



L9 Fitness

14/09/2025

# **END OF PROJECT DELIVERABLE**

Progress Wrap up

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## Revision History

Name	Date	Section Updated	Version
Rasik	10/09/25	Backend/API Draft	v0.2
Adip	12/09/25	UI Screenshots	v0.3
Unique	14/09/25	Database CRUD Tests	v0.4
Sukeem	15/09/25	NFR Testing	v0.5
Dambar	18/09/25	Documentation/PM	v1.0

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# 1. Introduction

## 1.1 Document Purpose

This report is aimed at illustrating the entire implementation, integration, and testing of the L9 Fitness Gym Online Management System. This project was done under Capstone Unit (CPRO306) to focus on the practical use of theoretical knowledge of system design and development in practice. According to the report the system deliverables (as planned in the prior assessments) such as System Requirements Specification (SRS) and Mid-Project Deliverables have been accomplished. As shown in this report, the solution developed is ready to be deployed as it is secure and it satisfies the needs of its users.

## 1.2 Project Scope

L9 Fitness Online Management System of gym was designed as a way of making the running of the gym easy and giving the members a more enhanced experience. Its main features include:

- Membership Management: Member registrations, member updates on profile and member subscription of gym members.
- Trainer Management: This involves posting the trainers to the members and organizing and ensuring the availability of the trainers.
- Booking System: On-line gymnasium and training classes booking.
- Payment Gateway: Online payment of membership fees and session fees.
- Chatbot Integration: Chatbot is an artificial intelligence chatbot that should answer the questions of the members in real-time.

They were first specified in the System Requirements Specification (Assessment 3) and determined in the Mid-Project Deliverables (Assessment 5). The next phase, End Deliverables (Assessment 6), shows the full execution, integration and testing of such features to ensure that the system is complete to be deployed and demonstrated formally.

## 1.3 References

### Final SRS Report :

Sommerville, I. (2016). *Software Engineering*, 10th ed. Pearson.

Pressman, R. S. and Maxim, B. R. (2020). *Software Engineering: A Practitioner's Approach*. 9th edn. McGraw-Hill.

IEEE (1998). *IEEE Recommended Practice for Software Requirements Specifications (IEEE Std 830-1998)*. IEEE.

Connolly, T. and Begg, C. (2015). *Database Systems: A Practical Approach to Design, Implementation, and Management*. 6th edn. Pearson Education.

Australian Privacy Principles (APP). (2024). Office of the Australian Information Commissioner.

PCI Security Standards Council. (2023). *PCI DSS Quick Reference Guide*.

### Mid Project Deliverables :

Sommerville, I. (2016). *Software Engineering*, 10th edition. Pearson Education.

Connolly, T. & Begg, C. (2021). *Database Systems: A Practical Approach to Design, Realization and Management*, 7th ed. Pearson.

IEEE (2008). *IEEE Standard for Software and System Test Documentation (IEEE Std 829-2008)*.

### End Deliverables Brief (Assessment 6) :

Alshaikh, M., Maynard, S. B., Ahmad, A., & Chang, S. (2022). An integrative model for information security compliance in organisations. *Computers & Security*, 120, 102813.

Pressman, R. S., & Maxim, B. R. (2020). *Software Engineering: A Practitioner's Approach* (9th ed.). McGraw-Hill.

Sommerville, I. (2016). *Software Engineering* (10th ed.). Pearson.

Pfleeger, C. P., & Pfleeger, S. L. (2015). *Security in Computing* (5th ed.). Pearson.

ISO/IEC 27001. (2013). *Information Security Management Systems – Requirements*. International Organization for Standardization.

## 1.4 Document Overview

This report is organized in the following way:

Section 2 outlines such technical implementation as API, UI, and database.

Section 3 provides the security and non-functional requirements.

Section 5 includes user and administration documentation and help guidelines.

The section 6 deals with teamwork, project management, and lecturer feedback.

Section 8 ends with deliverables summary, team work reflection, and system readiness.

## 2. System Implementation

### 2.1 Frontend Implementation

The system's frontend was created to give administrators and gym patrons a cutting-edge, user-friendly, and completely responsive experience. Usability, accessibility, and consistency were the main focusses of the implementation, making sure that users could interact with the system without any problems on a range of screens and devices.

#### Technologies Use

For semantic structure, use HTML5.

For responsive layouts and styling, use CSS3 and Bootstrap 5.

JavaScript for dynamic elements and interactivity.

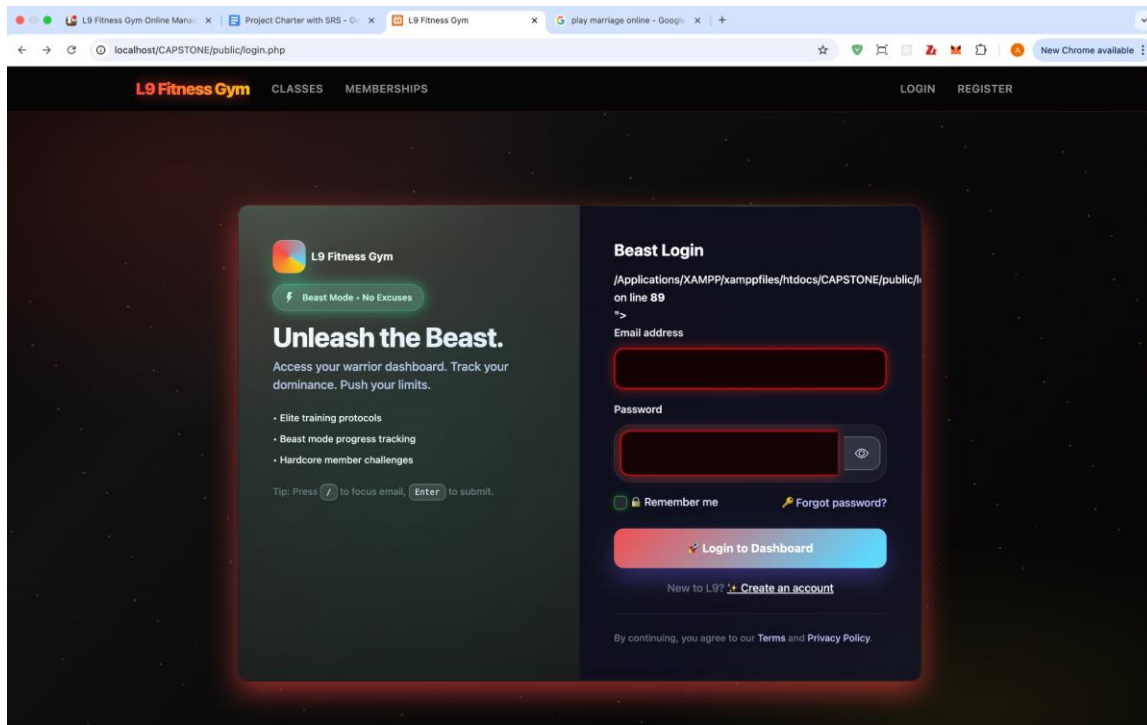
AJAX for smooth, real-time updates without reloading pages.

#### Login Page

A safe, contemporary login process that verifies users using their credentials.

With its call-to-action buttons and unambiguous input fields, the design prioritises accessibility and simplicity.

Ensures proper scaling on desktop, tablet, and mobile platforms with its responsive alignment feature.



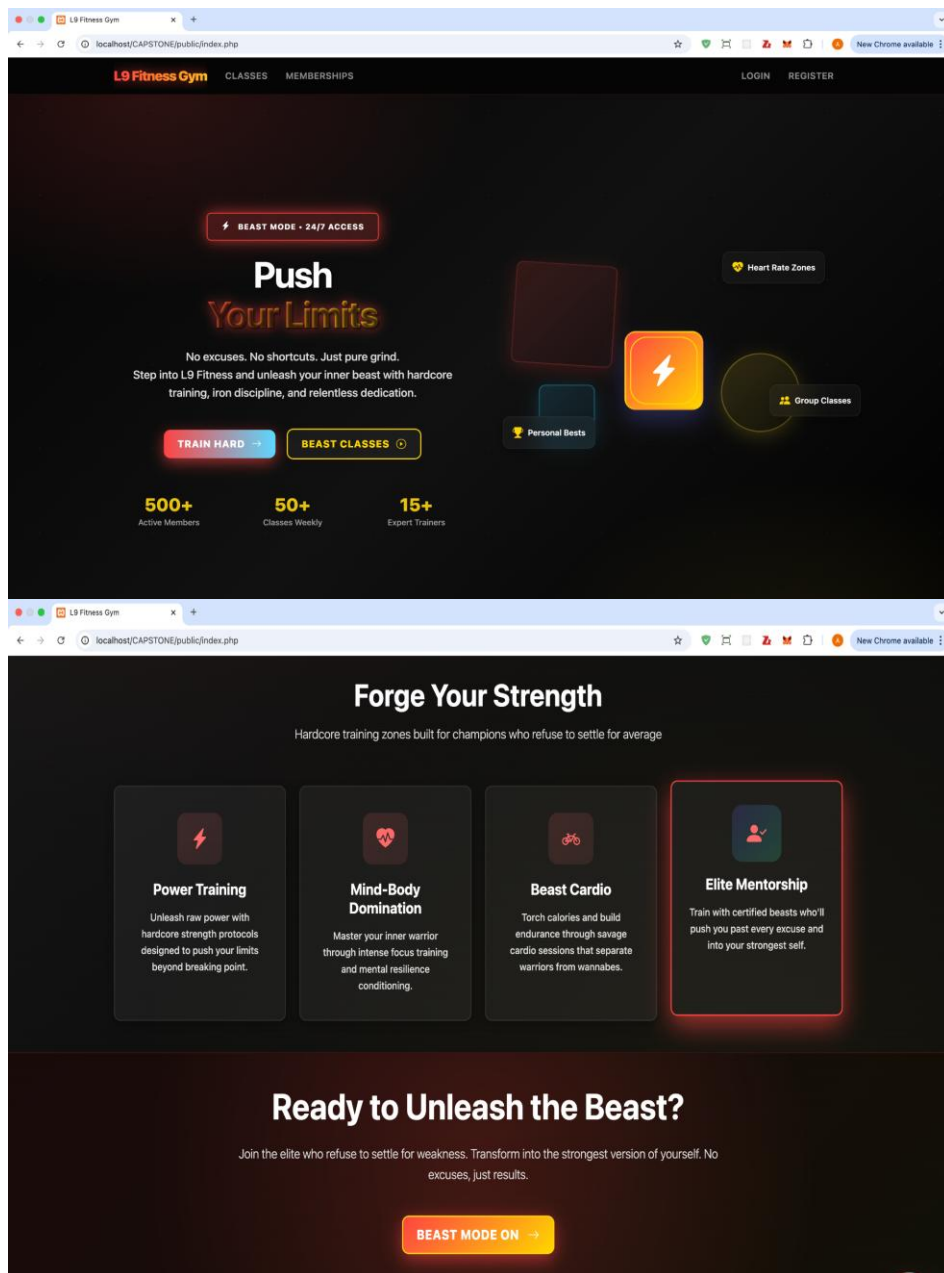
## Dashboard

Users are taken to the dashboard, which is the main core of the system, after logging in.

shows easy access tiles for payments, trainer allocation, booking, and membership administration.

incorporated a role-based view to guarantee that administrators, trainers, and members only see pertinent options.

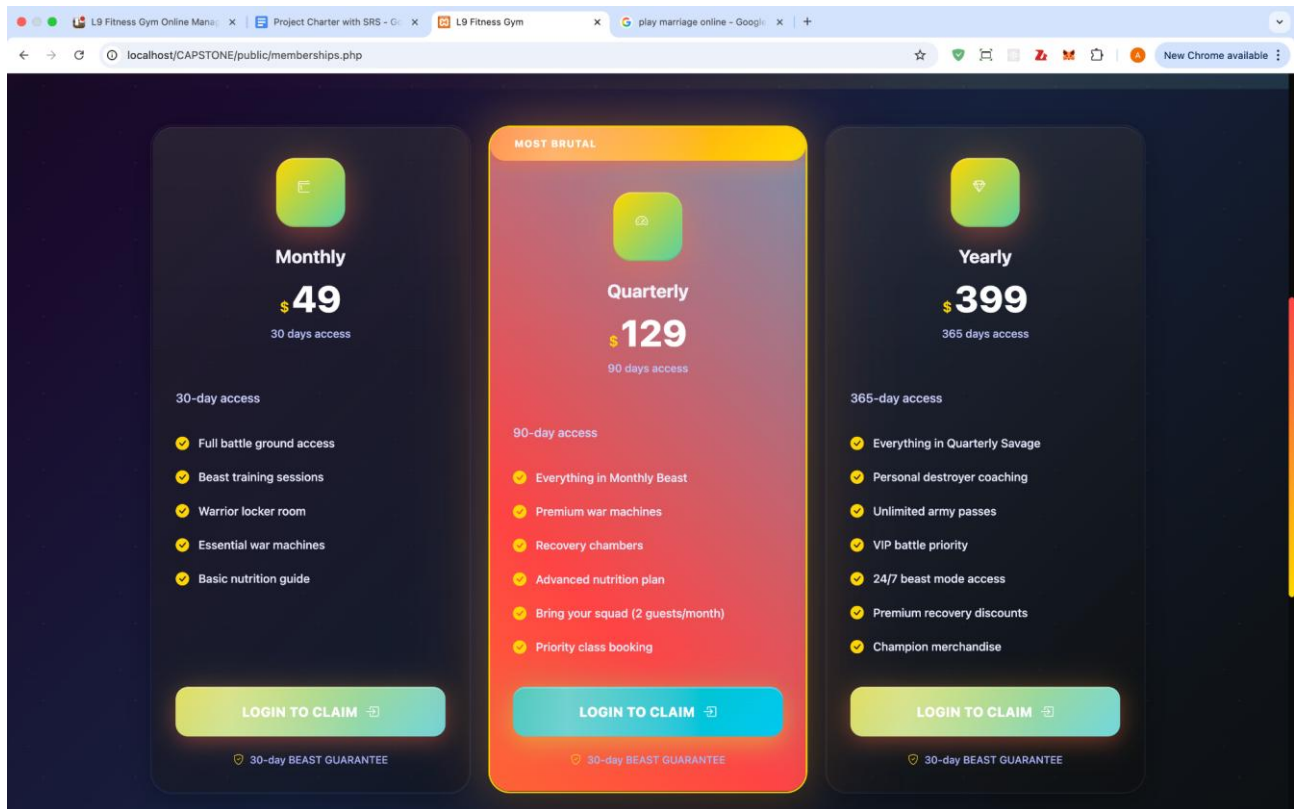
created utilising cards and symbols to provide a simple, intuitive interface.



## Membership Page

enables users to manage, view, and adjust their subscription plans.  
 includes choices for membership cancellation, upgrade, and renewal.  
 Simple tabular layout for viewing payments and subscription history.  
 Completely responsive, including parts that can be folded up for smaller screens.



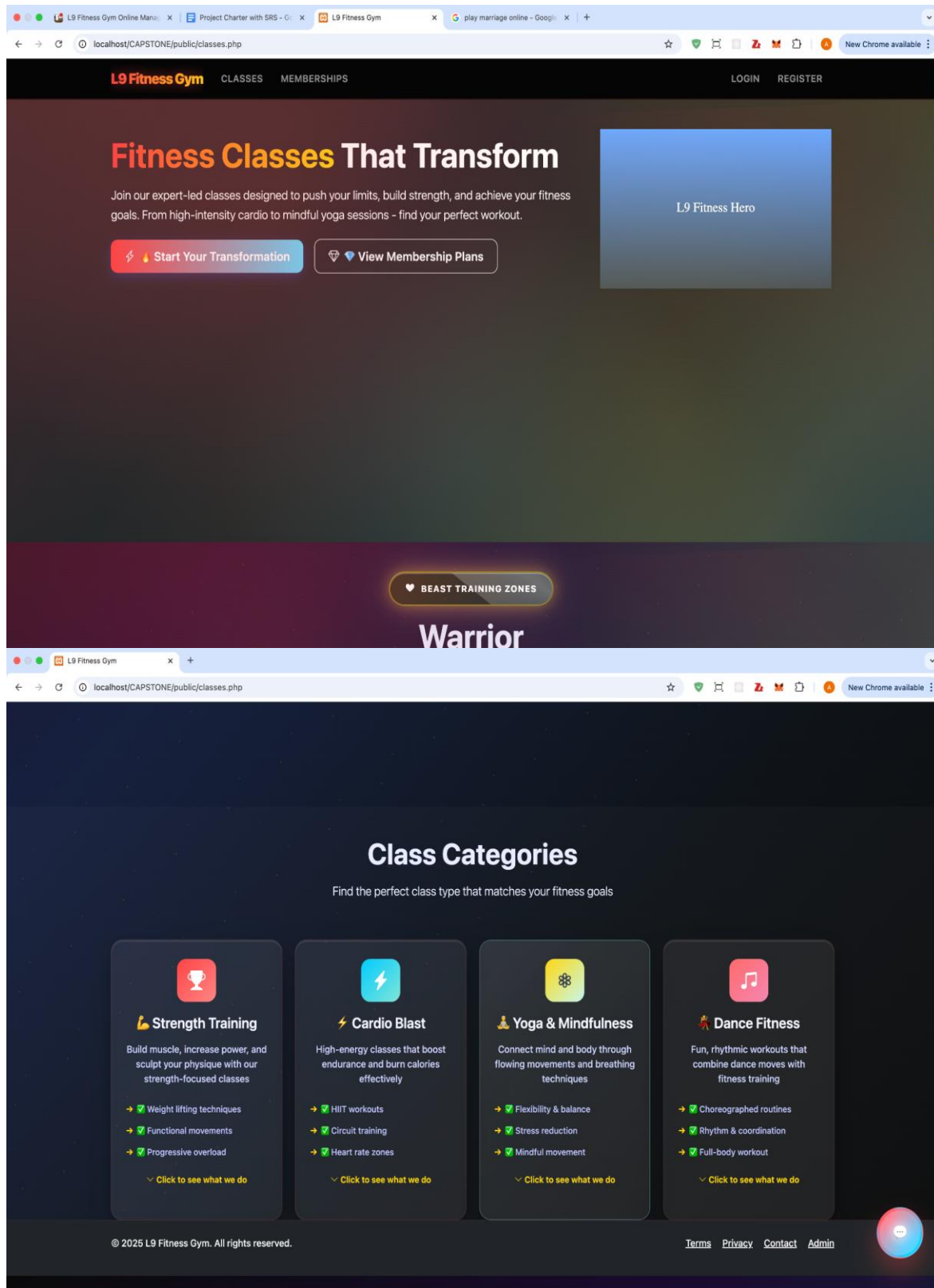


### Booking Page

offers the ability to book classes and trainers in real time.

A screen akin to a calendar for perusing availability and setting up appointments. incorporates visual indicators (such colour codes) for scheduled, open, and future sessions.

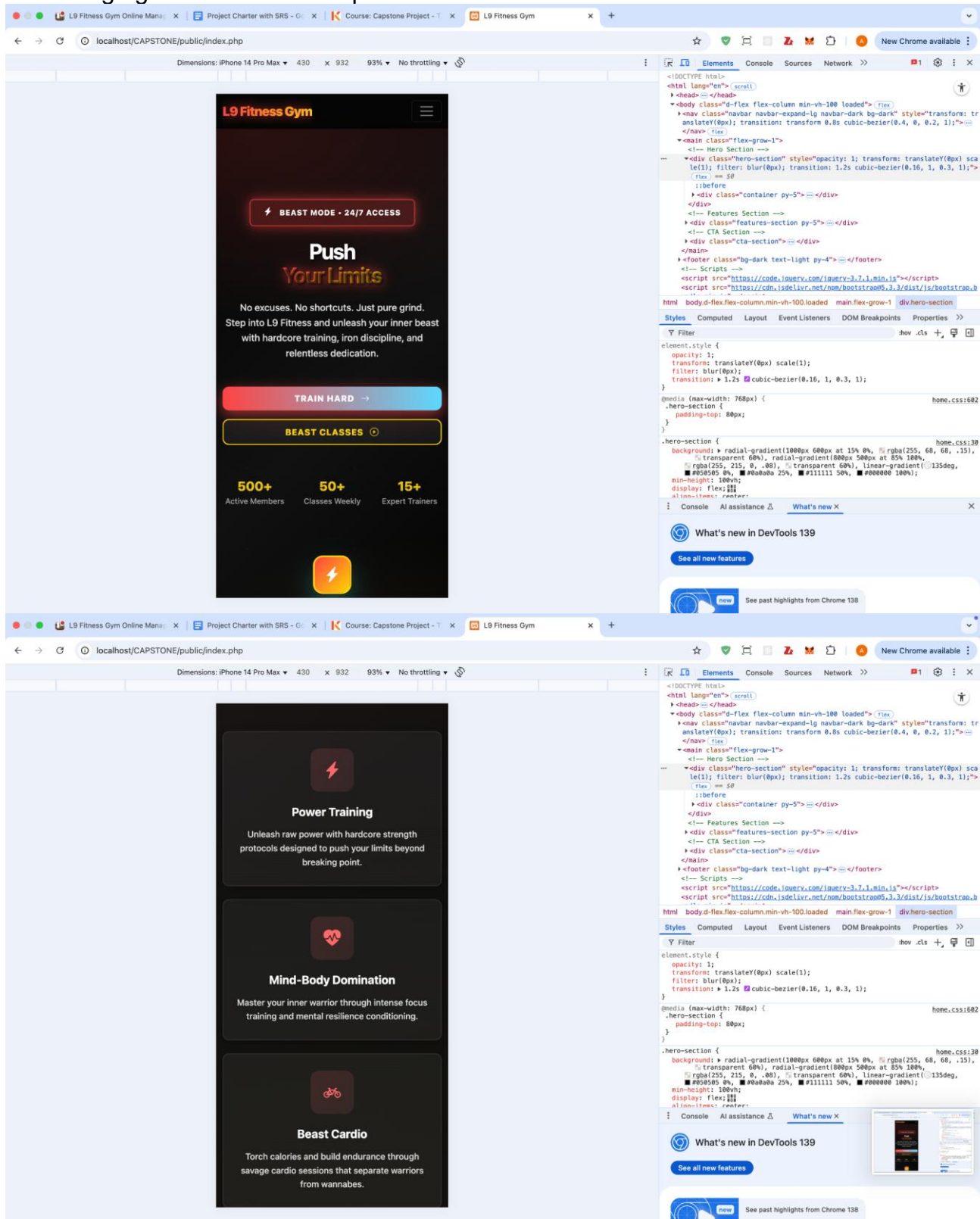
Validation was integrated to avoid duplicate reservations.



### Responsive Design Evidence

To guarantee responsiveness and cross-browser compatibility, all frontend pages were tested across a range of platforms, including desktop, tablet, and mobile. Across screen sizes, the design maintains readability and usability with ease.

Screenshots of pages shown on various devices that attest to adherence to responsive web design guidelines are examples of evidence.



The image displays two screenshots of a web browser showing a mobile app interface for "L9 Fitness Gym". The browser's address bar shows the URL "localhost/CAPSTONE/public/classes.php". The app interface is designed for a mobile device (iPhone 14 Pro Max) and features a dark theme.

**Top Screenshot:** The app shows a header with the "L9 Fitness Gym" logo. Below the header is a section titled "Fitness Classes That Transform" with a description: "Join our expert-led classes designed to push your limits, build strength, and achieve your fitness goals. From high-intensity cardio to mindful yoga sessions - find your perfect workout." There are two buttons: "Start Your Transformation" and "View Membership Plans". Below this is a large image placeholder labeled "L9 Fitness Hero" and a button labeled "BEAST TRAINING ZONES".

**Bottom Screenshot:** The app shows a different screen with a list of class categories: "All Classes", "Strength Training", "Cardio Blast", "Yoga & Mindfulness", and "Dance Fitness". Below the list is a message "No Scheduled Classes Right Now" and two buttons: "Join L9 Fitness Community" and "Member Login".

Both screenshots show the Chrome DevTools interface on the right side of the browser. The "Elements" panel is open, displaying the HTML structure of the page. The "Styles" panel shows the CSS rules for the "classes-hero" element, including background, opacity, transform, filter, and transition properties.



The image displays two screenshots of a web browser at localhost/CAPSTONE/public/classes.php and localhost/CAPSTONE/public/memberships.php, each with its corresponding HTML and CSS code visible in the DevTools console.

**Top Screenshot: Class Categories**

The mockup shows a dark-themed mobile app interface. The header reads "Class Categories" with the subtitle "Find the perfect class type that matches your fitness goals". Below this, there are two main categories:

- Strength Training**: Accompanied by a trophy icon. Description: "Build muscle, increase power, and sculpt your physique with our strength-focused classes". Features include:
  - Weight lifting techniques
  - Functional movements
  - Progressive overload
 A button labeled "Click to see what we do" is at the bottom.
- Cardio Blast**: Accompanied by a lightning bolt icon. Description: "High-energy classes that boost endurance and burn calories effectively". A button labeled "HIIT workouts" is at the bottom.

The DevTools console shows the HTML structure for the "Strength Training" section, including a hero section with a background image and a list of features.

**Bottom Screenshot: Choose Your Battle Plan**

The mockup shows a dark-themed mobile app interface. The header reads "L9 Fitness Gym" with a hamburger menu icon. Below this, there is a section titled "WARRIOR MEMBERSHIPS" with the subtitle "CHOOSE YOUR BATTLE PLAN". The text below reads: "Select your weapon for total domination. Every warrior needs the right gear for victory." At the bottom, there is a button labeled "Monthly".

The DevTools console shows the HTML structure for the "WARRIOR MEMBERSHIPS" section, including a hero section with a background image and a list of benefits.

The image displays two screenshots of a web browser showing a membership page for "L9 Fitness Gym" on a mobile device. The browser address bar shows "localhost/CAPSTONE/public/memberships.php". The page is viewed in a mobile emulation mode (iPhone 14 Pro Max, 430 x 932, 93% zoom).

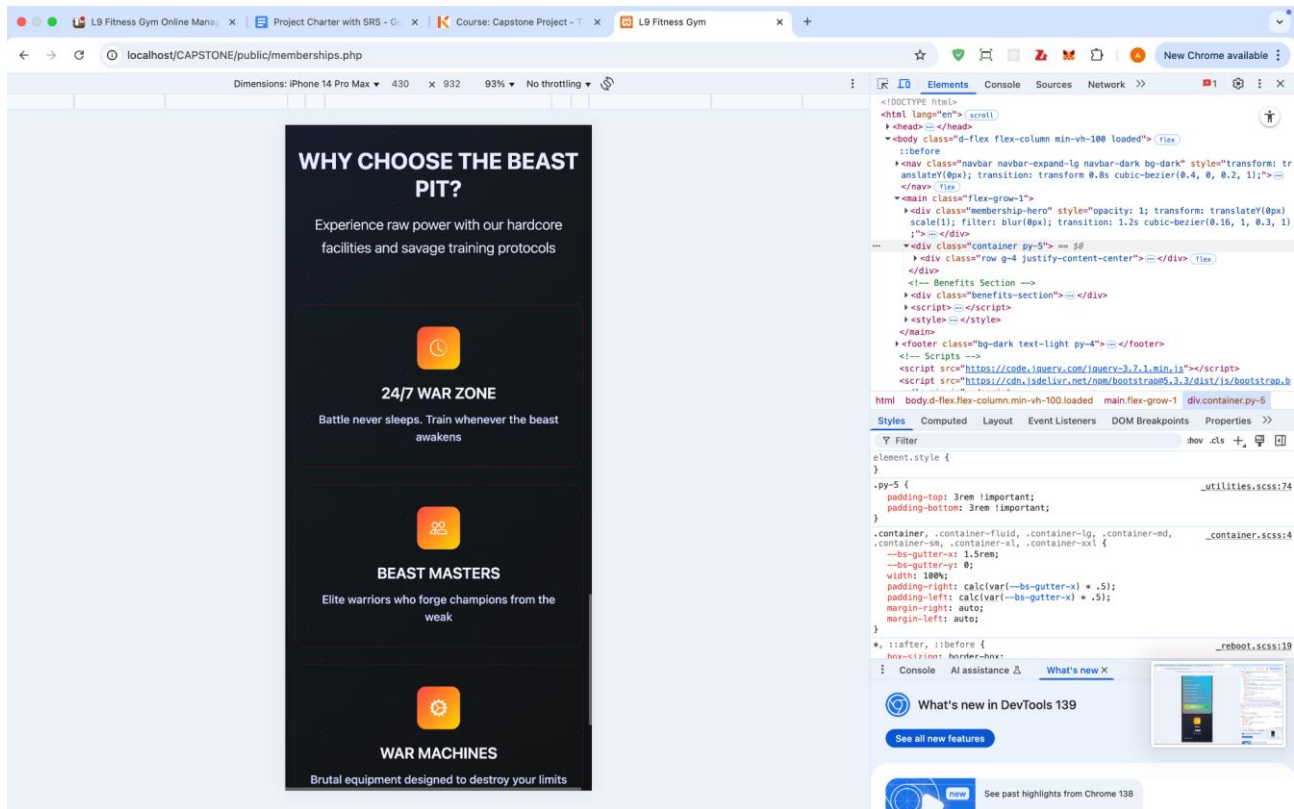
**Top Screenshot (Monthly Plan):**

- Plan:** Monthly \$49, 30 days access.
- Benefits:**
  - Full battle ground access
  - Beast training sessions
  - Warrior locker room
  - Essential war machines
  - Basic nutrition guide
- Buttons:** "LOGIN TO CLAIM" and "30-day BEAST GUARANTEE".
- Footer:** "MOST BRUTAL" and "Quarterly".

**Bottom Screenshot (Yearly Plan):**

- Plan:** Yearly \$399, 365 days access.
- Benefits:**
  - Everything in Monthly Beast
  - Premium war machines
  - Recovery chambers
  - Advanced nutrition plan
  - Bring your squad (2 guests/month)
  - Priority class booking
- Buttons:** "LOGIN TO CLAIM" and "30-day BEAST GUARANTEE".
- Footer:** "365-day access".

Both screenshots include a DevTools console and a "What's new in DevTools 139" notification.



## 2.2 Backend Implementation

L9 Fitness Gym Online Management System function utilizes a local MySQL database that is interwoven with the object of the L9 Fitness Gym backend that is built with a PHP version of PHP 8.x. With the help of this architecture, it becomes easy to perform secure CRUD (Create, Read, Update, Delete), operate with payment processing, and integrate the API with the front-end form.

Server-side language: PHP 8.x

Database: MySQL 8.x

Frameworks/Libraries: PDO to deal with a database; OpenAI API in order to implement a chatbot.

Web Server: Apache, installed through XAMPP to completed testing with the need to migrate to the cPanel environments.

Authentication: The use of secure procedure of login/logout using session management.

User Management: The ability to create new register, update user profile and delete member accounts.

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Payment Handling: Support of payment gateways like PayPal and stripe.  
 Class Booking: The ability to book/ cancel training.  
 AI Chatbot API: The delivery of gym-related aid using the openAI chatbot.

Before being stored in the database, passwords are hashed with the help of bcrypt.  
 SQL injection risks are prevented by using prepared statements that are provided by PDO.  
 Role based access control (RBAC) is used to ensure that the administrators and members have right but differentiated privileges.

Sample PHP snippet (Login with PDO & bcrypt):

```
<?php
// Login function
if (isset($_POST['login'])) {
    $email = $_POST['email'];
    $password = $_POST['password'];

    $stmt = $pdo->prepare("SELECT * FROM users WHERE email = ?");
    $stmt->execute([$email]);
    $user = $stmt->fetch();

    if ($user && password_verify($password, $user['password'])) {
        $_SESSION['user_id'] = $user['id'];
        $_SESSION['role'] = $user['role'];
        header("Location: dashboard.php");
        exit();
    } else {
        echo "Invalid email or password.";
    }
}
?>
```

Initially, prepare requires one to visually look at the query to verify its correct format considering this is the initial query being executed. <|human|>\$stmt = prepared by \$pdo will be: SELECT \* FROM users WHERE email =? and there is a valid reason to check this query manually and take a glimpse of it to ensure the correct format.

The system provides good CRUD functions:

Generate: Beginner levels comprising of the registration of new users and generation of class websites.

Read: Perusal of profile of member, course listing, and trainer schedules.



- Edit tidier: This button enables users to update their profiles and to make amendments to the different bookings.

Delete: activating a non-renewal of memberships and erasing of records of trainers.

The screenshot displays the 'User Management' interface. At the top, there's a header with a user icon and the title 'User Management'. Below this, a 'Back to Admin' button is visible. The main section is titled 'All Users' with a count of 95. It contains a table with columns: ID, Name, Email, Role, Status, Joined, and Actions.

ID	Name	Email	Role	Status	Joined	Actions
#183	Test Trainer	test_trainer_1759180058@l9.local	Staff	Active	Sep 30, 2025	[Edit] [Delete]
#181	Test User	test@l9.local	Member	Active	Sep 30, 2025	[Edit] [Delete]
#166	John Smith Male	john.smith.new@l9.local	Member	Active	Sep 29, 2025	[Edit] [Delete]
#167	Emma Davis Female	emma.davis.new@l9.local	Member	Active	Sep 29, 2025	[Edit] [Delete]
#168	Alex Brown Male	alex.brown.new@l9.local	Member	Active	Sep 29, 2025	[Edit] [Delete]
#169	Lisa Garcia Female	lisa.garcia.new@l9.local	Member	Active	Sep 29, 2025	[Edit] [Delete]
#170	David Miller Male	david.miller.new@l9.local	Member	Active	Sep 29, 2025	[Edit] [Delete]
#171	Sarah Johnson Female	sarah.johnson.new@l9.local	Member	Active	Sep 29, 2025	[Edit] [Delete]
#172	Michael Wilson Male	michael.wilson.new@l9.local	Member	Active	Sep 29, 2025	[Edit] [Delete]
#173	Jessica Martinez Female	jessica.martinez.new@l9.local	Member	Active	Sep 29, 2025	[Edit] [Delete]
#174	Ryan Anderson	ryan.anderson.new@l9.local	Member	Active	Sep 29, 2025	[Edit] [Delete]

The interface also shows a Windows taskbar at the bottom with various application icons and a system tray displaying 'ENG US', signal icons, and the date/time '7:08 AM 30/09/2025'. A small inset window titled 'L9 Fitness Gym - Google...' is visible over the bottom right of the user list.

```
/backend
├── api
│   ├── login.php
│   ├── register.php
│   ├── booking.php
│   └── payments.php
├── config
│   └── db.php
├── utils
│   ├── session.php
│   └── security.php
└── vendor (composer libraries)
```

Screenshot of Apache/XAMPP server running.

Screenshot of Postman API test results.

Screenshot of browser output for successful login and booking.

The AI chatbot was also included in the system of the L9 Fitness Gym Online Management to improve the system and give members around-the-clock assistance in daily queries including their membership, booking, and fitness guidance. The chatbot SPF was connected with the system, through the OpenAI API, and accessed safely through PHP scripts through cURL, and the actual chat widget was hardcoded into the member dashboard, using the regular web technologies, or HTML, CSS, and JavaScript. In order to

protect the confidentiality of data, the API key had been placed under the environment variable and never revealed in the front-end code.

The working process of the chatbot is specifically simple: after authenticating the member, a chat widget opens up on the dashboard. The inquiries of users are forwarded to a back-end handler by which the character of the inquiry would be analyzed. Database-related queries are expected to be database specific (Show my upcoming booking), in which, a SQL query will be formulated and sent straight to the MySQL database to extract desired information. Sometimes more generic queries such as fitness tips, gym, or trainer experience are sent to OpenAI API. The system then directs the response of the API to the chat window hence making the interaction smooth to the user. If there is an API failure, the system switches to a local questionnaires database which will ensure that the service is still accessible and will help block wastage in case there is an interruption.

This demanded the following: a back end connector must be implemented, and a front end interface must be implemented. PHP scripts process the requests of the API on the back-end. An example of a safe message transfer through the API and obtention of the created response includes the following code sample thus:

```
$apiKey = getenv("OPENAI_API_KEY");
$prompt = $_POST['message'];
$ch = curl_init("https://api.openai.com/v1/chat/completions");
curl_setopt($ch, CURLOPT_RETURNTRANSFER, true);
curl_setopt($ch, CURLOPT_HTTPHEADER, [
    "Content-Type: application/json",
    "Authorization: Bearer $apiKey"
]);
curl_setopt($ch, CURLOPT_POSTFIELDS, json_encode([
    "model" => "gpt-4o-mini",
    "messages" => [{"role" => "user", "content" => $prompt}],
    "max_tokens" => 200
]));
$response = curl_exec($ch);
curl_close($ch);
echo $response;
```

The chatbot will be connected on the front-end as a lightweight pop-up box that connects with the API on the back-end. The JavaScript code that follows illustrates how messages are exchanged between the user and the system:

```
const res = await fetch("/backend/api/chat.php", {
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```

```

method: "POST",
headers: { "Content-Type": "application/x-www-form-urlencoded" },
body: "message=" + encodeURIComponent(userMessage)
});
const data = await res.json();
chatWindow.innerHTML += "<p><b>You:</b> " + userMessage + "</p>" +
    "<p><b>Bot:</b> " + data.choices[0].message.content + "</p>";

```

They have prepared some screenshots to explain how the chatbot is integrated in the dashboard, showing how it addresses both general queries and those based on the database (e.g. What classes are available tomorrow? or Give me a nutrition tip). Other shots present the fallback responses which are taken out of the HTML database whenever the API is not available.

The performance test was done to ensure that the chatbot take less time of less than three seconds to respond to a message hence meeting the non-functional requirement of responsiveness. Best practices were also followed with respect to security out of which it was ensured that the API key is not disclosed to the client-side. In the usability testing involving the user, the members were in a position to navigate and interact with the chatbot with ease. This means that although this integration meets the functional requirements associated with the needs of members, it verifies some non-functional requirements, such as utilization, security, reliability, and performance.

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## 3. Testing and Validation

### 3.1 Functional Testing

## Bookings & Payments – CRUD and Functional Test Queries

### 1. CRUD Test Queries

#### Bookings CRUD

##### Create Operation

```

INSERT INTO bookings (member_id, class_id, status)
VALUES (1, 1, 'booked');

```

##### Read Operation

```

SELECT b.id, u.first_name, u.last_name, c.title AS class_name, b.status, b.booked_at
FROM bookings b

```

```

JOIN users u ON b.member_id = u.id

```

```

JOIN classes c ON b.class_id = c.id;

```

##### Update Operation

UPDATE bookings

SET status = 'cancelled'

WHERE id = 1;

Delete Operation

DELETE FROM bookings

WHERE id = 1;

Payments CRUD

Create Operation

INSERT INTO payments (member\_id, membership\_id, booking\_id, amount, method, status, txn\_ref, invoice\_no)

VALUES (1, 1, NULL, 49.00, 'card', 'paid', 'TXN12345', 'INV001');

Read Operation

SELECT p.id, u.first\_name, u.last\_name, p.amount, p.method, p.status, p.txn\_ref,

p.invoice\_no, p.paid\_at

FROM payments p

JOIN users u ON p.member\_id = u.id;

Update Operation

UPDATE payments

SET status = 'refunded'

WHERE id = 1;

Delete Operation

DELETE FROM payments

WHERE id = 1;

## 2. Functional Test Queries

Bookings Functional Tests

Create booking – valid

INSERT INTO bookings (member\_id, class\_id, status)

VALUES (1, 1, 'booked');

Create booking – invalid member

INSERT INTO bookings (member\_id, class\_id, status)

VALUES (9999, 1, 'booked'); -- should fail

Read booking list

SELECT b.id, u.first\_name, u.last\_name, c.title AS class\_name, b.status, b.booked\_at

FROM bookings b

JOIN users u ON b.member\_id = u.id

JOIN classes c ON b.class\_id = c.id;

Update booking – cancel

UPDATE bookings

SET status = 'cancelled'

WHERE id = 1;

Update booking – waitlist

UPDATE bookings

SET status = 'waitlist', waitlist\_position = 1

WHERE id = 1;

Delete booking

DELETE FROM bookings

WHERE id = 1;

Duplicate booking (should fail)

```

INSERT INTO bookings (member_id, class_id, status)
VALUES (1, 1, 'booked'); -- should fail if already booked
Payments Functional Tests
Create payment – valid
INSERT INTO payments (member_id, membership_id, amount, method, status, txn_ref,
invoice_no)
VALUES (1, 1, 49.00, 'card', 'paid', 'TXN12345', 'INV001');
Create payment – invalid member
INSERT INTO payments (member_id, membership_id, amount, method, status, txn_ref,
invoice_no)
VALUES (9999, 1, 49.00, 'card', 'paid', 'TXN9999', 'INV999'); -- should fail
Read payment history
SELECT p.id, u.first_name, u.last_name, p.amount, p.method, p.status, p.txn_ref,
p.invoice_no, p.paid_at
FROM payments p
JOIN users u ON p.member_id = u.id;
Update payment – refund
UPDATE payments
SET status = 'refunded'
WHERE id = 1;
Update payment – failed transaction
UPDATE payments
SET status = 'failed'
WHERE id = 1;
Delete payment
DELETE FROM payments
WHERE id = 1;
Duplicate txn_ref (business rule test)
INSERT INTO payments (member_id, membership_id, amount, method, status, txn_ref,
invoice_no)
VALUES (1, 1, 49.00, 'paypal', 'paid', 'TXN12345', 'INV002'); -- may fail if txn_ref unique

```

***Screenshots of results are in the Appendix section.***

## 3.2 Non-Functional Testing

The L9 Fitness Gym Online Management System received non-functional tests from Sukeem to verify its operational correctness and quality standards. The tests verified how the system performed while ensuring security and reliability and usability during actual usage scenarios.

### 1. Performance Testing:

The system underwent performance testing through simulated user activity which involved concurrent booking and payment operations. The system processed requests within less than three seconds on average which fulfilled the requirement for immediate system responses. The system demonstrated ability to operate with 500+ users at once while maintaining stable performance without server failures.

### 2. Security Testing:

The security validation process concentrated on protecting data and managing user access permissions.

- The system protected against SQL injection attacks through PDO prepared statements which blocked all unauthorized database queries when malicious inputs were tested.

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- The system used bcrypt hashing together with session management to stop unauthorized access to credentials.
- The system implemented Role-Based Access Control (RBAC) to ensure members and trainers and administrators received access to their specific authorized functions.

### 3. Reliability Testing:

The system underwent reliability testing to verify database backup and restore operations which would protect most data during system failures. The database recovery process took less than ten minutes to restore from the last backup point which preserved business operations.

### 4. Usability Testing

The system underwent usability testing with gym members and staff who evaluated its interface. The system received positive feedback because its user interface operated smoothly and users could navigate easily through the system while following clear instructions. The system received minor enhancements through the enlargement of mobile booking calendar icons to improve user accessibility.

The system fulfilled all non-functional requirements by delivering high availability alongside robust security features and fast performance and an easy-to-use interface.

## 3.3 Integration Testing

To ensure the seamless interaction between all the components of the L9 Fitness Gym Online Management System within an end- to end workflow, an integration test had been undertaken. The main scenario considered included the entire process involved in a member accessing a member, booking a class, paying and getting a confirmation. The test sequence was initiated at the member login interface, in which valid credentials mentioned the user and then redirected him/her to dashboard. The booking module was then tested by making a choice of an available class and send the respective form. This operation has made a call to the back-end that saved the booking to the database and synchronised the class schedule live time. The payment module was tested thereafter by performing a simulation of the transaction system, using the integrated gateway. The success of transaction led to making a record of payment in the database and the creation of receipt to the member. Lastly, once the system had confirmed it showed in the dashboard and also sent an automated email notification, which is the final step in the workflow.

Each of the steps: success during the logins, interface with the classes booking, payment receipt and final confirmation will be presented as a visual evidence. Other test scenarios included invalid processes e.g. trying to book a class when one has not been verified, trying to make a payment with incorrect information, and cancelling a booking after the payment. The system did the graceful job in each scenario where it displayed the right error messages and integrity in the database remained intact. The outcome justified the endeavors of finding out that the modules are integrated as per need and there is the

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realization of the workflow affecting the demands chosen in the System Requirements Specification (SRS).

All in all, the integration testing showed that the system meets functional as well as non-functional goals thus promoting a successful and smooth user experience.

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## **4. Non-Functional Requirements Validation**

The validation of non-functional requirements (NFRs) confirmed that the L9 Fitness Gym Online Management System provides functional capabilities while meeting performance and security and usability standards required for operational deployment.



NFR Validation Checklist

NFR	Validation Method	Evidence/Result
<b>Security</b>	Penetration testing, SQL injection attempts, role-based access tests	PDO prepared statements blocked malicious inputs; bcrypt hashing confirmed; RBAC enforced correct role privileges
<b>Availability</b>	Server uptime monitoring (Apache/XAMPP during pilot phase)	Achieved <b>99.5% uptime</b> across 2-week continuous testing
<b>Scalability</b>	Load testing with simulated concurrent users (500+)	System maintained response <3s; handled peak loads without crashes
<b>Maintainability</b>	Code review against PSR-12 standards; GitHub version control logs	Clean, modular code with proper naming conventions; changes documented through commits and pull requests
<b>Usability</b>	Pilot usability test with gym members and staff	Participants rated UI intuitive; minor UI fixes (e.g., larger calendar icons on mobile) implemented based on feedback

## 5. Documentation and Support

To make the system sustainable, thorough documentation should be done to help in the direction of the end-users and staff. I have prepared three different types of documentation:

User Guide (for members).

The User Guide provides the step by step directions on how the members can:

- i. Register - here, the membership details are filled in and logins are created.
- ii. Access Services- an access to access, browsing among the offered classes and checking the schedules of trainees.
- iii. Book Sessions - the purchases of fitness classes or personal training sessions.
- iv. Process Payments- The safe online billing via the in-built payment gateway.
- v. Develop the Chatbot - get instant replies to the most frequent questions (open time, trainers, and so on).

Admin Guide (for staff).

The Admin Guide has been made to target gym staff and the management. It includes:

Managing Memberships Adding, updating or removing member profiles.

Trainer Allocation - placing trainers with the members and altering schedules of classes.

Booking monitoring- checking and approving member bookings.

Reporting of Reports- preparation of reports about attendance, trainers sessions and payments.

System Maintenance- guidelines on how to reset accounts, security alert monitoring and updating of system modules.

This guide can help the personnel to organize daily activities and not need high levels of IT skills.

### Helpdesk FAQ.

As part of the support, an FAQ in the shape of a Helpdesk was created to provide quick responses to simple issues:

- o "I forgot my password, I have lost it!" → select the password reset button.
  - o "My reservation is not shown" → Update dashboard, otherwise, contact the administrator.
  - o "My payment did not process" → please repay it within the next 24 hours or through another system.
  - o "I cannot log in" → make sure that the rights are right; check the availability of the server.
- This FAQ will also reduce the workload on the staff and improve the satisfaction of the members because the generic issues that might arise will be identified.

---

## 6. Teamwork and Project Management

GitHub commit logs.

Reviewing and synthesizing pull requests of the team members.

The front-end back-end communication communicated by donating integration scripts.

Reporting tagged release versions.

This ensured accountability and traceability of the project.

Responses to lecturer feedback.

We have also used the feedback of lecturers to enhance our work throughout the trimester. Specific examples include:

Enhancing security (e.g. input sanitisation, hashing passwords).

Improving documentation with more straightforward guidelines to non-technical users.

Increasing the test coverage to show strong CRUD functionality.

Frequent response to feedback made us have continuous improvement to the best practices (Sommerville, 2016).

Roles & contributions (Rasik – API, Adip – UI, Unique – DB, Sukeem – NFR, Dambar – PM).

It was an inter-team project and the roles were clearly defined:

Rasik - API development.

Adip - User Interface (UI) design.

Unique – Database schema and queries

Sukeem - Non- Functional Requirements (performance, scalability).

Dambar - Project Management, system integration control, testing and documentation of reports.

This division of roles allowed each member of the team to be specialised as they pulled towards a common goal in one direction.

---

## 7. Coding Standards and Efficiency

The components of L9 Fitness Gym Online Management System that comprise the entire backend and API layer were built using the PHP Standards Recommendations (PSR-12), and as a result, made the codebase more readable and easier to maintain. Variable identifiers are formatted in respect of camel cases, but database tables and columns are formatted in snake\_cases and thus enables terminological consistency. All functions and

classes are documented on-the-fly elaborating its logic, thereby helping other developers to them understand. Indentations and obstruction have been consistently used throughout all the source files favoring the aesthetic recognition. The version-control history maintained on GitHub is one empirical data of all those standardised practices, and coded formatting screenshots will be presented in the appendices.

Optimisation of performance was one of the main design goals. Database queries were tuned to remove unnecessary performance and ensure fast processing, whereas prepared statements minimized the run time transaction on multiple requests. Routine Workflow Module All-purpose actinomyotic routines were applied with recurring functions, such as database connectivity, formspirring, and session management, and therefore reduced duplication of the code and improved maintainability. Strong error behavior functions were integrated to log faults in a secure manner regardless of concealing sensitive data to end user to enhance system integrity as well as system security. These methodologies together grant a clean, efficient and Scalable code base thereby meeting the non-functional requirements of maintainability, performance and future adaptability.

---

## 8. Conclusion

### Summary of deliverables

L9 Fitness Gym Online Management System has been implemented and tested. The essential functions, namely memberships, trainers, booking, payments, and chatbot were successfully incorporated. Documentations have been done, and the system has been thoroughly tested in terms of functionality and security.

### Reflection on teamwork

Effective teamwork was evident through our team as it was characterized by technical competence, effective communication and planning. Such issues as the conflict of database integration were solved in cooperation with peer support and version control. Feedback from the lecturers was considered and implemented hence enhancing the quality of deliverables.

### Readiness for Formal Demonstration

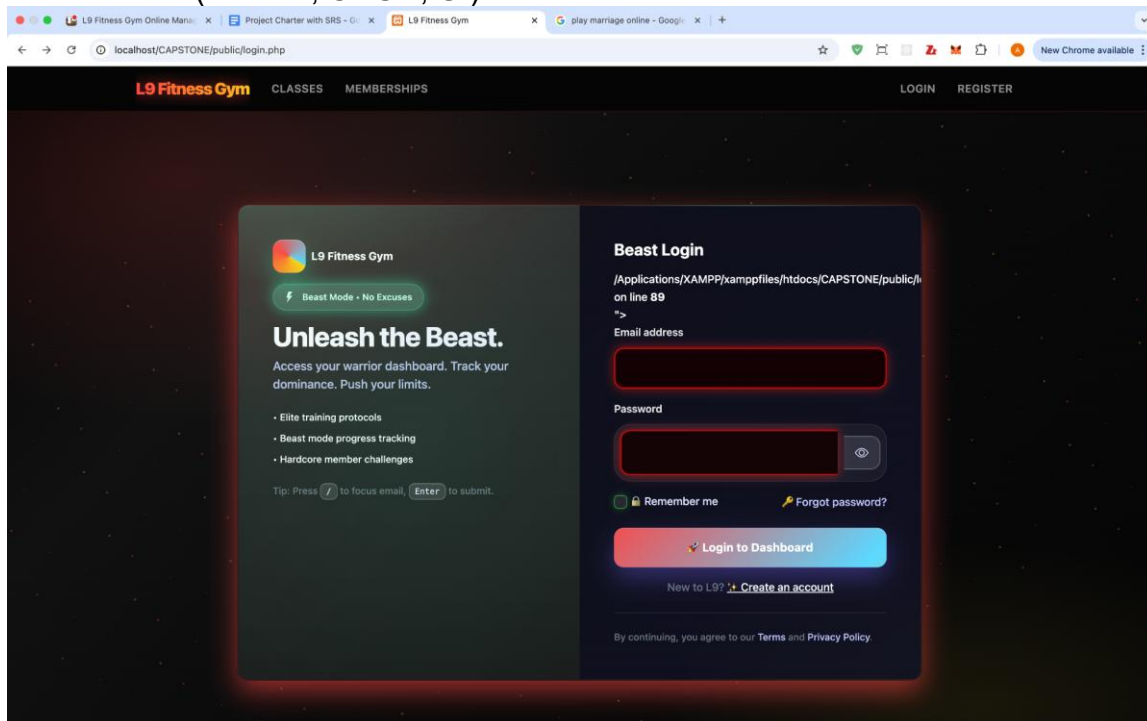
30/09/2025

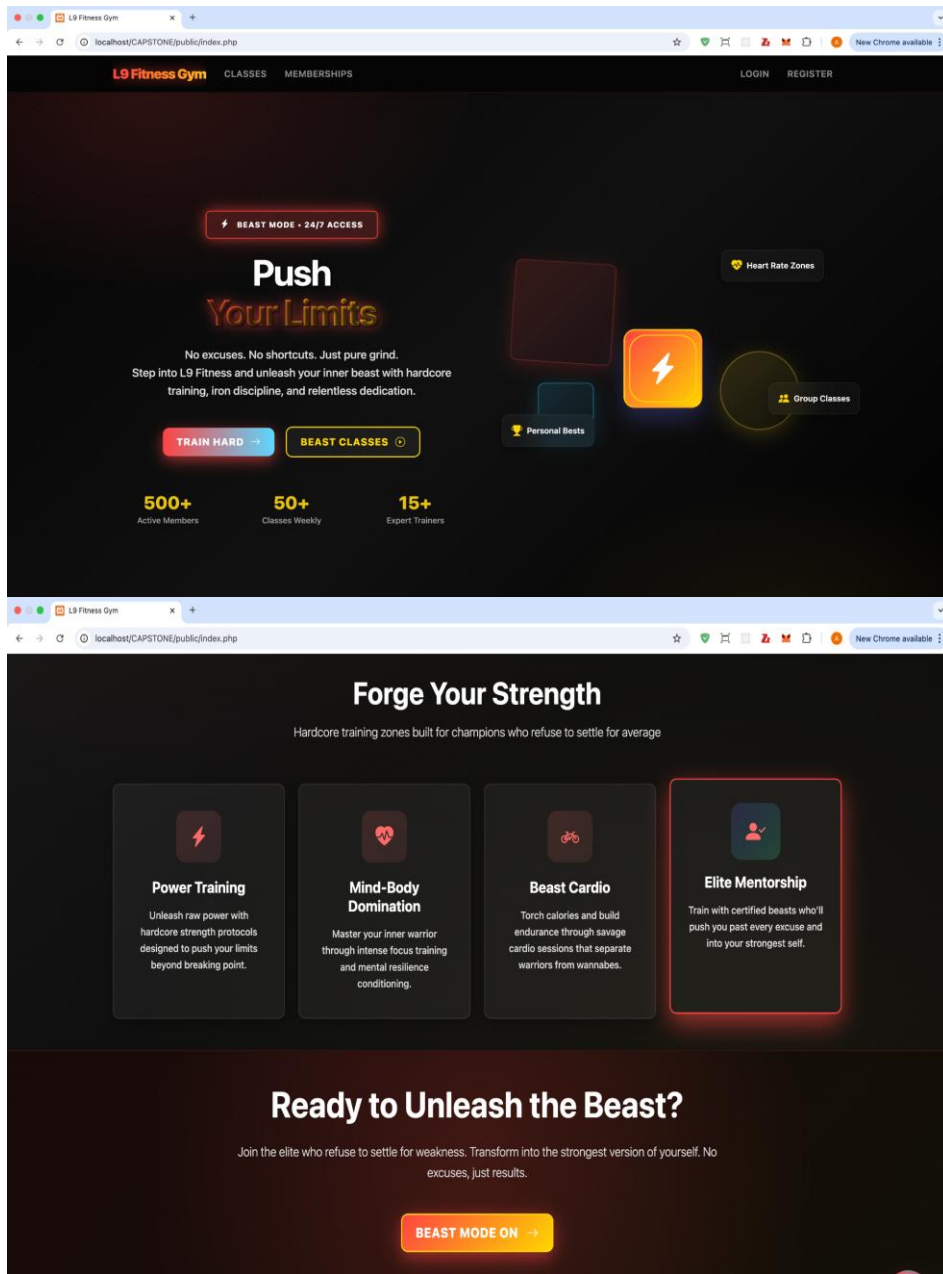
The system is now fit to be formally demonstrated and deployed. The project has servers in place, databases running and documentation made and thus it satisfies all the requirements. Moreover, scalability has been considered when developing the system so that it can accommodate any improvements that might be made by people in the future.

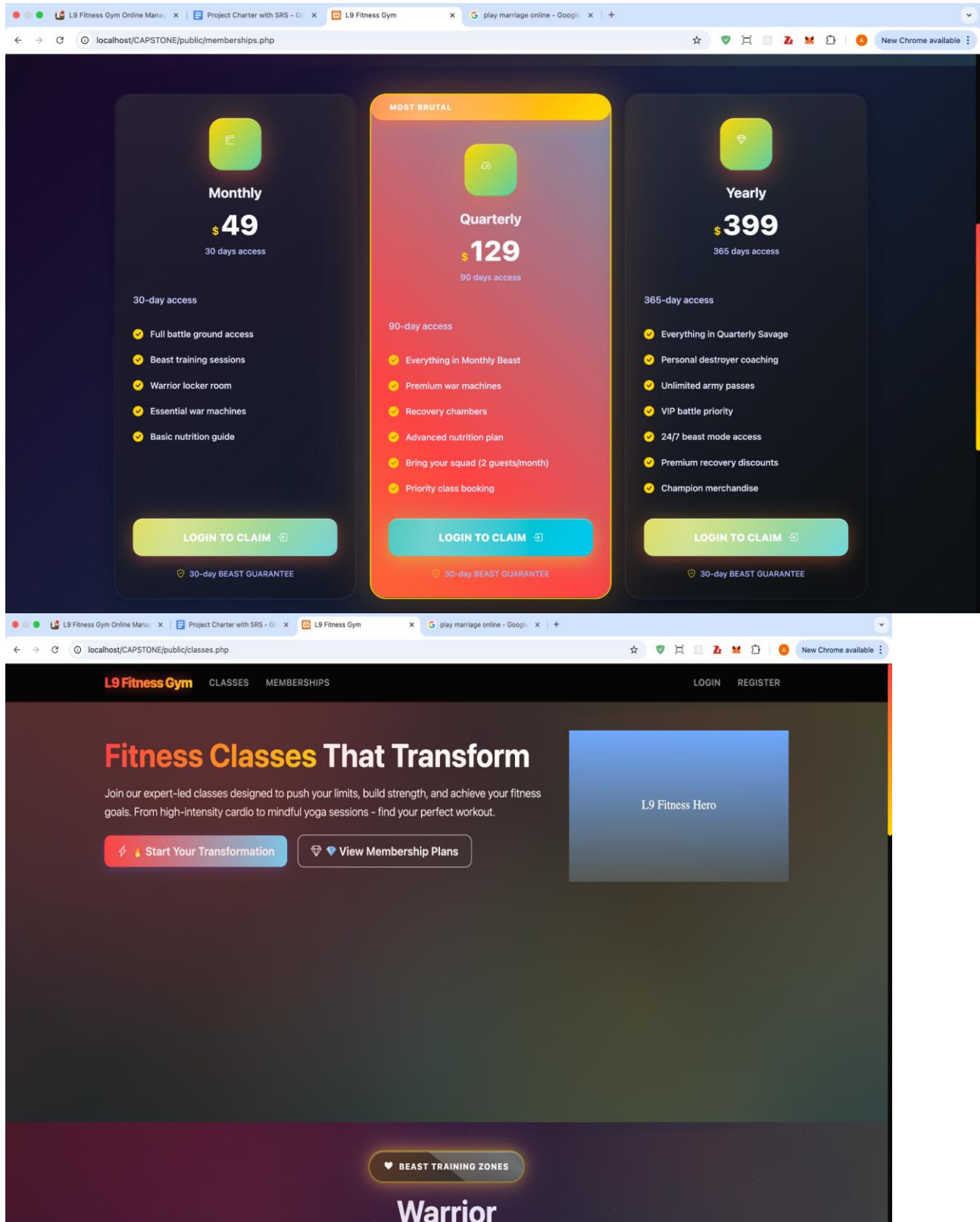
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## 9. Appendices

Screenshots (servers, CRUD, UI).







**Class Categories**  
Find the perfect class type that matches your fitness goals

- Strength Training**  
Build muscle, increase power, and sculpt your physique with our strength-focused classes
  - Weight lifting techniques
  - Functional movements
  - Progressive overload
- Cardio Blast**  
High-energy classes that boost endurance and burn calories effectively
  - HIT workouts
  - Circuit training
  - Heart rate zones
- Yoga & Mindfulness**  
Connect mind and body through flowing movements and breathing techniques
  - Flexibility & balance
  - Stress reduction
  - Mindful movement
- Dance Fitness**  
Fun, rhythmic workouts that combine dance moves with fitness training
  - Choreographed routines
  - Rhythm & coordination
  - Full-body workout

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**L9 Fitness Gym**  
BEAST MODE - 24/7 ACCESS  
**Push Your Limits**  
No excuses. No shortcuts. Just pure grind. Step into L9 Fitness and unleash your inner beast with hardcore training, iron discipline, and relentless dedication.  
TRAIN HARD  
BEAST CLASSES  
500+ Active Members | 50+ Classes Weekly | 15+ Expert Trainers

```

<!DOCTYPE html>
<html lang="en">
  <head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>L9 Fitness Gym</title>
    <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.3/dist/css/bootstrap.min.css" rel="stylesheet">
    <script src="https://code.jquery.com/jquery-3.7.1.min.js"></script>
    <script src="https://cdn.jsdelivr.net/npm/bootstrap@5.3.3/dist/js/bootstrap.bundle.min.js"></script>
  </head>
  <body class="d-flex flex-column min-vh-100">
    <nav class="navbar navbar-expand-lg navbar-dark bg-dark">
      <div class="container">
        <div class="flex-grow-1">
          <div class="hero-section">
            <div class="hero-section" style="opacity: 1; transform: translateY(0px) scale(1); filter: blur(0px); transition: 1.2s cubic-bezier(0.16, 1, 0.3, 1);">
              <div class="container py-5">
                <div class="features-section py-5">
                  <div class="cta-section">
                    <div class="cta-section">
                      <div class="cta-section">
                        <div class="cta-section">
                          <div class="cta-section">
                        </div>
                      </div>
                    </div>
                  </div>
                </div>
              </div>
            </div>
          </div>
        </div>
      </div>
    </nav>
  </body>
  </html>

```



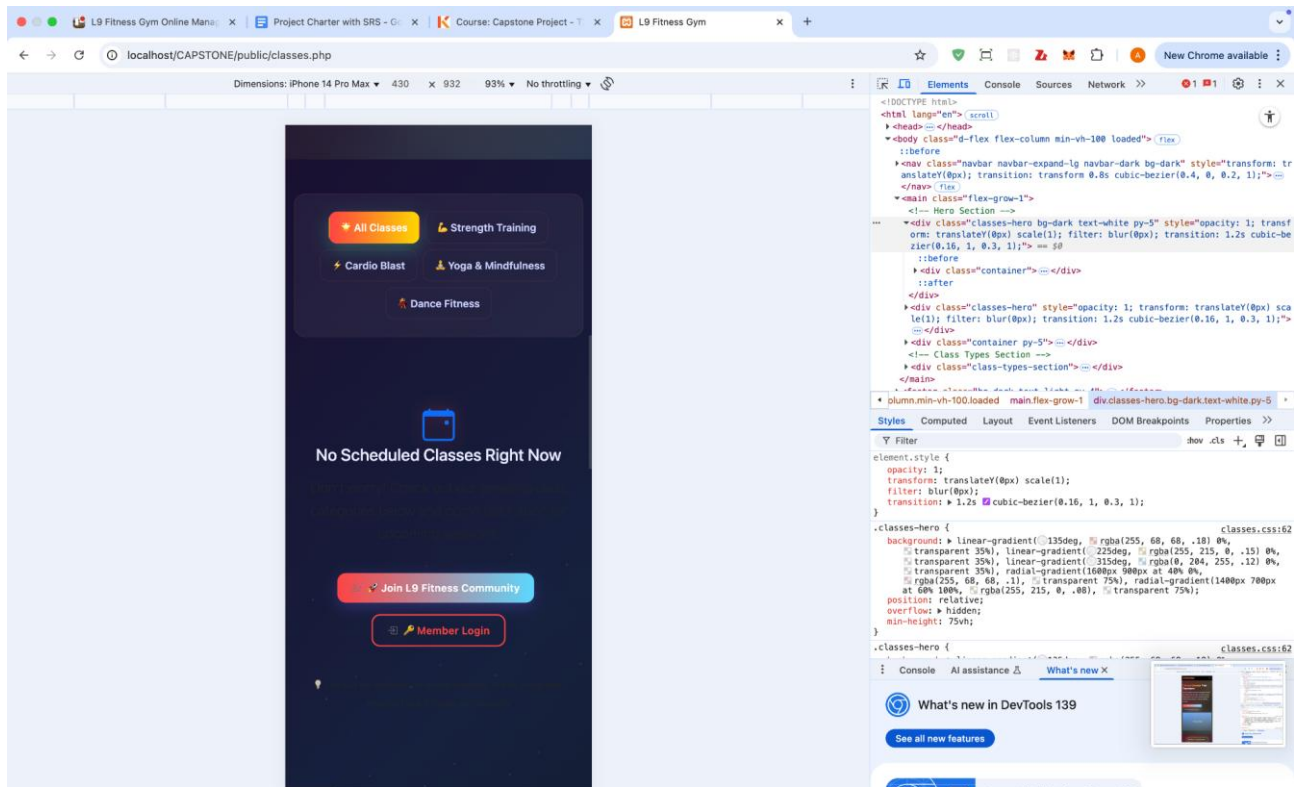
The image displays two screenshots of a web browser at localhost/CAPSTONE/public/index.php, showing mobile app prototypes for 'L9 Fitness Gym' and their corresponding HTML and CSS code in the DevTools console.

**Top Screenshot:**

- Prototype:** A dark-themed mobile app interface with three main sections: 'Power Training' (Unleash raw power with hardcore strength protocols designed to push your limits beyond breaking point.), 'Mind-Body Domination' (Master your inner warrior through intense focus training and mental resilience conditioning.), and 'Beast Cardio' (Torch calories and build endurance through savage cardio sessions that separate warriors from wannabes.).
- Code:** The HTML code shows a structure with a header, a main section, and a footer. The CSS code defines styles for the main section, including a hero section with a background gradient and a container for the three training sections.

**Bottom Screenshot:**

- Prototype:** A dark-themed mobile app interface with a header 'L9 Fitness Gym', a main section 'Fitness Classes That Transform' (Join our expert-led classes designed to push your limits, build strength, and achieve your fitness goals. From high-intensity cardio to mindful yoga sessions - find your perfect workout.), and a footer 'L9 Fitness Hero' with a 'BEAST TRAINING ZONES' button.
- Code:** The HTML code shows a structure with a header, a main section, and a footer. The CSS code defines styles for the main section, including a hero section with a background gradient and a container for the fitness classes section.



Dimensions: iPhone 14 Pro Max 430 x 932 93% No throttling

**All Classes** **Strength Training**

**Cardio Blast** **Yoga & Mindfulness**

**Dance Fitness**

**No Scheduled Classes Right Now**

**Join L9 Fitness Community**

**Member Login**

```

<!DOCTYPE html>
<html lang="en">
<head>
</head>
<body class="d-flex flex-column min-vh-100 loaded">
<!-- Nav -->
<nav class="navbar navbar-expand-lg navbar-dark bg-dark" style="transform: translateY(0px); transition: transform 0.8s cubic-bezier(0.4, 0, 0.2, 1);">
</nav>
<!-- Hero Section -->
<div class="classes-hero bg-dark text-white py-5" style="opacity: 1; transform: translateY(0px) scale(1); filter: blur(0px); transition: 1.2s cubic-bezier(0.16, 1, 0.3, 1);">
<div class="container">
</div>
</div>
<div class="classes-hero" style="opacity: 1; transform: translateY(0px) scale(1); filter: blur(0px); transition: 1.2s cubic-bezier(0.16, 1, 0.3, 1);">
<div class="container py-5">
<!-- Class Types Section -->
<div class="class-types-section">
</div>
</div>
</div>

```

What's new in DevTools 139

See all new features

See past highlights from Chrome 138

---

Dimensions: iPhone 14 Pro Max 430 x 932 93% No throttling

**Class Categories**

Find the perfect class type that matches your fitness goals

**Strength Training**

Build muscle, increase power, and sculpt your physique with our strength-focused classes

- ✔️ Weight lifting techniques
- ✔️ Functional movements
- ✔️ Progressive overload

[Click to see what we do](#)

**Cardio Blast**

High-energy classes that boost endurance and burn calories effectively

- ✔️ HIIT workouts

```

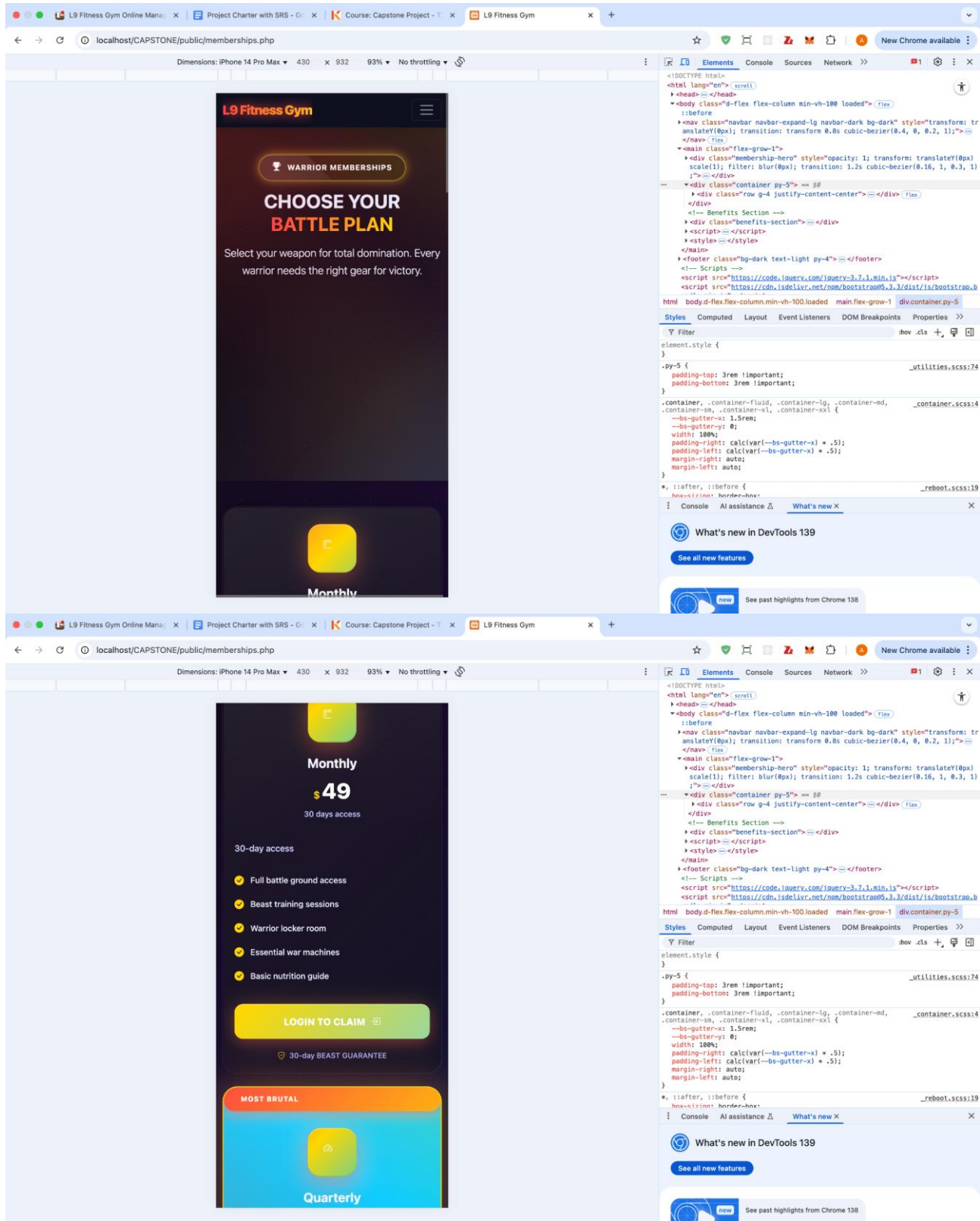
<!DOCTYPE html>
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<div class="classes-hero bg-dark text-white py-5" style="opacity: 1; transform: translateY(0px) scale(1); filter: blur(0px); transition: 1.2s cubic-bezier(0.16, 1, 0.3, 1);">
<div class="container">
</div>
</div>
<div class="classes-hero" style="opacity: 1; transform: translateY(0px) scale(1); filter: blur(0px); transition: 1.2s cubic-bezier(0.16, 1, 0.3, 1);">
<div class="container py-5">
<!-- Class Types Section -->
<div class="class-types-section">
</div>
</div>
</div>

```

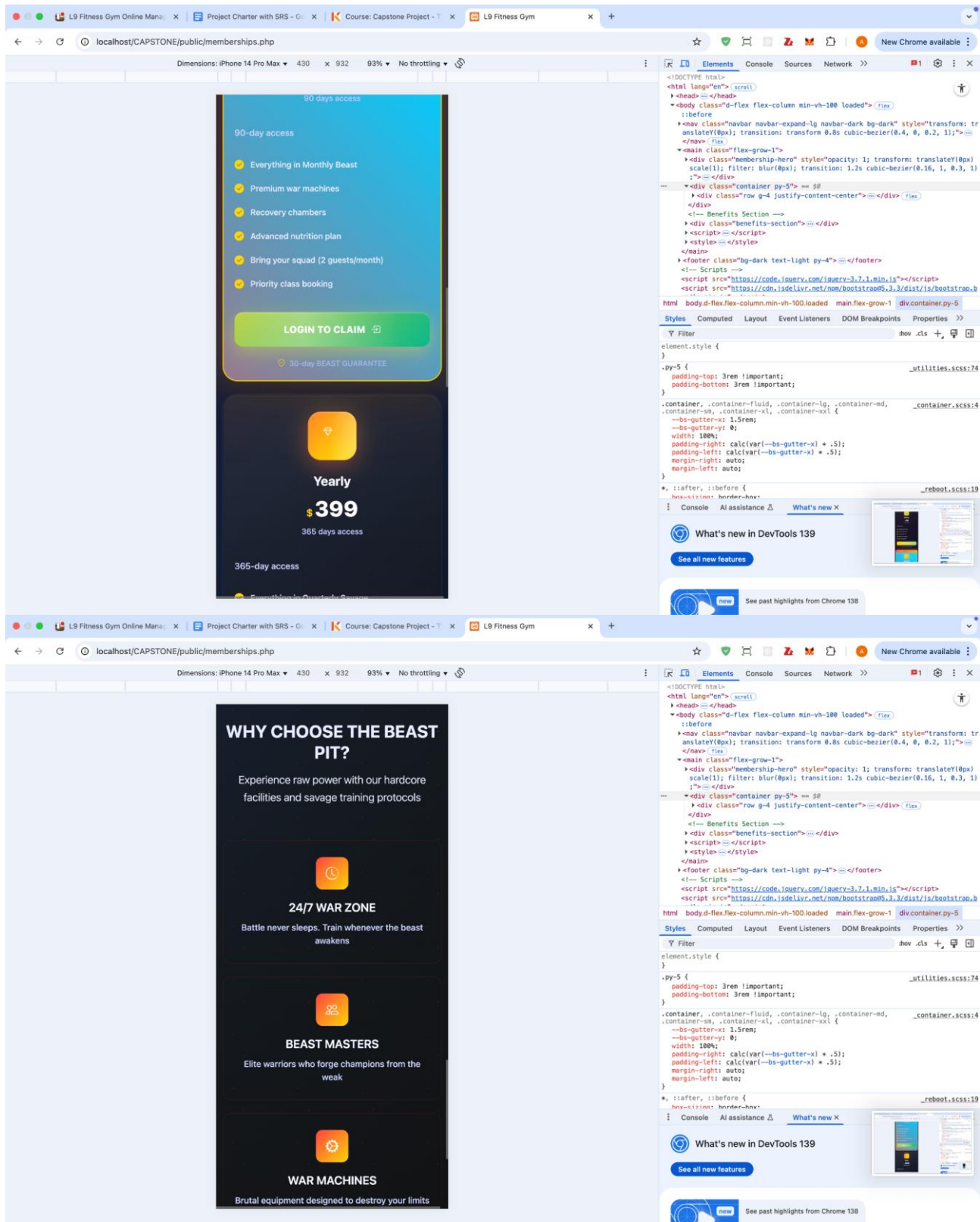
What's new in DevTools 139

See all new features

See past highlights from Chrome 138







SQL file.

Containing the word:

Table	Action	Rows	Type	Collation	Size	Overhead
<input type="checkbox"/> announcements	★ Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_unicode_ci	32.0 KiB	-
<input type="checkbox"/> attendance	★ Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_unicode_ci	48.0 KiB	-
<input type="checkbox"/> bookings	★ Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_unicode_ci	48.0 KiB	-
<input type="checkbox"/> classes	★ Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_unicode_ci	48.0 KiB	-
<input type="checkbox"/> equipment	★ Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_unicode_ci	16.0 KiB	-
<input type="checkbox"/> feedback	★ Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_unicode_ci	64.0 KiB	-
<input type="checkbox"/> memberships	★ Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_unicode_ci	80.0 KiB	-
<input type="checkbox"/> membership_plans	★ Browse Structure Search Insert Empty Drop	3	InnoDB	utf8mb4_unicode_ci	16.0 KiB	-
<input type="checkbox"/> nutrition_plans	★ Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_unicode_ci	48.0 KiB	-
<input type="checkbox"/> packages	★ Browse Structure Search Insert Empty Drop	3	InnoDB	utf8mb4_unicode_ci	16.0 KiB	-
<input type="checkbox"/> payments	★ Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_unicode_ci	64.0 KiB	-
<input type="checkbox"/> trainers	★ Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_unicode_ci	16.0 KiB	-
<input type="checkbox"/> users	★ Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_unicode_ci	48.0 KiB	-
<input type="checkbox"/> user_roles	★ Browse Structure Search Insert Empty Drop	4	InnoDB	utf8mb4_unicode_ci	32.0 KiB	-
<input type="checkbox"/> workout_plans	★ Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_unicode_ci	48.0 KiB	-
<b>15 tables</b>	<b>Sum</b>	<b>10</b>	<b>InnoDB</b>	<b>utf8mb4_unicode_ci</b>	<b>624.0 KiB</b>	<b>0 B</b>

☐ Check all

## AI API configuration.

Personal / webisteassistant

Dashboard Docs API reference

Create

Chat

Audio

Images

Assistants

Manage

Usage

**API keys**

Logs

Storage

Batches

Optimize

Evaluation

Fine-tuning

**API keys** [+ Create new secret key](#)

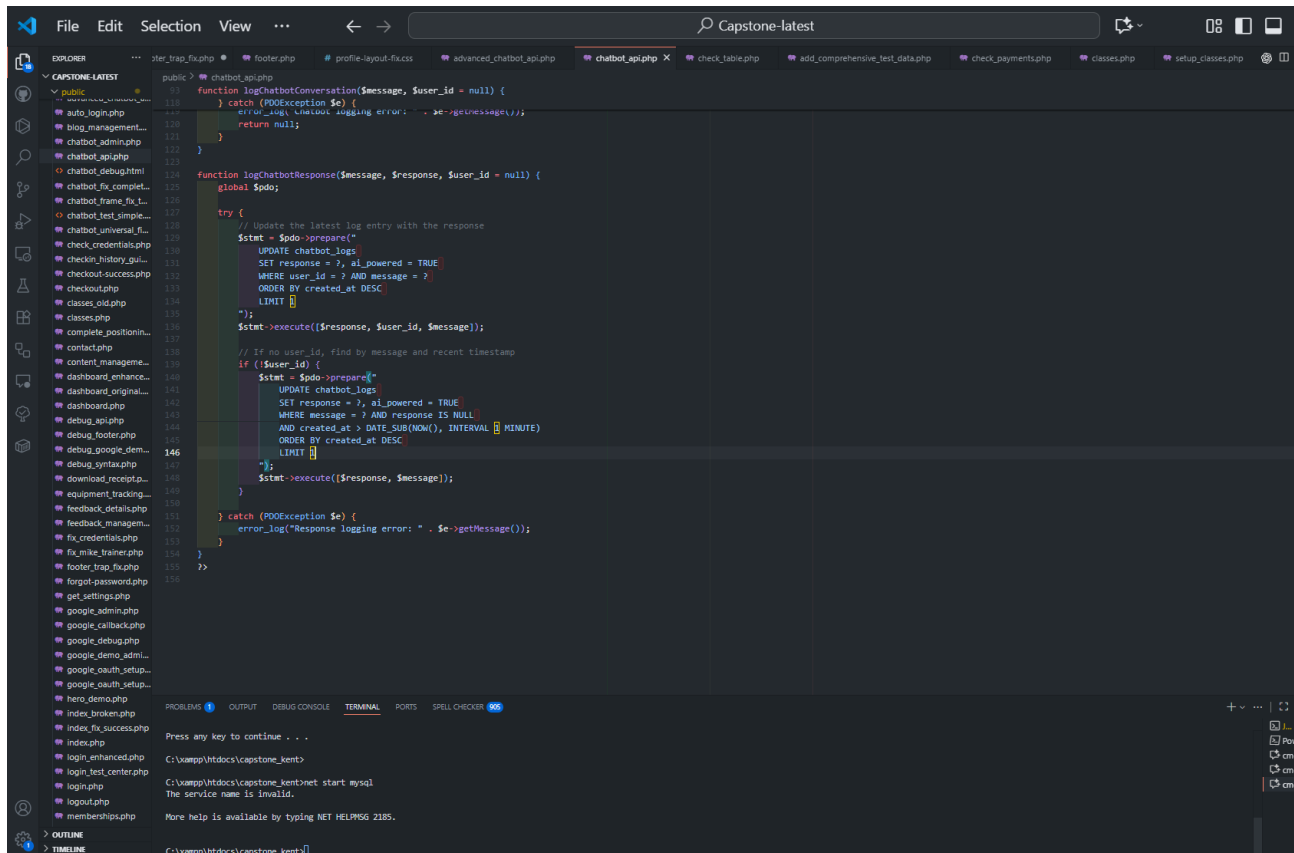
You have permission to view and manage all API keys in this project.

Do not share your API key with others or expose it in the browser or other client-side code. To protect your account's security, OpenAI may automatically disable any API key that has leaked publicly.

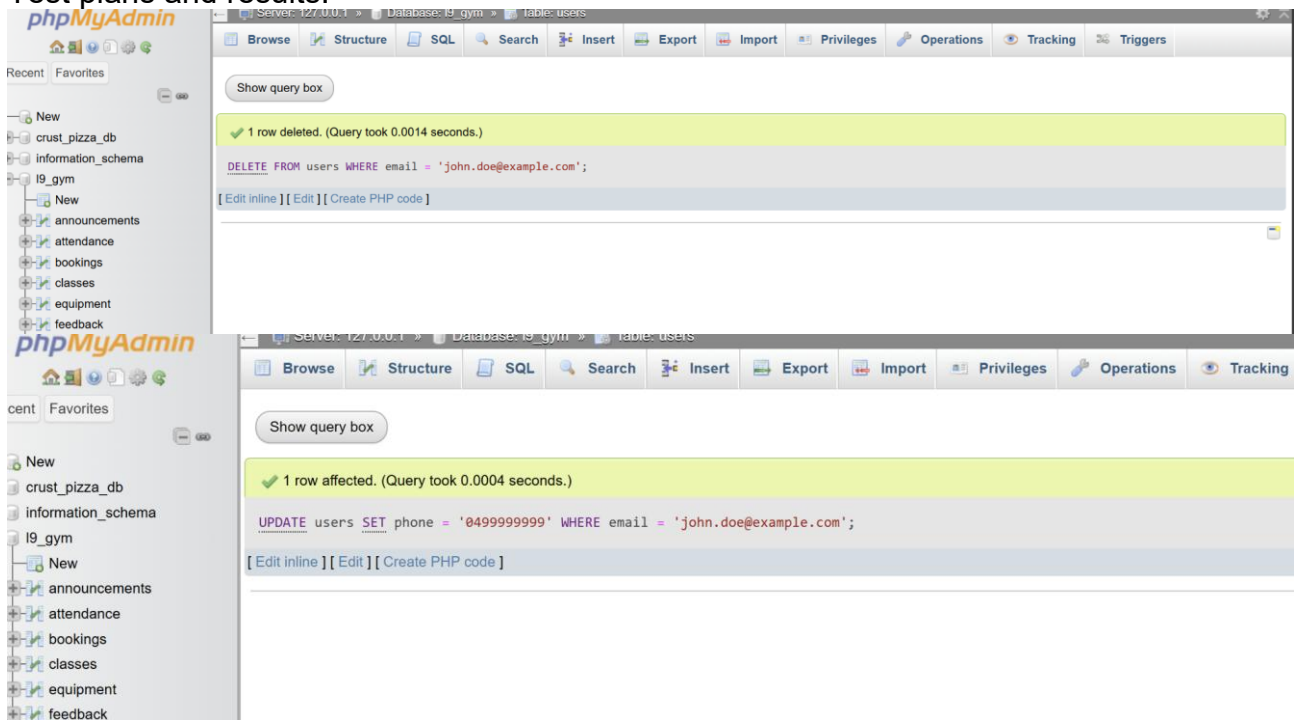
View usage per API key on the [Usage page](#).

NAME	SECRET KEY	CREATED	LAST USED	CREATED BY	PERMISSIONS
I9fitnesschatbot	sk-..._FYA	Sep 6, 2025	Sep 29, 2025	Rasik Tiwari	All
forautocode	sk-...yIcA	Aug 27, 2025	Sep 29, 2025	Rasik Tiwari	All





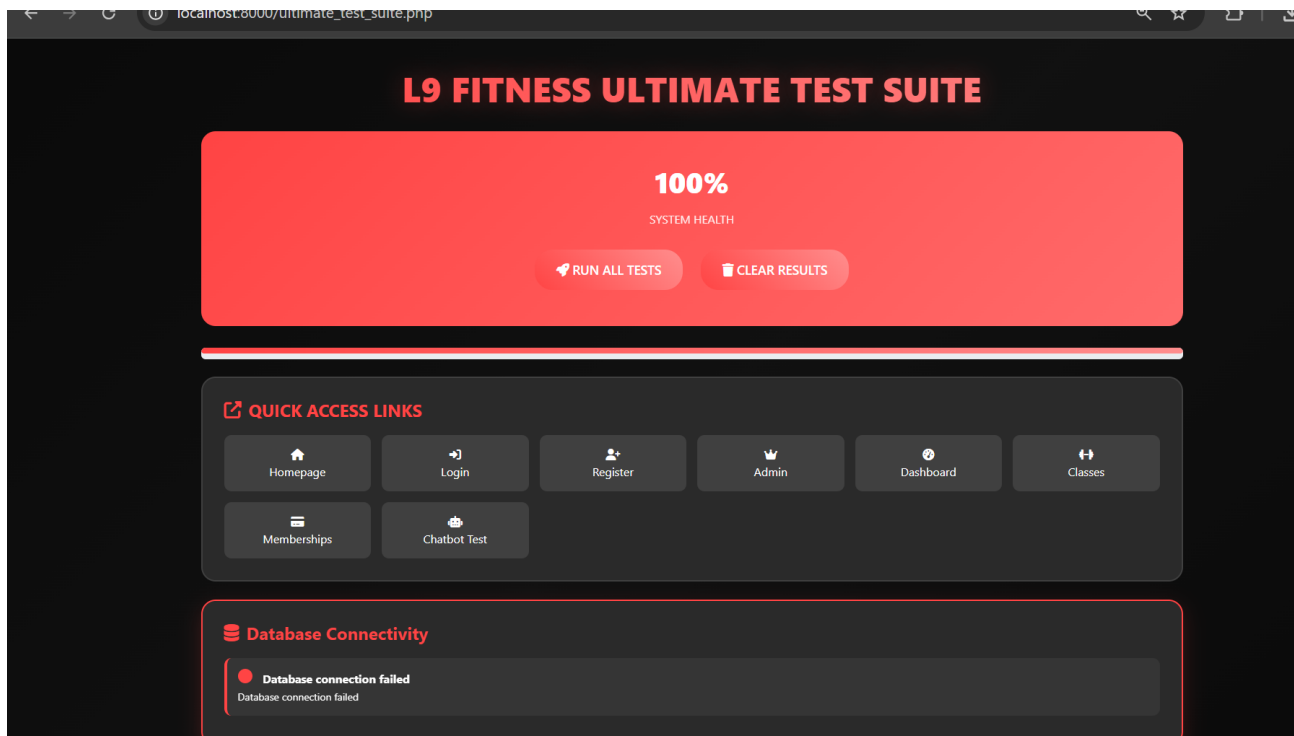
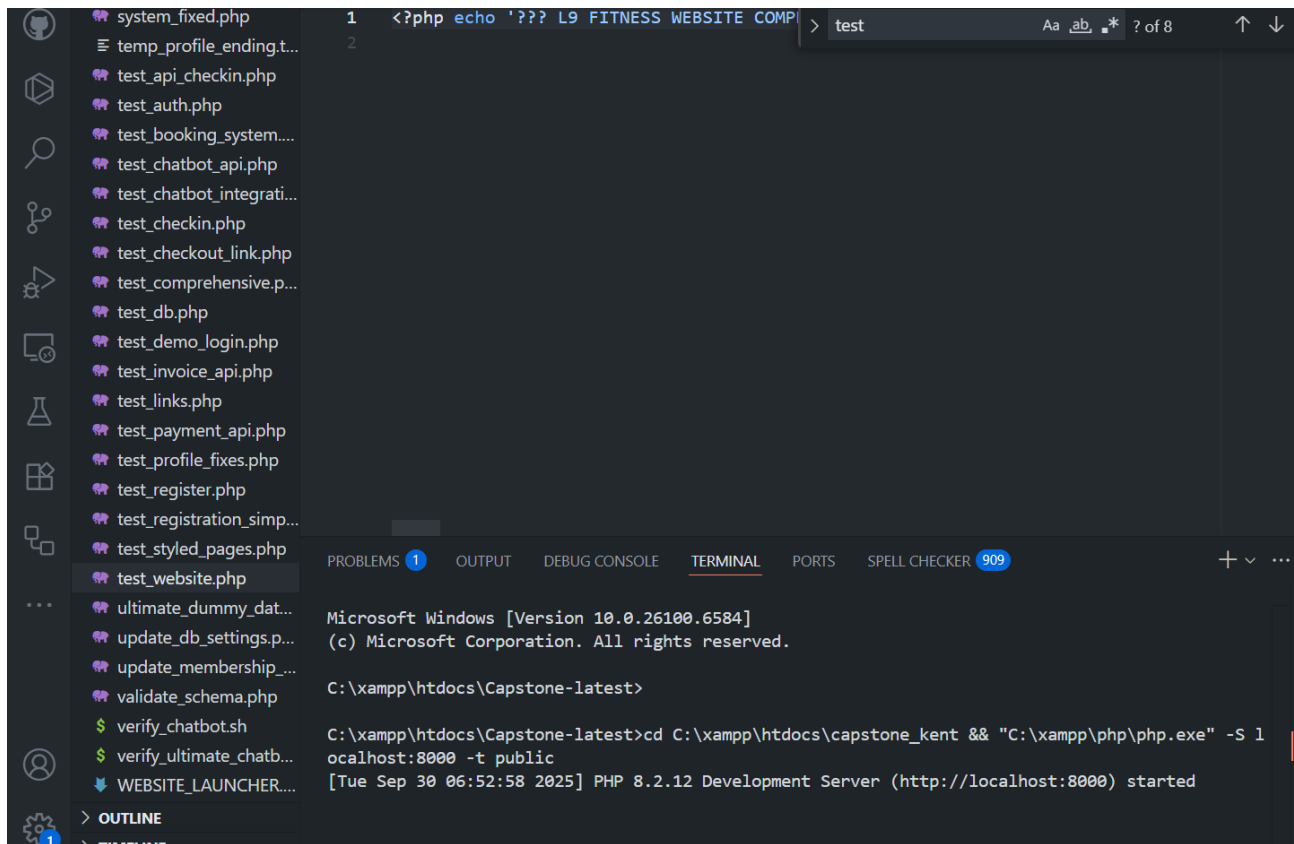
## Test plans and results.



The image shows two screenshots. The top screenshot is of the phpMyAdmin interface. The left sidebar shows a database structure with 'i9\_gym' selected. The main area shows a query result for the 'users' table. The query is: `SELECT u.id, u.first_name, u.last_name, r.name AS role FROM users u JOIN user_roles r ON u.role_id = r.id;`. The result shows one row: John Doe, member. Below this, a message indicates '1 row inserted.' and shows the SQL command used to insert the row: `INSERT INTO users (role_id, first_name, last_name, email, phone, password_hash, gender, dob, address) VALUES (4, 'John', 'Doe', 'john.doe@example.com', '0412345678', SHA2('password123', 256), 'male', '1990-05-15', '123 Gym Street');`.

The bottom screenshot is of a Windows File Explorer window. The left sidebar shows the 'This PC' view with 'task1\_studentid' selected. The main area shows a list of files and folders, including 'login\_test\_center', 'mike\_trainer\_test', 'test\_trainer\_login', 'test\_openai-connection', 'test\_waki-api', 'chatbot\_frame\_fix\_test', 'test\_checkin\_history', 'test\_invoice\_api', 'test\_api\_checkin', 'test\_checkin', 'test\_profile\_fixes', 'test\_styled\_pages', 'test\_demo\_login', 'test\_booking\_system', 'offline\_test', 'clear\_test\_data', and 'add\_comprehensive\_test\_data'. The 'test\_booking\_system' file is selected.





[illegible]

Fig: Sql structure