CMR College of Engineering & Technology
Kandlakoya(v), Medchal Road Hyderabad, Telangana, India - 501401,
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SKILL DEVELOPMENT LABORATORY (NODE JS/REACT JS/DJANGO)

B.TECH: III YEAR – I SEMESTER (2024-2025)

PREPARED BY
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ASST.PROF

Vision

Our Vision is to remain a premier academic institution striving continuously for excellence in technical education, research and render technological services to the nation.

Mission

• Our Mission is to create and sustain a community of learning in which students acquire knowledge and learn to apply it professionally with a concern for the society.

• Pursue and Disseminate Research Findings and Offer Knowledge-Based Technological Services to Satisfy the Needs of Society and the Industry.

• Promote Professional Ethics, Leadership Qualities and Social Responsibilities.

Vision of the Department

• To evolve as a centre of academic excellence in Computer Science & Engineering by building strong teaching and research environment.

Mission of the Department

• To offer high quality graduate and post graduate programs in computerscience education and to prepare students for professional career and/orhigher studies globally.

• To develop self learning abilities and professional ethics to serve thesociety.

Program Educational Objectives (PEOs)

PEO I:	Excel in their professional career and higher education in Computer Science & Engineering and chosen fields.
PEO II:	Demonstrate leadership qualities, team work and professional ethics to serve the society
PEO III:	Adapt to state of art technology through continuous learning in the areas of interest.

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(A405513) SKILL DEVELOPMENT LABORATORY (NODE JS/REACT JS/DJANGO)

Course Outcomes

1. Build a custom website with HTML, CSS, Bootstrap, and little JavaScript.
2. Demonstrate Advanced features of JavaScript and learn about JDBC
3. Develop Server – side implementation using Java technologies like
4. Develop the server–side implementation using Node JS.
5. Design a single-page application using React.

CO & PO Mapping

CO \ PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO10	PO11	PO12	PSO1	PSO2
CO1	1		2		3				2			1		2
CO2	2	2	2	3	3				2		1	2	2	2
CO3	2	2	3	3	3		2		3	2	2	2	2	2
CO4	2	2	3	3	3		2		2		2	2	2	2
CO5	2	2	2		3						3	3	2	2

LAB Exercises:

1. Build a responsive web application for shopping carts with registration, login, catalog and cart pages using CSS3 features, flex and grid.
2. Make the above web application responsive web application using Bootstrap framework.
3. Use JavaScript for doing client – side validation of the pages implemented in experiment 1 and experiment 2.
4. Explore the features of ES6 like arrow functions, callbacks, promises, async/await. Implement an application for reading the weather information from openweathermap.org and display the information in the form of a graph on the web page.
5. Develop a java standalone application that connects with the database (Oracle / mySql) and performs the CRUD operation on the database tables.
6. Create an xml for the bookstore. Validate the same using both DTD and XSD.
7. Design a controller with servlet that provides the interaction with application developed in experiment 1 and the database created in experiment 5.
8. Maintaining the transactional history of any user is very important. Explore the various session tracking mechanism (Cookies, HTTP Session)
9. Create a custom server using http module and explore the other modules of Node JS like OS, path, event.
10. Develop an express web application that can interact with REST API to perform CRUD operations on student data. (Use Postman) .
11. For the above application create authorized end points using JWT (JSON Web Token).
12. Create a react application for the student management system having registration, login, contact, about pages and implement routing to navigate through these pages.
13. Create a service in react that fetches the weather information from openweathermap.org and the display the current and historical weather information using graphical representation using chart.js.
14. Create a TODO application in react with necessary components and deploy it into GitHub.

REFERENCE BOOKS

1. Jon Duckett, Beginning HTML, XHTML, CSS, and JavaScript, Wrox Publications,2010 .
2. Bryan Basham, Kathy Sierra and Bert Bates, Head First Servlets and JSP, O'Reilly Media, 2nd Edition, 2008.
3. Vasan Subramanian, Pro MERN Stack, Full Stack Web App Development with Mongo, Express, React, and Node, 2nd Edition, A Press.

LAB MANUAL

1. **Build a responsive web application for shopping carts with registration, login, catalog and cart pages using CSS3 features, flex and grid**.

Structure of program

```
shopping-cart-app/
├── index.html
├── styles/
│   ├── style.css
├── scripts/
│   ├── app.js
```

index.html

```
<!DOCTYPE html>
<html lang="en">
<head>
   <link rel="stylesheet" href="./style.css">
   <title>Home - FBS</title>
</head>
<body>
   <div class="wrapper">
      <div class="container">
         <header>
            <table width="100%" align="center" cellpadding="0" cellspacing="2">
            <tr>
            <th width="20%"><img src="fbs.png" alt="FBS LOGO" width="130"
height="100"/></th>
            <th colspan=4>
            <h1 style="color:white;">FBS - WORLD BEST ONLINE EBOOKS WEBSITE</h1>
            </th>
            </tr>
            </table>
         </header>
         <nav>
            <table width="100%" align="center" cellpadding="0" cellspacing="2">
            <tbody align="center"  style="font-weight:bold;font-size:18px;"">
            <tr>
            <td width="20%"><hr><a href="index.html">Home</a><hr></td>
            <td width="20%"><hr><a href="login.html">Login</a><hr></td>
            <td width="20%"><hr><a href="registration.html">Registration</a><hr></td>
            <td width="20%"><hr><a href="cart.html" >Cart</a><hr></td>
            </tr>
            </tbody>
            </table>
```

```
        </nav>
      </div>
      <div class="container1">
        <div class="sidebar1"></div>
        <div class="container2">
          <main>
            <center>
            <h2>Welcome to FBS e-Book's Website</h2>
              <p>Shopping at <font size=5>FBS</font> can be both <font size=5>fun</font>
              and <font size=5>savings</font>.</br>Shop with us in this special <font
              size=5>discount</font> season and save upto <font size=5>90%</font> on all
your
              purchases.</br></p>
            <br/><br/><br/><br/><br/><br/><br/><br/>
          </main>
        </div>
        <div class="sidebar2"></div>
      </div>
      <footer><font color="white">(C) 2024 All rights reserved by FBS ebooks</font></footer>
    </div>
</body>
</html>
```

login.html

```
<!DOCTYPE html>
<html lang="en">
<head>
    <link rel="stylesheet" href="./style.css">
    <title>Login - FBS</title>
</head>
<body>
    <div class="wrapper">
        <div class="container">
            <header>
                <table width="100%" align="center" cellpadding="0" cellspacing="2">
                <tr>
                <th width="20%"><img src="fbs.png" alt="FBS LOGO" width="130"
height="100"/></th>
                <th colspan=4>
                <h1 style="color:white;">FBS - WORLD BEST ONLINE EBOOKS WEBSITE</h1>
                </th>
                </tr>
                </table>
            </header>
            <nav>
                <table width="100%" align="center" cellpadding="0" cellspacing="2">
```

```
        <tbody align="center"  style="font-weight:bold;font-size:18px;"">
        <tr>
        <td width="20%"><hr><a href="index.html">Home</a><hr></td>
        <td width="20%"><hr><a href="login.html">Login</a><hr></td>
        <td width="20%"><hr><a href="registration.html">Registration</a><hr></td>
        <td width="20%"><hr><a href="cart.html" >Cart</a><hr></td>
        </tr>
        </tbody>
        </table>
      </nav>
    </div>
    <div class="container1">
      <div class="sidebar1"></div>
      <div class="container2">
        <main>
          <center><br>
          <h3> Login Details</h3> <br/>
            <form name="f1">
              <table width="100%" align="center" >
              <tr>
              <td> User Name : </td>
              <td> <input type="text" name="username"></td>
              </tr>
              <tr><td><br></td></tr>
              <tr>
              <td> Password : </td>
              <td> <input type="password" name="password"></td>
              </tr>
              <tr><td><br></td></tr>
              <tr><td></td>
              <td><input type="submit" value="SUBMIT">
              <input type="reset" value="RESET"></td>
              </tr>
              </table>
            </form>
          </center>
        </main>
      </div>
      <div class="sidebar2"></div>
    </div>
    <footer><font color="white">(C) 2024 All rights reserved by FBS ebooks</font></footer>
  </div>
</body>
</html>
```

Registration.html

```
<!DOCTYPE html>
<html lang="en">
<head>
   <link rel="stylesheet" href="./style.css">
   <title>Registration - FBS</title>
</head>
<body>
   <div class="wrapper">
      <div class="container">
         <header>
            <table width="100%" align="center" cellpadding="0" cellspacing="2">
            <tr>
            <th width="20%"><img src="fbs.png" alt="FBS LOGO" width="130"
height="100"/></th>
            <th colspan=4>
            <h1 style="color:white;">FBS - WORLD BEST ONLINE EBOOKS WEBSITE</h1>
            </th>
            </tr>
            </table>
         </header>
         <nav>
            <table width="100%" align="center" cellpadding="0" cellspacing="2">
            <tbody align="center"  style="font-weight:bold;font-size:18px;"">
            <tr>
            <td width="20%"><hr><a href="index.html">Home</a><hr></td>
            <td width="20%"><hr><a href="login.html">Login</a><hr></td>
            <td width="20%"><hr><a href="registration.html">Registration</a><hr></td>
            <td width="20%"><hr><a href="cart.html" >Cart</a><hr></td>
            </tr>
            </tbody>
            </table>
         </nav>
      </div>
      <div class="container1">
         <div class="sidebar1"></div>
         <div class="container2">
            <main>
               <center><br>
                  <h3>Registration Form </h3>
                  <br/>
                  <form name="f1">
                  <table cellpadding="1" align="center" >
                  <tr><td> Name:*</td>
                  <td><input type="text" name="username"></td></tr>
                  <tr><td>Password:*</td>
                  <td><input type="password" name="password"></td></tr>
```

```
                <tr><td>Email ID:*</td>
                <td><input type="text" name="email"></td></tr>
                <tr><td>Phone Number:*</td>
                <td><input type="text" name="phno"></td></tr>
                <tr><td valign="top">Gender:*</td>
                <td><input type="radio" name="radio" value="1">Male   
                <input type="radio" name="radio" value="2">Female</td></tr>
                <tr> <td valign="top">Language Known:*</td>
                <td> <input type="checkbox" name="checkbox" value="English">English<br/>
                <input type="checkbox" name="checkbox" value="Telugu">Telugu<br>
                <input type="checkbox" name="checkbox" value="Hindi">Hindi<br>
                <input type="checkbox" name="checkbox" value="Tamil">Tamil
                </td></tr>
                <tr> <td valign="top">Address:*</td>
                <td><textarea name="address"></textarea></td>
                <tr><td></td><td><input type="submit" value="submit" hspace="10">
                <input type="reset" value="reset"></td></tr>
                <tr> <td colspan=2 >*<font color="#FF0000">fields are mandatory</font>
                </td>
                </tr>
                </table>
                </form>
              </center>
            </main>
          </div>
          <div class="sidebar2"></div>
        </div>
        <footer><font color="white">(C) 2024 All rights reserved by FBS ebooks</font></footer>
    </div>
</body>
</html>
```

Cart.html

```
<!DOCTYPE html>
<html lang="en">
<head>
    <link rel="stylesheet" href="./style.css">
    <title>Cart - FBS</title>
</head>
<body>
    <div class="wrapper">
        <div class="container">
            <header>
                <table width="100%" align="center" cellpadding="0" cellspacing="2">
                <tr>
```

```
            <th width="20%"><img src="fbs.png" alt="FBS LOGO" width="130"
height="100"/></th>
            <th colspan=4>
            <h1 style="color:white;">FBS - WORLD BEST ONLINE EBOOKS WEBSITE</h1>
            </th>
            </tr>
            </table>
         </header>
         <nav>
            <table width="100%" align="center" cellpadding="0" cellspacing="2">
            <tbody align="center"  style="font-weight:bold;font-size:18px;"">
            <tr>
            <td width="20%"><hr><a href="index.html">Home</a><hr></td>
            <td width="20%"><hr><a href="login.html">Login</a><hr></td>
            <td width="20%"><hr><a href="registration.html">Registration</a><hr></td>
            <td width="20%"><hr><a href="cart.html" >Cart</a><hr></td>
            </tr>
            </tbody>
            </table>
         </nav>
      </div>
      <div class="container1">
         <div class="sidebar1"></div>
         <div class="container2">
            <main>
                <center>
               <h3>Cart</h3>
                  <table width="100%" align="center" >
                  <tbody>
                  <tr>
                  <th width="40%"><hr>BookName<hr></th>
                  <th width="20%"><hr>Price<hr></th>
                  <th width="20%"><hr>Quantity<hr></th>
                  <th width="20%"><hr>Amount<hr></th> </tr>
                  </tbody>
                  <tbody align=center>
                  <tr> <td>Java Programming </td>
                  <td>Rs. 2300/-</td>
                  <td>2</td>
                  <td>Rs. 4600/-</td></tr>
                  <tr><td>Web Technologies</td>
                  <td>Rs. 3000/-</td>
                  <td>1</td>
                  <td>Rs. 3000/-</td></tr>
                  <tr><td></td>
                  <td><hr><font color="#996600">Total Amount:</font><hr></td>
```

```
                <td><hr>3<hr></td>
                <td><hr>Rs. 7600/-<hr></td> </tr>
                </tbody>
                </table>
              </center>
            </main>
          </div>
          <div class="sidebar2"></div>
        </div>
        <footer><font color="white">(C) 2024 All rights reserved by FBS ebooks</font></footer>
    </div>
</body>
</html>
```

CSS Styling

styles/style.css

```
body{
  font-family: monospace;
}

main {
  background-color: #efefef;
  color: #330000;
  margin-left: 10px;
  height: 60vh;
}

 header, footer {
  background-color: #000d57;
  color: #fff;
  padding: 1rem;
  height: 50px;
}

header, nav{
  margin-bottom: 10px;
  flex-basis: 50%;
}

footer{
  margin-top: 10px;
}
nav {
  background-color: #fff;
  color: #000;
```

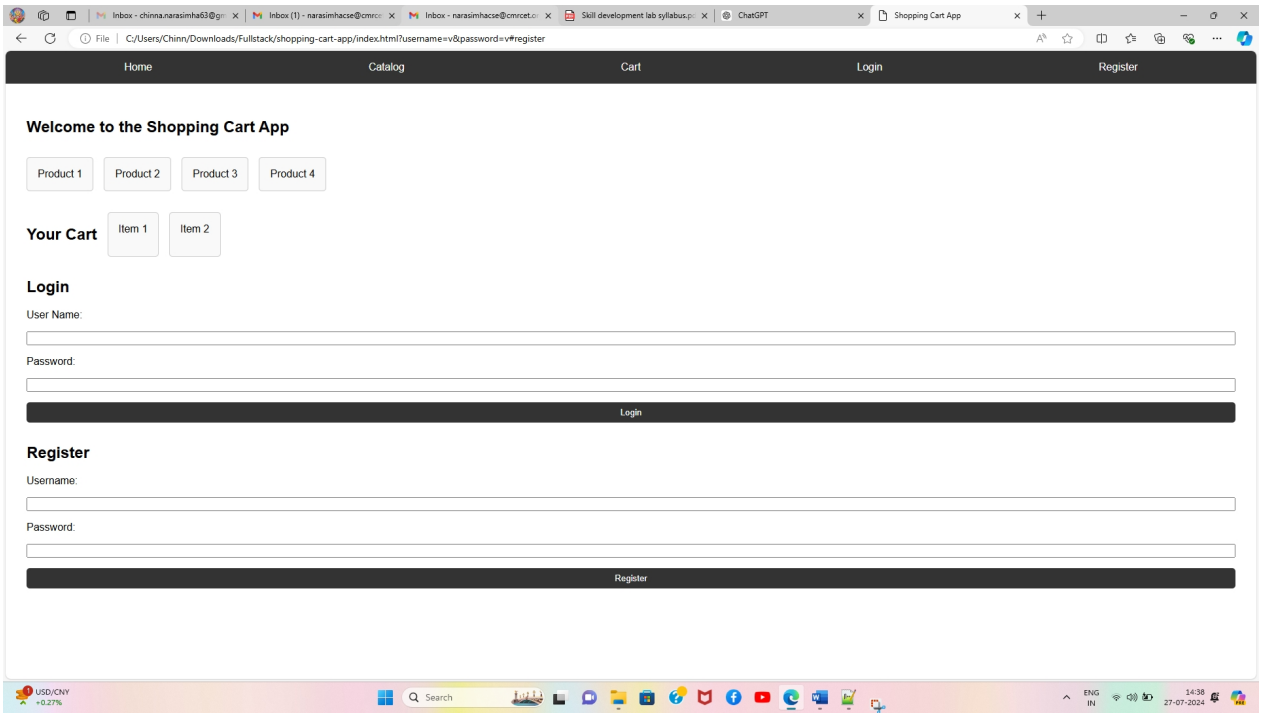
```
  padding: 1rem;
  height: 20px;
}

.sidebar1, .sidebar2 {
  flex-basis: 10%;
  background-color: #fff;
  color: #000;
}

.sidebar2{
  margin-left: 10px;
}

.container1{
  display: flex;
}

.container2 {
  display: flex;
  flex-direction: column;
  flex: 1;
}

header, nav, main, .sidebar1, .sidebar2, footer{
  display: flex;
  align-items: center;
  justify-content: center;
  border-radius: 10px;
}

.wrapper {
  display: flex;
  flex-direction: column;
  font-weight: 600;
}
```

JavaScript Functionality.

scripts/app.js

```
document.addEventListener('DOMContentLoaded', () => {
    // Add your JavaScript here
    // For example, you can handle form submissions and cart interactions
});
```

Output



Experment 2:
Make the above web application responsive web application using Bootstrap framework.
Index.html

(add this code to above index.html experiment-1)

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Shopping Cart App</title>
    <!-- Bootstrap CSS -->
    <link                href="https://stackpath.bootstrapcdn.com/bootstrap/4.5.2/css/bootstrap.min.css"
rel="stylesheet">
    <link rel="stylesheet" href="styles/style.css">
</head>
<body>
    <!-- Add your content here -->
    <!-- Bootstrap JS and dependencies -->
    <script src="https://code.jquery.com/jquery-3.5.1.slim.min.js"></script>
    <script
src="https://cdn.jsdelivr.net/npm/@popperjs/core@2.9.2/dist/umd/popper.min.js"></script>
    <script src="https://stackpath.bootstrapcdn.com/bootstrap/4.5.2/js/bootstrap.min.js"></script>
    <script src="scripts/app.js"></script>
```

```
</body>
</html>
```

Experiment-3

Use JavaScript for doing client – side validation of the pages implemented in the experiment

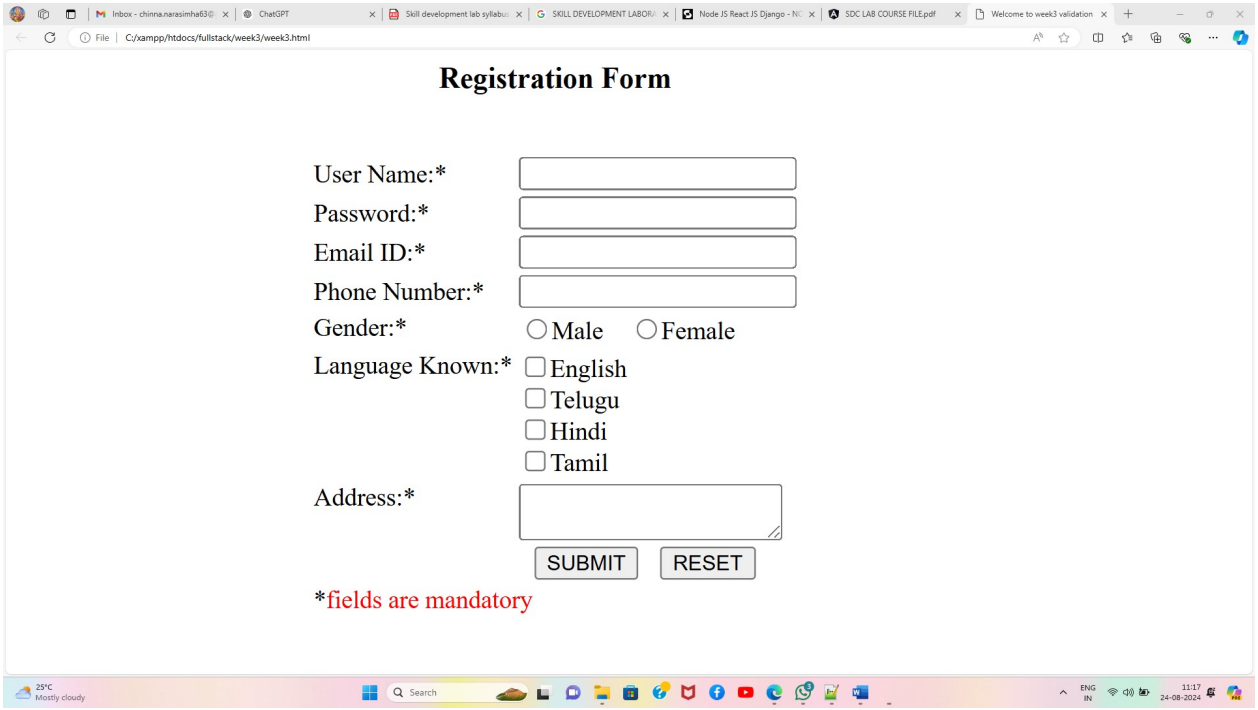
Client - Side validation of Registration Page
registrationJS.html

```
<html>
<head>
   <title> Welcome to NNRG e-Book's website</title>
   <script language="javascript">
   function validate() {
      // username validation
      var uname = f1.username.value;
      if (uname.length<=0)
      {
         alert("Please Enter UserName");
         f1.username.focus();
         return false;
      }
      if (uname.length < 8)
      {
         alert("Please enter UserName not less than 8");
         f1.username.focus();
         return false;
      }
      //password validation
      var pwd = f1.password.value;
      if (pwd.length<=0)
      {
         alert("Please Enter password");
         f1.password.focus();
         return false;
      }
      if (pwd.length < 6)
      {
         alert("Please enter Password not less than 6");
         f1.password.focus();
         return false;
      }
      // email validation
      var email = f1.email.value;
      if (email.length<=0)
      {
         alert("Please Enter email");
```

```
    f1.email.focus();
    return false;
}
else {
    let eflag=false;
    for(i=0;i<email.length;i++) {
        if(email.charAt(i)=="@")
            {
                eflag=true;
            }
    }
        if(!(eflag))
        {
            alert("Please enter a valid Email ID");
            f1.email.focus();
            return false;
        }
}
// phone number validation
var phno = f1.phno.value;
if (phno.length<=0)
{
    alert("Please Enter Phone Number");
    f1.phno.focus();
    return false;
}
if (isNaN(phno))
{
    alert("Please Enter Valid Phone Number");
    f1.phno.focus();
    return false;
}
if (phno.length != 10)
{
    alert("Please Enter Valid Phone Number");
    f1.phno.focus();
    return false;
}
// gender validation
let flag=false;
for(i=0;i<f1.gen.length;i++)
    if(f1.gen[i].checked)
        flag=true;
if(!(flag))
{
alert("Please choose a Gender");
```

```
        return false;
        }
        // Language validation
        flag=false;
        for(i=0;i<f1.lang.length;i++)
           if(f1.lang[i].checked)
              flag=true;
        if(!(flag))
        {
        alert("Please select at least one of the Language options.");
        return false;
        }
        // address validation
        var addr = f1.address.value;
        if (addr.length<=0)
        {
           alert("Please Enter address");
           f1.address.focus();
           return false;
        }
        // to display Success message
        alert("Registration Successful");
     }
     </script>
</head>
<body>
<center><br>
     <h3>Registration Form </h3>
     <br/>
     <form name="f1">
     <table cellpadding="1" align="center" >
     <tr><td> User Name:*</td>
     <td><input type="text" name="username"></td></tr>
     <tr><td>Password:*</td>
     <td><input type="password" name="password"></td></tr>
     <tr><td>Email ID:*</td>
     <td><input type="text" name="email"></td></tr>
     <tr><td>Phone Number:*</td>
     <td><input type="text" name="phno"></td></tr>
     <tr><td valign="top">Gender:*</td>
     <td><input type="radio" name="gen" value="Male">Male   
     <input type="radio" name="gen" value="Female">Female</td></tr>
     <tr> <td valign="top">Language Known:*</td>
     <td> <input type="checkbox" name="lang" value="English">English<br/>
     <input type="checkbox" name="lang" value="Telugu">Telugu<br>
     <input type="checkbox" name="lang" value="Hindi">Hindi<br>
```

```
    <input type="checkbox" name="lang" value="Tamil">Tamil
    </td></tr>
    <tr> <td valign="top">Address:*</td>
    <td><textarea name="address"></textarea></td>
    <tr><td></td><td><input type="button" value="SUBMIT" hspace="10" onclick="validate()">
    <input type="reset" value="RESET"></td></tr>
    <tr> <td colspan=2 >*<font color="#FF0000">fields are mandatory</font>
    </td>
    </tr>
    </table>
    </form>
</center>
</body>
</html>
```



4. **Explore the features of ES6 like arrow functions, callbacks, promises, async/await. Implement an application for reading the weather information from openweathermap.org and display the information in the form of a graph on the web page..**

   Arrow Functions: more concise syntax for writing functions

const add = (a, b) => a + b;

Callbacks:

- Functions passed as arguments to other functions and executed once a task is completed.
- Often used for asynchronous operations like reading files, making network requests, etc

```
function fetchData(callback) {
   // Simulate a data fetch
   setTimeout(() => {
      const data = { temperature: 25 };
      callback(data);
   }, 1000);
}

fetchData((data) => {
   console.log(data.temperature); // 25
});
```

Output

25

Promises:

- Objects representing the eventual completion (or failure) of an asynchronous operation.
- Allow chaining of asynchronous operations using .then() and handling errors with .catch().

```
const fetchData = () => {
   return new Promise((resolve, reject) => {
      setTimeout(() => {
         resolve({ temperature: 25 });
      }, 1000);
   });
};

fetchData().then(data => {
   console.log(data.temperature); // 25
}).catch(error => {
   console.error(error);
});
```

Output
25

Async/Await:

- A syntactic sugar built on top of Promises that allows writing asynchronous code that looks synchronous.
- Makes the code easier to read and maintain.

```
const fetchData = async () => {
   const response = await fetch('https://api.example.com/weather');
   const data = await response.json();
   console.log(data.temperature);
};

fetchData();
```
output

Building the Weather Application

To build a simple web application that fetches weather data from OpenWeatherMap and displays it as a graph, follow these steps:

Index.html

```
<html lang="en">
<head>
<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
<link rel="stylesheet" href="styles.css">
<title>Weather Graph</title> </head>
<body>
<div class="container"> <h1>Weather Graph</h1> <canvas id="weatherGraph" width="400"
height="200"></canvas>
</div>
<script src="https://cdn.jsdelivr.net/npm/axios/dist/axios.min.js"></script>
<script src="https://cdn.jsdelivr.net/npm/chart.js"></script> <script src="script.js"></script>
</body>
</html>
</html>
```

Styles.css

body

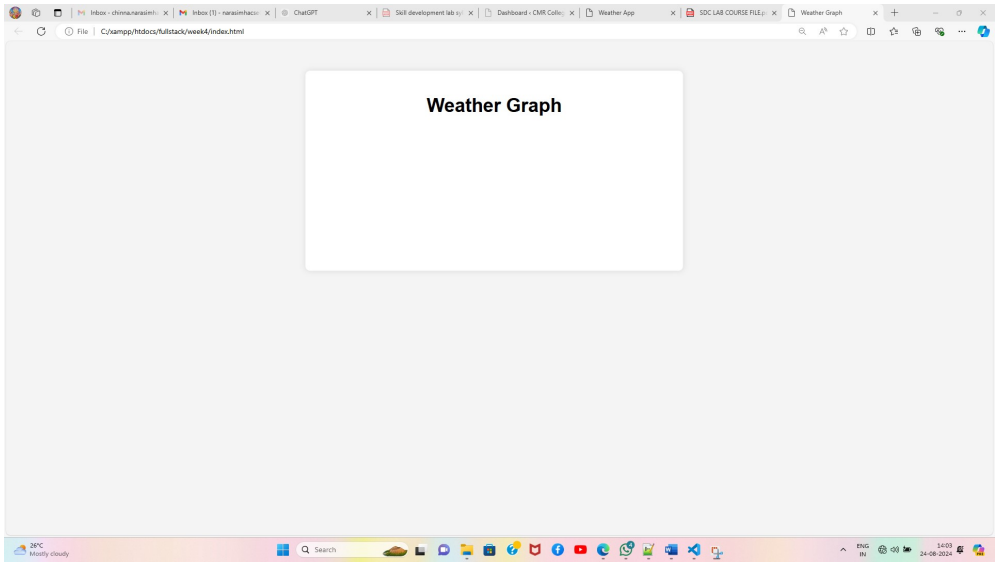
```
{
font-family: 'Arial', sans-serif; margin: 0; padding: 0; background-color: #f4f4f4;
}
.container { max-width: 600px; margin: 50px auto; background-color: #fff;
padding: 20px;
border-radius: 8px;
box-shadow: 0 0 10px rgba(0, 0, 0, 0.1);
}
h1 {
text-align: center;
```

```
}
canvas {
display: block;
margin: 20px auto;
}
```

script.js

```
document.add EventListener('DOMContentLoaded', () =>
   { const apiKey = 'YOUR_OPENWEATHERMAP_API_KEY';
const city = 'YOUR_CITY_NAME'; const apiUrl =
`https://api.openweathermap.org/data/2.5/weather?q=${city}&appid=${apiKey}&units=
metric`;
 const fetchData = async () => { try { const response = await axios.get(apiUrl);
    const weatherData = response.data; updateGraph(weatherData.main.temp);
    } catch (error) {
console.error('Error fetching weather data:', error.message);
} };
const updateGraph =
(temperature) => { const ctx =
document.getElementById('weatherGraph').getContext('2d');
new Chart(ctx, { type: 'bar', data: { labels: ['Temperature'], datasets: [{
label: 'Temperature (°C)', data: [temperature], backgroundColor: ['#36A2EB'], }],
}, options: { scales: { y: { begin At Zero: true, }, }, }, }); };
fetchData();
});
```

output:



5. **Develop a java standalone application that connects with the database (Oracle / mySql) and performs the CRUD operation on the database tables**