Functional Specification Document

1. Introduction

This document specifies the functionality and features of the FastAPI server for DietFit, a system designed to manage user signups, logins, dietary recommendations, BMI calculations, calorie tracking, and exercise planning. The application integrates MongoDB as a database and external APIs for generating diet plans and recipes.

2. Purpose

The system aims to provide:

- A secure platform for users to sign up, log in, and manage dietary and exercise plans.
- Tools for calculating health metrics like BMI and calorie requirements.
- Integration with external APIs for personalized meal and exercise recommendations.

3. Functional Requirements

3.1 User Management

- Signup: Users provide `firstName`, `lastName`, `email`, and `password`. The system validates the email's uniqueness and hashes the password using SHA256 before storing it in MongoDB.
- Login: Users log in with an email and password. The system verifies credentials and provides appropriate responses.
- First Name Retrieval: Users can fetch their first name using their email.

3.2 Health Metric Calculations

- BMI Calculation: Users provide `gender`, `age`, `height`, and `weight`. The system calculates BMI using the formula: BMI = weight (kg) / (height (m))^2.
- Calorie Calculation: Users provide `gender`, `age`, `height`, `weight`, and activity level. The system calculates BMR

and daily calorie intake based on activity level.

3.3 Diet Plan

- Users provide diet preferences and filters through a POST request.

- The system queries the Edamam API to fetch meal data.

- A 7-day diet plan is generated, including meals (breakfast, lunch, dinner) with nutritional details.

3.4 Exercise Plan

- Users provide filters (e.g., difficulty, type, muscle).

- The system fetches exercise recommendations from MongoDB.

- A 7-day plan is generated with categorized exercises.

3.5 Static Pages

- The system includes static pages for Login, Signup, BMI Calculator, Calorie Tracker, Diet Plan, Exercise Plan, and About Us.

3.6 Testing Endpoints

- Provides debugging routes for GET and POST requests.

4. Data Management

4.1 MongoDB Collections

1. Users Collection: Stores user details such as `email`, `firstName`, `lastName`, and `hashedPassword`. Indexed by `email`.

2. Exercises Collection: Stores exercise data including `name`, `type`, `muscle`, `equipment`, `difficulty`, and `instructions`. Indexed by multiple fields for optimized querying.

4.2 External API Integration

1. Edamam Meal Planner API: Fetches meal recommendations based on user preferences.

2. Edamam Recipe API: Fetches detailed recipe information for selected meals.

5. Security Features

- Password Hashing: Passwords are hashed using SHA256 before storage.

- SSL: The server supports HTTPS with SSL key and certificate files (`key.pem`, `cert.pem`).

6. Key Functional Components

6.1 Routes

1. User Management: `/signupCheck`, `/loginCheck`, `/getFirstname`

2. Health Calculations: `/calculate_bmi`, `/calculate_calories`

3. Diet and Exercise Plans: `/viewDiet`, `/getExercises`

4. Static Pages: `/login`, `/signup`, `/bmi`, `/calorie`, `/dietplan`, `/exerciseplan`, `/about`

6.2 Utility Functions

- Password Utilities: Hashing and password matching.

- Database Utilities: Fetching user data and inserting new users.

7. Non-Functional Requirements

- Performance: Handles up to 100 concurrent users without significant latency.

- Reliability: MongoDB connection is verified at server startup.

- Scalability: API architecture supports horizontal scaling.

- Maintainability: Modular code structure with separate utilities for user, diet, and exercise features.

- Security: Sensitive data is securely hashed and stored.

8. Assumptions and Constraints

- The application assumes valid input data from users.

- External API keys must be properly configured for Edamam API access.

- MongoDB must be running and accessible.

9. Future Enhancements

- Mobile App Support: Extend functionality for mobile users.

- Additional Metrics: Include metrics like heart rate or activity tracking.

- Internationalization: Support multiple languages.