**EECS3311 – Echo fitness app**Software Design Document

| **Version** | **Date** | **Author(s)** | **Summary of Changes** |
| --- | --- | --- | --- |
| 1.0 | 13/10/23 | Khoa Tran | Document created, general structure outlined, project title pending. |
| 1.1 | 13/10/23 | Adam Mokdad | Added charts for modules and interfaces. |
| 1.2 | 14/10/23 | Alex Valdez | Added test cases |

# Introduction:

**Purpose:** The goal of the project is to create an application that tracks and calculates a user’s BMR level, BMI level, calorie intake, and nutrition goals.

**Overview:** The software must be able to handle the following use cases.

1. *As a user, I want to be able to create a profile in the application.*
2. *As a user, I want to be able to log my diet data in the application.*
3. *As a user, I want to be able to log my exercise in the application.*
4. *As a user, I want to be able to visualize my calory intake and my exercise over time.*
5. *As a user, I want to be able to visualize my daily nutrient intake.*
6. *As a user, I want to see how much weight in fat I will lose under my current diet and exercise pattern.*
7. *As a user, I want to know how well my diet aligns with the Canada Food Guide.*

**References:**

* BMR Calculator Formula: <https://www.calculator.io/bmr-calculator/#the-formula-of-katch-mcardle-3>
* BMI Calculator Formula: <https://www.calculator.io/bmi-calculator/>
* Total Daily Energy Expenditure: <https://www.verywellfit.com/what-is-energy-expenditure-3496103#toc-tdee-calculator>

# Major Design Decisions:

# Sequence Diagrams:

# Architecture:

**Modules**

| **Module Name** | **Description** | **Exposed Interface Names** | **Interface Description** |
| --- | --- | --- | --- |
| M1: User Profile | Manage user profile (creation, editing, deletion). Manage settings. | M1:I1, M1:I2 | M1:I1: Interface to handle basic user data.  M1:I2: Interface to manage user settings and preferences |
| M2: Dietary and Exercise Logging | Allows users to log dietary and exercise data, and calculate nutritional value and calories burned. | M2:I3, M2:I4 | M2: I3: Interface for data input and nutrition calculation  M2:I4: Interface for logging exercise and calculate calories burned |
| M3: Graphing Visualization | Generates visual data representations for caloric and nutritional data. | M3:I5 | M3: I5: Interface to produce various visualizations |
| M4: Weight Prediction | Uses caloric data to predict potential weight loss | M4:I6 | M4:I6: Predicts weight loss based on caloric data |
| M5: CFG Alignment | Compares dietary data with CFG recommendations | M5:I7 | M5:I7: Evaluates and visualizes alignment with CFG |
| M6: Database | Handles storage, retrieval and management of all user data | M6:I8 | M6:I8: Handles data storage and retrieval |
| M7: UI | Renders UI, handles user inputs, and manages frontend interaction. | M7:I9 | M7:I9: Interfaces for displaying UI and managing user interactions. |

**Interfaces**

| Interface Name | Operations | Operation Desc |
| --- | --- | --- |
| M1:I1 | <void> I1:Op1() used by M7  <void> I1:Op2(int x) used by M7 | Op1(): Handle creation and selection of user profiles.  Op2(int x): Modify details in a user’s profile. |
| M1:I2 | <void> I2:Op3() used by M7 | Op3(): Adjust user settings |
| M2:I3 | <Nutrition Data> I3:Op4(String y) used by M7, M4, M5 | Op4(String y): Input dietary data and calculate nutritional values. |
| M2:I4 | <int> I4:Op5(int z) used by M7, M4 | Op5(int z): Log exercise data and calculate calories burned. |
| M3:I5 | <Chart> I5:Op6(Date a, Date b) used by M7 | Op6(Date a, Date b): Generate a visualization for a specified date range. |
| M4:I6 | <float> I6:Op7() used by M7 | Op7(): Predict weight loss using current data. |
| M5:I7 | <CFG Comparison> I7:Op8() used by M7 | Op8(): Compare and visualize comparison with CFG recommendations. |
| M6:I8 | <User Data> I7:Op8() used by M7, M2, M3, M4, M5 | Op9(): Retrieve/store data in the database. |
| M7:I9 | <void>  I9:Op10() used by M1, M2, M3, M4, M5, M6 | Op10(): Render specific UI elements based on user interaction. |

# Class Diagrams and Initial Implementation:

# Design Patterns:

* Structural Patterns:
* Behavioral Patterns:
* Creational Patterns:

# Activities Plan, Product Backlog, and Sprint Backlog:

**Group Meeting Logs:**

# Test Driven Development:

| Test ID | 1 |
| --- | --- |
| Category | Evaluation of parameters to create a profile |
| Requirements Coverage | UC1-Successful-profile-creation |
| Initial Condition | System has been initiated and runs |
| Procedure | 1. User provides name 2. User provides date of birth 3. User provides height 4. User provides weight 5. User clicks create profile |
| **Expected Outcome** | The users profile should be added and will be displayed in the splash screen |
| **Notes** | User should provide valid input |

| Test ID | 2 |
| --- | --- |
| Category | Evaluation of parameters to log diet data |
| Requirements Coverage | UC2-Successful-data-load |
| Initial Condition | System has been initiated and runs,user is able to access their profile and its data |
| Procedure | 1. User inputs a meal 2. User inputs a date 3. User inputs an amount 4. User clicks log data |
| **Expected Outcome** | Data about the meals calories, food group and nutrients is correctly fetched from the database |
| **Notes** | User should provide valid input |

| Test ID | 3 |
| --- | --- |
| Category | Evaluation of parameters to catch when a meal is not known |
| Requirements Coverage | UC3-Successful-error-catch |
| Initial Condition | System has been initiated and runs,user is able to access their profile and its data |
| Procedure | 1. User inputs a meal (\*that is not in the database) 2. User inputs a date 3. User inputs an amount 4. User clicks log data |
| **Expected Outcome** | The data is not fetched and an message is displayed |
| **Notes** | User should provide valid input |

| Test ID | 4 |
| --- | --- |
| Category | Evaluation of parameters to catch when input is not provided |
| Requirements Coverage | UC4-Successful-data-load |
| Initial Condition | System has been initiated and runs,user is able to access their profile and its data |
| Procedure | 1. User inputs a meal 2. User inputs a date 3. User forgets to input amount or inputs an amount of zero 4. User clicks log data   \*user could forget to input meal, date and/or amount |
| **Expected Outcome** | The data is not fetched and a message is displayed |
| **Notes** |  |

| Test ID | 5 |
| --- | --- |
| Category | Evaluation of parameters to exercise data |
| Requirements Coverage | UC5-Successful-data-load |
| Initial Condition | System has been initiated and runs,user is able to access their profile and its data |
| Procedure | 1. User inputs a date and time 2. User inputs the type of exercise 3. User inputs duration 4. User inputs the intensity 5. User clicks log exercise data |
| **Expected Outcome** | Data about the exercise is correctly fetched form the database |
| **Notes** | User should provide valid input |

| Test ID | 6 |
| --- | --- |
| Category | Evaluation of parameters to catch when an exercise is unknown |
| Requirements Coverage | UC6-Successful-error-catch |
| Initial Condition | System has been initiated and runs,user is able to access their profile and its data |
| Procedure | 1. User inputs a date and time 2. User inputs the type of exercise (\*that is not in the database) 3. User inputs duration 4. User inputs the intensity 5. User clicks log exercise data |
| **Expected Outcome** | Data is not fetched and a message is displayed |
| **Notes** | User should provide valid input |

| Test ID | 7 |
| --- | --- |
| Category | Evaluation of parameters to catch when an exercise is unknown |
| Requirements Coverage | UC7-Successful-error-catch |
| Initial Condition | System has been initiated and runs,user is able to access their profile and its data |
| Procedure | 1. User inputs a date and time 2. User inputs the type of exercise 3. User inputs duration 4. User forgets to input the intensity 5. User clicks log exercise data   \*user could forget to input date and time, type of exercise, duration and/or intensity |
| **Expected Outcome** | Data is not fetched and a message is displayed |
| **Notes** | User should provide valid input |

| Test ID | 8 |
| --- | --- |
| Category | Evaluation of parameters to calculate calories burnt |
| Requirements Coverage | UC8-Successful-calcualtion |
| Initial Condition | System has been initiated and runs, exercise data is accurately logged |
| Procedure | 1. System access exercise data 2. Calculates calories burnt |
| **Expected Outcome** | Amount of calories burnt is calculated accurately and saved in the database |
| **Notes** |  |

| Test ID | 9 |
| --- | --- |
| Category | Evaluation of parameters to calculate BMR |
| Requirements Coverage | UC9-Successful-BMR-calcualtion |
| Initial Condition | System has been initiated and runs, exercise data is accurately logged |
| Procedure | 1. System access exercise data 2. Calculates BMR |
| **Expected Outcome** | BMR is calculated accurately and saved in the database |
| **Notes** |  |

| Test ID | 10 |
| --- | --- |
| Category | Evaluation of parameters to input a time period |
| Requirements Coverage | UC10-Successful-data-load |
| Initial Condition | System has been initiated and runs |
| Procedure | 1. User inputs start date 2. User inputs an end date 3. User clicks confirm |
| **Expected Outcome** | Time period is logged and used in use case four,five,six or seven |
| **Notes** | User should provide valid input |