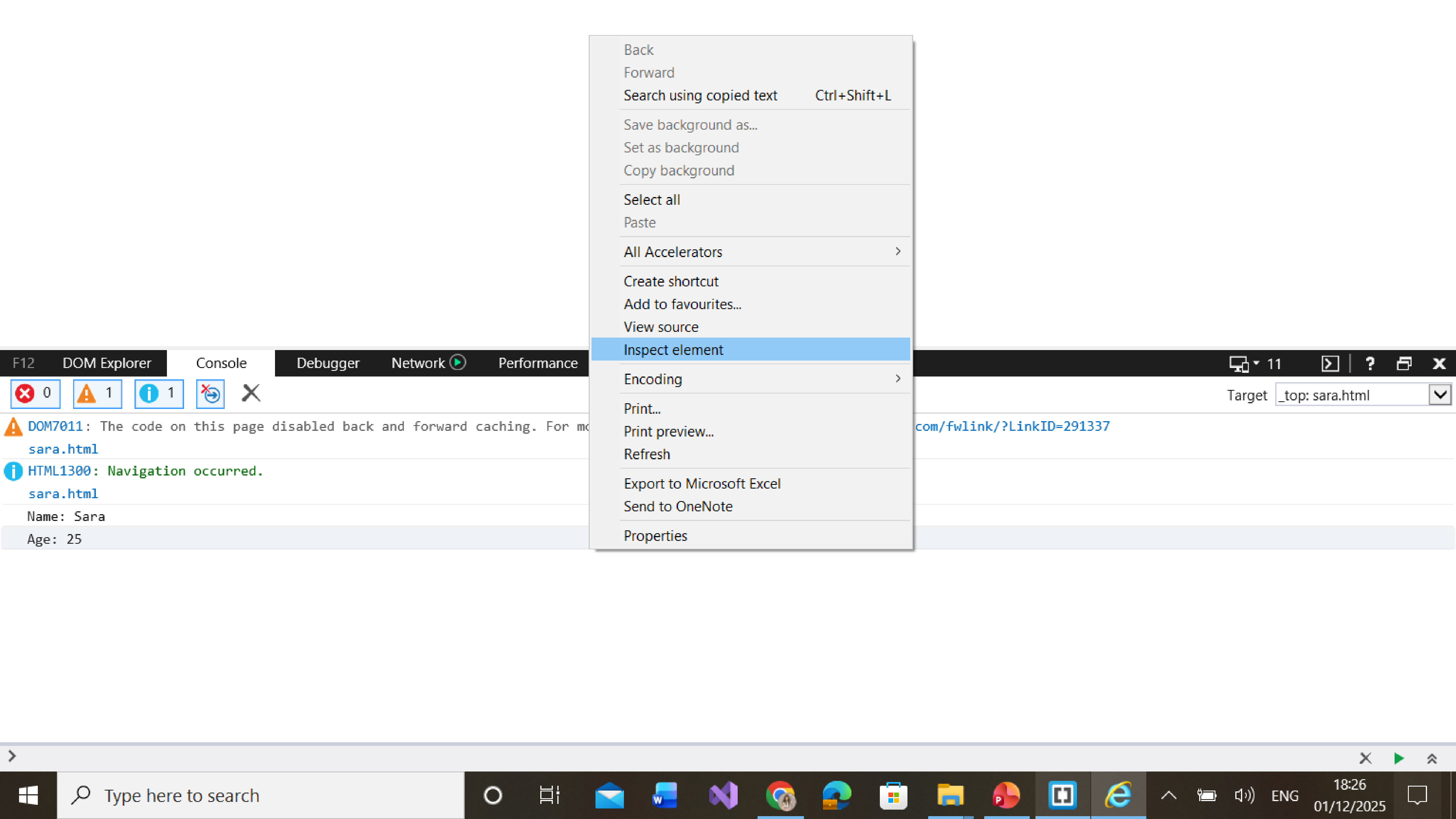


```
Person name: Sara Mohamed
First fruit: Apple
All fruits: Apple,Banana,Orange
Empty value: null
Age: 25
Price: 19.99
Hello, Sara!
s student? true
```

Output in JavaScript

1. You can easily output a message or writes data to the browser console using the console.log() method.
2. You can also use alert dialog boxes to display the message or output data to the user. An alert dialog box is created using the alert() method.
3. You can use the document. Write() method to write the content to the current document only.
4. You can also write or insert output inside an HTML element using the element's innerHTML property. However, before writing the output first we need to select the element using a method such as getElementById().

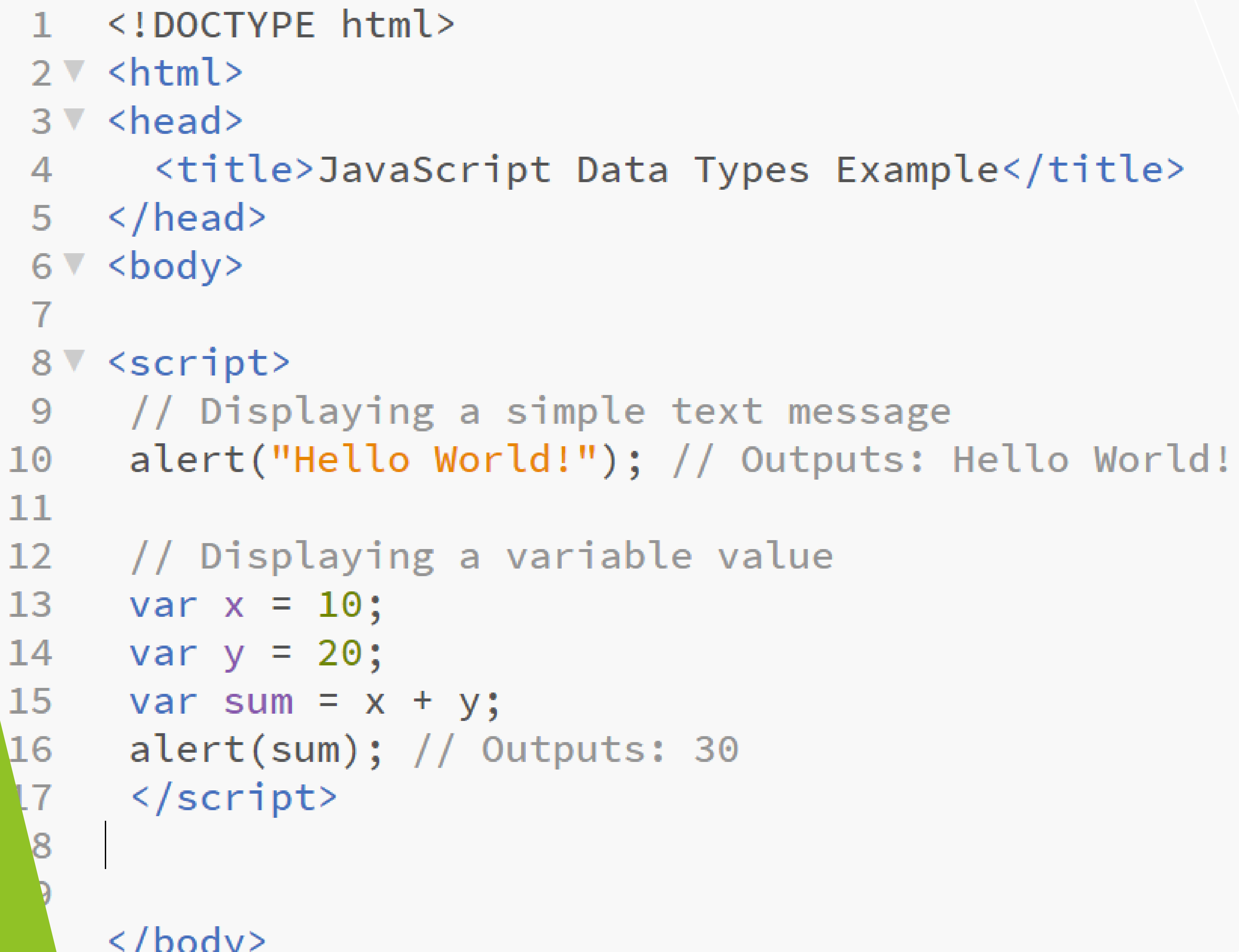
Print variables to the console



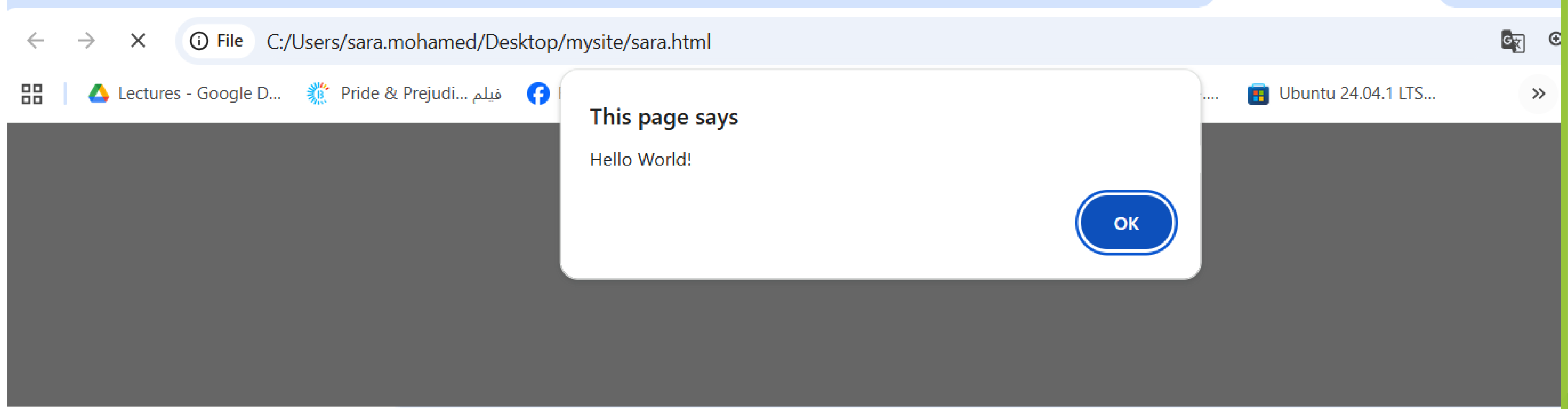
Target: _top: sara.html

```
DOM7011: The code on this page disabled back and forward caching. For mo          com/fwlink/?LinkID=291337
sara.html
HTML1300: Navigation occurred.
sara.html
Name: Sara
Age: 25
```

Example for alert() function

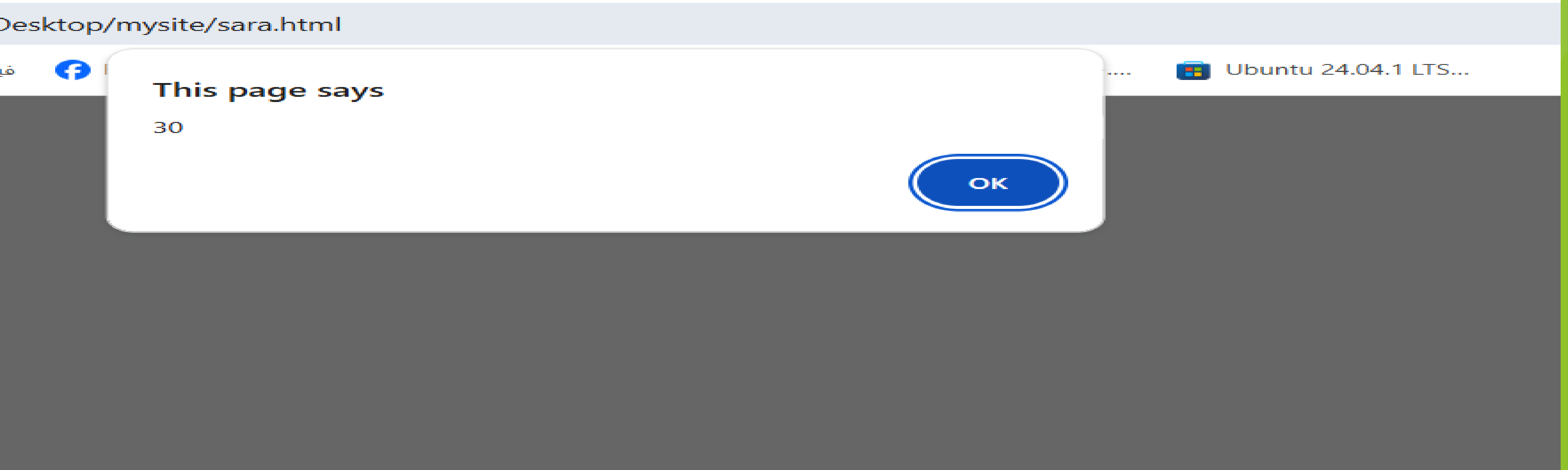


```
<!DOCTYPE html>
<html>
<head>
  <title>JavaScript Data Types Example</title>
</head>
<body>

<script>
 // Displaying a simple text message
 alert("Hello World!"); // Outputs: Hello World!

 // Displaying a variable value
 var x = 10;
 var y = 20;
 var sum = x + y;
 alert(sum); // Outputs: 30
 </script>


</body>
```



This page says

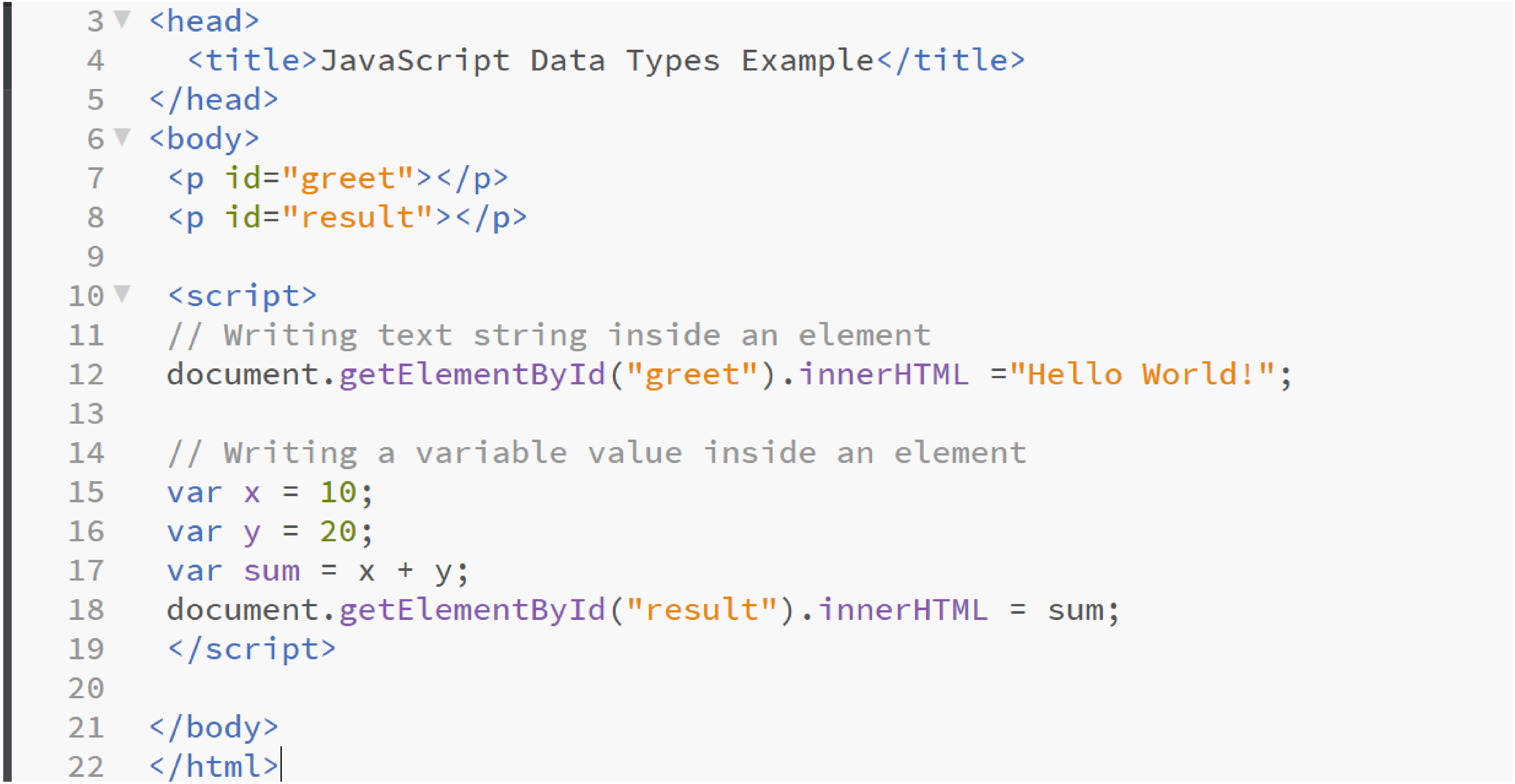
Hello World!



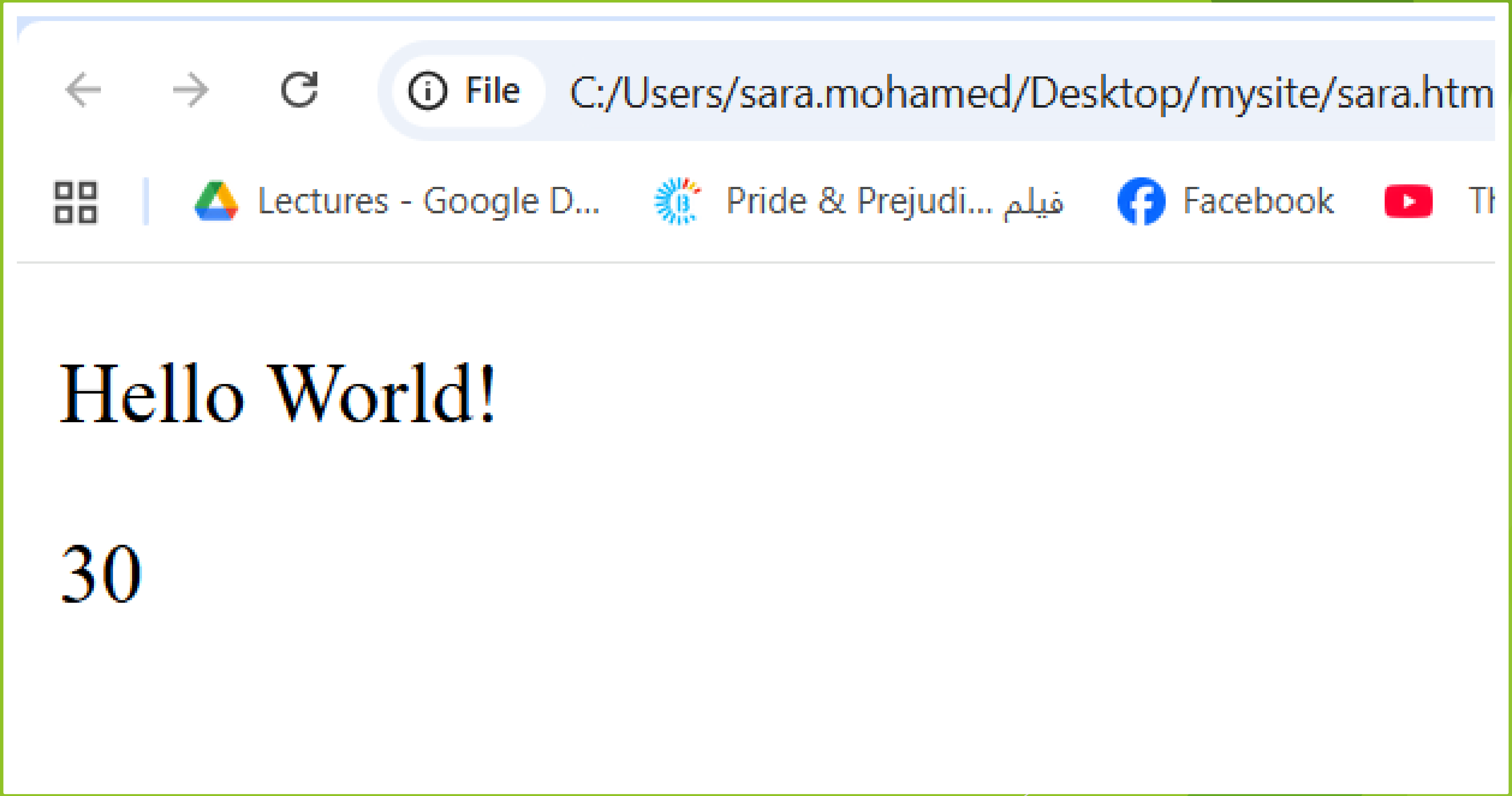
This page says

30

Output using the element's innerHTML property



```
<head>
  <title>JavaScript Data Types Example</title>
</head>
<body>
 <p id="greet"></p>
 <p id="result"></p>

 <script>
 // Writing text string inside an element
 document.getElementById("greet").innerHTML ="Hello World!";

 // Writing a variable value inside an element
 var x = 10;
 var y = 20;
 var sum = x + y;
 document.getElementById("result").innerHTML = sum;
 </script>

</body>
</html>
```



```
Hello World!

30
```

References

- https://www.geeksforgeeks.org/javascript/what-is-javascript/
- https://www.geeksforgeeks.org/javascript/difference-between-var-let-and-const-keywords-in-javascript/
- https://www.geeksforgeeks.org/javascript/difference-between-var-let-and-const-keywords-in-javascript/
- https://www.geeksforgeeks.org/javascript/javascript-data-types/

Thank you