FitTrack Pro - Fitness Management System Documentation

Group code: ONL2_SWD5_S5

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Contents

1. Project Planning & Management

1.1 Project Proposal

- **Overview:**
  FitTrack Pro is a fitness management system designed to streamline workout, diet, and progress tracking for Admins, Coaches, and Clients.
- **Objectives:**
  - Provide an easy-to-use platform for fitness tracking and management.
  - Facilitate effective communication between coaches and clients.
  - Enable personalized workout and diet plans tailored to individual needs.
- **Scope:**
  - Develop a web application using ASP.NET Core for the backend and React/Angular for the frontend.
  - Integrate SQL Server as the database for secure data storage.
  - Ensure role-based access (Admin, Coach, Client) to control and customize functionalities.

1.2 Project Plan

- **Timeline:**
  The project will be developed over 45 days.
- **Milestones & Deliverables:**
  - **Week 1-2:** Finalize project proposal, complete database design, and set up the initial API structure.
  - **Week 3-4:** Develop core backend functionalities (authentication, user management, plan management).
  - **Week 5:** Develop and integrate frontend components; initiate basic UI with responsive design.
  - **Week 6:** Conduct integration and user testing; prepare documentation and deployment plan.
- **Gantt Chart:**
  (Insert a Gantt chart here using your preferred tool or draw one manually outlining tasks, start dates, and deadlines.)
- **Resource Allocation:**
  - **Development:** Backend and Frontend developers
  - **Testing:** QA team
  - **Project Management:** Project manager and documentation lead
  -

1.3 Task Assignment & Roles

- **Admin:**
  - Oversee project management tasks
  - Validate overall system performance
  - Manage user accounts and system configuration
- **Coach:**
  - Create workout and diet plans
  - Monitor client progress
  - Provide feedback and direct support
- **Client:**
  - Use the system to track fitness progress
  - Log workouts and view assigned plans
  - Communicate with coaches
- **Team Roles (if applicable):**
  - **Project Manager:** Coordination and timeline management
  - **Backend Developer:** API development, database integration, authentication
  - **Frontend Developer:** UI/UX design, integration with backend
  - **QA Specialist:** Testing and quality assurance
  - **Documentation Lead:** Prepare project reports and documentation

1.4 Risk Assessment & Mitigation Plan

- **Identified Risks:**
  - **Technical Risks:** Performance bottlenecks, security vulnerabilities, and integration challenges.
  - **Project Risks:** Delays in milestones, miscommunication among team members, or resource constraints.
- **Mitigation Strategies:**
  - **Technical:** Conduct regular code reviews, apply secure coding practices, and perform integration testing.
  - **Project:** Hold weekly progress meetings, use agile methodologies to adapt to changes, and ensure clear communication of responsibilities.

1.5 KPIs (Key Performance Indicators)

- **Response Time:** System responses under 200ms.
- **System Uptime:** 99.9% uptime to ensure reliability.
- **User Adoption Rate:** Measured by active user sessions and engagement levels.
- **Feedback Scores:** Collected from user testing and surveys regarding ease of use and satisfaction.

2. Literature Review

2.1 Feedback & Evaluation

- **Lecturer's Assessment:**
  Summarize the lecturer's initial feedback regarding the project's scope, technical choices, and proposed implementation strategy.
- **Key Points:**
  - Alignment with course objectives
  - Relevance of the chosen tech stack (ASP.NET Core, SQL Server, React/Angular)
  - Areas identified for further exploration and optimization

2.2 Suggested Improvements

- **Areas for Enhancement:**
  - **User Interface:** Streamline and modernize the UI for better user experience.
  - **Performance:** Optimize backend queries and API calls to meet performance benchmarks.
  - **Security:** Enhance data encryption and authentication mechanisms.
  - **Scalability:** Plan for future growth in terms of user base and feature expansion.
- **Implementation:**
  Include a roadmap for integrating these improvements in subsequent development phases.

2.3 Final Grading Criteria

- **Documentation:** Clarity, thoroughness, and organization of project documents.
- **Implementation:** Quality and completeness of code, integration of core features, and adherence to best practices.
- **Testing:** Effectiveness of testing strategies, including unit, integration, and user acceptance testing.
- **Presentation:** Overall presentation of the project, including design, usability, and demonstration of functionalities.
- **Evaluation Breakdown:**
  - Documentation: 25%
  - Code Implementation: 40%
  - Testing & Quality Assurance: 20%
  - Presentation & Demonstration: 15%

3. Requirements Gathering

3.1 Stakeholder Analysis

- **Primary Stakeholders:**
  - **Admins:** Need robust tools for user management and system monitoring.
  - **Coaches:** Require functionalities to create and manage personalized fitness plans and monitor client progress.
  - **Clients:** Expect an intuitive interface for tracking workouts, progress, and receiving feedback.
- **Secondary Stakeholders:**
  - **Technical Team:** Developers, QA, and project managers responsible for building and maintaining the system.
  - **Institution/Department:** Oversees the project as a part of learning outcomes and grading.

3.2 User Stories & Use Cases

- **User Stories:**
  - *As a client, I want to log my workouts easily so that I can track my progress over time.*
  - *As a coach, I want to create and modify workout plans so that I can tailor them to each client's needs.*
  - *As an admin, I want to manage user roles and access rights so that I can maintain system security.*
- **Use Cases:**
  - **User Registration/Login:** Process for new users to create accounts and existing users to access the system securely.
  - **Workout Plan Creation:** Coaches design, save, and assign workout plans.
  - **Diet Plan Management:** Similar process for managing diet plans.
  - **Progress Tracking:** Clients log workouts and coaches review progress logs.
  - **Communication:** In-app messaging system for coach-client interactions.

3.3 Functional Requirements

- **User Management:**
  - Registration, authentication, and role-based access control (Admin, Coach, Client).
- **Plan Management:**
  - CRUD operations for workout and diet plans.
  - Ability to assign plans to specific users.
- **Progress Tracking:**
  - Logging workouts and tracking client progress over time.

- **Communication System:**
  - Secure messaging between coaches and clients.
- **Data Analytics:**
  - Basic reporting tools for performance monitoring and statistical analysis.

3.4 Non-Functional Requirements

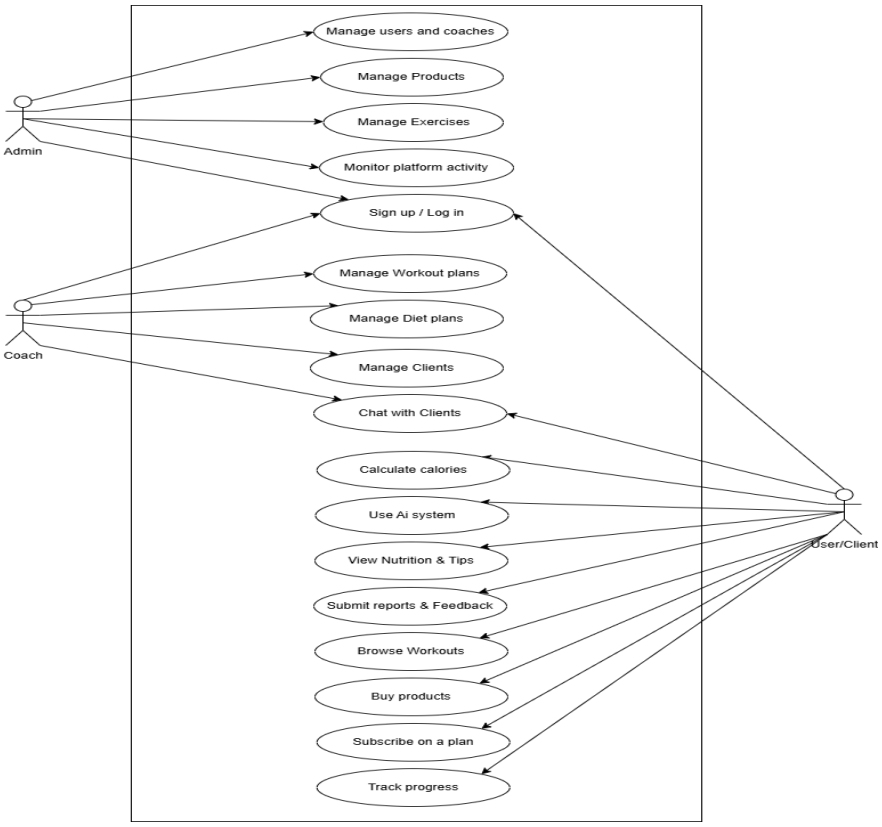
- **Performance:**
  - System response time under 200ms.
  - Efficient data retrieval and processing.
- **Security:**
  - JWT-based authentication and secure data handling.
  - Data encryption both in transit and at rest.
- **Usability:**
  - Intuitive UI/UX design that is mobile responsive.
  - Accessibility compliance for diverse users.
- **Reliability:**
  - 99.9% uptime with robust error handling and failover mechanisms.
- **Scalability:**
  - Modular architecture to support future feature enhancements and increased user load.

4. System Analysis & Design

4.1 Problem Statement & Objectives

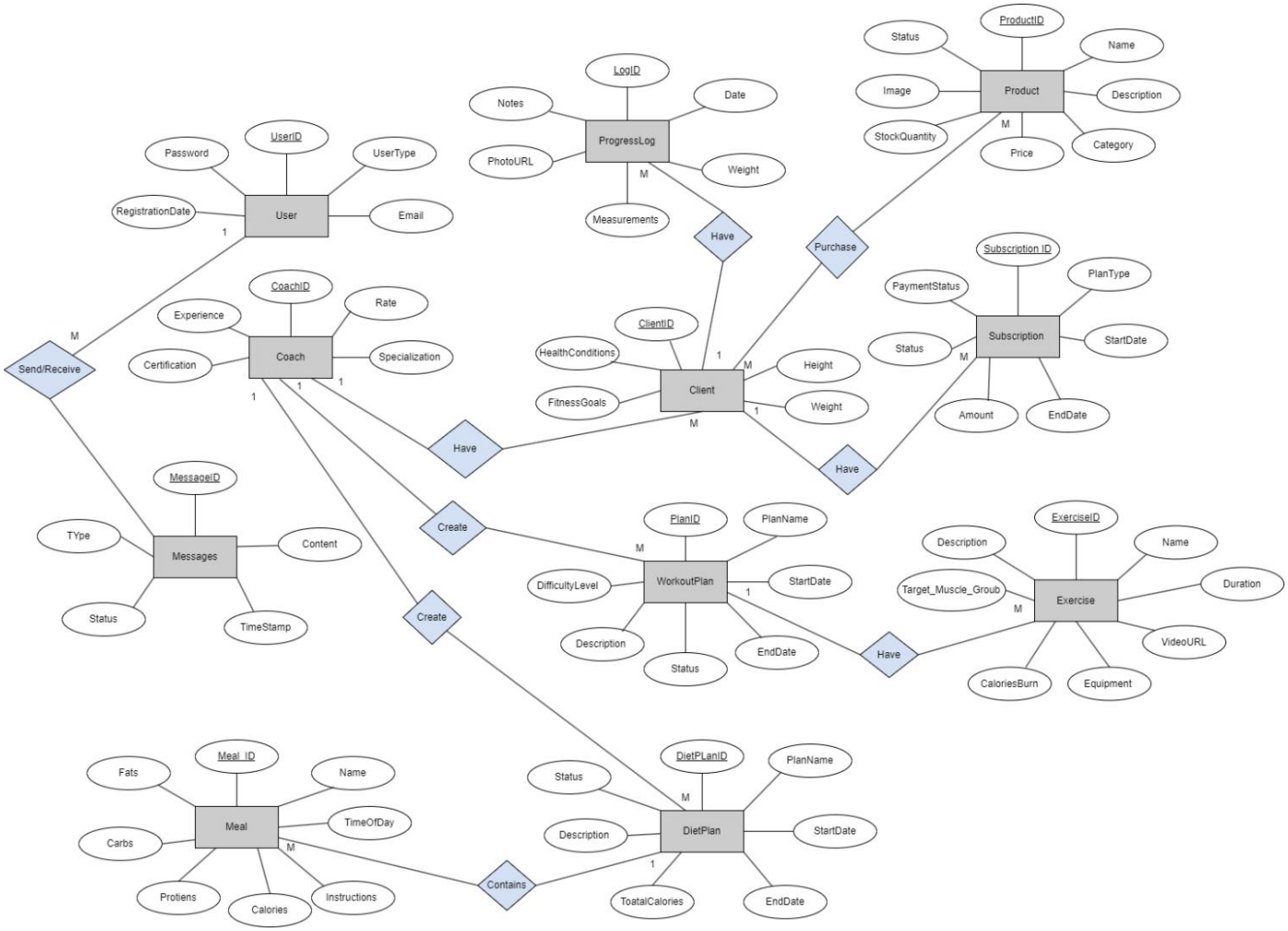
- **Problem Statement:**
  FitTrack Pro aims to address the challenge of efficiently managing fitness routines, diet plans, and progress tracking for diverse users (Admins, Coaches, and Clients). Many fitness management solutions are either too generic or lack effective communication tools between coaches and clients. This project solves these issues by offering a tailored, user-friendly platform that integrates workout planning, nutritional guidance, progress monitoring, and real-time coach-client interaction.
- **Project Objectives:**
  - **Streamline Fitness Management:** Develop a system that consolidates workout and diet plan management in one platform.
  - **Enhance Communication:** Facilitate seamless communication between coaches and clients through integrated messaging and progress updates.
  - **Improve User Experience:** Deliver a responsive, intuitive user interface that adapts to both desktop and mobile devices.
    - **Ensure Reliability & Security:** Provide a robust system with high performance, secure data handling, and reliable uptime.

4.2 Diagrams & Models



- **Use Case Diagram**

- **ER Diagram**


User
UserID
Password
UserType
RegistrationDate
Email
Coach
CoachID
Experience
Rate
Certification
Specialization
Client
ClientID
HealthConditions
Height
FitnessGoals
Weight
ProgressLog
LogID
Notes
Date
PhotoURL
Weight
Measurements
Product
ProductID
Status
Name
Image
Description
StockQuantity
Price
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PaymentStatus
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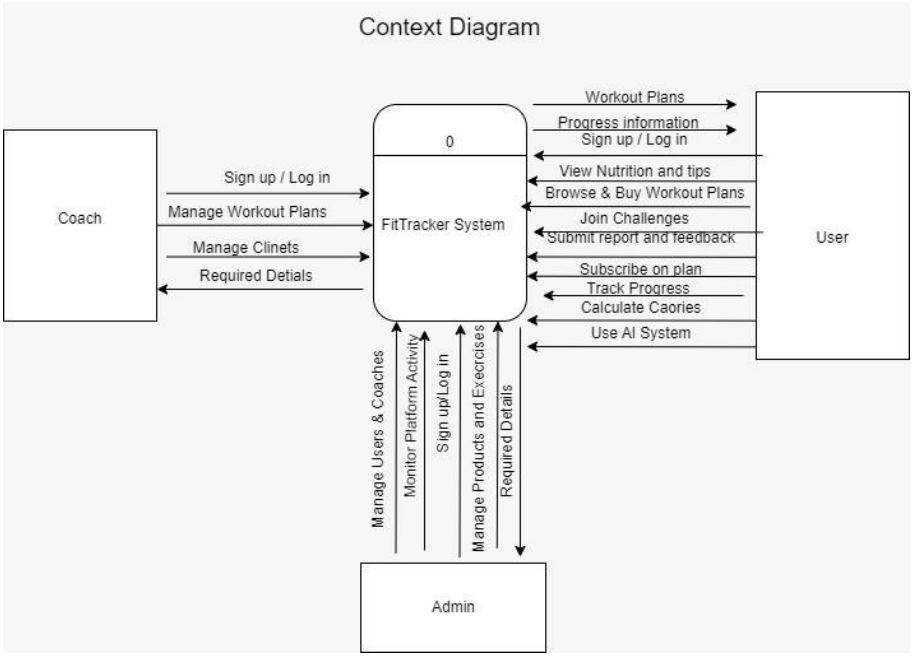
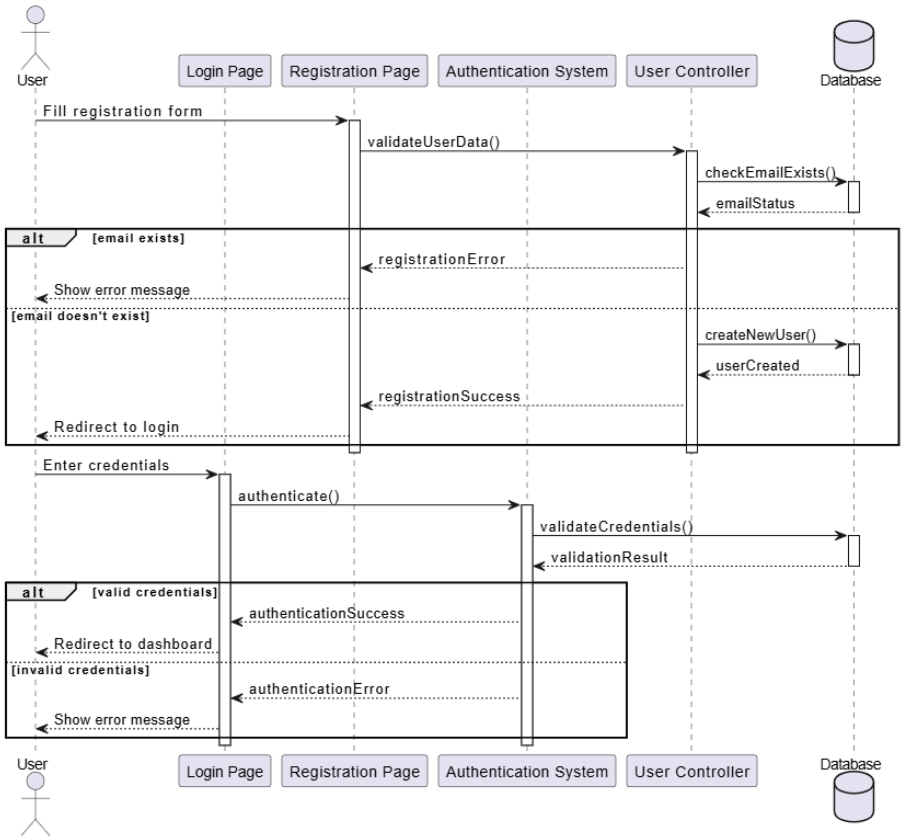
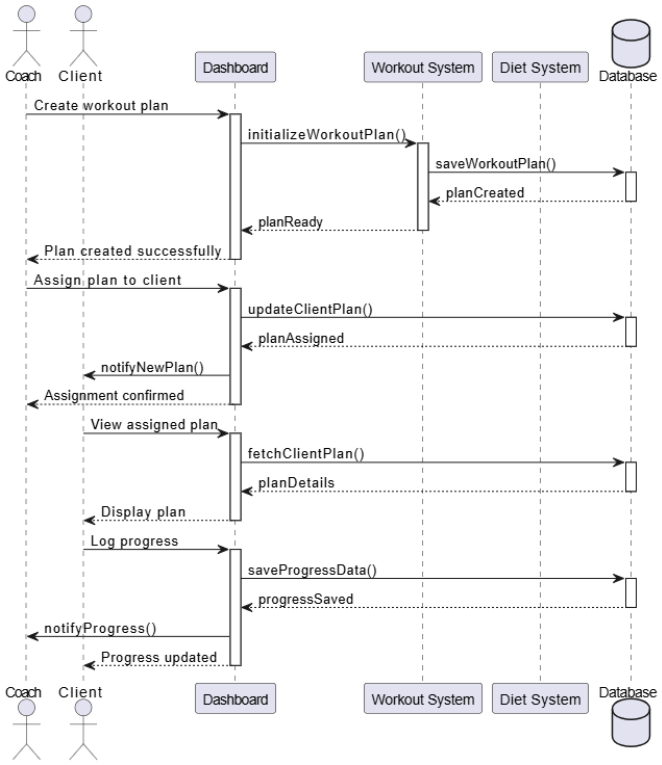
- **Data Flow Diagram (DFD)**

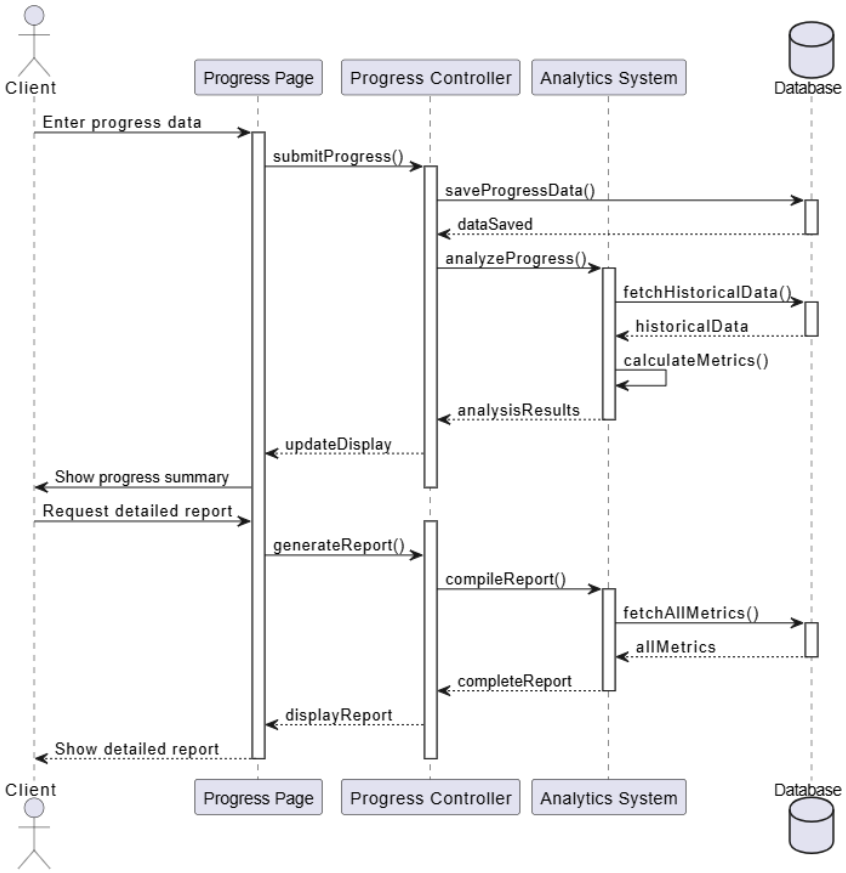




- **Sequence Diagram (login & Signup)**

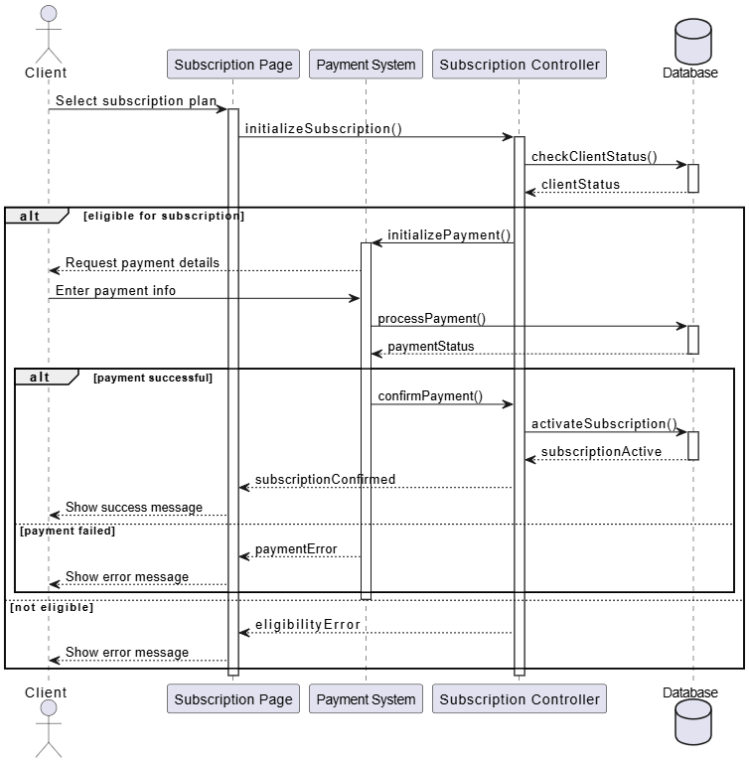


- **Sequence Diagram (Coach-client Interaction)**

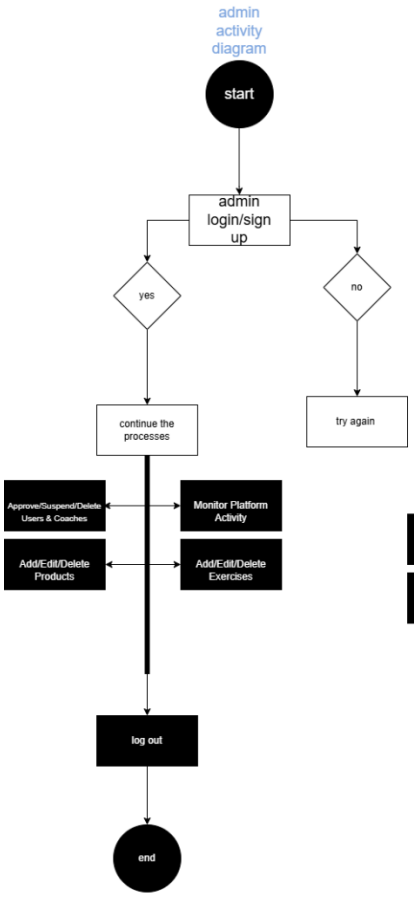


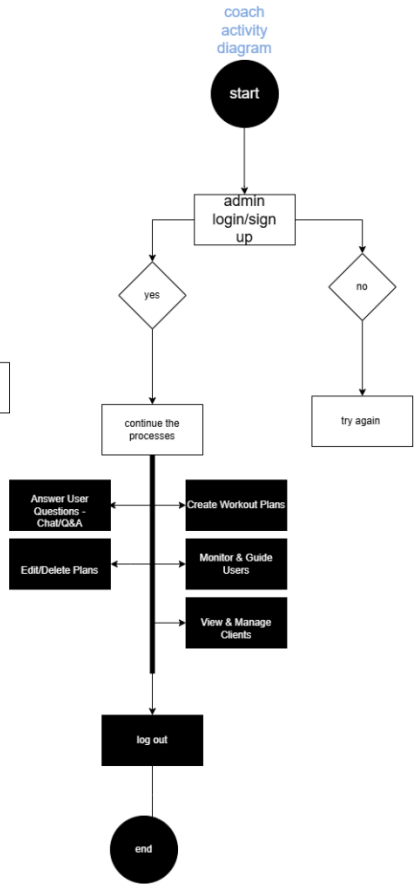
- **Sequence Diagram (Progress Summary)**

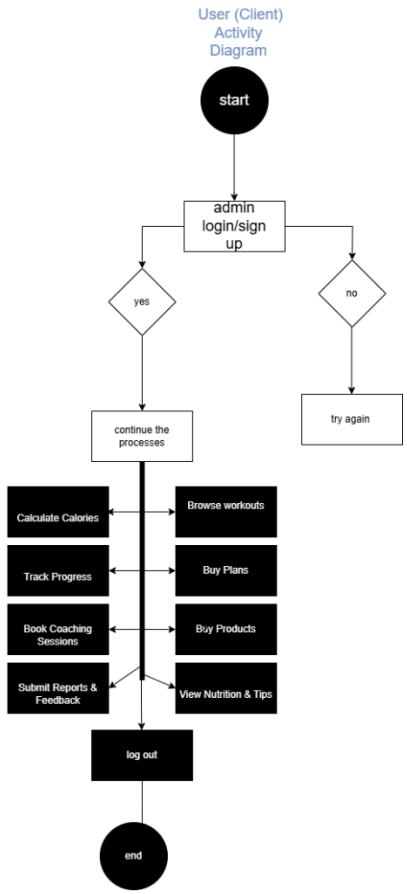
- **Sequence Diagram (Payment)**



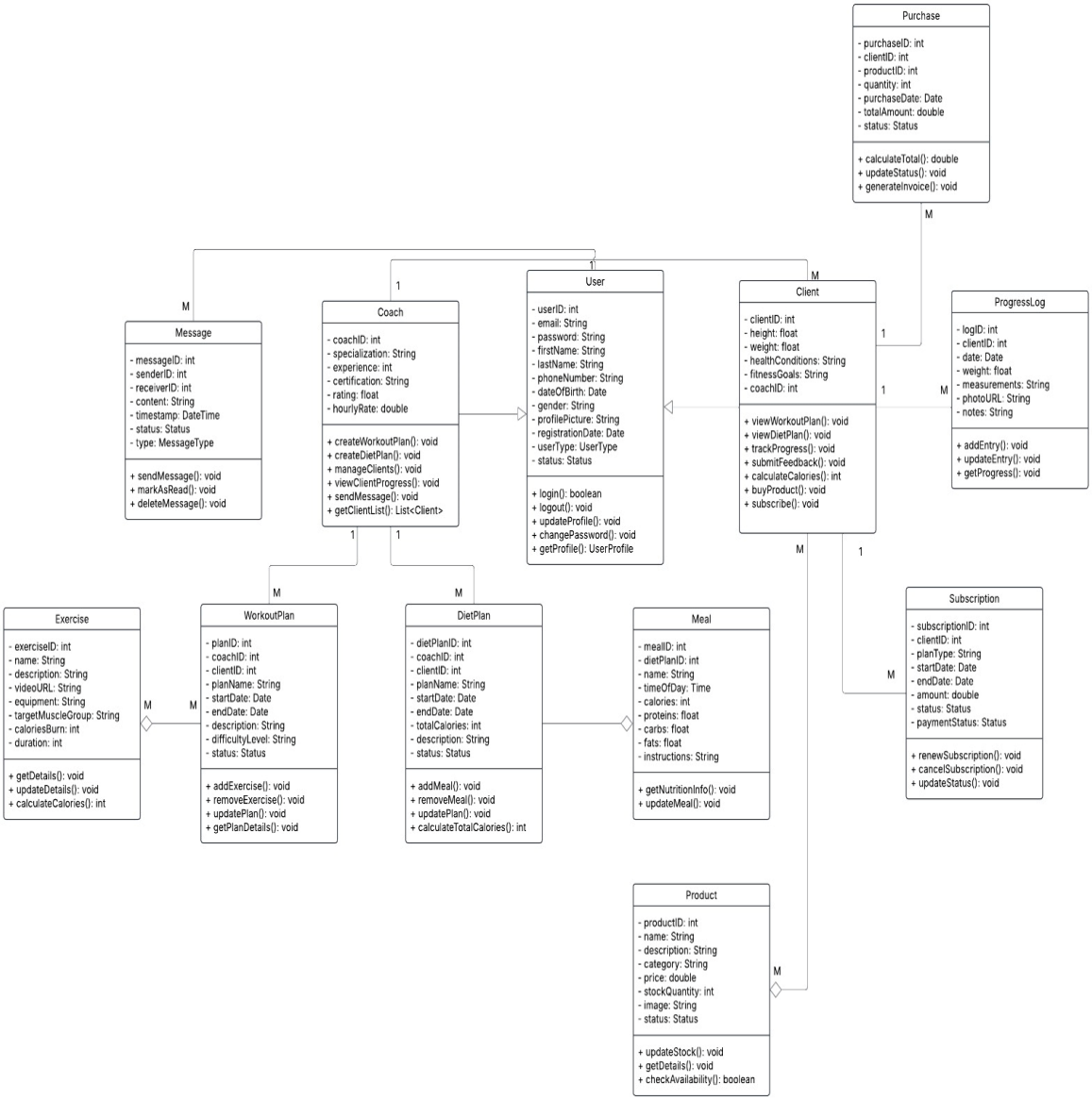
- **Activity Diagram**



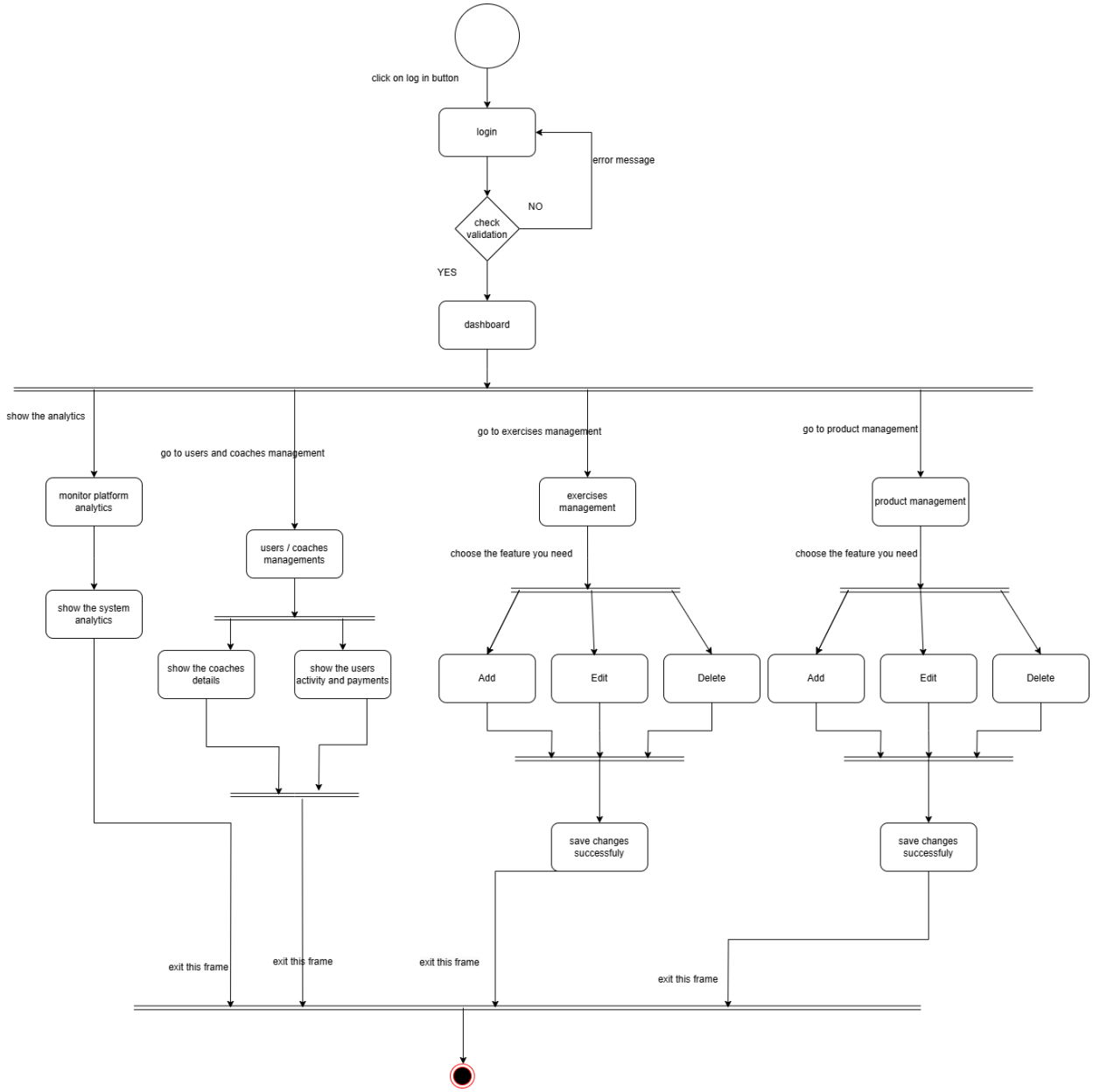




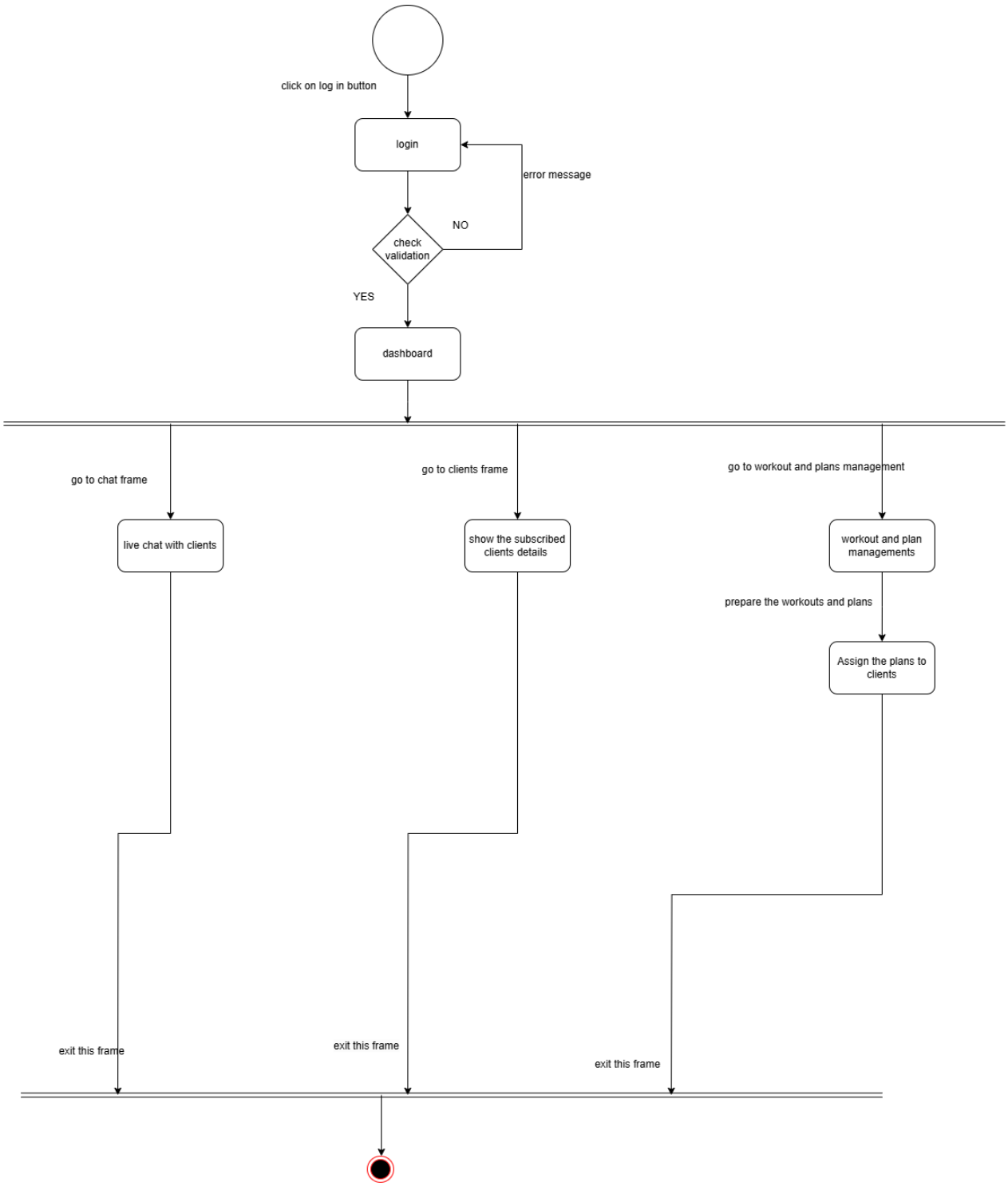
- **Class Diagram**



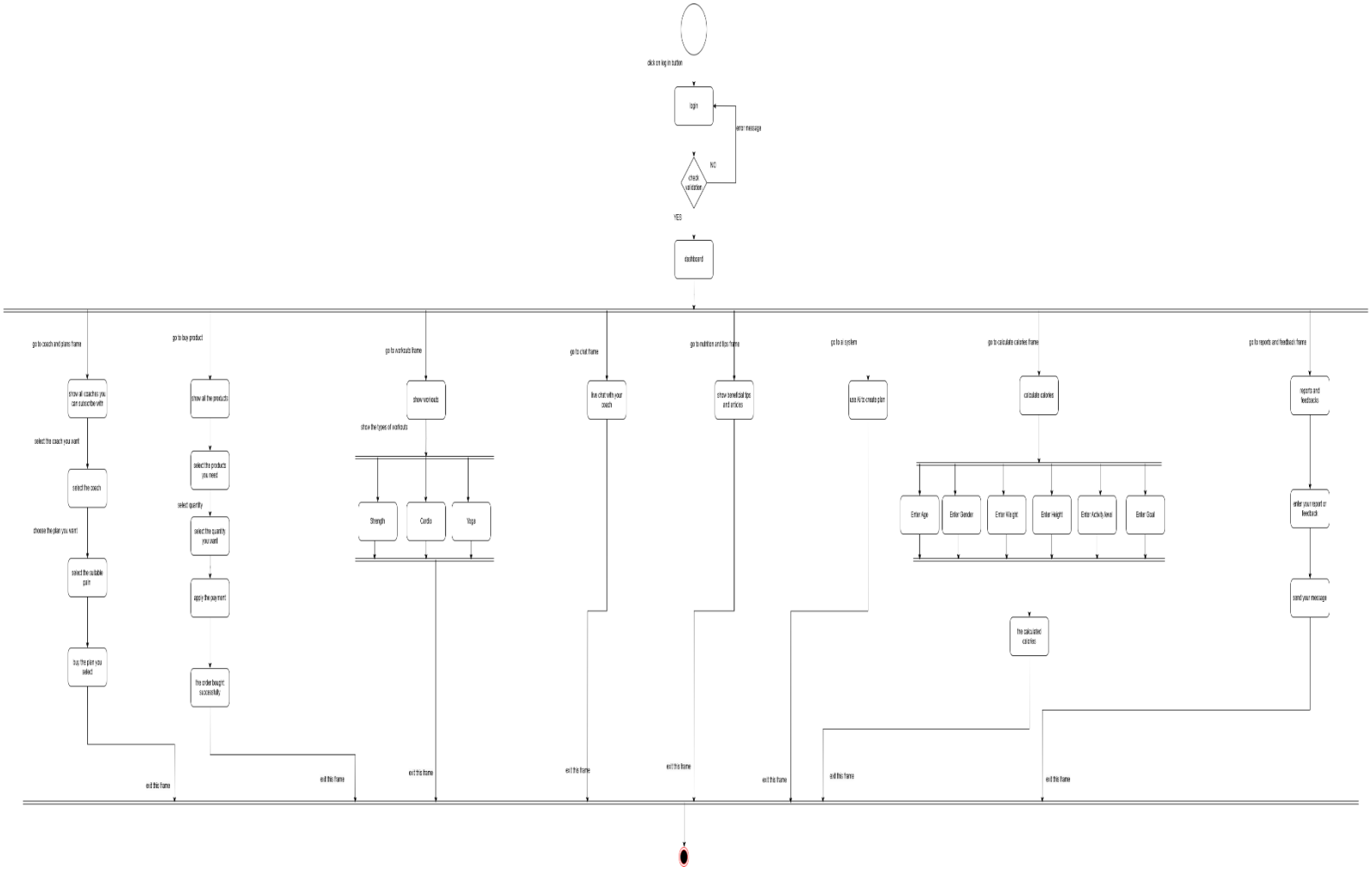
- **State Diagram (Admin)**



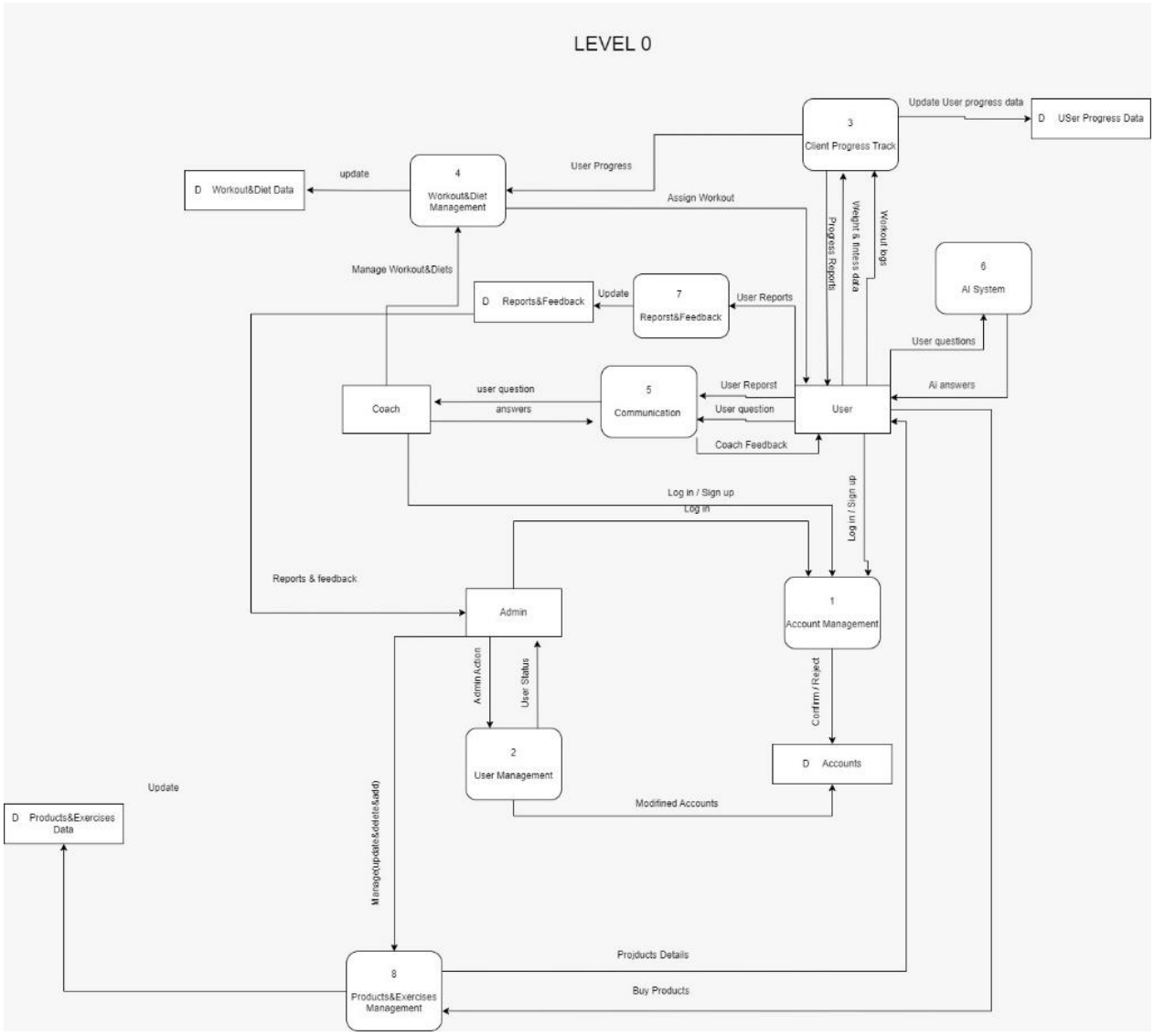
- **State Diagram (Coach)**



- **State Diagram (Client)**



- **DFD**


LEVEL 0
3
Client Progress Track
Update User progress data
D USer Progress Data
D Workout&Diet Data
update
4
Workout&Diet Management
User Progress
Assign Workout
Progress Reports
Weight & fitness data
Workout logs
6
AI System
Manage Workout&Diets
D Reports&Feedback
Update
7
Reporst&Feedback
User Reports
User questions
AI answers
Coach
user question
answers
5
Communication
User Reporst
User question
Coach Feedback
User
Log in / Sign up
Log in
Reports & feedback
Admin
1
Account Management
Admin Action
User Status
Confirm / Reject
2
User Management
D Accounts
Modified Accounts
Update
D Products&Exercises Data
Manage(Update&delete&add)
Projducts Details
8
Products&Exercises Management
Buy Products

4.3 Diagrams Description

4.3.1 Use Case Description

Use Case Overview:

The Use Case Diagram represents the interactions between three primary actors (Admin, Coach, and User/Client) and the system. Each actor has specific roles and functionalities within the platform.

Actors:

1. **Admin**
    - Manages users and coaches.
    - Manages products available on the platform.
    - Manages exercises to be included in workout plans.
    - Monitors overall platform activity.
    - Has access to the Sign up / Log in feature to manage platform access.
2. **Coach**
    - Manages workout plans for clients.
    - Manages diet plans to help users follow a proper nutrition schedule.
    - Manages clients assigned to them.
    - Chats with clients for guidance and support.
    - Uses system features like Calculate Calories and AI System to enhance training plans.
3. **User/Client**
    - Signs up/logs into the system.
    - Calculates calories based on food intake.
    - Uses the AI system for personalized recommendations.
    - Views nutrition and fitness tips.
    - Submits reports and feedback on progress.
    - Browses available workouts.
    - Purchases products related to fitness and health.
    - Subscribes to a plan for premium access.
    - Tracks progress over time.

4.3.2 Activity Diagram Description

System Overview:

The activity diagrams illustrate the workflow for three main actors: Admin, Coach, and User/Client. Each diagram describes how the system interacts with the actor from login to logout, including key activities.

1. Admin Activity Diagram

Flow Description:

1. Start
2. Admin Login/Sign Up
    - If successful → continue the process.
    - failed → retry login.
3. Admin Activities:
    - Approve/Suspend/Delete Users & Coaches
    - Add/Edit/Delete Products
    - Add/Edit/Delete Exercises
    - Monitor Platform Activity
4. Log Out
5. End

Purpose:

The admin oversees platform management by handling users, coaches, products, and exercises while ensuring smooth system operation.

2. Coach Activity Diagram

Flow Description

1. Start
2. Coach Login/Sign Up
    - If successful → continue the process.
    - If failed → retry login.
3. Coach Activities:

- Create Workout Plans
- Edit/Delete Plans
- View & Manage Clients
- Monitor & Guide Users
- Answer User Questions (Chat/Q&A)

4. Log Out
5. End

Purpose:

The coach assists clients by creating workout plans, monitoring their progress, and answering their questions.

3. User (Client) Activity Diagram

Flow Description

1. Start
2. User Login/Sign Up
    - If successful → continue the process.
    - If failed → retry login.
3. **User Activities:**
    - Calculate Calories
    - Track Progress
    - Book Coaching Sessions
    - Submit Reports & Feedback
    - Browse Workouts
    - Buy Plans
    - Buy Products
    - View Nutrition & Tips
4. Log Out
5. End

Purpose:

Users interact with the system to track fitness progress, receive AI-based insights, purchase products/plans, and communicate with coaches.

4.3.3 Class Diagram Description

Class Diagram Overview:

The system follows an object-oriented approach with different entities representing users, plans, products, and interactions. Below is a brief description of key classes and their responsibilities.

1. User Management

- **User**: Stores personal details, login credentials, and profile information.
- **Coach (inherits from User)**: Specializes in fitness training, managing clients, and creating workout/diet plans.
- **Client (inherits from User)**: Tracks fitness progress, follows plans, and makes purchases.

2. Communication & Logging

- **Message**: Handles user messaging, including sending, receiving, and status tracking.
- **ProgressLog**: Stores client progress details such as weight, measurements, and notes.

3. Fitness & Nutrition Plans

- **WorkoutPlan**: Manages exercises for clients, including duration, difficulty, and assigned coach.
- **DietPlan**: Defines client meal plans, including total calories and nutritional breakdown.
- **Meal**: Represents an individual meal with calorie details and preparation instructions.

4. Exercise & Products

- **Exercise**: Stores exercise details such as description, equipment, and targeted muscle group.
- **Product**: Represents fitness-related products for sale, tracking stock and price.

5. Transactions & Subscriptions

- **Purchase**: Manages client purchases, including date, quantity, and total amount.
- **Subscription**: Tracks client subscription plans, renewal, and status updates.

6. Key Functionalities

- Coaches can **create and manage workout/diet plans** for clients.
- Clients can **track progress, subscribe to plans, and make purchases**.
- Admins or users can **send messages and monitor interactions**.

4.3.4 ER Diagram Description

ERD Overview:

The system follows a **relational database design**, focusing on user management, fitness tracking, and transactions. Below is a brief description of key entities and their relationships.

1. User & Roles

- **User**: Stores login details, email, and profile information.
- **Coach (inherits from User)**: Has expertise, certifications, and manages workout/diet plans.
- **Client (inherits from User)**: Tracks health conditions, fitness goals, and follows workout/diet plans.

2. Fitness & Nutrition Plans

- **WorkoutPlan**: Contains exercises assigned to clients with difficulty level and schedule.
- **DietPlan**: Defines nutrition plans, total calories, and meal details.
- **Meal**: Represents an individual meal, tracking calories, proteins, carbs, and fats.
- **Exercise**: Stores details like duration, targeted muscle group, and calories burned.

3. Progress & Communication

- **ProgressLog**: Tracks client progress, including weight, measurements, and notes.
- **Messages**: Allows communication between users (coaches & clients).

4. Transactions & Subscriptions

- **Product**: Represents fitness-related items available for purchase.
- **Purchase**: Records transactions including product details, date, and amount.
- **Subscription**: Manages client subscriptions, renewal, and payment status.

5. Key Relationships

- Clients **have** workout and diet plans.
- Coaches **create** workout and diet plans.
- Clients **track progress** via logs.
- Clients **purchase** products and subscriptions.
- Users **send/receive** messages for communication.

4.3.5 State Diagram Description

State Diagram Overview:

The FitTracker system includes state diagrams for three main user roles: Admin, Coach, and Client.

1. **Admin State Diagram:** The admin logs in and accesses the dashboard, where they can manage users, exercises, products, and analytics. They can also edit, add, or delete records while overseeing system activity.
2. **Coach State Diagram:** The coach logs in to manage workouts and client plans, view subscribed clients, and communicate via live chat.
3. **Client State Diagram:** The client logs in and can interact with coaches, purchase plans/products, track workouts, calculate calories, and receive fitness tips.

4.3.6 Sequence Diagram Description

Sequence Diagram Overview:

The sequence diagrams illustrate the interactions between system components in various processes, including user authentication, subscription management, progress tracking, and workout planning.

1. User Authentication

This diagram details both user registration and login processes:

- **Registration:**
    - The user fills in the registration form.
    - The system checks if the email already exists. If it does, an error message is shown.
    - If the email is unique, a new user account is created, and the system redirects to the login page.

- **Login:**
    - The user enters their credentials.
    - The system validates them against stored records.
    - If credentials are correct, the user is granted access; otherwise, an error message is displayed.

2. Subscription Management

This sequence diagram represents the subscription flow:

- **Subscription Initialization:**
    - The client selects a subscription plan.
    - The system checks the client's eligibility. If ineligible, an error message is shown**.**
- **Payment Processing:**
    - If eligible, the system requests payment details.
    - Payment is processed, and the system verifies the transaction.
    - If successful, the subscription is activated, and the user receives a confirmation.
    - If the payment fails, an error message is displayed.

3. Progress Tracking

This diagram illustrates how clients track and analyze their progress:

- The client submits progress data, which is saved in the database.
- The system fetches historical data, analyzes performance, and calculates metrics.
- The client can view a progress summary or request a detailed report, which is compiled and displayed accordingly.

4. Workout & Diet Plan Management

This sequence diagram covers the interaction between coaches and clients for workout and diet planning:

- **Workout Plan Creation:**
    - A coach creates a workout plan, which is stored in the system.
    - Once the plan is ready, it is assigned to a client.
    - The client is notified of the assigned plan.

- **Plan Access & Progress Tracking:**
    - The client views the assigned plan and logs progress.
    - Progress updates are saved, and notifications are sent upon updates

4.3.6 Data Flow Diagram Description

Data Flow Diagram (DFD) Overview:

The Data Flow Diagram (DFD) provides a high-level view of the data movement within the FitTracker System. It consists of multiple processes, external entities, and data stores.

- **The Context Diagram represents the FitTracker System as a single entity interacting with three main actors:**

1. **Admin**:
    - Manages users & coaches
    - Monitors platform activity
    - Manages products & exercises
    - Oversees sign-up & login process
2. **Coach:**
    - Manages workout plans
    - Manages clients
    - Provides required details
3. **User/Client:**
    - Signs up/logs in
    - Views workout plans & nutrition tips
    - Joins challenges
    - Tracks progress & calculates calories
    - Uses AI system
    - Submits reports & feedback

- **The Level 1 DFD expands the system into detailed processes and data flow. Here's a step-by-step explanation:**

Processes & Data Flow:

1. **Account Management (Process 1)**

- Handles user Sign-up/Login
- Stores data in Accounts Database
- Confirms registration

2. **User Management (Process 2)**

    - Managed by Admin to handle user & coach accounts
    - Updates user status

3. **Client Progress Tracking (Process 3)**

    - Monitors user progress
    - Assigns workouts
    - Updates user progress data

4. **Workout & Diet Management (Process 4)**

    - Coaches manage Workout & Diet Plans
    - Updates stored Workout & Diet Data

5. **Communication (Process 5)**

    - Allows users to ask questions
    - Coaches provide answers
    - Enables chat-based feedback

6. **AI System (Process 6)**

    - Users ask AI system questions
    - AI provides responses & fitness recommendations

7. **Reports & Feedback (Process 7)**

    - Users submit progress reports & feedback
    - Coaches/Admin can review and update feedback

8. **Products & Exercises Management (Process 8)**

    - Manages fitness-related products & exercises
    - Users can browse & purchase workout products
    - Updates stored Products & Exercises Data