



Department of Computer Science and Engineering (Data Science)

AY: 2024-25

Subject: Web Engineering Laboratory

Experiment 3

(JavaScript)

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Aim: Client-Side Scripting

1. Programs based on objects in JavaScript.
2. Program to design a calculator using JavaScript
3. Program based on form validation.

Theory:

JavaScript was initially created to “make web pages alive”.

The programs in this language are called *scripts*. They can be written right in a web page's HTML and run automatically as the page loads.

Scripts are provided and executed as plain text. They don't need special preparation or compilation to run.

In this aspect, JavaScript is very different from another language called Java.

JavaScript can be implemented using JavaScript statements that are placed within the `<script>... </script>` HTML tags in a web page.

You can place the `<script>` tags, containing your JavaScript, anywhere within your web page, but it is normally recommended that you should keep it within the `<head>` tags. The `<script>` tag alerts the browser program to start interpreting all the text between these tags as a script. A simple syntax of your JavaScript will appear as follows.

```
<script ...>  
  JavaScript code  
</script>
```

The script tag takes two important attributes –

- Language – This attribute specifies what scripting language you are using. Typically, its value will be javascript. Although recent versions of HTML (and XHTML, its successor) have phased out the use of this attribute.
- Type – This attribute is what is now recommended to indicate the scripting language in use and its value should be set to "text/javascript".



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Objects:



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Objects are composed of attributes. If an attribute contains a function, it is considered to be a method of the object, otherwise the attribute is considered a property.

objectName.objectProperty = propertyValue;

Code and Output:

1. Programs based on objects in JavaScript.

```
<html>
<head>
  <title>User-defined objects</title>
  <script type = "text/javascript">
    var book = new Object(); // Create the object
    book.subject = "Perl";   // Assign properties to the object
    book.author = "Mohtashim";
  </script>
</head>

<body>
  <script type = "text/javascript">
    document.write("Book name is : " + book.subject + "<br>");
    document.write("Book author is : " + book.author + "<br>");
  </script>
</body>
</html>
```

Output:

Book name is : Perl

Book author is : Mohtashim

2. Program to design a calculator using JavaScript

Calculator.html

```
<!DOCTYPE html>

<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta http-equiv="X-UA-Compatible" content="IE=edge">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <script src="./calc.js" type="text/javascript"></script>
  <link rel="stylesheet" href="calc.css">
  <title>Calculator-JS</title>
</head>
<body>
```



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```
<h1 style="text-align:center">Calculator App</h1>
<div class="container">
<br>
<table>
<tr>
<td colspan="3"><input type='text' id='result' class ='screen' style="text-align:
right;"></td>
<td>
<input type='button' value = 'C' onclick="clearScreen()" class="clear"/>
</td>
</tr>
</table>
<div class="keys">
<input type="button" value="7" class="button" onClick="display('7')"></input>
<input type="button" value="8" class="button" onClick="display('8')"></input>
<input type="button" value="9" class="button" onClick="display('9')"></input>
<input type="button" value="/" class="operator" onClick="display('/')"></input>
<input type="button" value="4" class="button" onClick="display('4')"></input>
<input type="button" value="5" class="button" onClick="display('5')"></input>
<input type="button" value="6" class="button" onClick="display('6')"></input>
<input type="button" value="*" class="operator" onClick="display('*')"></input>
<input type="button" value="1" class="button" onClick="display('1')"></input>
<input type="button" value="2" class="button" onClick="display('2')"></input>
<input type="button" value="3" class="button" onClick="display('3')"></input>
<input type="button" value="-" class="operator" onClick="display('-')"></input>
<input type="button" value="0" class="button" onClick="display('0')"></input>
<input type="button" value="." class="button" onClick="display('.')"></input>
<input type="button" value="=" class="button equal-sign"
onClick="solve()"></input>
<input type="button" value="+" class="operator" onClick="display('+')"></input>
</div>
</div>
</body>
</html>
```

calc.css

```
.container {
border: 1px solid #cccccc;
box-shadow: 10px 10px 30px 0px rgba(0,0,0,0.75);
border-radius: 20px;
position: absolute;
top: 55%;
left: 50%;
transform: translate(-50%, -50%);
width: 450px;
```



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```
height: 400px;
}
.keys {
  display: grid;
  grid-template-columns: repeat(4, 1fr);
  grid-gap: 10px;
  padding: 10px;
  margin: auto;
}
.button {
  height: 60px;
  padding: 5px;
  background-color: #fff;
  border-radius: 3px;
  border: 1px solid #c4c4c4;
  background-color: transparent;
  font-size: 2rem;
  color: #333;
  background-image: linear-gradient(to bottom, transparent 50%,
  rgba(0,0,0,.04));
  box-shadow: inset 0 0 0 1px rgba(255,255,255,.05), inset 0 1px 0 0
  rgba(255,255,255,.45), inset 0 -1px 0 0 rgba(255,255,255,.15), 0 1px 0 0
  rgba(255,255,255,.15);
  text-shadow: 0 1px rgba(255,255,255,.4);
}
.button:hover {
  background-color: #eaeaea;
}
.operator {
  color: #fff;
  background-color: #eebb24;
}
.clear {
  background-color: #f0595f;
  border-color: #b0353a;
  color: #fff;
  width: 80px;
  height: 30px;
}
.clear:hover {
  background-color: #f17377;
}
.equal-sign {
  background-color: #25a8e0;
  border-color: #25a8e0;
  color: #fff;
```



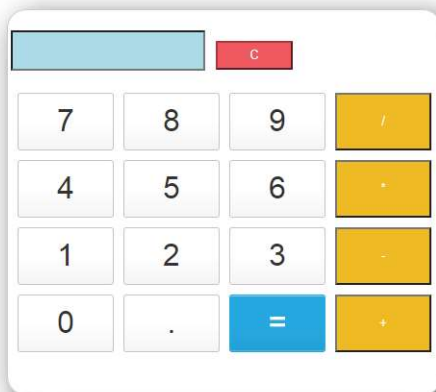
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```
}  
.equal-sign:hover {  
  background-color: #4e9ed4;  
}  
}  
.screen{  
  background-color:rgb(171,219,231);  
  justify-content: left;  
  color: black;  
  font-size: medium;  
  width: 50%;  
  height: 30%;  
  cursor: default;  
  padding: 10px;  
  padding-left: 40%;  
  margin: auto;  
  margin-bottom: 10px;  
}
```

calc.js

```
function display(val){  
  document.getElementById('result').value += val  
  return val  
}  
function solve(){  
  let x = document.getElementById('result').value  
  let y = eval(x);  
  document.getElementById('result').value = y  
  return y  
}  
function clearScreen(){  
  document.getElementById('result').value = "  
}
```

Output:





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3. Programs based on form validation.

```
<html>
<head>
  <title>Form Validation</title>
  <script type = "text/javascript">

function validate() {

  if( document.myForm.Name.value == "" ) {
    alert( "Please provide your name!" );
    document.myForm.Name.focus() ;
    return false;
  }
  if( document.myForm.EMail.value == "" ) {
    alert( "Please provide your Email!" );
    document.myForm.EMail.focus() ;
    return false;
  }
  if( document.myForm.Zip.value == "" || isNaN( document.myForm.Zip.value ) ||
    document.myForm.Zip.value.length != 5 ) {

    alert( "Please provide a zip in the format #####" );
    document.myForm.Zip.focus() ;
    return false;
  }
  if( document.myForm.Country.value == "-1" ) {
    alert( "Please provide your country!" );
    return false;
  }
  return( true );
}

function validateEmail() {
var emailID = document.myForm.EMail.value;
atpos = emailID.indexOf("@");
dotpos = emailID.lastIndexOf(".");

if (atpos < 1 || ( dotpos - atpos < 2 )) {
  alert("Please enter correct email ID")
  document.myForm.EMail.focus() ;
  return false;
}
return( true );
}
```



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```
</script>
</head>

<body>
  <form action = "/cgi-bin/test.cgi" name = "myForm" onsubmit =
"return(validate());">
    <table cellpadding = "2" cellspacing = "2" border = "1">

      <tr>
        <td align = "right">Name</td>
        <td><input type = "text" name = "Name" /></td>
      </tr>

      <tr>
        <td align = "right">EMail</td>
        <td><input type = "text" name = "EMail" /></td>
      </tr>

      <tr>
        <td align = "right">Zip Code</td>
        <td><input type = "text" name = "Zip" /></td>
      </tr>

      <tr>
        <td align = "right">Country</td>
        <td>
          <select name = "Country">
            <option value = "-1" selected>[choose yours]</option>
            <option value = "1">USA</option>
            <option value = "2">UK</option>
            <option value = "3">INDIA</option>
          </select>
        </td>
      </tr>

      <tr>
        <td align = "right"></td>
        <td><input type = "submit" value = "Submit" /></td>
      </tr>
    </table>
  </form>
</body>
</html>
```




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Output:

Name	<input type="text"/>
E-Mail	<input type="text"/>
Zip Code	<input type="text"/>
Country	<input type="text" value="[choose yours]"/>
<input type="button" value="Submit"/>	

Name	<input type="text"/>
E-Mail	<input type="text"/>
Zip Code	<input type="text"/>
Country	<input type="text" value="[choose yours]"/>
<input type="button" value="Submit"/>	

This page says
Please provide your name!

OK

Name	<input type="text" value="Pradnya"/>
E-Mail	<input type="text"/>
Zip Code	<input type="text"/>
Country	<input type="text" value="[choose yours]"/>
<input type="button" value="Submit"/>	

This page says
Please provide your Email!

OK

Lab Assignments to complete:

Create a sign-up page and use JavaScript for form validation for the below fields as per the image below.

Sign Up

Username:

Username must be between 3 and 25 characters.

Email:

Password:

Password must has at least 8 characters that include at least 1 lowercase character, 1 uppercase characters, 1 number, and 1 special character in (!@#\$%^&*)

Confirm Password:

Please enter the password again

CODE:



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HTML:

```
1 <!DOCTYPE html>
2 <html lang="en">
3 <head>
4   <meta charset="UTF-8">
5   <meta name="viewport" content="width=device-width, initial-scale=1.0">
6   <title>Sign-Up Form</title>
7   <link rel="stylesheet" href="FormValidation.css">
8 </head>
9 <body>
10  <div class="container">
11    <h2>Sign Up</h2>
12    <form id="signUpForm" onsubmit="validateForm(event)">
13      <!-- Username Field -->
14      <div class="form-group">
15        <label for="username">Username</label>
16        <input type="text" id="username" name="username">
17        <div class="error-message" id="usernameError"></div>
18      </div>
19      <!-- Email Field -->
20      <div class="form-group">
21        <label for="text">Email</label>
22        <input type="text" id="email" name="email">
23        <div class="error-message" id="emailError"></div>
24      </div>
25      <!-- Password Field -->
26      <div class="form-group">
27        <label for="password">Password</label>
28        <input type="password" id="password" name="password">
29        <div class="error-message" id="passwordError"></div>
30      </div>
31      <!-- Confirm Password Field -->
32      <div class="form-group">
33        <label for="confirmPassword">Confirm Password</label>
34        <input type="password" id="confirmPassword" name="confirmPassword">
35        <div class="error-message" id="confirmPasswordError"></div>
36      </div>
37      <!-- Sign-Up Button -->
38      <button type="submit" class="submit-btn">Sign Up</button>
39    </form>
40  </div>
41  <script src="FormValidation.js"></script>
42</body>
43</html>
44
```

CSS:



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```
1  body {  
2    font-family: Arial, Helvetica, sans-serif, sans-serif;  
3    background-color: #000000;  
4    display: flex;  
5    justify-content: center;  
6    align-items: center;  
7    height: 100vh;  
8    margin: 0;  
9  }  
10  
11  .container {  
12    background-color: #fff;  
13    padding: 30px;  
14    border-radius: 8px;  
15    box-shadow: 0 4px 8px rgba(0, 0, 0, 0.1);  
16    width: 100%;  
17    max-width: 400px;  
18  }  
19  
20  
21  h2 {  
22    text-align: center;  
23  
24    text-align: center;  
25    margin-bottom: 20px;  
26  }  
27  
28  .form-group {  
29    margin-bottom: 20px;  
30    margin-right: 20px;  
31  }  
32  
33  label {  
34    display: block;  
35    font-size: 16px;  
36    margin-bottom: 8px;  
37  }  
38  
39  input {  
40    width: 100%;  
41    padding: 10px;  
42    border: 1px solid #ddd;  
43    border-radius: 4px;  
44    font-size: 14px;  
45    margin-bottom: 5px;
```



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```
44 }
45
46 input:focus {
47   outline-color: #007bff;
48 }
49
50 input.error {
51   border-color: red;
52 }
53
54 input.success {
55   border-color: green;
56 }
57
58 .error-message {
59   color: red;
60   font-size: 12px;
61   margin-top: 5px;
62 }
63
64 .submit-btn {
65   width: 100%;
66   padding: 12px;
67   border: none;
68   background-color: #007bff;
69   color: white;
70   font-size: 16px;
71   border-radius: 4px;
72   cursor: pointer;
73 }
74
75 .submit-btn:hover {
76   background-color: #0056b3;
77 }
78
79 .success-message {
80   color: green;
81   font-size: 12px;
82   margin-top: 5px;
83 }
84
```



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JS:

```
1  function validateForm(event) {  
2      event.preventDefault();  
3  
4      let valid = true;  
5  
6      document.getElementById('usernameError').innerHTML = "";  
7      document.getElementById('emailError').innerHTML = "";  
8      document.getElementById('passwordError').innerHTML = "";  
9      document.getElementById('confirmPasswordError').innerHTML = "";  
10  
11     document.getElementById('username').classList.remove('error', 'success');  
12     document.getElementById('email').classList.remove('error', 'success');  
13     document.getElementById('password').classList.remove('error', 'success');  
14     document.getElementById('confirmPassword').classList.remove('error', 'success');  
15  
16     let username = document.getElementById('username').value;  
17     if (username.length < 3 || username.length > 25) {  
18         document.getElementById('usernameError').innerHTML = "Username must be between 3 and 25  
19         characters.";   
20         document.getElementById('username').classList.add('error');  
21         valid = false;  
22     } else {  
23  
24  
25         let email = document.getElementById('email').value;  
26         let emailPattern = /^[a-zA-Z0-9._-]+@[a-zA-Z0-9.-]+\.[a-zA-Z]{2,6}$/;  
27         if (email.trim() === "") {  
28             document.getElementById('emailError').innerHTML = "Email is required.";   
29             document.getElementById('email').classList.add('error');  
30             valid = false;  
31         } else if (!emailPattern.test(email)) {  
32             document.getElementById('emailError').innerHTML = "Please enter a valid email address.";   
33             document.getElementById('email').classList.add('error');  
34             valid = false;  
35         } else {  
36             document.getElementById('email').classList.add('success');  
37         }  
38  
39         let password = document.getElementById('password').value;  
40         let passwordPattern = /^(?=.*[a-z])(?=.*[A-Z])(?=.*\d)(?=.*[!@#$%^&*])[A-Za-z\d!@#%&*]{8,}$/;  
41         if (password.trim() === "") {  
42             document.getElementById('passwordError').innerHTML = "Password is required.";   
43             document.getElementById('password').classList.add('error');  
44             valid = false;  
45         }  
46     }  
47 }  
48
```




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```
45     } else if (!passwordPattern.test(password)) {  
46         document.getElementById('passwordError').innerHTML = "Password must have at least 8  
characters, including 1 lowercase, 1 uppercase, 1 number, and 1 special character (!@#%&^*).  
";  
47         document.getElementById('password').classList.add('error');  
48         valid = false;  
49     } else {  
50         document.getElementById('password').classList.add('success');  
51     }  
52  
53     let confirmPassword = document.getElementById('confirmPassword').value;  
54     if (confirmPassword.trim() === "") {  
55         document.getElementById('confirmPasswordError').innerHTML = "Please enter the password again.  
";  
56         document.getElementById('confirmPassword').classList.add('error');  
57         valid = false;  
58     } else if (confirmPassword !== password) {  
59         document.getElementById('confirmPasswordError').innerHTML = "Passwords do not match.";  
60         document.getElementById('confirmPassword').classList.add('error');  
61         valid = false;  
62     } else {  
63         document.getElementById('confirmPassword').classList.add('success');  
64     }  
65  
66     if (valid) {  
67         document.getElementById('signUpForm').submit();  
68     }  
69 }
```

OUTPUT

The screenshot shows a web form titled "Sign Up" on a white background with a black border. The form contains the following elements:

- Username:** A text input field containing "Jash Patel".
- Email:** A text input field containing "hello@gmail.com".
- Password:** A password input field with a red border and three dots. Below it is a red error message: "Password must have at least 8 characters, including 1 lowercase, 1 uppercase, 1 number, and 1 special character (!@#%&^*).".
- Confirm Password:** A text input field with a blue border. Below it is a red error message: "Please enter the password again:".
- Sign Up Button:** A blue button with the text "Sign Up" in white.



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WRITE UP:

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W E
Experiment 3

Q1) What is Javascript?

→ i) Javascript is a high level, interpreted programming language that is one of the core technologies of the World Wide Web alongside HTML & CSS.

ii) It is a versatile language which is used to create dynamic & interactive content on web pages.

iii) Javascript is an essential part of web development, enabling developers to implement complex features on web pages including dynamically updating content, multimedia control, animated graphics & user form validation.

iv) Javascript runs on the client side meaning the code is executed in the user's browser which can result in faster & more responsive web applications.

Q2) Javascript Built-in Objects.

→ Javascript provides a set of built-in objects that enhances the language's functionality. These objects come with a variety of properties & methods that allows developers to perform various operations. Some of the commonly used built-in objects include:

i) Array → It is used to store multiple values in a single variable.

ii) String → It represents a sequence of characters.

iii) Number → It represents numerical values.

iv) Date → It represents date & time.

v) Object → The base object from which all other objects are derived.

FOR EDUCATIONAL USE



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CONCLUSION

The creation of a simple calculator demonstrated event handling and DOM manipulation, while the form validation program highlighted the importance of ensuring accurate user input. Overall, this experiment provided valuable hands-on experience in enhancing web functionality, reinforcing JavaScript's role in modern web development. We also explored the fundamentals of client-side scripting using JavaScript by implementing programs based on objects, form validation, and a calculator application. We learned how JavaScript enables dynamic interactions in web applications by manipulating objects, handling user input, and updating content in real time.