A INDUSTRIAL TRAINING REPORT

On

"FULL STACK WEB DEVELOPMENT"

Submitted in the fulfilment of the requirement for the award of the degree of

Bachelor of Technology

in

COMPUTER SCIENCE



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CERTIFICATE

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Candidate's Declaration

I hereby declare that the work, which is being presented in the Industrial Training report entitled "FULL STACK WEB DEVELOPMENT" In partial fulfilment for the award of Degree of "Bachelor of Technology" in Department of Computer Science & Engineering with Specialization in Computer Engineering and submitted to the Department of Computer Science & Engineering, Arya College of Engineering And Research Center is a record of my own investigations carried under the Guidance of Mr Pawan Sen Assistant Professor, Department of Computer Science & Engineering.

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Bablu Kumar

ABSTRACT

The aim of this Bachelor's thesis was to develop a mobile-first style website for the customer, Pohjois-Suomen Pesis. The main purpose of the devel- opment was to learn website designing principles and create a responsive website for the mobile and desktop platforms. The development process began defining the requirements of the website and creating the requirements document. Then next step was learning how to design a website layout and to choose the colour scheme for the site. The website was constructed by Mern and Bootstrap. The result of the website was as desired. The website scaled all the different platforms, and all the required requirements were fulfilled.

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Chapter 1

Introduction

1.1 WEB DEVELOPMENT

Web development is the work involved in developing a web site for the Internet oran intranet. Web development can range from developing a simple single static page of plain text to complex web-based internet applications, electronic businesses, and social network services

Chapter 2

WEB

2.1 HTTP

HTTP stands for Hyper Text Transfer Protocol WWW is about communication between web clients and servers Communication between client computers and web servers is done by sending HTTP Requests and receiving HTTP Responses

2.1.1 HTTP Request / Response

Communication between clients and servers is done by requests and responses:

- a. A client (a browser) sends an HTTP request to the web
- b. An web server receives the request
- c. The server runs an application to process the request
- d. The server returns an HTTP response (output) to the browser
- e. The client (the browser) receives the response

2.1.2 The HTTP Request Circle

A typical HTTP request / response circle:

- a. The browser requests an HTML page. The server returns an HTML file.
- b. The browser requests a stylesheet. The server returns a CSS file.
- c. The browser requests an JPG image. The server returns a JPG file.
- d. The browser requests JavaScript code. The server returns a JS file
- e. The browser requests data. The server returns data (in XML or JSON).

2.2 HTML

HTML stands for Hyper Text Markup Language HTML is the standard markup language for Web pages HTML elements are the building blocks of HTML pages HTML elements are represented by tags BASIC TERMS:

</html>

2.2.1 HTML Elements

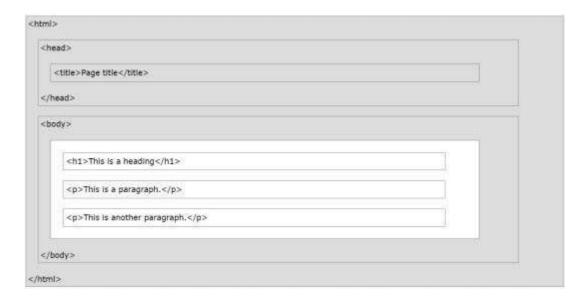
An HTML element is a start tag and an end tag with content in between:



Figure 2.1: Heading Tag

2.2.2 HTML Documents

The HTML document itself begins with html tag and ends with html tag followed by '/' forward slash. The visible part of the HTML document is between body tag.



. <HTML> tag:

The HTML <title> tag is used for declaring the title, or name, of the HTML document. The title is usually displayed in the browser's title bar (at the top). It is also displayed in browser bookmarks and search results. The title tag is placed between the opening and closing <head> tags. The link> element is used to define a relationship between an HTML document and an external re-source. This element is most commonly used to define the relationship between a document and one or more external CSS stylesheets.

. HTML Headings
HTML headings are defined with h1 to h6 tags.

```
<h1>This is heading 1</h1>
<h2>This is heading 2</h2>
<h3>This is heading 3</h3>
```

. HTML Paragraphs
HTML paragraphs are defined with p tags:

```
This is a paragraph.
This is another paragraph.
```

. HTML Links
HTML links are defined with a tags:

```
<a href="https://www.w3schools.com">This is a link</a>
```

. HTML Images

HTML images are defined with img tags.

The source file (src), alternative text (alt), width, and height are provided as attributes:

```
<img src="img_w3schools.jpg" alt="W3Schools" style="width:120px;height:150px"</pre>
```

. HTML Buttons

HTML buttons are defined with button tags:

```
<button>Click me</button>
```

. HTML Lists

HTML lists are defined with ul tag (unordered/bullet list) or ol tag (ordered/numbered list) tags, followed by li tags (list items):

```
    Coffee
    Tea
    Milk
```

. HTML Tables

An HTML table is defined with a table tag. Table rows are defined with tr tags. Table headers are defined with th tags. (bold and centered by default). Table cells (data) are defined with td tags.

```
(tr>
 Firstname
 Lastname
 Age
(tr)
 Jill
 Smith
 50
(tr>
 Eve
 Jackson
 94
```

. <Body> tag:

Description. The HTML ¡body¿ tag defines the main content of the HTML document or the section of the HTML document that will be directly visible on your web page. This tag is also commonly referred to as the <body> element.

. <header>:

he <header> element is intended to usually contain the section's heading(an < h1 > - < h6 > element or an < hgroup> element), but this is not required. The <header> element can also be used to wrap a section's table of contents, a search form, or any relevant logos.

. <div> tag:

The <div> tag defines a division or a section in an HTML document. The <div> element is often used as a container for other HTML elements to style them with CSS or to perform certain tasks with JavaScript. The div tag is known as Division tag. The Div tag is used in HTML to make divisions of content in the web page like (text, images, header, footer, navigation bar etc). Div tag has

both open(<) and closing (>) tag and it is mandatory to close the tag. The Div is the most usable tag in web development because it helps us to separate out data in the web page and we can create a particular section for particular dataor function in the web pages.

Div tag is Block level tag
It is a generic container tag

It is used to the group of various tags of HTML so that sections can be created and style can be Applied on them.

Left center right.

.
 tag:

The 'href' attribute is the most important attribute of the HTML a tag. An unvisited link is displayed underlined and blue. A visited link displayed underlined and purple. An active link is underlined and red.

. <footer> tages:

HTML5 <footer> Element. The <footer> elementspecifies a footer for a document or section. A <footer> element should contain information about its containing element. A footer typically contains the author of the document, copyright information, links to terms of use, contact information, etc.

. <form> tag:

The <form>tag is used in conjunction with form-associated elements. To create a form, you can nest form-associated elements inside the opening/closing <form> tags. You can also use the form attribute within those elements to reference the ID of the form to use.

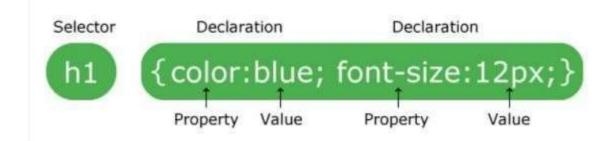
2.3 CSS

CSS stands for Cascading Style Sheets.

Cascading Style Sheets is a style sheet language used for describing the presentation of a document written in a markup language like HTML. CSS is a cornerstone technology of the World Wide Web, alongside HTML and JavaScript.

2.3.1 CSS Syntax

A CSS rule consists of a selector and a declaration block:



The selector points to the HTML element to style (h1). The declaration block (in curly braces) contains one or more declarations separated by semicolons. Each declaration includes a CSS property name and a value, separated by a colon. In the following example all p tag elements will be 32px wide, center-aligned, and with red.

Example:

```
<style>
p {
    font-size: 32px;
    color: red;
    text-align: center;
}
</style>
```

2.3.2 External Style Sheet

The external style sheet is generally used when you want to make changes on multiple pages. It is ideal for this condition because it facilitates you to change the look of the entire website by changing just one file. It uses the link tag on every pages and the link tag should be put inside the head section.

Example:

```
body {background-color: orange; font-family:verdana}
h1 {color: white;}
p {font-size: 20px;}
```

Figure 2.3: .css file

The external style sheet may be written in any text editor but must be saved with a .css extension. This file should not contain HTML elements.

```
<!DOCTYPE html>
<html>
<link rel="stylesheet" href="mystyle.css">
<body>
<h1>My First CSS Example</h1>
This is a paragraph.
</body>
</html>
```

Figure 2.4: .css file linked with .html file

2.3.3 Inline Style

We can apply CSS in a single element by inline CSS technique.

The inline CSS is also a method to insert style—sheets in HTML document. This method mitigates some advantages of stylesheets so it is advised to use this method sparingly.

If you want to use inline CSS, you should use the style attribute to the relevant tag.

```
<a href="cssproperty1:value; cssproperty2:value;"> </a> <a href="https://htmltag>
Figure 2.5: Inline Syntax .css file"> <a href="https://htmltag>"> <a href="https://htmlt
```

Example:

```
<!DOCTYPE html>
<html>
<html>
link rel="stylesheet" href="mystyle.css">
<body>

<h1>My First CSS Example</h1>
This is a paragraph.
This is a paragraph.
This is a paragraph.
</body>
</html>
```

Figure 2.6: Inline Style Sheet

2.4 Google fonts

Google Fonts is a Google API.

We can use Google Fonts in our Website design.

```
<!DOCTYPE html>
<html>
<head>
k href='https://fonts.googleapis.com/css?family=Sofia' rel='stylesheet'>
<style>
body {
   font-family: 'Sofia'; font-size: 22px;
</style>
</head>
<body>
<h1>Sofia</h1>
Imagination is more important than knowledge.
123456790
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopgrstuvwxyz
</body>
</html>
```

Figure 2.7: Google font using in .html file

When we use google fonts in designing webpage it will be viewed as:

Sofia

Imagination is more important than knowledge.

123456790

ABCDEFGHIJKLMNOPQRSTUVWXYZ

abcdefghijklmnopgrstuwwxyz

Figure 2.8: Google font viewpage

What is Javascript?

a lightweight programming language ("scripting language") used to make web pages interactive insert dynamic text into HTML (ex: user name) react to events (ex: page load user click) get information about a user's computer (ex: browser type) perform calculations on user's computer (ex: form validation)
a web standard (but not supported identically by all browsers) NOT related to Java other than by name and some syntactic similarities
Javascript vs Java
interpreted, not compiled more relaxed syntax and rules fewer and "looser" data types variables don't need to be declared errors often silent (few exceptions)

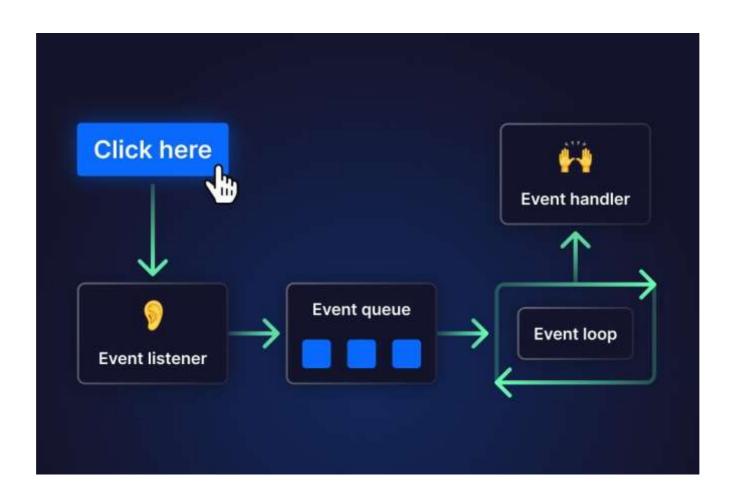
□ contained within a web page and integrates with its HTML/CSS content

key construct is the function rather than the class"first-class" functions are used in many situations

Linking to a JavaScript file: script

- □ script tag should be placed in HTML page's head
- □ script code is stored in a separate .js file
- ☐ JS code can be placed directly in the HTML file's body or head (like CSS)
- □ but this is bad style (should separate content, presentation, and behavior

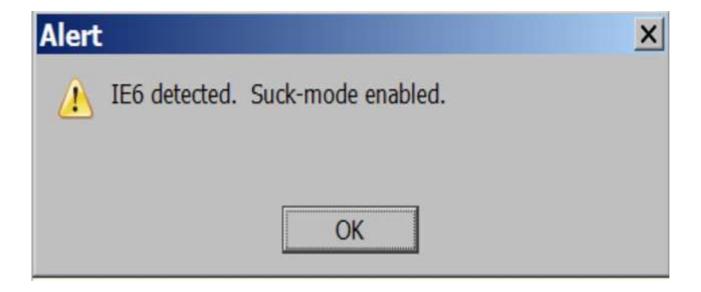
Event-driven programming



A JavaScript statement: alert

```
alert("IE6 detected. Suck-mode enabled.");

JS
```



□ a JS command that pops up a dialog box with a message

Event-driven programming

☐ you are used to programs start with a main method (or implicit main like in PHP)
☐ JavaScript programs instead wait for user actions called events and respond to them
 □ event-driven programming: writing programs driven by user events □ Let's write a page with a clickable button that pops up a "Hello, World"
window
Event Types ☐ Mouse Events: Click, double-click, hover, etc. ☐ Keyboard Events: Keydown, keyup, etc. ☐ Form Events: Submit, change, etc. ☐ Document Events: DOMContentLoaded, load, etc. ☐ 2.2 Event Listeners ☐ Functions that wait for a specific event to occur and then execute a predefined action.
Event Propagation □ Events can propagate through the DOM in two phases: capturing and bubbling.
Event Object
☐ An object containing information about the event, passed to the event handler.
Handling Events: ☐ Inline Event Handlers ☐ Assigning event handlers directly in HTML attributes.
☐ Traditional Event Handling
☐ Using addEventListener to attach event handlers dynamically.

Event-driven programming

you are used to programs start with a main method (or implicit main like in PHP)
JavaScript programs instead wait for user actions called events and respond to them
event-driven programming: writing programs driven by user events Let's write a page with a clickable button that pops up a "Hello, World" window

Buttons

<button>Click me!</button>

HTML

button's text appears inside tag; can also contain images
To make a responsive button or other UI control:
choose the control (e.g. button) and event (e.g. mouse 1. click) of interest
write a JavaScript function to run when the event occurs
attach the function to the event on the control

JavaScript functions

```
function name() {
  statement;
  statement;
  ...
  statement;
}
```

```
function myFunction() {
    alert("Hello!");
    alert("How are you?");
}
```

- ☐ the above could be the contents of example.js linked to our HTML page
- ☐ statements placed into functions can be evaluated in response to user events

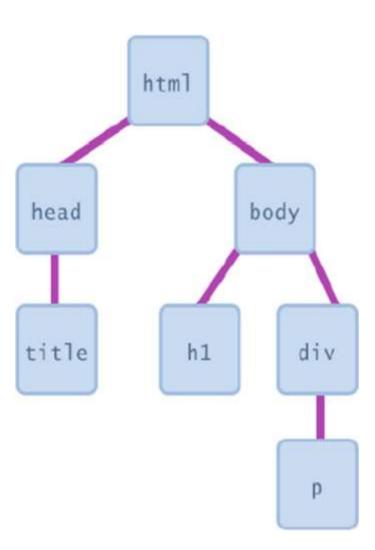
Event handlers

<element< th=""><th>attributes onclick="function();"></th><th>HTML</th></element<>	attributes onclick="function();">	HTML
,		•
<button< td=""><td>onclick="myFunction();">Click me!</td><td></td></button<>	onclick="myFunction();">Click me!	
		HTML

□ JavaScript functions can be set as event handlers
 □ when you interact with the element, the function will execute
 □ onclick is just one of many event HTML attributes we'll use
 □ but popping up an alert window is disruptive and annoying
 □ A better user experience would be to have the message appear on the page...

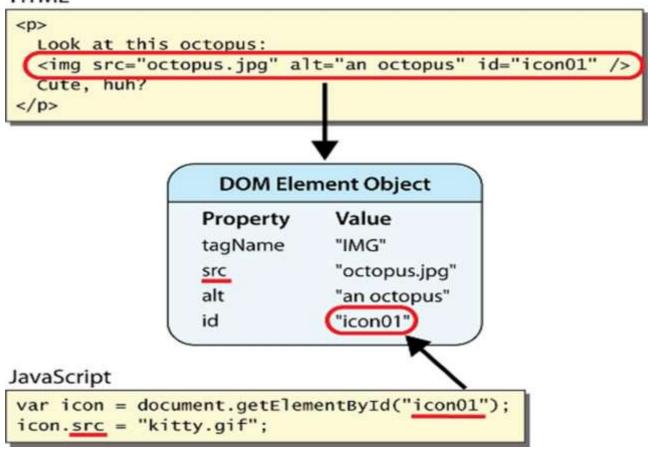
Document Object Model (DOM)

□ most JS code manipulates elements on an HTML page
□ we can examine elements' state
□ e.g. see whether a box is checked
□ we can change state
□ e.g. insert some new text into a div
□ we can change styles
□ e.g. make a paragraph red



DOM element objects

HTML



Accessing elements:

document.getElementById

```
<button onclick="changeText();">Click me!</button>
<span id="output">replace me</span>
<input id="textbox" type="text" /> HTML
```

```
function changeText() {
    var span = document.getElementById("output");
    var textBox = document.getElementById("textbox");

    textbox.style.color = "red";
}
```

Accessing elements: document.getElementByld

document.getElementById returns the DOM object for an element with a given id can change the text inside most elements by setting the innerHTML property can change the text in form controls by setting the value property

Variables

```
var name = expression; JS
```

```
var clientName = "Connie Client";
var age = 32;
var weight = 127.4;
```

- □ variables are declared with the var keyword (case sensitive)
- ☐ types are not specified, but JS does have types ("loosely typed")
- □ Number, Boolean, String, Array, Object, Function, Null, Undefined
- ☐ can find out a variable's type by calling type of

Comments (same as Java)

```
// single-line comment
/* multi-line comment */

JS
```

☐ identical to Java's comment syntax
☐ recall: 4 comment syntaxes
☐ HTML: <!-- comment -->
☐ CSS/JS/PHP: /* comment */
☐ Java/JS/PHP: // comment
☐ PHP: # comment

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Chapter 3

Software Requirements Specification

3.1 Software

3.1.1 Browser

Firefox has always been known for its flexibility and support for extensions, but in recent years it had started to lag behind the competition in terms of speed. Firefox Quantum, first released last year, represented a total overhaul of the browser's code base, with speeds now comparable with Google Chrome. That's not just on top-end computers, either – the new Firefox makes frugal use of RAM, even with masses of tabs open.

. Mozilla Firefox



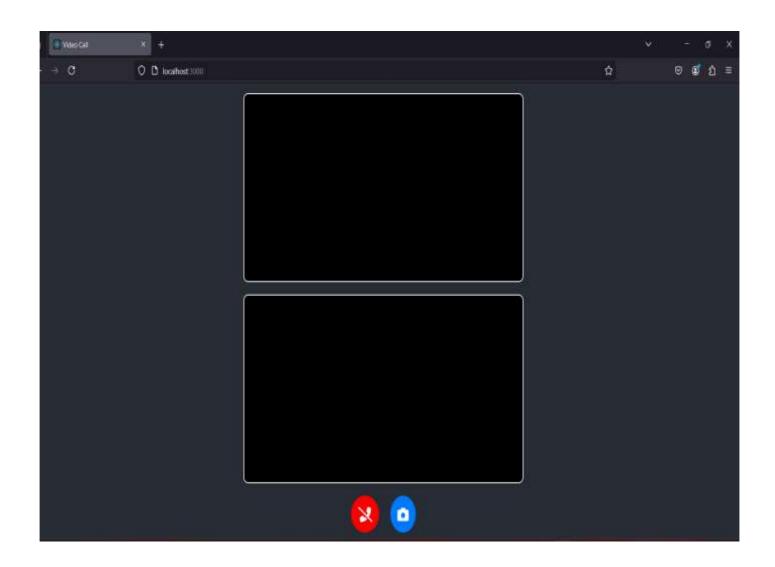
Mozilla Firefox is a free and open-source web browser developed by The Mozilla Foundation and its subsidiary, Mozilla Corporation. Firefox is avail- able for Windows, macOS, Linux, BSD, illumos and Solaris operating systems. Its sibling, Firefox for Android, is also available.

. Google Chrome



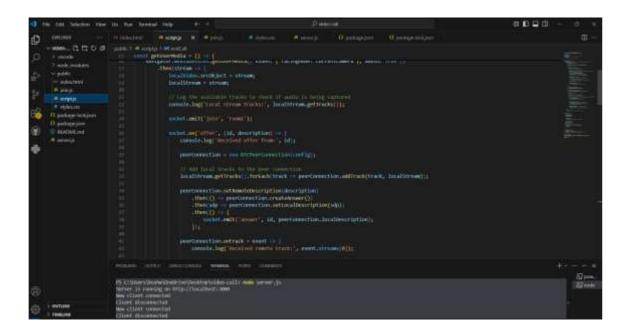
Project Details 4.1 4.1 VIDEO CALL

4.1 VIDEO CALL 4.1a Front-End Design



Chapter 4.1

Source Code



Project Description

Project Title: Video Call Web Application

Overview:

This dynamic web application facilitates real-time video calling between users. The project implements core features like initiating and ending video calls, switching between front and rear cameras, and managing peer-to-peer connections. The system uses modern web technologies like HTML, CSS, JavaScript, and WebRTC for real-time communication, with Node.js, Express.js, and Socket.IO for backend and signaling functionalities.

Application Key Components:

- 1. index.html The main video call interface.
- 2. join.js Facilitates joining a specific video call room.
- 3. script.js Handles WebRTC connections and video call functionalities.
- 4. server.js The backend server managing WebSocket signaling.

Code Explanation

1. index.html (Video Call Interface)

Purpose:

This HTML file provides the user interface for initiating and managing video calls.

Key Features:

Video Elements: Two video elements display the local and remote video streams.

Buttons:

End Call Button – Ends the current video call.

Switch Camera Button – Switches between the front and back cameras.

2.join.js (Room Joining Logic)

Purpose:

This file allows users to join specific video call rooms.

Key Features:

- **Room Selection:** Users can join a room by entering a room ID.
- **Redirection:** Redirects users to the main call page with the selected room

3 Script.js (Video Call Logic)

Purpose:

This file handles WebRTC peer-to-peer video call functionalities, including camera switching and call termination.

Key Features:

- WebRTC Connection: Establishes a peer-to-peer connection using STUN servers.
- Camera Switching: Toggles between front and rear cameras.
- Call Termination: Ends the call and releases media resources.
- Signaling with Socket.IO: Manages communication with the signaling server.

Getting User Media:

Switching Cameras:

```
// Function to switch the camera
const switchCamera = () => {
    // Toggle between front and back camera
    currentCamera = (currentCamera ==== 'user') ? 'environment' : 'user';
    //endCall(); End the current call before switching the camera
    getUserMedia(); // Restart user media with the new camera
};
```

4 Script.js

Purpose:

Manages WebSocket signaling for the video calls and handles room connections.

Key Features:

- Signaling: Handles offer, answer, and candidate events for WebRTC connections.
- Room Management: Manages users joining and leaving rooms.
- Socket, IO Events: Facilitates real-time communication.

Handling New Connections:

```
io.on('connection', socket => {
    console.log('New client connected');

socket.on('join', room => {
    if (!rooms[room]) {
        rooms[room] = [];
}
```

Chapter 4.2

User Management Web Application

▼ 📎 With Service Form X +					-	0	x
← → C ② localhost3000		Ą	À	ជ	ė	0	i
	User Resistration						
	Last Maria						
	Media No: Cinuit						
	Address: Street						
	Chy State						
	Courtey:						
	Login ID Password						
	Sare						

Chapter 4.2

Source Code

```
| December | No. | December | No. | December | December
```

Overview:

It is a dynamic web application that handles the registration and management of users. CRUD (Create, Read, Update, Delete) functionalities have been implemented in this application. A user-friendly interface has been provided for users to add, view, and delete.

The key components of the application are:

- 1. User Registration Form (index.html)
- 2. User Display Page (display.html)
- 3. Backend Server (server.js) which interacts with MongoDB.

This project has been built using modern web technologies like HTML, CSS, JavaScript, jQuery, Node.js, Express.js, and MongoDB.

Code Explanation

1. index.html (User Registration Page)

Purpose: This page provides a form for users to register.

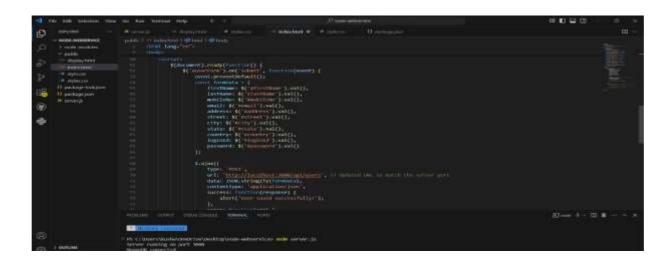
Key Features:

Form Fields: There are form fields to collect user details like:

First Name, Last Name, Email, Mobile No, Address, Login ID, and Password.

Form Submission: When submitting a form using jQuery, the data is sent to the backend API (http://localhost:3000/api/users) through a POST request.

Validation: Required fields ensure that all fields have been filled.



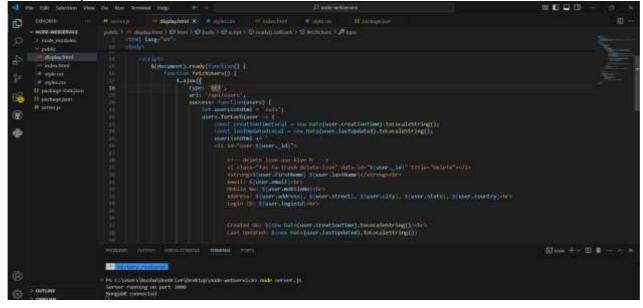
2. display.html (User Display Page)

Purpose: This page is used to list registered users and delete them.

Key Features:

Dynamic User List: Users are fetched from /api/users endpoint using jQuery and AJAX and displayed.

Delete Functionality: Delete icon is given to users to delete. When a delete request is sent, the entry is removed from the user list.



2. server.js (Backend Server)

Purpose: This server-side file saves, fetches, and deletes user data in the MongoDB database.

Key Features:

API Endpoints:

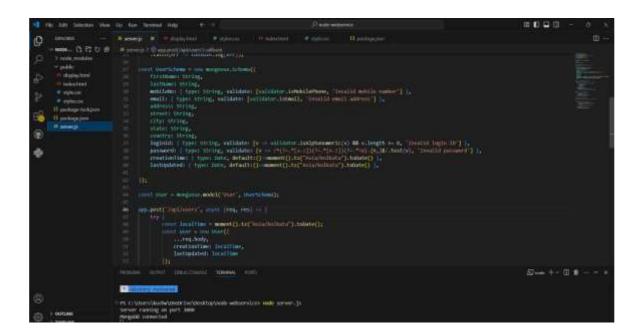
POST /api/users: To register a new user.

GET /api/users: To fetch all users.

DELETE /api/users/:id: To delete specific user.

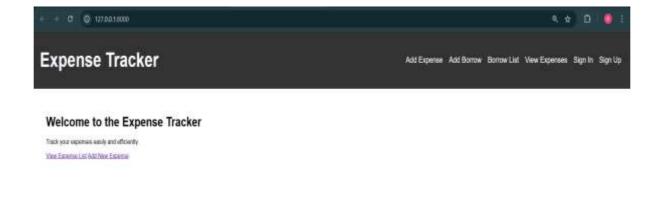
Data Validation: Validation has been applied for Email, Mobile Number, and Password.

Timezone Handling: User creation and update times are stored in Indian Standard Time (IST) format.



Chapter 4.3

Expence Tracker.



CATALOgue Darke Marris survey

