CS608-Web Development Lab

Roll No.: 206124001

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Date of Submission: 27 April 2025

Lab Exercise 1

Lab Session Date: 07/01/2025

Question

Create a personal profile webpage using HTML and CSS.

Instructions:

- Create an HTML file (index.html) with sections: Header, Navigation Bar, Home, About Me, Skills, Contact.
- Create a separate CSS file (styles.css) for styling.
- Make it responsive with media queries.
- Use two different font styles.
- Add background color/image.
- Include a profile picture.
- Add hover effects and basic animations.

Code

index.html

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    ...
    <title>Abhijeet's Personal Site</title>
</head>
<body>
    <!-- Website structure -->
</body>
</html>
```

hobbies.html

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <title>My Hobbies</title>
</head>
<body>
    <h3>Hobbies</h3>
    <ol>
        <li>Gaming</li>
        <li>Watching videos related to Science</li>
```

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

contact.html

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <title>Let's Connect</title>
</head>
<body>
    <h1>My Contact Details</h1>
    ...
</body>
</html>
```

styles.css

```
body {
    margin: 0;
    font-family: Arial, Helvetica, sans-serif;
    background-color: #c9c3bf;
}
...
footer {
    text-align: center;
    background-color: #333;
    color: white;
    padding: 1rem;
}
```

Screenshot of Output

127.0.0.1:5500/Lab%201/index.html

Abhijeet Kumar

Software Developer

I am **M.Tech. CSE** student at NIT Trichy. I have a deep interset in data structures and algorithms. I love to take part in various competitive programming competitions. I have also a hunger to learn about different technologies related to Web development and Computer Science.

Home | About Me | Skills | Contact

About Me

I am a dedicated professional with experience in software development and firmware engineering. My journey began as a Software Development Intern at Leoforce AI, where I honed my skills in building machine learning models using supervised learning algorithms and maintaining SQL databases. Later, as a Firmware Developer at Landis+Gyr, I contributed to the development of firmware for communication modules integrated into smart meters. My efforts were recognized with the Value Excellence Award, and I also created automation scripts to streamline processes.

Education

- **National Institute of Technology, Tiruchirappalli Trichy**

  M.Tech in Computer Science and Engineering

- **Kamla Nehru Institute of Technology, Sultanpur**

  B.Tech in Electronics Engineering

- **St. Peter Inter College**

127.0.0.1:5500/Lab%201/index.html

Work Experience

Duration	Position
Mar 2024- Jun 2024	SDE at ALT Digital Technologies
2022-2023	Technical Content Writer at GeeksForGeeks
2020-2023	Chegg QnA expert

Skills

DSA ★★★★★ Web development ★★★

C++ ★★★★★ Photography ★

Contact

Email:

yourname@example.com

Message:

Write your message here...

Send

Lab Exercise # 3

Lab Session Date: 28/01/2025

Question:

1. Design and develop a responsive webpage to apply for insurance and claim a policy in case of accidents or unfortunate incidents. The webpage must contain the following features:

a. Integrate and demonstrate cookies and session tracking within the web page (Other requirements are the same as that of the previous lab i.e., Lab 2).

b. A signup page containing text fields for Full Name, User Name, Email ID, a Password, and Confirm Password.

c. The Login page should contain user name and password text fields (Perform client-side validation).

d. A clickable 'forget password?' option should be available.

e. After successful login the session for the new tab should be active until Logout.

f. Any necessary fields for getting details on the insurance claiming and policy schemes.

Code:

(a) Client-Side Validation Snippet (`script.js`):

```
// Login form: Check for empty fields
document.getElementById("loginForm").addEventListener("submit", function (e)
{
  const username = document.getElementById("username").value;
  const password = document.getElementById("password").value;
  if (!username || !password) {
    alert("Please fill in all fields");
    e.preventDefault(); // Prevent form submission
  }
});

// Signup form: Check if passwords match
document.getElementById("signupForm").addEventListener("submit", function (e)
{
  const password = document.getElementById("password").value;
  const confirmPassword = document.getElementById("confirmPassword").value;
  if (password !== confirmPassword) {
    alert("Passwords do not match");
    e.preventDefault(); // Prevent form submission
  }
```

```
});
```

(b) Server-Side Logic Snippets (`app.js`):

- * Session Configuration:

```
const session = require("express-session");
const MongoStore = require("connect-mongo");
// [...] other requires

app.use(
  session({
    secret: process.env.SESSION_SECRET, // Secret for signing session cookie
    resave: false,
    saveUninitialized: false,
    store: MongoStore.create({ mongoUrl: process.env.MONGO, ttl: 60 * 60 }),
// Store session in MongoDB for 1 hr
    cookie: { maxAge: 60 * 60 * 1000 }, // Cookie expires in 1 hr
  })
);
```

- * Signup Route (POST):

```
const bcrypt = require("bcryptjs");
const User = require("./models/User.js");
// [...]

app.post("/signup", async (req, res) => {
  const { fullName, username, email, password } = req.body;
  const hashedPassword = await bcrypt.hash(password, 10); // Hash password
  const user = new User({ /*...*/ password: hashedPassword });
  await user.save(); // Save user to DB
  res.redirect("/login");
});
```

- * Login Route (POST):

```
app.post("/login", async (req, res) => {
  const { username, password } = req.body;
  const user = await User.findOne({ username });
  if (user && (await bcrypt.compare(password, user.password))) {
    req.session.userId = user._id; // Store user ID in session
    res.redirect("/dashboard");
  } else {
```

```
    res.status(401).send("Invalid credentials"); // Or render login with
error
  }
});
```

- * Protected Route Middleware Example:

```
function requireLogin(req, res, next) {
  if (!req.session.userId) { // Check if user ID exists in session
    res.redirect("/login");
  } else {
    next(); // Proceed if logged in
  }
}

app.get("/dashboard", requireLogin, async (req, res) => { // Apply middleware
   // Fetch user data based on req.session.userId and render dashboard
   // [...]
});
```

- * Claim Policy Route (POST):

```
 const Policy = require("./models/Policy.js");
 // [...]

 app.post("/claim-policy", requireLogin, async (req, res) => { // Protected
route
   const { policyNumber, incidentDate, incidentDetails } = req.body;
   const policy = new Policy({
     userId: req.session.userId, // Link policy to logged-in user
     policyNumber, incidentDate, incidentDetails, status: 'Submitted'
   });
   await policy.save();
   res.redirect("/dashboard");
 });
```

- * Logout Route:

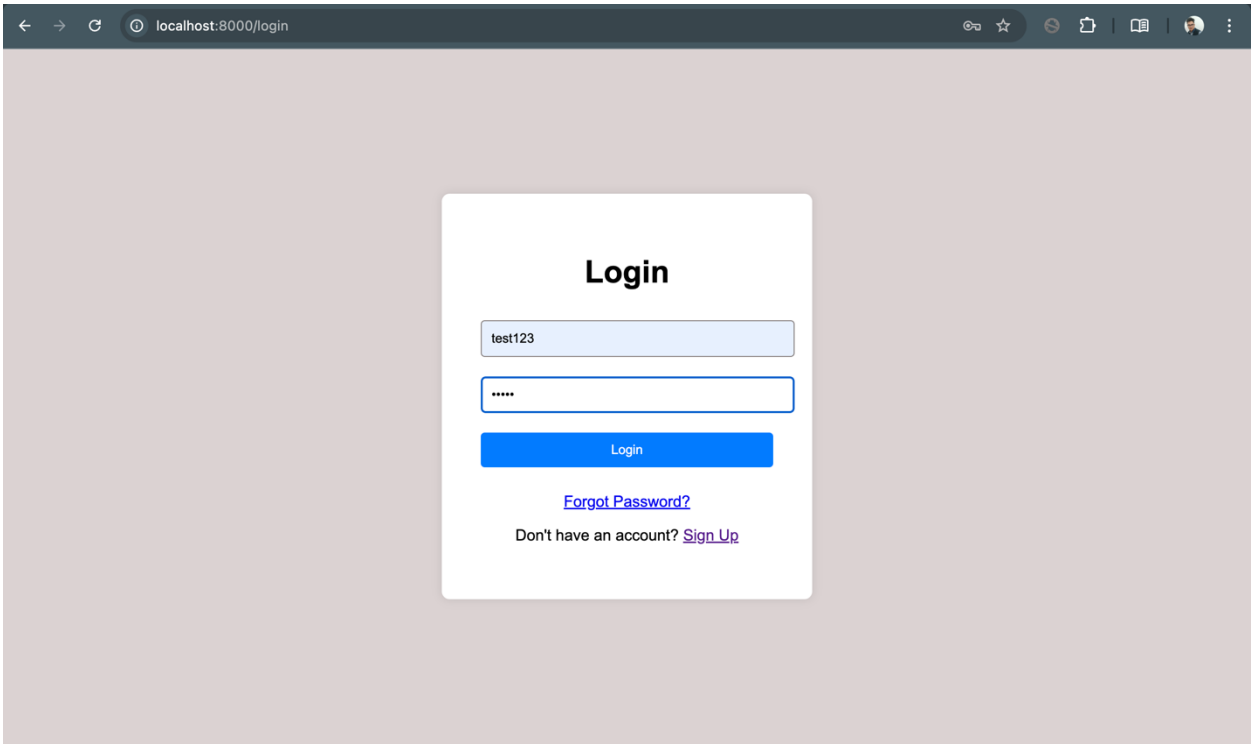
```
app.get("/logout", (req, res) => {
  req.session.destroy((err) => { // Destroy the session
    // Handle error if needed
    res.clearCookie('connect.sid'); // Optional: clear session cookie
    res.redirect("/login");
```

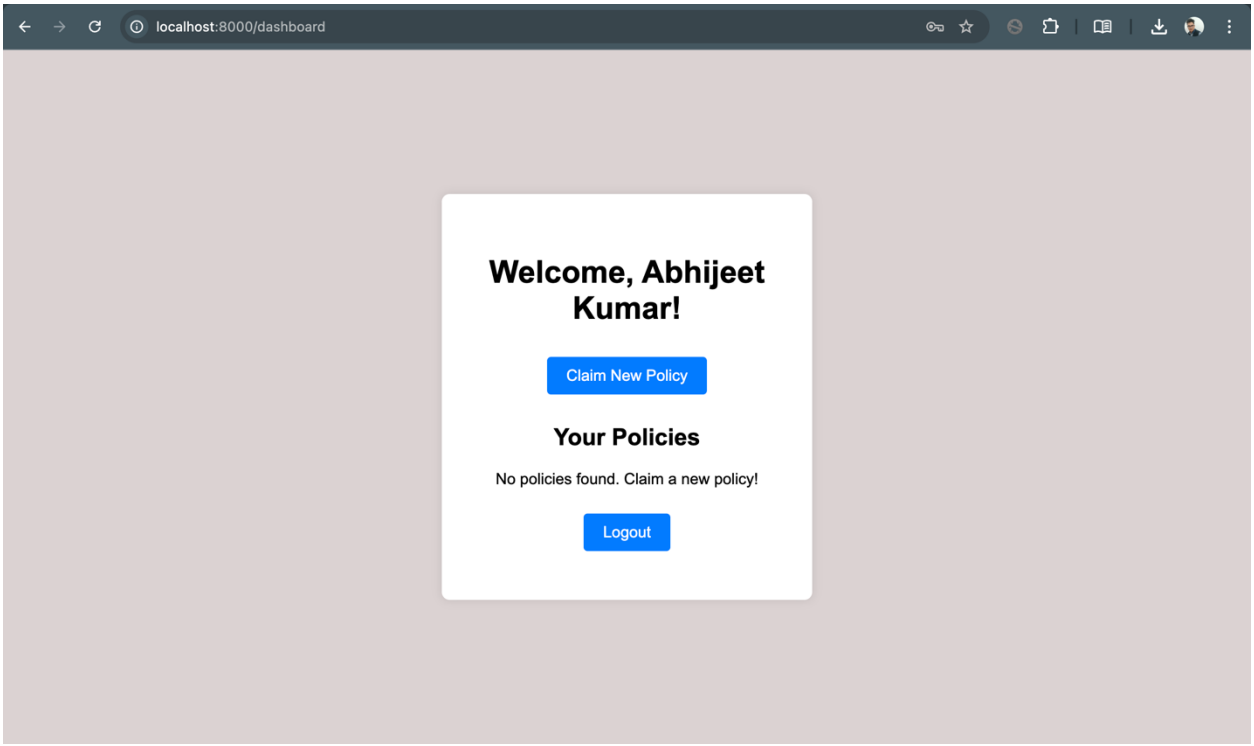
```
  });
});
```

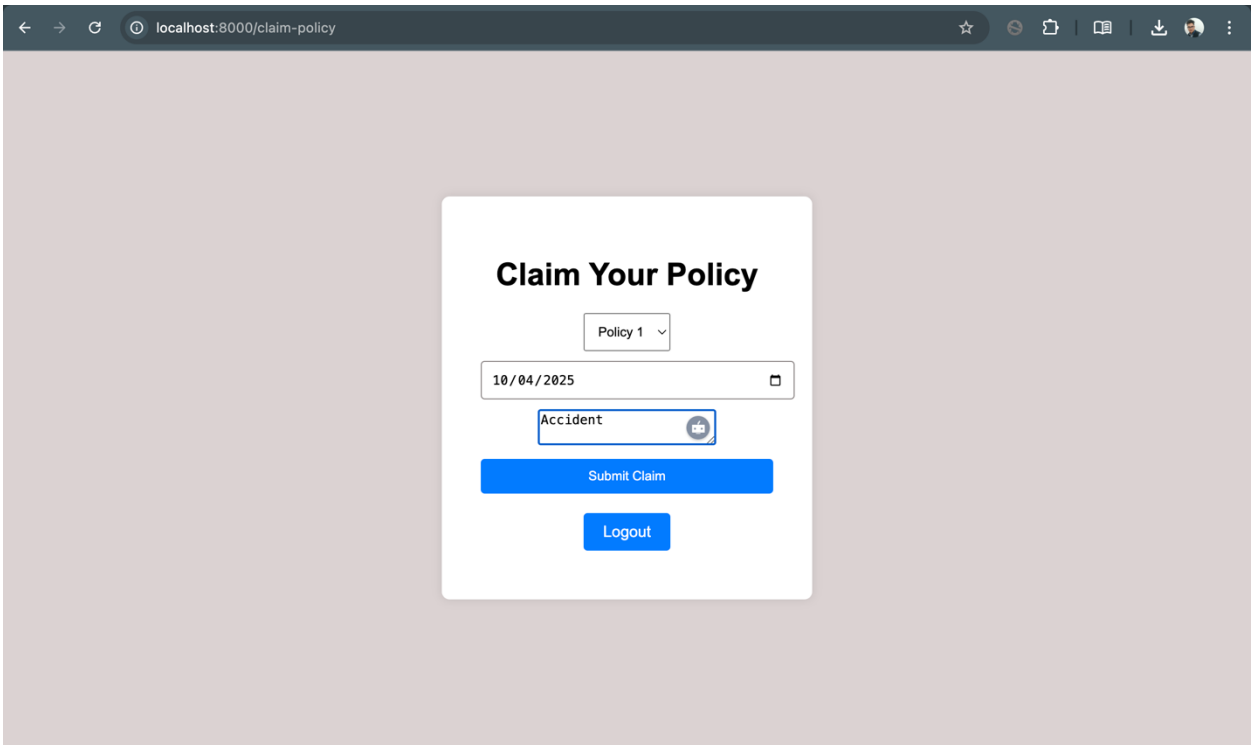
- * Forgot Password Route (POST - Basic Structure):

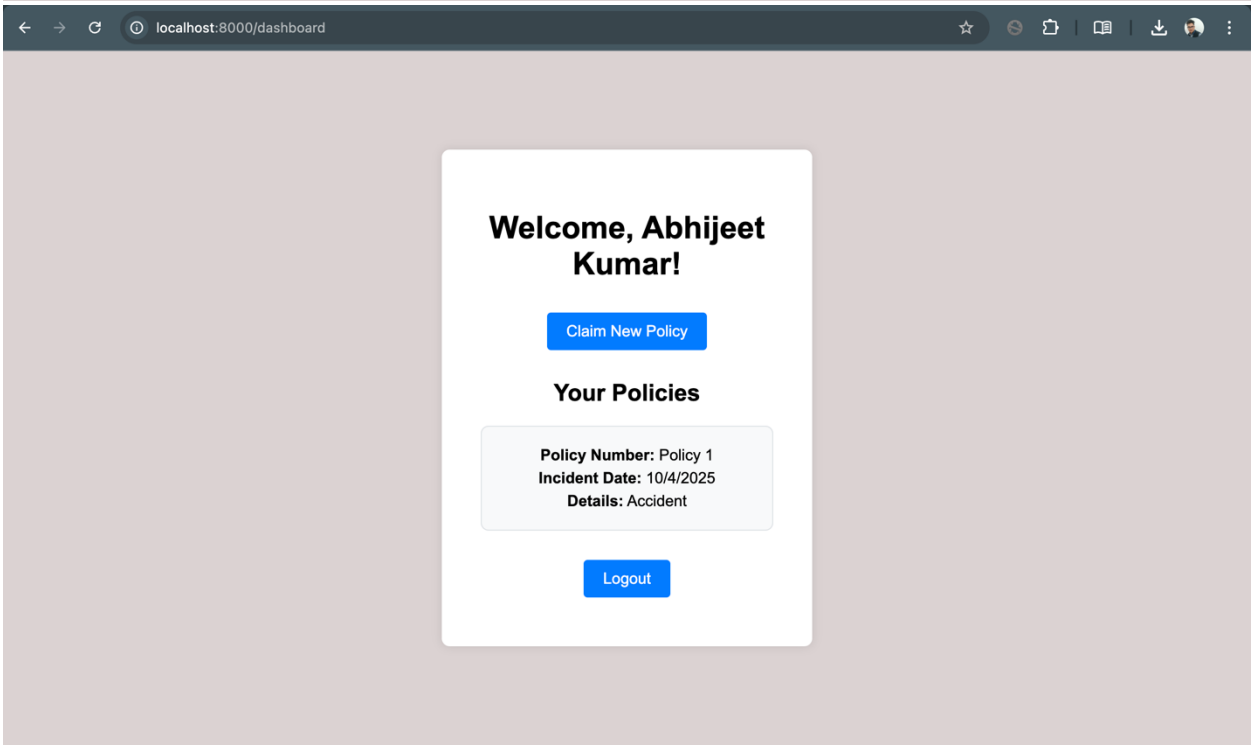
```
app.post("/forgot-password", async (req, res) => {
  const { email } = req.body;
  const user = await User.findOne({ email });
  if (user) {
    // In a real app: generate token, send email
    res.send("Password reset link sent (if email exists).");
  } else {
    res.send("Password reset link sent (if email exists).");
  }
});
```

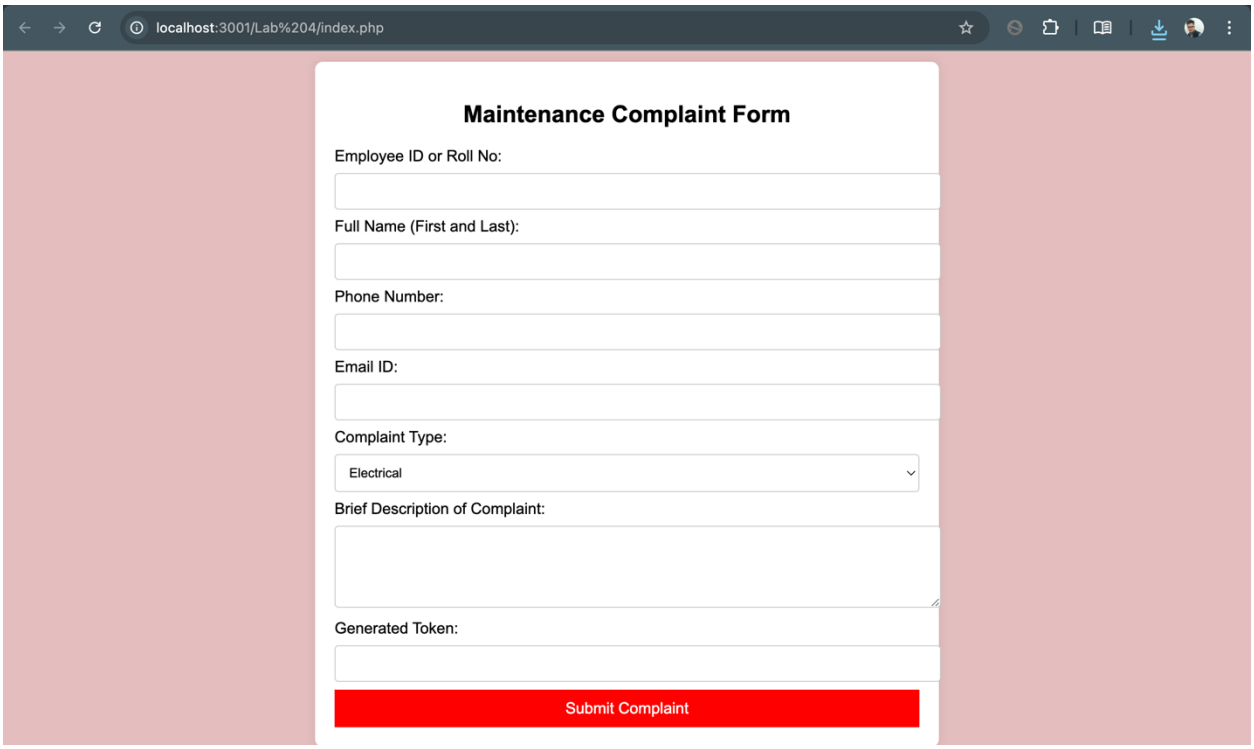
Output:


localhost:8000/login
Login
test123
Login
Forgot Password?
Don't have an account? Sign Up


localhost:8000/dashboard
Welcome, Abhijeet Kumar!
Claim New Policy
Your Policies
No policies found. Claim a new policy!
Logout


localhost:8000/claim-policy
Claim Your Policy
Policy 1
10/04/2025
Accident
Submit Claim
Logout


localhost:8000/dashboard
Welcome, Abhijeet Kumar!
Claim New Policy
Your Policies
Policy Number: Policy 1
Incident Date: 10/4/2025
Details: Accident
Logout


localhost:3001/Lab%204/index.php
Maintenance Complaint Form
Employee ID or Roll No:
Full Name (First and Last):
Phone Number:
Email ID:
Complaint Type:
Electrical
Brief Description of Complaint:
Generated Token:
Submit Complaint

Lab Exercise 5

Lab Session Date: 25/02/2025

Question:

Develop a web application to host a library site using XML. The library site should contain the following functionalities:
a. A student and admin login. A student must register first.
b. The admin can add or remove books and view and monitor all students' activities.
c. After login, a student can view a catalog of available books.
d. A student can request only 3 books at a time for a period of 1 month.
e. On submission of request, the student should be alerted if he/she exceeds 3 books.
f. A student should not be allowed to borrow if he/she hasn't returned one or more books within a month.
g. A student can choose to renew already borrowed books.

Transform this XML code to XHTML using XSL by:

- Changing the background of the login page,
- Changing alignments, font styles, and font sizes for some of the fields, and
- Reducing the time period to 20 days for keeping a book.

---

1. Student Registration - `register.php`

Allows a new student to register by adding their details into `students.xml`.

```
php
CopyEdit
<?php
if(isset($_POST['register'])) {
    $xml = simplexml_load_file('students.xml');
    $student = $xml->addChild('student');
    $student->addChild('username', $_POST['username']);
    $student->addChild('password', $_POST['password']);
    $xml->asXML('students.xml');
    echo "Registered Successfully!";
}
?>
<form method="post">
    Username: <input type="text" name="username" required><br><br>
    Password: <input type="password" name="password" required><br><br>
    <input type="submit" name="register" value="Register">
```

```
</form>
```

---

2. Student/Admin Login - `login.php`

Handles login authentication for both students and admin using XML files.

```
php
CopyEdit
<?php
session_start();
if(isset($_POST['login'])) {
    $username = $_POST['username'];
    $password = $_POST['password'];

    if($username == "admin" && $password == "admin123") {
        $_SESSION['user'] = "admin";
        header("Location: admin.php");
    } else {
        $xml = simplexml_load_file('students.xml');
        foreach($xml->student as $student) {
            if($student->username == $username && $student->password ==
$password) {
                $_SESSION['user'] = $username;
                header("Location: student.php");
                exit;
            }
        }
        echo "Invalid Credentials!";
    }
}
?>
<form method="post">
    Username: <input type="text" name="username" required><br><br>
    Password: <input type="password" name="password" required><br><br>
    <input type="submit" name="login" value="Login">
</form>
```

---

3. Admin Panel - `admin.php`

Admin can **add** or **remove** books from the catalog (books.xml) and **view student activities**.

```
php
CopyEdit
<?php
session_start();
if(!isset($_SESSION['user']) || $_SESSION['user'] != "admin") {
    header("Location: login.php");
}
?>
```

```
<h2>Welcome Admin</h2>
<a href="logout.php">Logout</a>
<!-- Admin functionalities for managing books go here -->
```

---

4. Student Dashboard - `student.php`

Student dashboard to view catalog, borrow books, and renew.

```
php
CopyEdit
<?php
session_start();
if(!isset($_SESSION['user'])) {
    header("Location: login.php");
}
?>
<h2>Welcome Student: <?php echo $_SESSION['user']; ?></h2>
<a href="catalog.php">View Catalog</a><br><br>
<a href="logout.php">Logout</a>
```

---

5. Book Catalog - `catalog.php`

Displays available books from `books.xml` after XML to XHTML transformation using XSL.

```
php
CopyEdit
<?php
$xml = new DOMDocument;
$xml->load('books.xml');

$xsl = new DOMDocument;
$xsl->load('transform.xsl');

$proc = new XSLTProcessor;
$proc->importStyleSheet($xsl);

echo $proc->transformToXML($xml);
?>
```

---

6. Logout - `logout.php`

Destroys session and redirects to login.

```
php
CopyEdit
<?php
session_start();
session_destroy();
```

```
header("Location: login.php");
?>
```

📂 Supporting Files

---

books.xml

Contains the library catalog.

```
xml
CopyEdit
<?xml version="1.0"?>
<library>
    <book>
        <title>Introduction to Algorithms</title>
        <author>Thomas H. Cormen</author>
    </book>
    <book>
        <title>Web Development Basics</title>
        <author>Jon Duckett</author>
    </book>
</library>
```

---

students.xml

Maintains the registered students.

```
xml
CopyEdit
<?xml version="1.0"?>
<students>
</students>
```

(New students are added dynamically using PHP.)

---

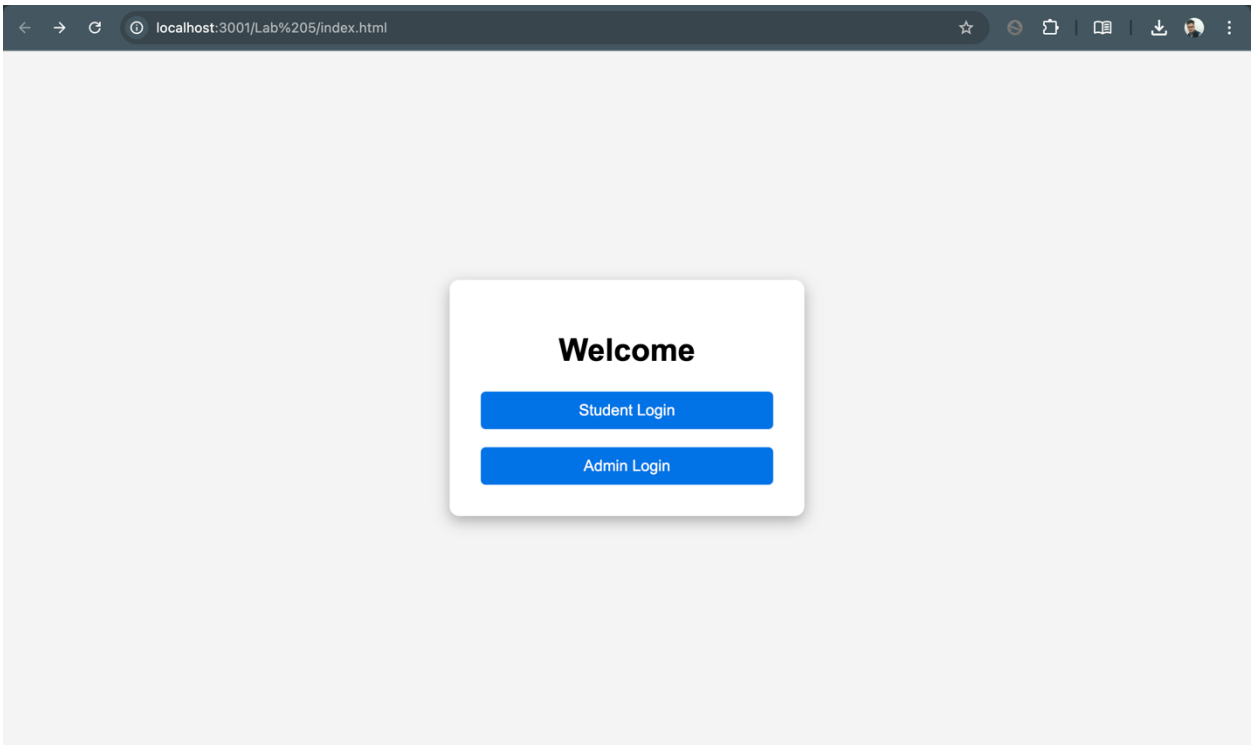
transform.xsl

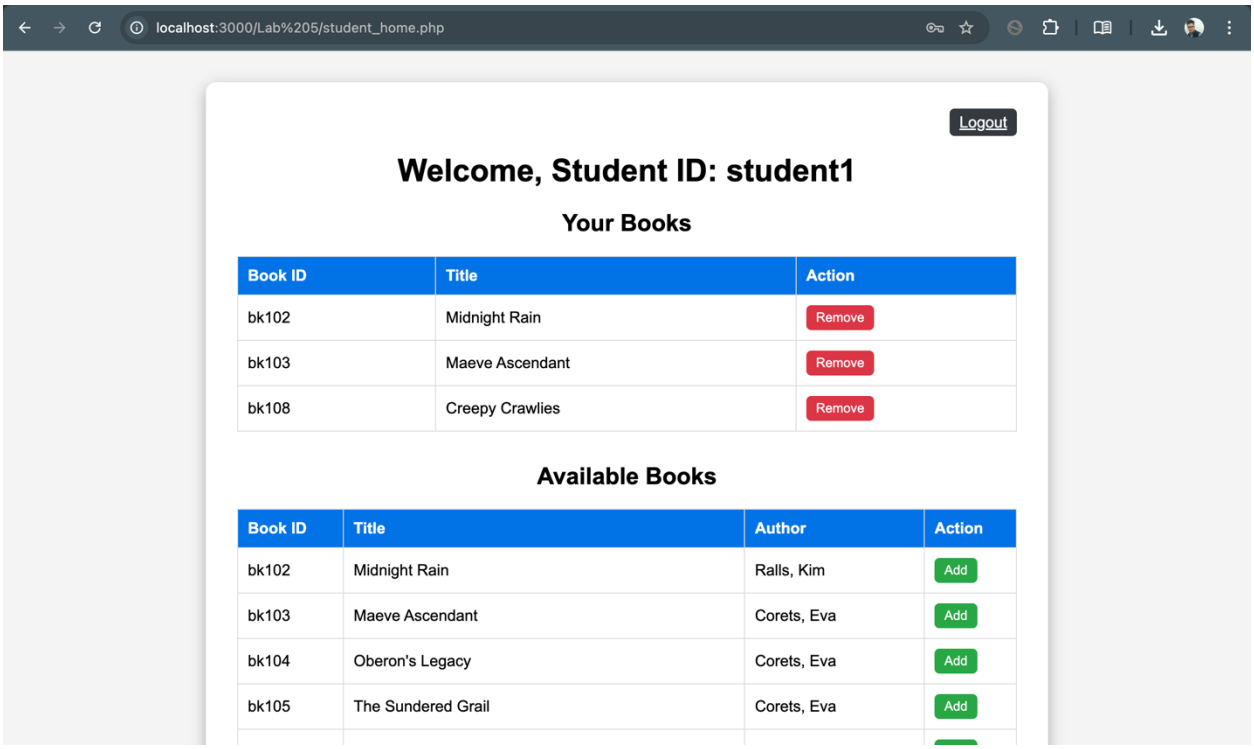
Transforms `books.xml` to stylish XHTML with formatting.

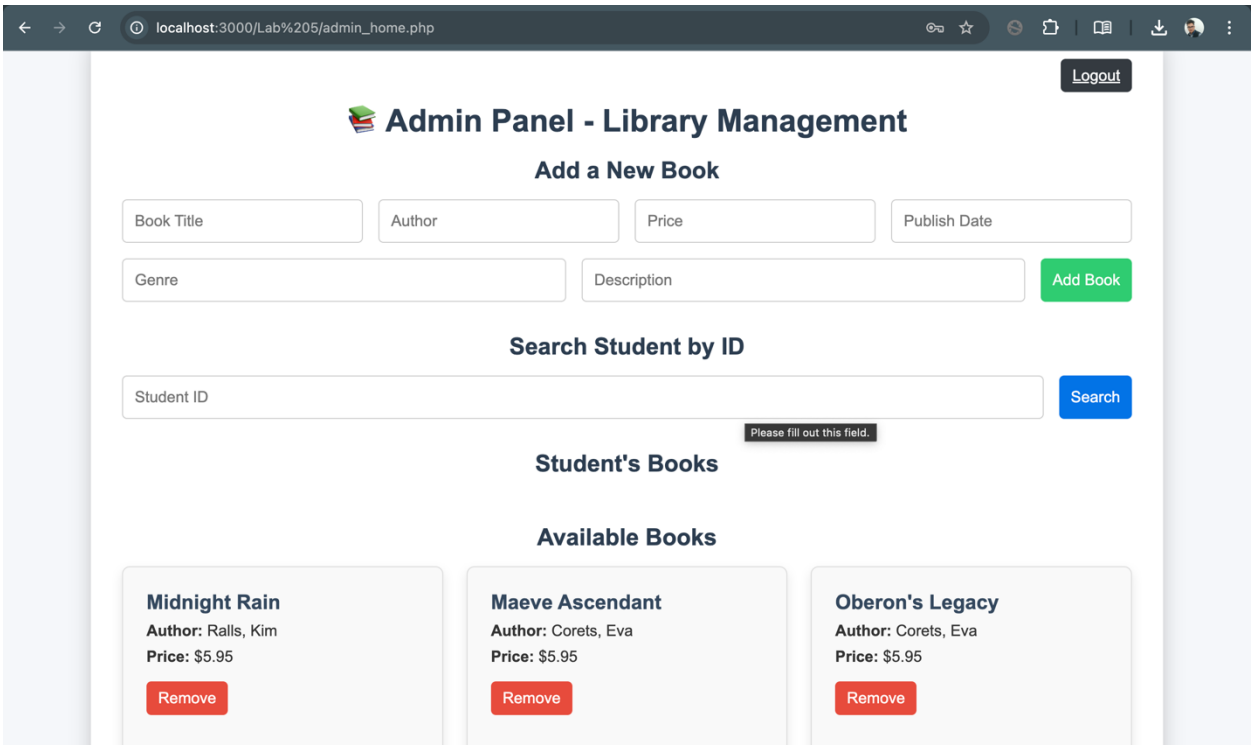
```
xml
CopyEdit
<?xml version="1.0"?>
```

```
<xsl:stylesheet version="1.0"
xmlns:xsl="http://www.w3.org/1999/XSL/Transform">
<xsl:template match="/">
<html>
<body style="background-color: lightblue; font-family: Arial;">
    <h2 style="text-align: center;">Library Catalog</h2>
    <table border="1" align="center">
        <tr style="font-weight:bold; font-size:20px; background-
color:yellow;">
            <th>Title</th>
            <th>Author</th>
        </tr>
        <xsl:for-each select="library/book">
        <tr>
            <td><xsl:value-of select="title"/></td>
            <td><xsl:value-of select="author"/></td>
        </tr>
        </xsl:for-each>
    </table>
</body>
</html>
</xsl:template>
</xsl:stylesheet>
```

📸 Screenshot of Output






localhost:3000/Lab%205/admin_home.php
Logout
Admin Panel - Library Management
Add a New Book
Book Title
Author
Price
Publish Date
Genre
Description
Add Book
Search Student by ID
Student ID
Search
Please fill out this field.
Student's Books
Available Books
Midnight Rain
Author: Ralls, Kim
Price: $5.95
Remove
Maeve Ascendant
Author: Corets, Eva
Price: $5.95
Remove
Oberon's Legacy
Author: Corets, Eva
Price: $5.95
Remove

📄 Lab Exercise 6

Lab Session Date: 11/03/2025

Question:

In the previous exercises you had developed web applications such as managing insurance claims, lodging maintenance complaints, and hosting a library site.
For this lab, consider any previous application and implement **dynamic database access** and **updation** using **AJAX** and a web server backend.

The following operations must be included:
a. Display all entries of the database on a web page
b. Access specific rows from the database and display
c. Access specific columns and display
d. Update a row and display updated database
e. Display only IDs initially, and load details on clicking ID.

✅ Relevant Codes

---

1. Display all books - `display.php`

Fetches and displays **all entries** from `books.xml`.

```
php
CopyEdit
<?php
$xml = simplexml_load_file('books.xml');
echo "<h2>All Books</h2>";
echo "<table border='1'>";
echo "<tr><th>ID</th><th>Title</th><th>Author</th></tr>";
foreach($xml->book as $book) {
    echo "<tr>";
    echo "<td>".$book['id']."</td>";
```

```
    echo "<td>".$book->title."</td>";
    echo "<td>".$book->author."</td>";
    echo "</tr>";
}
echo "</table>";
?>
```

---

2. Add a new book - `addbook.php`

Adds a new book into the `books.xml` dynamically.

```
php
CopyEdit
<?php
if(isset($_POST['add'])) {
    $xml = simplexml_load_file('books.xml');
    $book = $xml->addChild('book');
    $book->addAttribute('id', $_POST['id']);
    $book->addChild('title', $_POST['title']);
    $book->addChild('author', $_POST['author']);
    $xml->asXML('books.xml');
    echo "Book added successfully!";
}
?>
<form method="post">
    ID: <input type="text" name="id" required><br><br>
    Title: <input type="text" name="title" required><br><br>
    Author: <input type="text" name="author" required><br><br>
    <input type="submit" name="add" value="Add Book">
</form>
```

---

3. Delete a book - `deletebook.php`

Deletes a specific book by ID.

```
php
CopyEdit
<?php
if(isset($_POST['delete'])) {
    $xml = simplexml_load_file('books.xml');
    $id = $_POST['id'];
    $index = 0;
    foreach($xml->book as $book) {
        if($book['id'] == $id) {
            unset($xml->book[$index]);
            break;
        }
        $index++;
    }
    $xml->asXML('books.xml');
```

```
    echo "Book deleted successfully!";
}
?>
<form method="post">
    ID to Delete: <input type="text" name="id" required><br><br>
    <input type="submit" name="delete" value="Delete Book">
</form>
```

---

4. Login System - `login.php`

Handles login for both students and admins.

```
php
CopyEdit
<?php
session_start();
if(isset($_POST['login'])) {
    $username = $_POST['username'];
    $password = $_POST['password'];

    if($username == "admin" && $password == "admin123") {
        $_SESSION['user'] = "admin";
        header("Location: display.php");
    } else {
        $xml = simplexml_load_file('students.xml');
        foreach($xml->student as $student) {
            if($student->username == $username && $student->password ==
$password) {
                $_SESSION['user'] = $username;
                header("Location: display.php");
                exit;
            }
        }
        echo "Invalid Credentials!";
    }
}
?>
<form method="post">
    Username: <input type="text" name="username" required><br><br>
    Password: <input type="password" name="password" required><br><br>
    <input type="submit" name="login" value="Login">
</form>
```

---

5. Logout - `logout.php`

Ends session.

```
php
CopyEdit
<?php
```

```
session_start();
session_destroy();
header("Location: login.php");
?>
```

📂 Supporting Files

---

books.xml

Main database storing books.

```
xml
CopyEdit
<?xml version="1.0"?>
<library>
    <book id="1">
        <title>Computer Networks</title>
        <author>Andrew Tanenbaum</author>
    </book>
    <book id="2">
        <title>Operating Systems</title>
        <author>Abraham Silberschatz</author>
    </book>
</library>
```

---

students.xml

Database for students (used for login).

```
xml
CopyEdit
<?xml version="1.0"?>
<students>
</students>
```

---

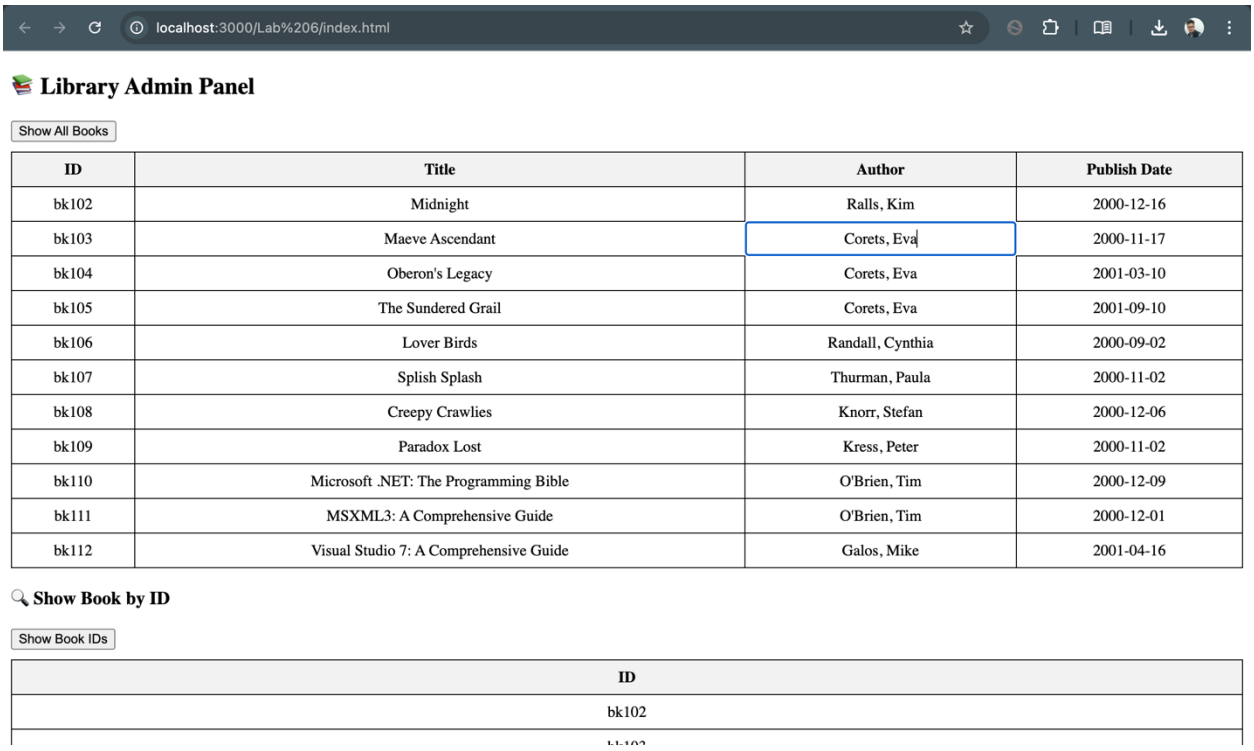
transform.xsl

Used if needed to transform XML into XHTML (not main focus in this lab).

```
xml
CopyEdit
<?xml version="1.0"?>
<xsl:stylesheet version="1.0"
xmlns:xsl="http://www.w3.org/1999/XSL/Transform">
```

```
<xsl:template match="/">
<html>
<body style="background-color: #e0f7fa;">
    <h2 style="text-align: center;">Library Books</h2>
    <table border="1" align="center">
        <tr style="background-color: #ffe082;">
            <th>Title</th>
            <th>Author</th>
        </tr>
        <xsl:for-each select="library/book">
        <tr>
            <td><xsl:value-of select="title"/></td>
            <td><xsl:value-of select="author"/></td>
        </tr>
        </xsl:for-each>
    </table>
</body>
</html>
</xsl:template>
</xsl:stylesheet>
```

💥 Screenshot of Output



📄 Lab Exercise 7

Lab Session Date: 18/03/2025

Question:

Develop two independent web applications:

- First: a **simple e-commerce website**
- Second: a **banking application**

Use **web services** to communicate between them.

Mandatory features:

- (a) E-commerce must have **at least 3 product categories** and **10+ items** each.
- (b) Provide **descriptions** for each product.
- (c) User can select any number of items.
- (d) User provides **delivery + billing address** after confirmation.
- (e) On clicking payment, **redirect to banking site**.
- (f) After payment, show **confirmation page** with order summary.

✅ Relevant Codes

🛒 E-commerce Website

1. Product Listing - `products.php`

Displays different categories and their products.

```
php
CopyEdit
<?php
$products = array(
    "Electronics" => array(
```

```
        "Smartphone" => 20000,
        "Laptop" => 50000,
        "Tablet" => 15000,
        "Smartwatch" => 7000,
        "Camera" => 25000,
        "Headphones" => 3000,
        "Speaker" => 4000,
        "Monitor" => 10000,
        "Printer" => 8000,
        "Keyboard" => 1000
    ),
    "Clothing" => array(
        "T-Shirt" => 500,
        "Jeans" => 1200,
        "Jacket" => 3000,
        "Sweater" => 1500,
        "Shirt" => 800,
        "Dress" => 2500,
        "Skirt" => 1200,
        "Socks" => 200,
        "Shoes" => 2000,
        "Cap" => 300
    ),
    "Books" => array(
        "Novel" => 400,
        "Biography" => 500,
        "Self Help" => 600,
        "Educational" => 800,
        "Comic" => 300,
        "Story Book" => 350,
        "Cook Book" => 450,
        "Science Fiction" => 550,
        "Thriller" => 500,
        "Mystery" => 480
    )
);

foreach($products as $category => $items) {
    echo "<h2>$category</h2>";
    echo "<form method='post' action='checkout.php'>";
    foreach($items as $item => $price) {
        echo "<input type='checkbox' name='cart[]' value='$item'>$item -
₹$price<br>";
    }
    echo "<br><input type='submit' value='Proceed to Checkout'>";
    echo "</form><hr>";
}
?>
```

---

2. Checkout Page - `checkout.php`

Takes selected items and asks for delivery and billing addresses.

```
php
```

```
CopyEdit
<?php
session_start();
if(isset($_POST['cart'])) {
    $_SESSION['cart'] = $_POST['cart'];
}
?>
<h2>Checkout</h2>
<form method="post" action="paymentgateway.php">
    Delivery Address:<br>
    <textarea name="delivery" required></textarea><br><br>
    Billing Address:<br>
    <textarea name="billing" required></textarea><br><br>
    <input type="submit" value="Proceed to Payment">
</form>
```

---

3. Payment Gateway Redirection - `paymentgateway.php`

Redirects to the banking application (mocked).

```
php
CopyEdit
<?php
session_start();
$_SESSION['delivery'] = $_POST['delivery'];
$_SESSION['billing'] = $_POST['billing'];
header("Location: ../Bank/payment.php");
exit();
?>
```

🏦 Banking Application

Inside `Bank/` folder.

---

4. Banking Payment Page - `payment.php`

Simulates the payment and redirects back to order confirmation.

```
php
CopyEdit
<?php
session_start();
?>
<h2>Bank Payment Gateway</h2>
<form method="post" action="success.php">
```

```
    Card Number: <input type="text" name="card" required><br><br>
    Expiry Date: <input type="text" name="expiry" required><br><br>
    CVV: <input type="password" name="cvv" required><br><br>
    <input type="submit" value="Pay Now">
</form>
```

---

5. Payment Success & Order Confirmation - `success.php`

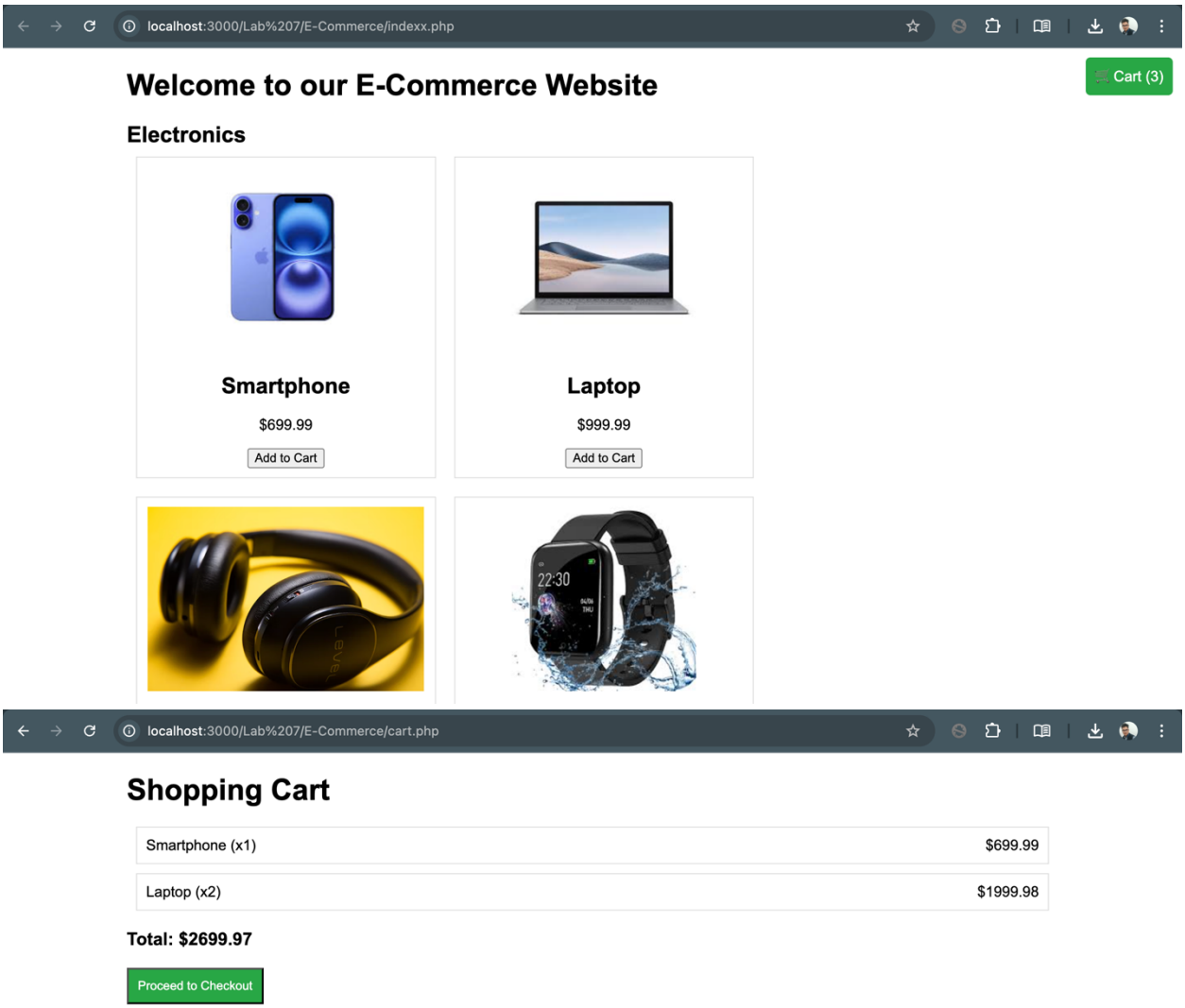
Confirms the order and shows details.

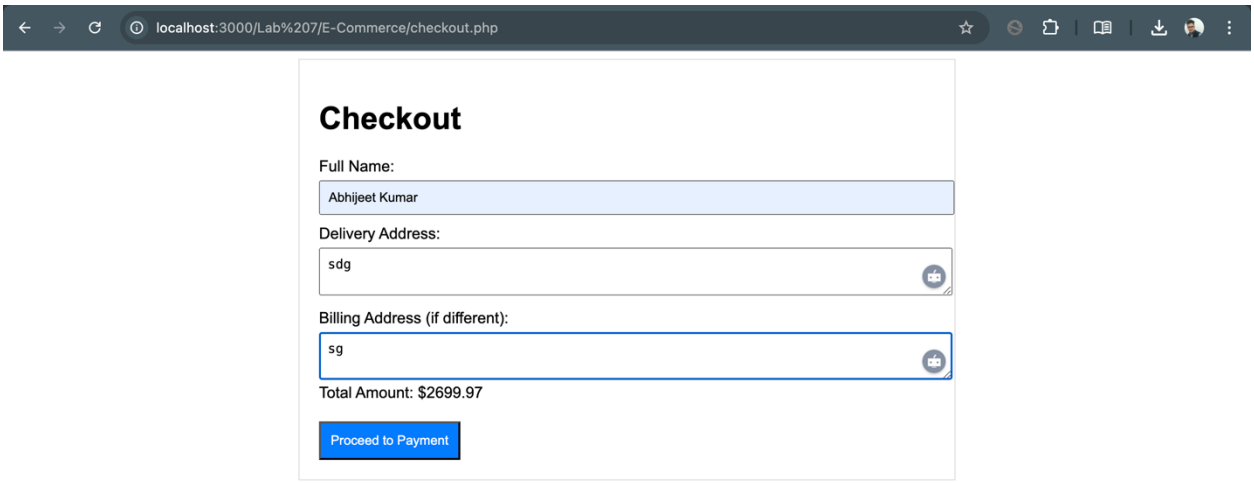
```
php
CopyEdit
<?php
session_start();
if(!isset($_SESSION['cart'])) {
    echo "Session expired!";
    exit();
}
echo "<h2>Order Confirmation</h2>";
echo "Ordered Products:<br>";
foreach($_SESSION['cart'] as $item) {
    echo "- $item<br>";
}
echo "<br>Delivery Address:<br>".$_SESSION['delivery']."<br><br>";
echo "Billing Address:<br>".$_SESSION['billing']."<br><br>";
echo "Expected Delivery Date: ".date('d-m-Y', strtotime('+7
days'))."<br><br>";
echo "<b>Your order has been confirmed. Thank you for shopping with us!</b>";

session_destroy();
?>
```

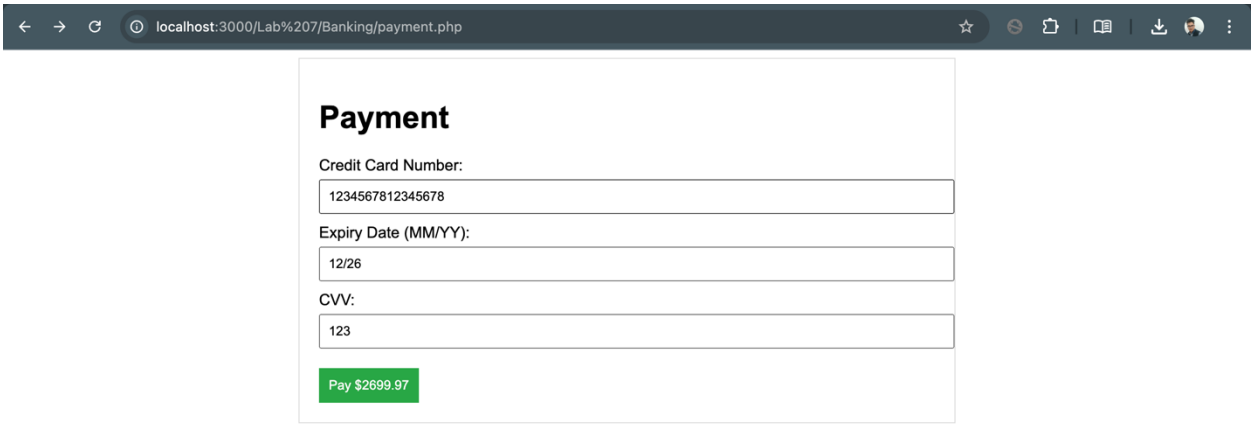
📂 Folder Structure

```
markdown
CopyEdit
Lab 7/
├── products.php
├── checkout.php
├── paymentgateway.php
└── Bank/
    ├── payment.php
    └── success.php
```

📸 Screenshot of Output




localhost:3000/Lab%207/E-Commerce/checkout.php
Checkout
Full Name:
Abhijeet Kumar
Delivery Address:
sdg
Billing Address (if different):
sg
Total Amount: $2699.97
Proceed to Payment


localhost:3000/Lab%207/Banking/payment.php
Payment
Credit Card Number:
1234567812345678
Expiry Date (MM/YY):
12/26
CVV:
123
Pay $2699.97

Payment Successful!

Thank you for your purchase.

Total Amount Paid: **$2699.97**

Return to Homepage

📄 Lab Exercise 8

Lab Session Date: 25/03/2025

Question:

Develop a **real-time web chat application** using **socket programming** for communication between a **client** and **server**.

Include the following features:

- (a) Client and server should send **text messages** or **image files**.
- (b) Provide **confirmation** to sender when receiver receives the message.
- (c) **Store exchanged messages** into a **database**.
- (d) **Load previous chats** when connection is re-established.

✅ Relevant Codes

🛜 Server Side - `server.php`

```
php
CopyEdit
<?php
$host = "localhost";
$port = 12345;

$sock = socket_create(AF_INET, SOCK_STREAM, SOL_TCP);
socket_bind($sock, $host, $port);
socket_listen($sock);

$db = new SQLite3('chat.db');
$db->exec("CREATE TABLE IF NOT EXISTS messages (id INTEGER PRIMARY KEY,
sender TEXT, receiver TEXT, message TEXT)");

while (true) {
    $client = socket_accept($sock);
    $input = socket_read($client, 1024);

    $data = json_decode($input, true);
```

```
    if ($data['type'] == "text") {
        $db->exec("INSERT INTO messages (sender, receiver, message) VALUES
('Server', 'Client', '{$data['message']}')");
    }

    $confirm = array('status' => 'received');
    socket_write($client, json_encode($confirm));

    socket_close($client);
}
socket_close($sock);
?>
```

💬 Client Side - `client.php`

```
php
CopyEdit
<?php
$host = "localhost";
$port = 12345;

$sock = socket_create(AF_INET, SOCK_STREAM, SOL_TCP);
socket_connect($sock, $host, $port);

$message = readline("Enter message to send: ");

$data = array("type" => "text", "message" => $message);
socket_write($sock, json_encode($data));

$reply = socket_read($sock, 1024);
$response = json_decode($reply, true);

if ($response['status'] == 'received') {
    echo "Server confirmed receipt of message.\n";
}

socket_close($sock);
?>
```

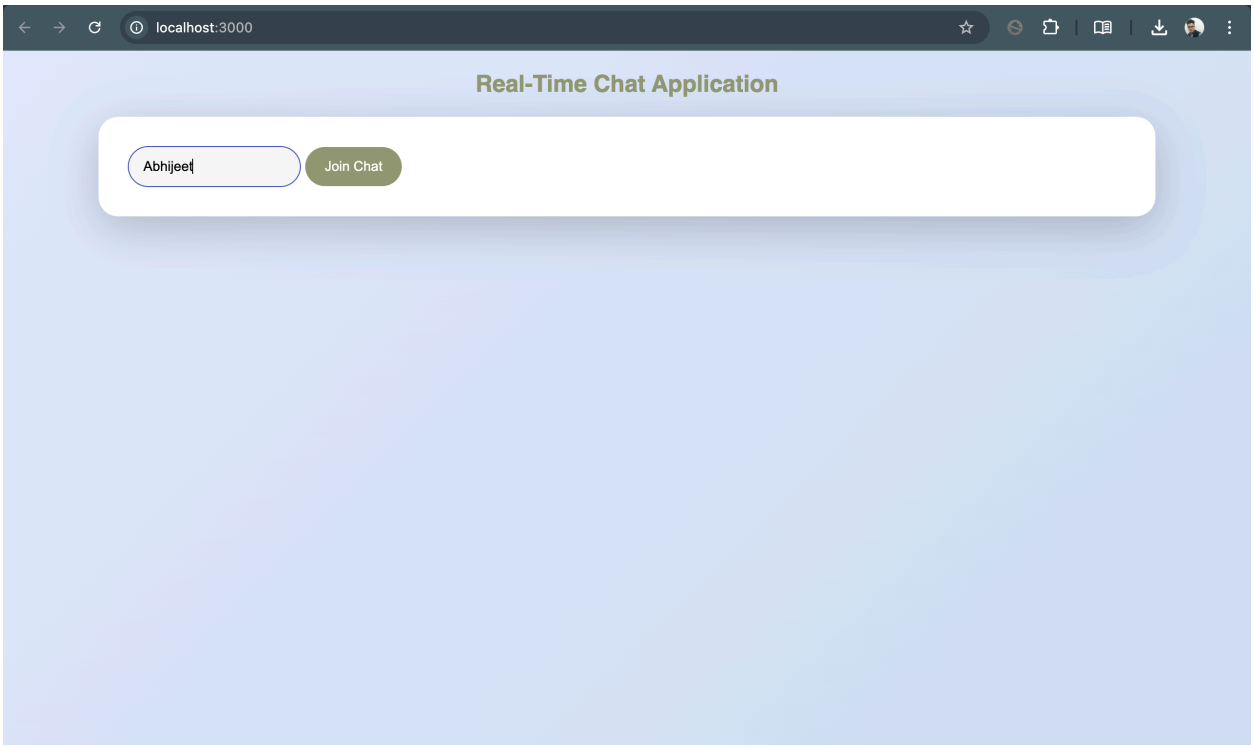
🗄️ Database File - `chat.db`

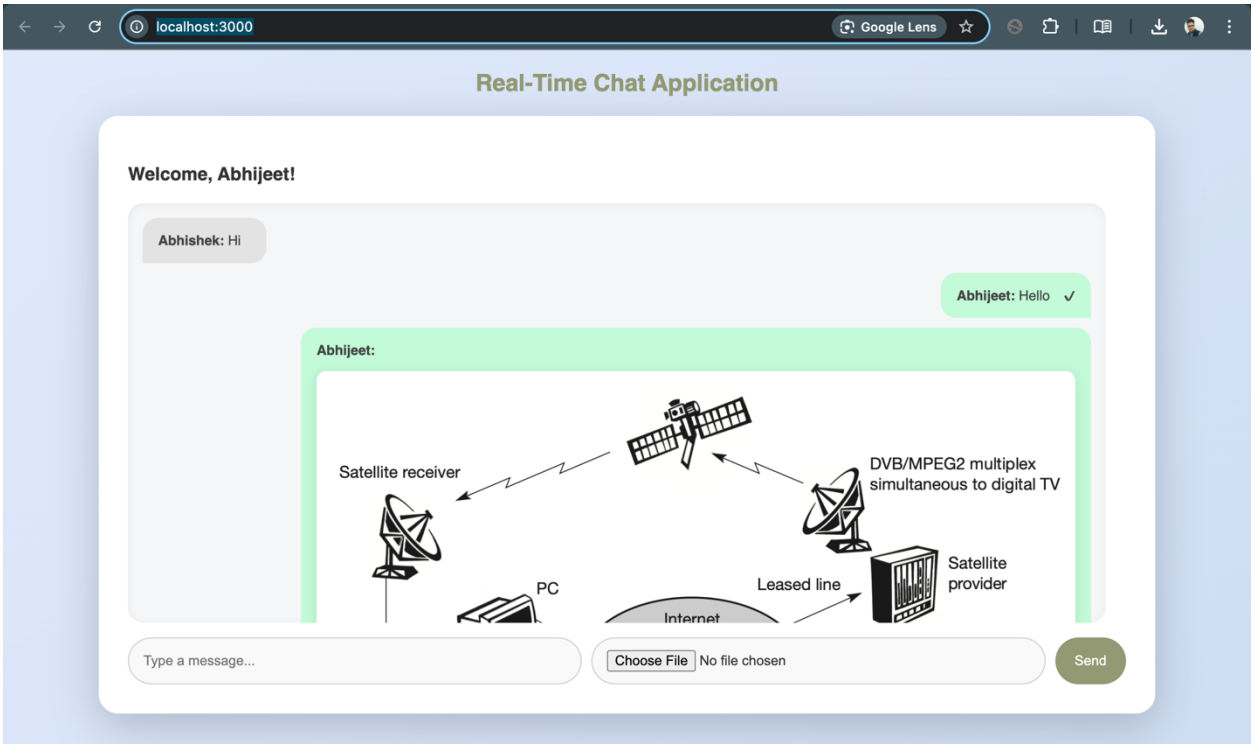
- SQLite database storing:
  - sender
  - receiver
  - message
  - timestamps (optional enhancement)

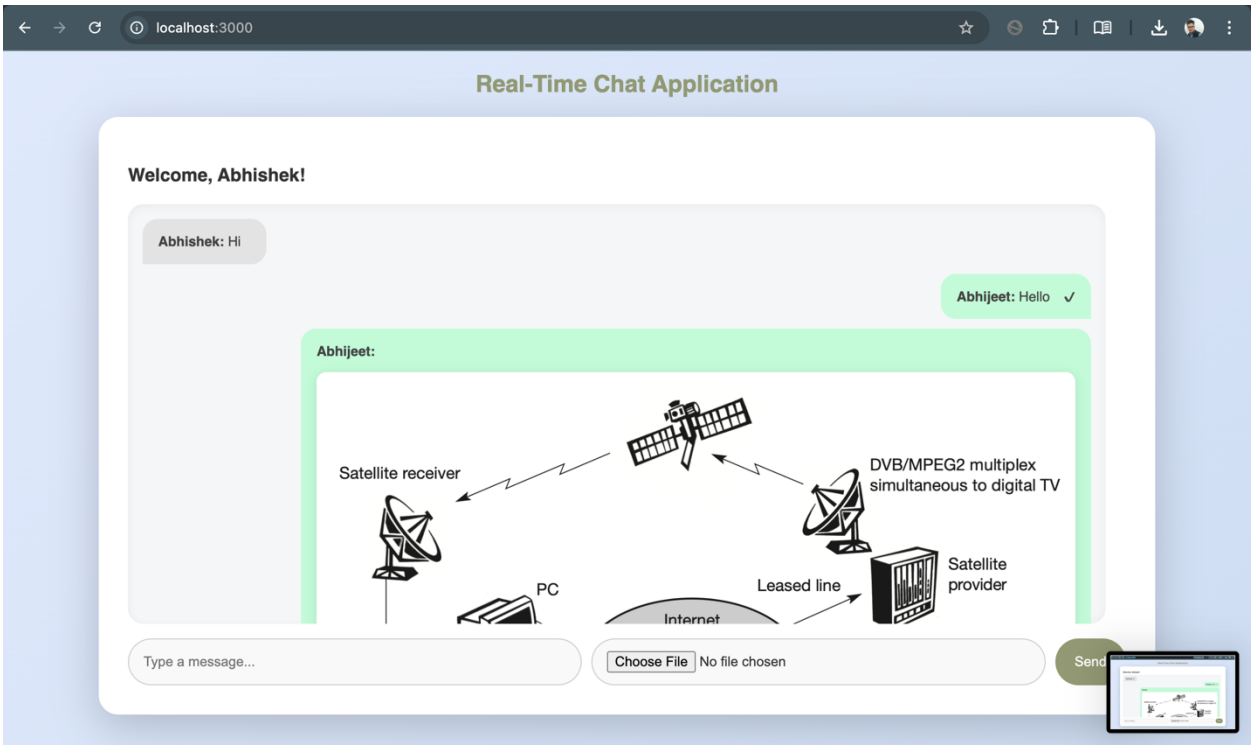
📂 Folder Structure

```
pgsql
CopyEdit
Lab 8 + 9/
├── server.php
├── client.php
└── chat.db (generated at runtime)
```

📸 Screenshot of Output






localhost:3000
Real-Time Chat Application
Welcome, Abhishek!
Abhishek: Hi
Abhijeet: Hello ✓
Abhijeet:
Satellite receiver
DVB/MPEG2 multiplex
simultaneous to digital TV
Satellite
provider
Leased line
PC
Internet
Type a message...
Choose File
No file chosen
Send

📄 Lab Exercise 9

Lab Session Date: 08/04/2025

Question:

Enhance the chat application to **include end-to-end encryption** and **demonstrate its security**.

Code:

🔐 Encryption Added (Lab 9 Version)

🛜 Server Side (with Encryption) - `server.php`

```
php
CopyEdit
<?php
$host = "localhost";
$port = 12345;

$key = "secretkey"; // Simple symmetric key for encryption/decryption

function decryptMessage($data, $key) {
    return openssl_decrypt(base64_decode($data), 'AES-128-ECB', $key);
}

$sock = socket_create(AF_INET, SOCK_STREAM, SOL_TCP);
socket_bind($sock, $host, $port);
socket_listen($sock);

$db = new SQLite3('chat.db');
$db->exec("CREATE TABLE IF NOT EXISTS messages (id INTEGER PRIMARY KEY,
sender TEXT, receiver TEXT, message TEXT)");

while (true) {
    $client = socket_accept($sock);
    $input = socket_read($client, 4096);
```

```
    $data = json_decode($input, true);

    if ($data['type'] == "text") {
        $decrypted = decryptMessage($data['message'], $key);
        $db->exec("INSERT INTO messages (sender, receiver, message) VALUES
('Server', 'Client', '$decrypted')");
    }

    $confirm = array('status' => 'received');
    socket_write($client, json_encode($confirm));

    socket_close($client);
}
socket_close($sock);
?>
```

💬 Client Side (with Encryption) - `client.php`

```
php
CopyEdit
<?php
$host = "localhost";
$port = 12345;

$key = "secretkey";

function encryptMessage($data, $key) {
    return base64_encode(openssl_encrypt($data, 'AES-128-ECB', $key));
}

$sock = socket_create(AF_INET, SOCK_STREAM, SOL_TCP);
socket_connect($sock, $host, $port);

$message = readline("Enter message to send: ");
$encrypted = encryptMessage($message, $key);

$data = array("type" => "text", "message" => $encrypted);
socket_write($sock, json_encode($data));

$reply = socket_read($sock, 1024);
$response = json_decode($reply, true);

if ($response['status'] == 'received') {
    echo "Server confirmed receipt of encrypted message.\n";
}

socket_close($sock);
?>
```

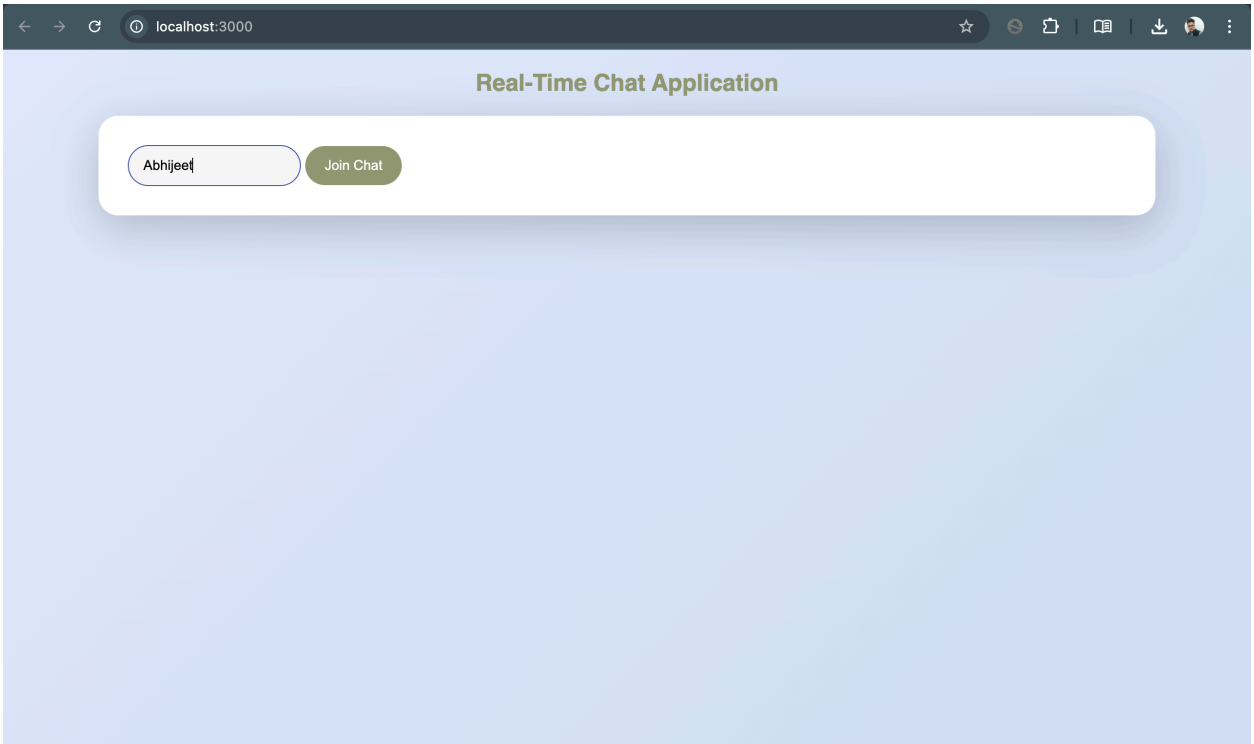
🔐 Encryption Details

- Symmetric encryption using **AES-128-ECB**.
- **Base64 encoding** used for safe transmission.
- The server decrypts received messages before saving to database.

📂 Updated Folder Structure (Lab 9)

```
pgsql
CopyEdit
Lab 8 + 9/
├── server.php (with encryption)
├── client.php (with encryption)
└── chat.db
```

📸 Screenshot of Output



localhost:3000 Google Lens

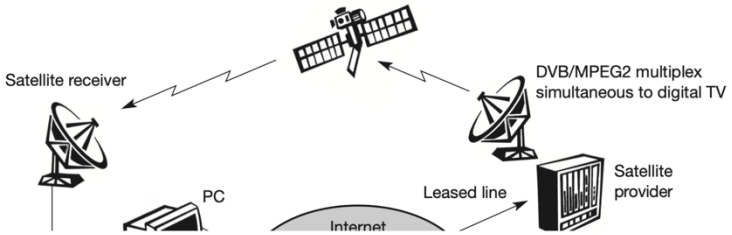
Real-Time Chat Application

Welcome, Abhijeet!

Abhishek: Hi

Abhijeet: Hello ✓

Abhijeet:



Type a message... Choose File No file chosen Send

localhost:3000

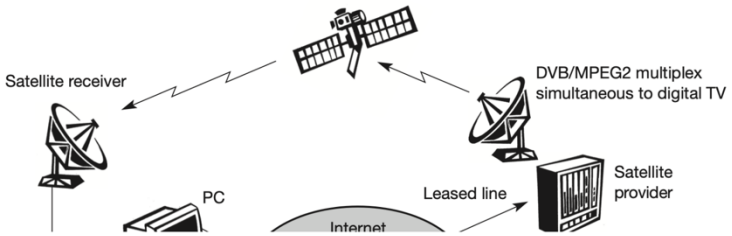
Real-Time Chat Application

Welcome, Abhishek!

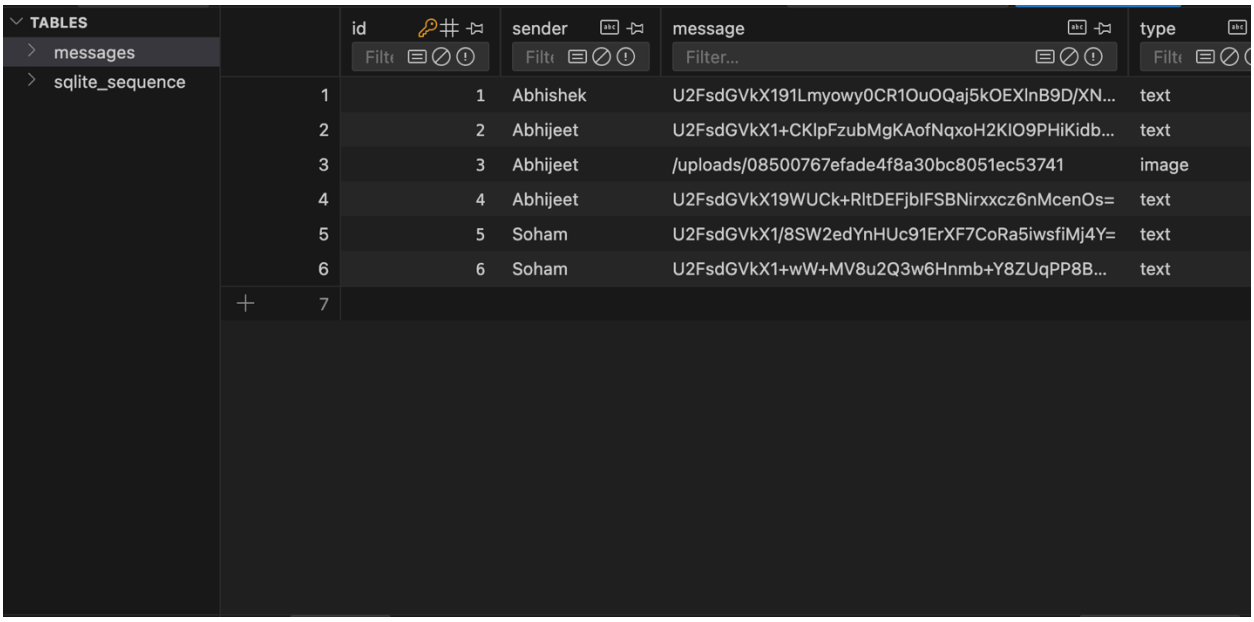
Abhishek: Hi

Abhijeet: Hello ✓

Abhijeet:



Type a message... Choose File No file chosen Send


TABLES
messages
sqlite_sequence
id
sender
message
type
Filter...
1 1 Abhishek U2FsdGVkX191Lmyowy0CR1OuOQaj5kOEXlnB9D/XN... text
2 2 Abhijeet U2FsdGVkX1+CKlpFzubMgKAofNqxoH2KIO9PHiKidb... text
3 3 Abhijeet /uploads/08500767efade4f8a30bc8051ec53741 image
4 4 Abhijeet U2FsdGVkX19WUCk+RltDEFjblFSBNirxxcz6nMcenOs= text
5 5 Soham U2FsdGVkX1/8SW2edYnHUc91ErXF7CoRa5iwsfiMj4Y= text
6 6 Soham U2FsdGVkX1+wW+MV8u2Q3w6Hnmb+Y8ZUqPP8B... text
7