UTM
UNIVERSITI TEKNOLOGI MALAYSIA

SECJ1023 Programming Technique II Semester 2, 2023/2024

Group Project Deliverable 4
Problem Analysis and Design

Section : 08

Group Member :

OW YEE HAO	A23CS0261
YAP JIA XIN	A23CS0199
CHANG WEI LAM	A23CS0212

Topic : Nutrition Tracker System

Section A : Compilation of findings from first and second deliverable

Synopsis

These days, the prevalence of unhealthy eating habits, fueled by a reliance on junk food and snacks, has contributed to many health issues, including obesity and related diseases. Recognizing the importance of maintaining a balanced diet and an active lifestyle, we aim to introduce a nutrition tracker system to address this growing concern.The nutrition tracking system aims to provide users with a comprehensive platform to monitor their dietary intake, set nutrition goals, and receive personalized recommendations. By integrating user-friendly interfaces and advanced data analysis, the system empowers individuals to make informed decisions about their health and wellness.

System Objectives and Purpose

1. Enable users to set personalized health goals based on factors such as age, weight, gender, and activity level
2. Track daily food intake, including calories, macronutrients (carbohydrates, fats, proteins) and fiber
3. Provide a tracking report based on the user's progress towards their calories intake and health condition.
4. Offer personalized feedback from nutritionists to optimize dietary habits and improve overall well-being.

How to use the system:

- User Registration/Login : The system allow two type of users:
    - Regular users: New users can sign up by creating a new username and password. Existing users can log in with their credentials.
    - Nutritionist: Nutritionists can register for specialized accounts that can access additional functionalities. Existing nutritionists can log in with their credentials to provide guidance to regular users.

- Profile Setup : Users set up their profiles by entering relevant details such as height, weight, and activity level. The system utilizes this information to determine suggested nutrition goals tailored to users' lifestyle.

- Goal Setting : The system provides a recommended daily calorie budget based on users' individual information. Users also have the option to set personalized nutrition goals, such as calorie intake targets.

- Daily Tracking:
    - Food Intake : Users categorize their daily food intake into distinct meal categories such as breakfast, lunch, dinner, and snack. They log their consumption by searching for items in the system's database or manually entering nutritional information. They track calories, macronutrients (carbohydrates, fats, proteins), and fiber consumed throughout the day.

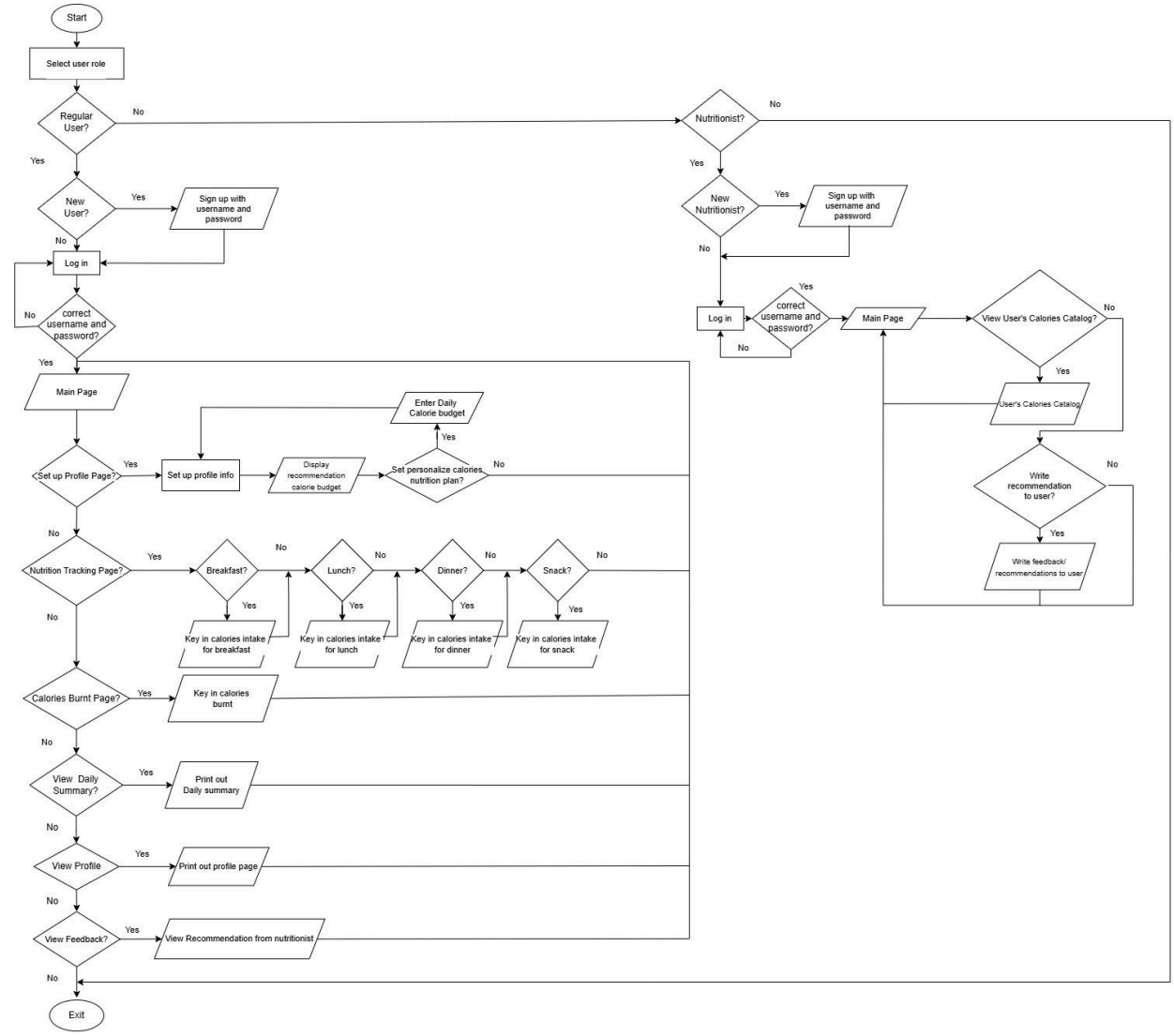
    - Physical Activity : Users also track their daily calories burned. This includes exercises, workouts, or any other physical movements that contribute to their energy expenditure. Users have the option to directly input the calories burnt through physical activity.

- Feedback from nutritionist : The system compares users' nutritional intake against personalized targets thereby generating real-time overview on users' progress towards their nutrition goals. Additionally, users are offered personalized feedback from nutritionists based on users' diet patterns.

Reporting/Output:

- Daily Summary : Users receive a daily summary of their food intake including nutrition intake and calories burnt.
- Nutritionist feedback : Nutritionists can review users' data and provide tailored feedback for achieving optimal health and wellness.

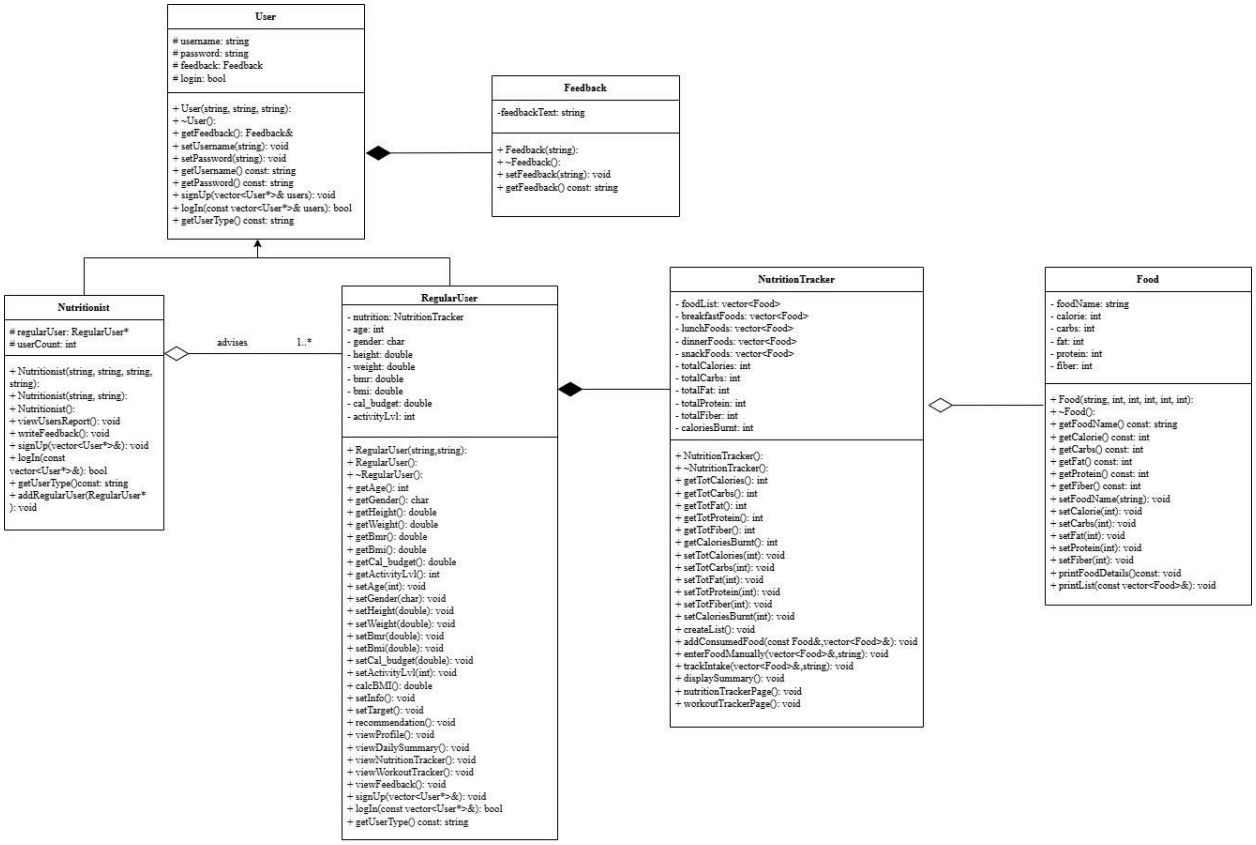
Flow Chart


Start
Select user role
Regular User?
No
Yes
New User?
Yes
Sign up with username and password
No
Log in
No
correct username and password?
Yes
Main Page
Set up Profile Page?
Yes
Set up profile info
Display recommendation calorie budget
Enter Daily Calorie budget
Yes
Set personalize calories nutrition plan?
No
No
Nutrition Tracking Page?
Yes
Breakfast?
No
Lunch?
No
Dinner?
No
Snack?
No
Yes
Key in calories intake for breakfast
Key in calories intake for lunch
Key in calories intake for dinner
Key in calories intake for snack
No
Calories Burnt Page?
Yes
Key in calories burnt
No
View Daily Summary?
Yes
Print out Daily summary
No
View Profile
Yes
Print out profile page
No
View Feedback?
Yes
View Recommendation from nutritionist
No
Exit
Nutritionist?
No
Yes
New Nutritionist?
Yes
Sign up with username and password
No
Log in
Yes
correct username and password?
No
Main Page
View User's Calories Catalog?
No
Yes
User's Calories Catalog
Write recommendation to user?
No
Yes
Write feedback/ recommendations to user

Main Process Description:

The system begins by identifying the user type, allowing individuals to choose whether they are a regular user or a nutritionist. Existing users can log in directly, while new users must sign up by creating a new password and username and nutritionists also login with their professional credentials.If the username and password is used before, the user should use others in order to create an account.Once logged in, regular users are directed to a main page with different sections: set up user profile, viewing user profile, nutrition tracker, calories burnt tracker, viewing daily summary and feedback. Firstly, users are required to set up their profile by providing their basic personal information, such as age, weight, and height and adjust their calorie budgets according to their preferences. They can view the user profile after setting up. In the daily summary section, users can view their nutrition history and calories intake or burnt in the daily report that is generated by the system.The Nutrition Tracker section allows users to log their nutritional intake for different meal categories, such as breakfast, lunch, snack, and dinner, as well as record the calories burnt through physical activities at the calories burnt section. Lastly, the Feedback section provides personalized feedback from nutritionist, and users can look through the feedback in the system. For nutritionists, they can view the calorie catalogs of regular users, allowing them to monitor users' nutritional intake and physical activity. Nutritionist can provide personalized feedback based on this data.

Class Diagram



Class Diagram Justification:

- User as a Base Class: Since both RegularUser and Nutritionist share common attributes like username and password, it's logical to have a base User class.
- RegularUser and Nutritionist Inheritance: Inheriting from User allows code reuse for common functionalities like SignUp and LogIn.
- Association Relationships: These relationships model real-world interactions between users, nutrition tracking, food and feedback mechanisms, ensuring that the design is intuitive and maintainable.

Section B : Implementation of the concept

<u>OO Concept</u>

1. Array of Objects

Create an array of objects to store multiple instances of a class. In our project, the nutritionist class consists of the array of the object which is a regular user to manage the regular user.

2. Encapsulation

Encapsulation refers to combining attributes and methods in one package, known as a class and hiding the implementation of the data from the user of the object. This ensures data security and prevents unauthorized access. We hide all those user information with the modifiers 'private' and the system access it via accessor and mutators

3. Association (Aggregation and Composition)

Composition :

1. User and Feedback:
    - User class has an attribute feedback of type Feedback.
    - Justification: A nutritionist can provide feedback to the user and it can be viewed by regular users. Thus, there is a direct relationship where each user can be associated with feedback.
2. RegularUser and NutritionTracker:
    - The RegularUser class has an attribute calories of type NutritionTracker.
    - Justification: Regular users need to track their calories, and this tracking is managed through the NutritionTracker class, thus associating these two classes.

Aggregation :

1. NutritionTracker and Food:
    - The NutritionTracker class has an attribute food of type Food by using vectors.
    - Justification: The nutrition tracker needs to manage different food items, hence associating it with the Food class.
2. Nutritionist and RegularUser:
    - Nutritionist class has an attribute regularUser of type RegularUser *.

- Justification: A nutritionist manages multiple regular users, providing recommendations and viewing their calorie catalogs, thereby creating an association relationship.

4. Inheritance and Polymorphism:

Inheritance:

1. RegularUser and User:
    - RegularUser inherits from User.
    - Justification: A regular user is a specific type of user with additional attributes and methods related to health and calorie tracking, thus inheriting basic user properties.
2. Nutritionist and User:
    - Nutritionist inherits from User.
    - Justification: A nutritionist is also a type of user with specialized methods for managing regular users, making inheritance from the User class appropriate.

Polymorphism:

- Login and Sign Up method
- Pure abstract method inside the User class and override in child class of regular user and nutritionist that have own specification

5. Exception Handling:

We apply on a Regular User class that checks age, height, weight, gender and activity level that is entered by the user to avoid invalid data and accepted by the system in order to avoid abnormal conditions in the system.

References

1. https://www.calculator.net/bmi-calculator.html
2. https://www.calculator.net/bmr-calculator.html
3. https://www.healthyweightforum.org/eng/calculators/activity-burned/
4. Nutritional Facts for most common foods (kaggle.com)