Software Engineering Assignment

**Project Name:** Fitness Tracking System Project

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**Introduction**

The Fitness Tracking System aims to assist individuals in tracking their fitness progress through recording workouts and keeping tabs on fitness objectives while observing improvements, over time. As the significance of health and fitness continues to grow in routines a fitness tracking application provides users with a digital resource to maintain motivation monitor performance levels and oversee dietary intake. This initiative focuses on creating a user adaptable platform to enable users to reach their wellness aspirations.

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| **ID**  **Functional Requirements** | | **Requirement** | **Description** | **Priority** | **Status** |
| 1. | Registration Detail and Profile Management | | * Users must be able to sign up for accounts via the system with a different username and password. * They shall use registered credentials to log in to the system. * The system will allow users to edit their profile data such us name, email, and fitness objectives. * Admin Controls Edit and Remove User Accounts: The system shall support admins in managing user accounts (updating and/or deleting of accounts if necessary). | High | In Progress |
| 2. | Workout Tracking | | * The system allows users to log their workouts, including type of exercise, duration, and repetitions. * As each user logs their workout, the system is also supposed to save each log, and associated it with the user. * Users will have the ability to view and update past workout records. * It allows a coach to update workouts for users managed by the coach. | High | In Progress |
| 3. | Nutrition Tracking | | * Users and admins shall be able to log their daily food intake by entering food items and their quantities into the system. * Calculate and maintain nutritional values (e.g. calories) based on food entries. * The system shall allow users to view and update their nutrition intake history. * Coaches and Nutritionists should be able to manage users' Nutrition plans, add/update details of Nutrition. | Medium | Not Started |
| 4. | Progress Reporting | | * Over time the system shall generate and display graphical representation(e.g. graphs) of users fitness progress. * The system shall allow users to view progress reports of workout and nutrition which is calculated by specific time frame(e.g. weekly, monthly). * The system shall allow coaches and admins to view users progress reports to track the fitness journey and also help them with their fitness goals. | Medium | Not Started |
| 5. | Account Management  (Admin) | | * The system shall allow admins to manage user accounts which includes creating, updating and deleting accounts. * The system shall enable admins to update any user information and reset passwords if needed. * The system shall provide account management functionalities specifically for coaches in handling nutrition tracking and assigned users workouts. | Medium | Completed |

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| **ID**  **Non-Functional Requirements** | **Requirements** | **Description** | **Priority** | **Status** |
| 1. | Performance | * The System should be able to hold up to 1,000 concurrent users. * The Loading time should be under 2 seconds in order for a responsive user experience. | High | In Progress |
| 2. | Security | * All the data of the user must be encrypted to protect unauthorized access. * Data Handling and Privacy policies must fall in with the relevant regulation like the GDPR and more. | High | Not Started |
| 3. | Usability | * The interface should be spontaneous and user friendly. * The interface should be easy for navigating around. * The system should be mobile responsive to provide an ideal experience across devices. | Medium | In Progress |
| 4. | Scalability | * The system should be designed to provide future features such as enhanced tracking and wearable devices. | Medium | Not Started |

**User Stories**

**Non-Functional Requirements**

1. As a user, I want to be able to create an account with a unique username and password so that I can access the fitness tracking app securely.
2. As a user, I want to update my personal information, so that my profile is accurate and relevant to my fitness needs.
3. As a user, I want to set and modify my fitness goals so that I can track my progress and stay motivated.
4. As a user, I want to log my workouts so that I can keep track of my fitness activities.
5. As a user, I want to view my workout history so that I can monitor my past activities and track my progress over time.
6. As a user, I want to log my daily food intake by entering food items and quantities so that I can monitor my nutrition.
7. As a user, I want to set nutritional goals for myself so that I can stay on track with my dietary plan.
8. As an admin, I want to be able to add new food items to the system so that users have a comprehensive list to choose from when logging their nutrition.
9. As a user, I want to view a graphical representation of my fitness progress over time so that I can see how my fitness level has improved.
10. As a user, I want to filter my progress reports by specific time frames (e.g., weekly, monthly, yearly) so that I can better understand my progress in different periods.
11. As a fitness coach, I want to generate a fitness progress report for my clients so that I can assess their achievements and adjust their fitness plan as needed.
12. As an admin, I want to manage user accounts, including creating, updating, and deleting accounts, so that I can maintain an organized user database.
13. Updating User Information
14. As an admin, I want to update user accounts with information provided by users or coaches so that the profiles stay up to date.
15. As an admin, I want to delete inactive or unauthorized user accounts so that the system remains secure and up to date.
16. As a fitness coach, I want to update users' workout routines so that they receive a personalized training program based on their progress.
17. As a fitness coach, I want to view my clients' progress reports so that I can provide them with targeted guidance and track their improvement.

**Stakeholders and Constraints**

* **Stakeholders:** User, Admins, Fitness coaches, Development team.
* **Constraints:** Budget Constraints, Security Constraints, Data Storage Constraints, Performance Constraints.

**Life-Cycle Model Analysis and Selection**

For this Section we will be comparing two software models: Waterfall and Agile, and from that we will be choosing the preferred model for our project.

**Firstly, we will be Comparing Waterfall and Agile**

* **Agile**

Agile development is an iterative and flexible process. It means dividing the project into bite sized pieces. Agile is focused on quality, short cycle and delivering high customer service.

* + **Benefits:**
* Flexibility
* Frequent User Feedback
  + **Drawbacks:**
* Requires Continuous Involvement
* Difficult to predict Timelines
* **Waterfall**

Waterfall is all about gathering all requirements upfront Waterfall is a linear and structured approach to development.

It Completes all work in pre-defined phases. (e.g. Requirements > System and Software Design > Implementation > System Testing > Maintenance).

* + **Benefits:**
* Flexibility
* Frequent User Feedback
  + **Drawbacks:**
* Requires Continuous Involvement
* Difficult to predict Timelines

**Selection of the Life Cycle Model**

Based on the Comparison made on the Two Models we decided to go with the Agile Model.

We kept Agile because, a fitness app might need to be updated because of user feedback and new trends in the world of exercising. Agile would also allow for ongoing updates and improvements

**For Example:**

* At first we start with a simple basic version that only handles workout or progress logging.
* Agile allows you to add nutritional tracking or goal setting later on down the road as feedback comes in from users.

**Justification:**

* + The approach towards Agile Model encourages us to form a collaborative environment where developers, users, and stakeholders work together to refine the system based on real-time insights and evolving fitness trends, which is important if you want your fitness app successful and keep engaging them.
  + Furthermore, the Agile model empowers the development team to respond promptly to user feedback and implement necessary adjustments. This iterative process ensures that the fitness tracking system remains relevant and user-friendly, meeting the diverse needs of targeting its audience. By embracing Agile methodology, the fitness tracking system is made for success in the dynamic and competitive fitness technology market

**Alternatively we could have chosen Waterfall Model**

* + In a case where we decided to keep the Fitness Tracking System just with the fixed requirements without any important updates in its functionality, Waterfall can be adapted. If we know exactly that this application is going to do (workout tracking, goal setting, progress charts), a linear approach makes sense.

**Initial Domain Models**

* **A diagram of a fitness tracking application

  Description automatically generatedUse case Diagram**
* **Class Diagram**



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**Release Plan**

1. **Initial Release**

In the Initial Release we will deal with core functionalities

* + **User Registration and Profile Management:** In this the User will be able to create accounts, login and update personal information like contact details and fitness goals.
  + **Workout and Nutrition Logging:** In this the User can log their workouts( exercise type, duration, reps) and checks the daily food intake( food items, quantities), which allows them to monitor both their fitness and nutrition habits.
  + **Basic Reporting:** In this the User views simple reports that is used to track progress in their workouts and nutrition over time.

1. **Phase 2**

In the second phase we will expand on advanced features such as,

* **Advanced Analytics:** In this the system will provide the analytics like the graphical representation of fitness programs and nutrition trends over various time frames
* **Integration and external System**: The Fitness tracking will be integrated by third-party system, such as health or school systems, for sharing relevant fitness data.
* **Automated reminders and notification:** Over here Users will receive notification for workouts and nutrition logging to encourage them with proper fitness routines.

1. **Final Release**

In the final release the key features are,

* **Scalability and performance Optimization:** Over here the System should support up-to 1000 concurrent users with loading time under 2 seconds for a smooth responsive experience.
* **Security and Privacy Enhancement:** All of the Users data will be encrypted to ensure privacy, with agreement to regulatory standards.
* **Enhanced User Interface:** A purified, user friendly interface optimized for easy use across various devices.
* Ongoing Maintenance and Support: The final release will establish a process for regular updates, Addressing the need of both maintenance and potential future expansions like wearable integration.