**Project Name: FitQuest**

**Project Overview:**

FitQuest is a comprehensive fitness and health tracking application designed to help users (clients) monitor their fitness progress, log activities, and follow personalized workout plans crafted by trainers. The application is built with user-centric features that cater to the needs of clients, trainers, and administrators, ensuring a seamless and engaging fitness experience. The platform leverages real-time communication and detailed analytics to enhance user interaction and optimize workout efficiency.

**Target Audience:**

* **Clients (Users):** Individuals who want to track their fitness activities, monitor their health metrics, and follow customized workout plans.
* **Trainers:** Professional trainers who create and manage personalized workout plans, track client progress, and provide guidance.
* **Admins:** Administrators who manage users, trainers, and the overall platform, ensuring smooth operation and data integrity.

**Core Features:**

1. **Authentication & Authorization:**
   * **Clients:** Can register, log in, and access personalized dashboards. They have permissions to log activities, view their workout history, and health statistics.
   * **Trainers:** Have additional permissions to create, update, and delete workout plans. They can access detailed client progress and offer real-time coaching.
   * **Admins:** Have the highest level of access, managing both clients and trainers. They ensure compliance with platform policies and maintain system health.
2. **User Dashboards:**
   * **Clients:** A dashboard showing their workout history, health metrics (e.g., weight, BMI, heart rate), and upcoming workout plans.
   * **Trainers:** A dashboard displaying client progress summaries, scheduled training sessions, and tools for creating or updating workout plans.
   * **Admins:** An administrative dashboard for monitoring platform activity, user statistics, and managing content.
3. **Detailed Data:**
   * **Workout History:** Clients can view a detailed history of their workouts, including type, duration, intensity, and calories burned.
   * **Health Metrics:** Track and visualize changes in health metrics over time, such as weight, BMI, or heart rate.
4. **Aggregated Data:**
   * **Trainers:** Access to aggregated data like the total number of workouts completed by all clients in a week, average progress per client, and more.
   * **Admins:** Can see overall platform statistics, such as user engagement, average workout completion rates, and overall health improvement metrics.
5. **Search & Filters:**
   * Clients can search for workouts by criteria such as type (cardio, strength, flexibility), difficulty (beginner, intermediate, advanced), duration, and equipment required.
   * Trainers can search for clients based on their progress, activity levels, or specific health goals.
6. **CRUD Operations:**
   * **Clients:** Can log new activities (e.g., a completed workout or a new health metric), update their profile information, and delete logs if needed.
   * **Trainers:** Create and update personalized workout plans, delete outdated plans, and manage client progress reports.
   * **Admins:** Manage user accounts, delete inappropriate content, and ensure data integrity across the platform.
7. **Real-Time Messaging via WebSockets:**
   * **Client-Trainer Communication:** Real-time messaging allows clients to ask trainers questions, receive feedback, and get motivation. Trainers can provide instant advice, adjust workout plans, and offer support.
   * **Notifications:** Clients receive real-time notifications for scheduled workouts, plan updates, or reminders to log their daily activities.
8. **Additional Features:**
   * **Progress Visualization:** Graphs and charts to help clients and trainers visualize progress over time, making it easier to track improvements and set new goals.
   * **Challenges & Goals:** Clients can participate in challenges set by trainers (e.g., 30-day workout challenge) and set personal goals within the app.
   * **Integration with Wearables:** Optional integration with wearable devices (e.g., Fitbit, Apple Watch) to automatically sync health data and activity logs.

**Tech Stack:**

* **Frontend:** React.js
  + **UI Frameworks:** Material-UI or Bootstrap for a responsive, user-friendly interface.
  + **State Management:** Redux for managing application state.
  + **Routing:** React Router for navigation.
* **Backend:** Spring Boot (Java)
  + **REST API:** Exposes endpoints for CRUD operations, user authentication, and real-time messaging.
  + **Security:** JWT-based authentication and role-based authorization.
  + **Data Access:** JPA/Hibernate for ORM, with custom JPQL queries for aggregated data.
  + **WebSockets:** Spring WebSocket for real-time communication between clients and trainers.
* **Database:** MySQL
  + **Schema:** Relational database schema with tables for users, workouts, health metrics, workout plans, messages, etc.
  + **Indexing:** Optimized queries for fast retrieval of detailed and aggregated data.
* **Deployment:**
  + **Cloud Hosting:** AWS or Heroku for hosting the application.
  + **CI/CD Pipeline:** Jenkins or GitHub Actions for continuous integration and deployment.
  + **Containerization:** Docker for consistent deployment environments.

**Project Plan:**

* **Sprint 1:** Setting up the development environment, creating the database schema, and implementing basic user authentication and role-based authorization.
* **Sprint 2:** Developing the user dashboards, including detailed data views (workout history, health metrics) and CRUD operations.
* **Sprint 3:** Implementing the trainer dashboard, workout plan management, and search/filter functionalities.
* **Sprint 4:** Adding WebSocket functionality for real-time messaging and notifications.
* **Sprint 5:** Testing, debugging, and refining the UI/UX for better user experience.
* **Sprint 6:** Final integration, deployment, and user acceptance testing.

FitTrack Pro aims to be an all-in-one solution for fitness enthusiasts and professionals, providing both the tools and data needed to achieve and maintain a healthy lifestyle.