Department of Computer Science and Engineering (Data Science)

AY: 2024-25

Subject: Web Engineering Laboratory

Experiment 3

(JavaScript)

Name: Krishna Borad	**SAP ID:**60009230190	**Roll no:**D056	**Date: 2**6/02/25

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".

Department of Computer Science and Engineering (Data Science)

Objects:

Department of Computer Science and Engineering (Data Science)

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>
```

```
    <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;
```

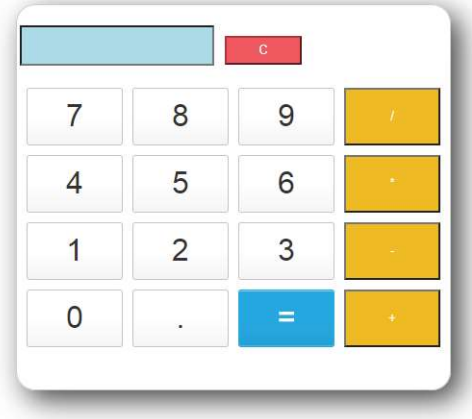
```
    height: 400px;
}
.keys {
    display: grid;
    grid-template-columns: repeat(4, 1fr);
    grid-gap: 10px;
    padding: 10px;
    margin:auto;
}
.button {
    height: 60px;
    padding: 5px;
    background-color: #fff;
    border-radius: 3px;
    border: 1px solid #c4c4c4;
    background-color: transparent;
    font-size: 2rem;
    color: #333;
    background-image: linear-gradient(to bottom, transparent, 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;
```

```
}
.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:



Department of Computer Science and Engineering (Data Science)

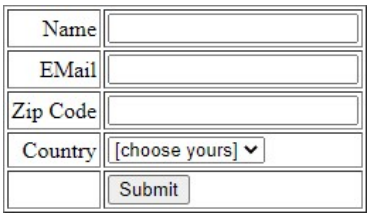
3. Programs based on form validation.

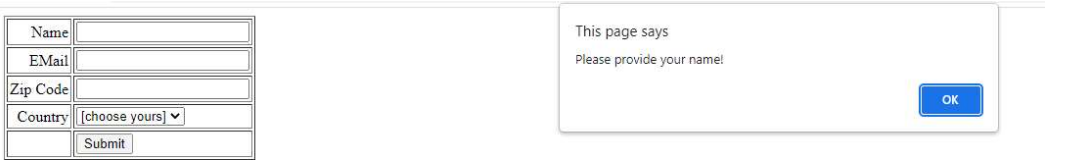
```
<html>
  <head>
    <title>Form Validation</title>
    <script type = "text/javascript">

    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 );
    }
```

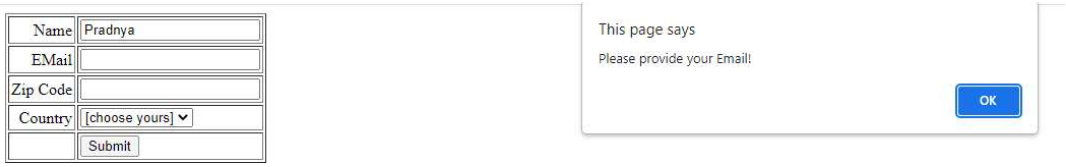
```
</script>
  </head>

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

Department of Computer Science and Engineering (Data Science)

Output:

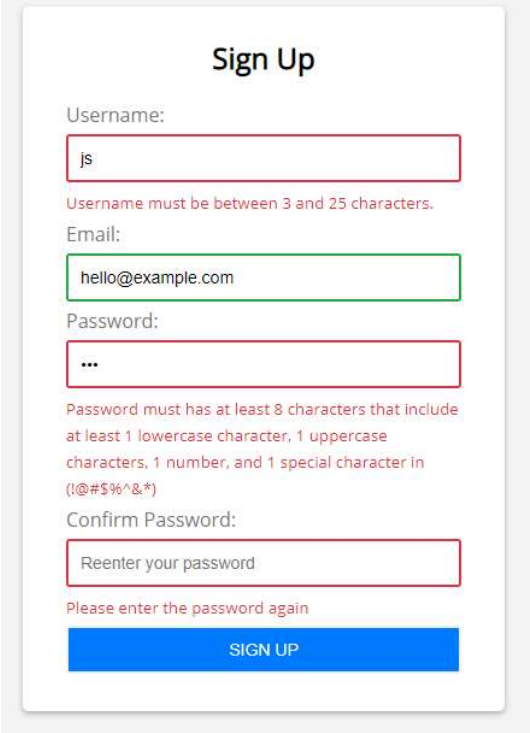






Lab Assignments to complete:

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



CODE:

Department of Computer Science and Engineering (Data Science)

HTML:

```html
<!DOCTYPE html>
<html Lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>Sign-Up Form</title>
  <link rel="stylesheet" href="FormValidation.css">
</head>
<body>
  <div class="container">
    <h2>Sign Up</h2>
    <form id="signUpForm" onsubmit="validateForm(event)">

      <!-- Username Field -->
      <div class="form-group">
        <label for="username">Username</label>
        <input type="text" id="username" name="username">
        <div class="error-message" id="usernameError"></div>
      </div>

      <!-- Email Field -->
      <div class="form-group">
        <label for="text">Email</label>
        <input type="text" id="email" name="email">
        <div class="error-message" id="emailError"></div>
      </div>

      <!-- Password Field -->
      <div class="form-group">
        <label for="password">Password</label>
        <input type="password" id="password" name="password">
        <div class="error-message" id="passwordError"></div>
      </div>

      <!-- Confirm Password Field -->
      <div class="form-group">
        <label for="confirmPassword">Confirm Password</label>
        <input type="password" id="confirmPassword" name="confirmPassword">
        <div class="error-message" id="confirmPasswordError"></div>
      </div>

      <!-- Sign-Up Button -->
      <button type="submit" class="submit-btn">Sign Up</button>
    </form>
  </div>

  <script src="FormValidation.js"></script>
</body>
</html>
```

CSS:

Department of Computer Science and Engineering (Data Science)

```css
body {
    font-family: Arial, Helvetica, sans-serif, sans-serif;
    background-color: #f4f6f9;
    display: flex;
    justify-content: center;
    align-items: center;
    height: 100vh;
    margin: 0;
}

.container {
    background-color: #fff;
    padding: 30px;
    border-radius: 8px;
    box-shadow: 0 4px 8px rgba(0, 0, 0, 0.1);
    width: 100%;
    max-width: 400px;

}

h2 {
    text-align: center;
    margin-bottom: 20px;
}

.form-group {
    margin-bottom: 20px;
    margin-right: 20px;
}

label {
    display: block;
    font-size: 16px;
    margin-bottom: 8px;
}

input {
    width: 100%;
    padding: 10px;
    border: 1px solid #ddd;
    border-radius: 4px;
    font-size: 14px;
    margin-bottom: 5px;
}
```

Department of Computer Science and Engineering (Data Science)

```css
input:focus {
  outline-color: #007bff;
}

input.error {
  border-color: red;
}

input.success {
  border-color: green;
}

.error-message {
  color: red;
  font-size: 12px;
  margin-top: 5px;
}

.submit-btn {
  width: 100%;
  padding: 12px;
  border: none;
  background-color: #007bff;
  color: white;
  font-size: 16px;
  border-radius: 4px;
  cursor: pointer;
}

.submit-btn:hover {
  background-color: #0056b3;
}

.success-message {
  color: green;
  font-size: 12px;
  margin-top: 5px;
}
```

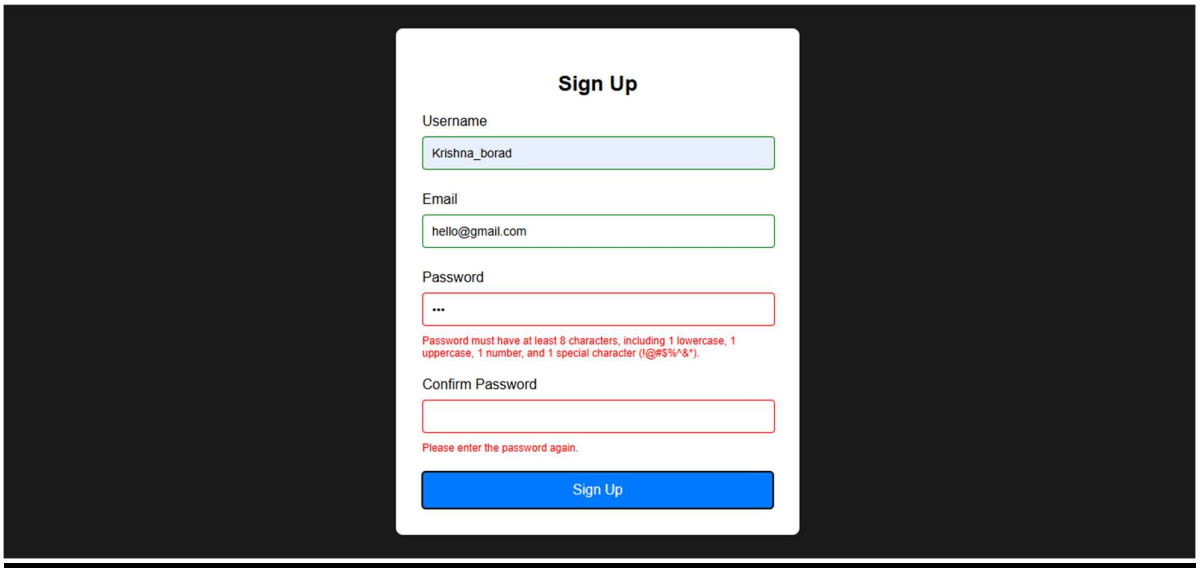
Department of Computer Science and Engineering (Data Science)

JSS:

```
function validateForm(event) {
    // Prevent form submission
    event.preventDefault();

    let valid = true;

    document.getElementById('usernameError').innerHTML = "";
    document.getElementById('emailError').innerHTML = "";
    document.getElementById('passwordError').innerHTML = "";
    document.getElementById('confirmPasswordError').innerHTML = "";

    document.getElementById('username').classList.remove('error', 'success');
    document.getElementById('email').classList.remove('error', 'success');
    document.getElementById('password').classList.remove('error', 'success');
    document.getElementById('confirmPassword').classList.remove('error', 'success');

    let username = document.getElementById('username').value;
    if (username.length < 3 || username.length > 25) {
      document.getElementById('usernameError').innerHTML = "Username must be between 3 and 25
      characters.";
      document.getElementById('username').classList.add('error');
      valid = false;
    } else {
      document.getElementById('username').classList.add('success');
    }

    let email = document.getElementById('email').value;
    let emailPattern = /^[a-zA-Z0-9._-]+@[a-zA-Z0-9.-]+\.[a-zA-Z]{2,6}$/;
    if (email.trim() === "") {
      document.getElementById('emailError').innerHTML = "Email is required.";
      document.getElementById('email').classList.add('error');
      valid = false;
    } else if (!emailPattern.test(email)) {
      document.getElementById('emailError').innerHTML = "Please enter a valid email address.";
      document.getElementById('email').classList.add('error');
      valid = false;
    } else {
      document.getElementById('email').classList.add('success');
    }

    let password = document.getElementById('password').value;
    let passwordPattern = /^(?=.*[a-z])(?=.*[A-Z])(?=.*\d)(?=.*[!@#$%^&*])[A-Za-z\d!@#$%^&*]{8,}$/;
    if (password.trim() === "") {
      document.getElementById('passwordError').innerHTML = "Password is required.";
```

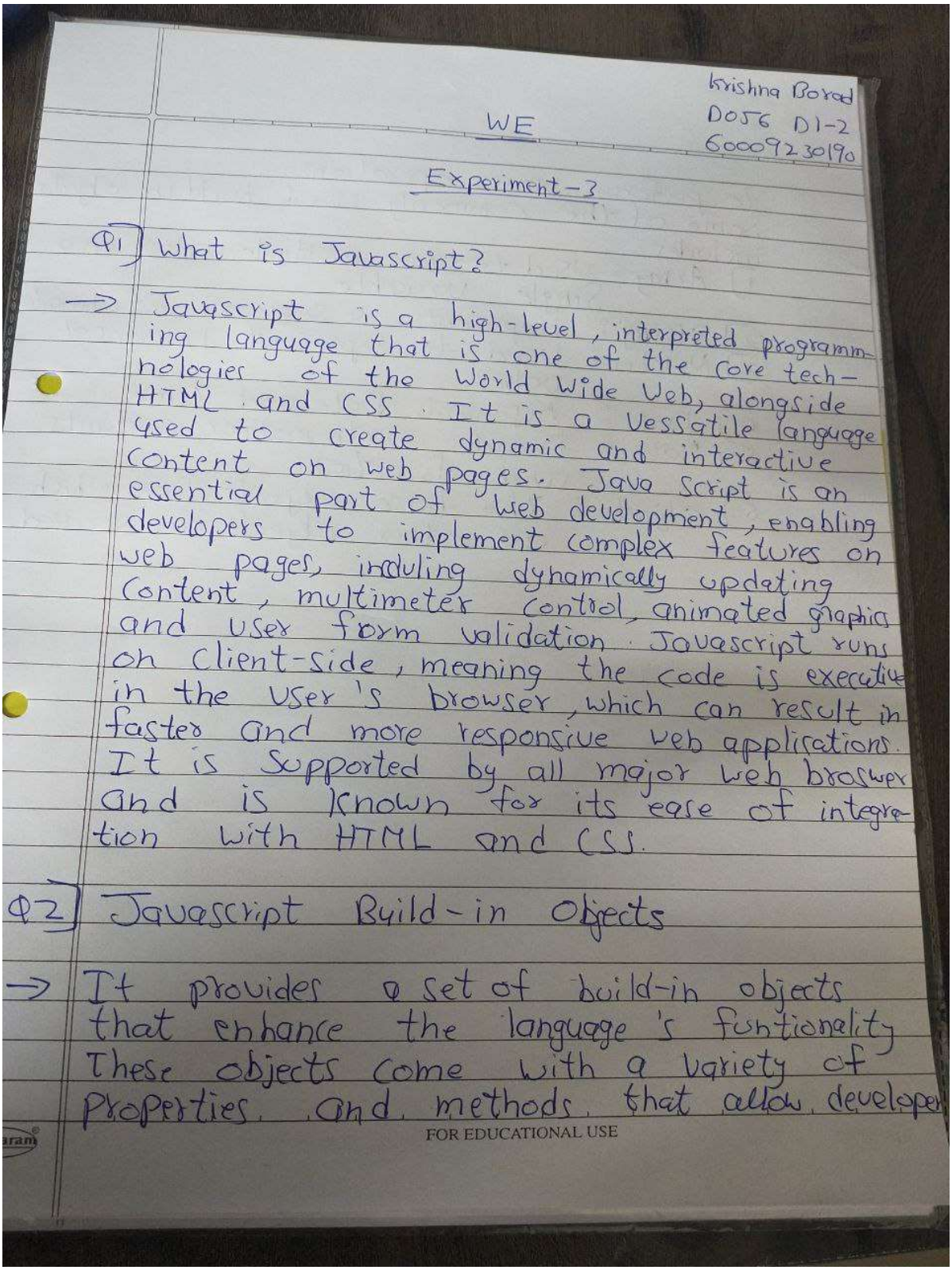
```
        document.getElementById('password').classList.add('error');
        valid = false;
      } else if (!passwordPattern.test(password)) {
        document.getElementById('passwordError').innerHTML = "Password must have at least 8
        characters, including 1 lowercase, 1 uppercase, 1 number, and 1 special character (!@#$%^&*).
        ";
        document.getElementById('password').classList.add('error');
        valid = false;
      } else {
        document.getElementById('password').classList.add('success');
      }

      let confirmPassword = document.getElementById('confirmPassword').value;
      if (confirmPassword.trim() === "") {
        document.getElementById('confirmPasswordError').innerHTML = "Please enter the password again.
        ";
        document.getElementById('confirmPassword').classList.add('error');
        valid = false;
      } else if (confirmPassword !== password) {
        document.getElementById('confirmPasswordError').innerHTML = "Passwords do not match.";
        document.getElementById('confirmPassword').classList.add('error');
        document.getElementById('confirmPassword').classList.add('error');
        valid = false;
      } else {
        document.getElementById('confirmPassword').classList.add('success');
      }

      if (valid) {
        document.getElementById('signUpForm').submit();
      }
    }

```

OUTPUT



Department of Computer Science and Engineering (Data Science)

WRITE UP:



Krishna Borad
D056 D1-2
60009230190

WE

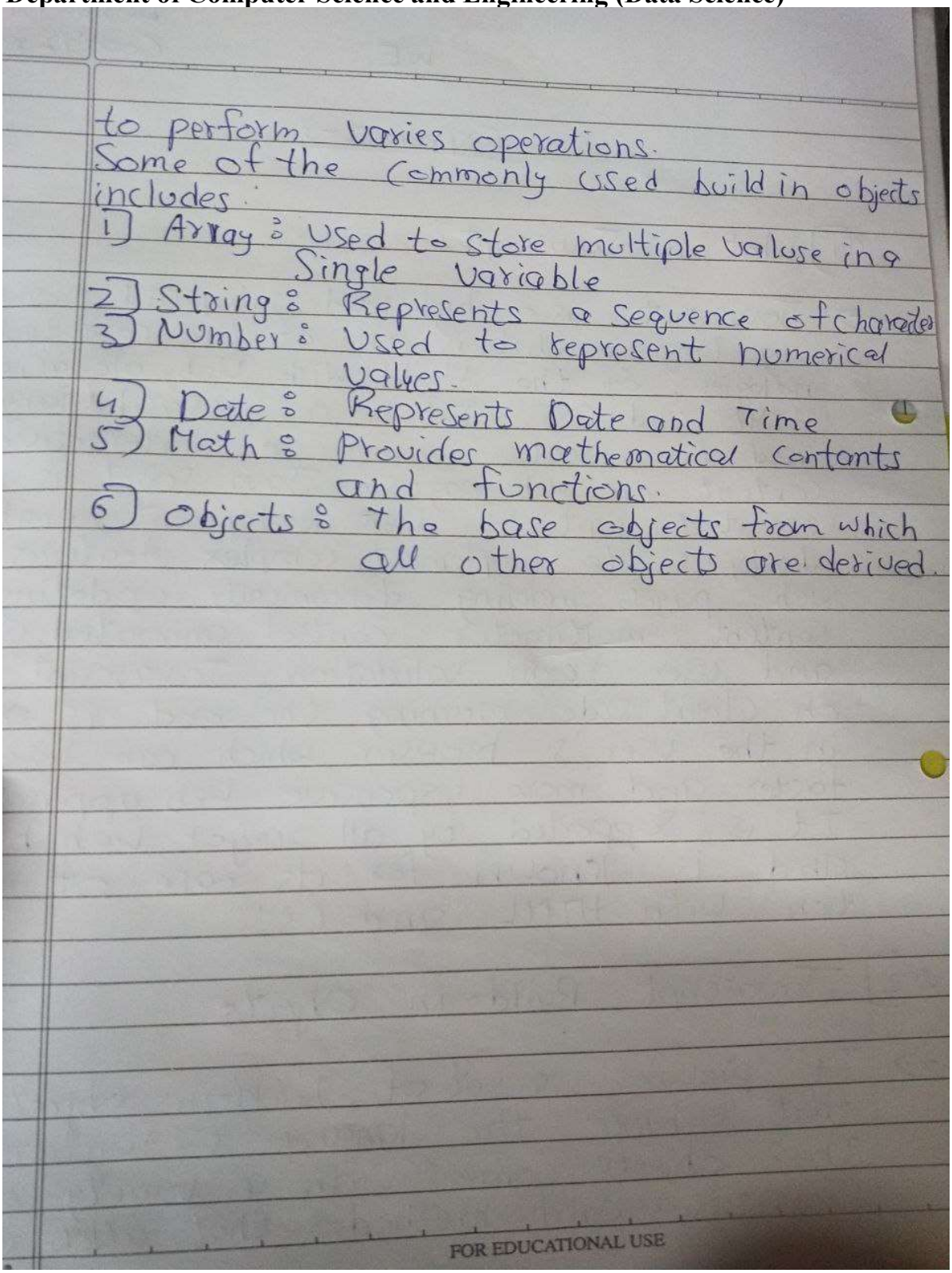
Experiment-3

Q1] What is Javascript?

→ Javascript is a high-level, interpreted programming language that is one of the core technologies of the World Wide Web, alongside HTML and CSS. It is a vessatile language used to create dynamic and interactive content on web pages. Java Script is an essential part of web development, enabling developers to implement complex features on web pages, incluling dynamically updating content, multimeter control, animated graphics and user form validation. Javascript runs on client-side, meaning the code is executed in the user's browser, which can result in faster and more responsive web applications. It is supported by all major web browser and is known for its ease of integration with HTML and CSS.

Q2] Javascript Build-in Objects

→ It provides a set of build-in objects that enhance the language's funtionality. These objects come with a variety of properties and methods that allow developer



to perform varies operations.
Some of the commonly used build in objects includes.

1] Array : Used to store multiple valuse in a Single variable
2] String : Represents a sequence of charaters
3] Number : Used to represent numerical values.
4] Date : Represents Date and Time
5] Math : Provides mathematical contants and functions.
6] Objects : The base objects from which all other objects are derived.

CONCLUSION

In this experiment, we 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.

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.