



GLOBAL
ENGINEERING
ACADEMY

Genesis



L&T Technology Services



GENESIS AUGUST 2021 APPLIED SDLC

C PROJECT ON HEALTH MONITORING SYSTEM

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Introduction

Physical fitness and health plays an important role in our day to day life. Regular exercise and physical activity in terms of sports, workouts and running promotes strong muscles and bones. It also improves respiratory, cardiovascular and overall health. With the recent unprecedented times of the Covid-19 pandemic the need for home workouts and a manageable diet based on individual needs has become one of the most common requirements to maintain a healthy lifestyle.

Research

The idea behind *HealthyMe!*

With the advent of Fast-food chain restaurants there are unhealthy yet tasty fast food items that are available at cheaper prices and with the introduction of food delivery aggregators people are inclined to order out rather than maintain a balanced or healthy diet. Improving technology has also played a major role in our everyday lives with an increase in jobs that promote an increasingly sedentary lifestyle. All these factors have contributed to a decline in the overall health and lifestyle of people these days.

With the recent spread of awareness in terms of social media over the various health concerns with an increasingly inactive lifestyle and its drawbacks people have now realised the benefit of exercise and a balanced diet but yet do not find the time to join Gym memberships and also find these overly expensive. Thus the solution in this case comes in terms of home workouts and health trackers that would allow user's to monitor not just their physical activity but their calorie intake as well.

HealthyMe is an inexpensive and easy to use application that can recommend a custom health plan consisting of both a balanced, healthy diet as well as a rigorous workout session based on the user's:

- Height
- Weight
- Age
- Gender

This data is used to calculate the user's **BMI, BMR** index and these values would then be used to ensure that the best possible fitness regime is recommended. The user may also accurately track their calorie intake to ensure they stick to the set plan and also keep a track of their water intake and set personalised goal that meets their requirements and comfort. All this coupled with easy access anytime and anywhere makes HealthyMe a convincing application that would be of great to use to a large demographic of young users and working professionals.

Advantages

- **Work out Anywhere:** As an application that is available on the go workouts are no longer restricted to a particular and can be done at any location as per the users convenience.
- **Cost Effective:** As these workouts do not require any specialised equipments they are usually cost effective with only a small subscription charge billed monthly or yearly based on the users requirement.
- **All in one Health App:** The can not only provide workout sessions but also recomend balanced diet plans and also help keep a track of daily calorie intake and help improve your lifestyle habits and health.
- **Keep you motivated:** A personalised notification can always serve as motivation to meet the fitness goals set for the day, this coupled with custom rewards goes a long way in keeping focused on your overall activities and fitness.

Disadvantages

- **May be inaccurate:** Fitness app rely to a large extend on the data provided by the user and may sometimes be inaccurate in case the user data is not updated frequently and accurately.
- **May or may not be helpful:** Unlike a paid membership at the Gym where a trainer ensures you achieve your workout goals fitness app rely on the user to make a conscious effort else there would be no scope for improvement in the user's lifestyle.
- **May be unregulated and sometimes harmful:** As of now there are multiple fitness apps availabe to be downloaded for free online but a majority of these apps are unregulated and do not have set standards due to which there is o certain assurance that the recomend plan might benifit the user.

Cost and Features

Development of a fitness application involve large costs in terms of UI/UX design, quality assurance services, DevOps services and project management. A **Minimum value product** is

first developed which is the app with only the basic and used to get user feedback after which advanced features can be gradually added.

On an average considering the development time spent on the various aspects of an app with an estimated cost of around \$50/hour rate:

Type of work	Back-end development	iOS development	Android development
Features	228 hours	438 hours	438 hours
Frameworks and libraries integration	35 hours	36 hours	36 hours
UI/UX design	-	120 hours	120 hours
Quality assurance	194 hours	343 hours	343 hours
DevOps	36 hours	62 hours	62 hours
Project management	124 hours	218 hours	218 hours
Total time	617 hours	1217 hours	1217 hours

Based on the above data we can estimate a cost of at least **\$88,250** for one platform and **\$150,850** for two platforms.

Reference: <https://www.cleveroad.com/blog/how-much-does-it-cost-to-make-a-fitness-app>

SWOT Analysis

SWOT ANALYSIS



4W's & 1H

Who

- BMI calculators and BMR calculators are popularly used by people on a weight loss regime.

What

- Taking the height and weight of a person and calculating BMI (Body Mass Index) and BMR (Basal Metabolic Rate).
- BMR is the number of calories required to keep body functioning at rest while BMI is a measure of body fat based on height and weight.
- Scheduling the diet plan and workout plan based on the data.

When

- During health complications, related to weight gain or weight loss.
- Whenever the user requires to actively monitor their calorie and water intake.

Where

- The user can access this application at the comfort of their home/office.

How

- The user can access the console through laptops/computer and get personalized diet and workout charts at the comfort of their home/office.

Detail requirements

High Level Requirements:

ID	Description	Status (Implemented/Future)
HR.01	User should be able to enter data in SI and Imperial system of units	Implemented
HR.02	System should be able to output personalized calorie intake	Implemented
HR.03	System should be able to output personalized workout routine	Implemented
HR.04	System should be able to provide workout intensity choices to the user (Basic, Moderate, Extensive)	Implemented
HR.05	System should be able to provide the ideal water intake to the user	Implemented

ID	Description	Status (Implemented/Future)
HR.06	System should be able to provide a dedicated report in a text file format for each Health parameter	Implemented

Low level Requirements:

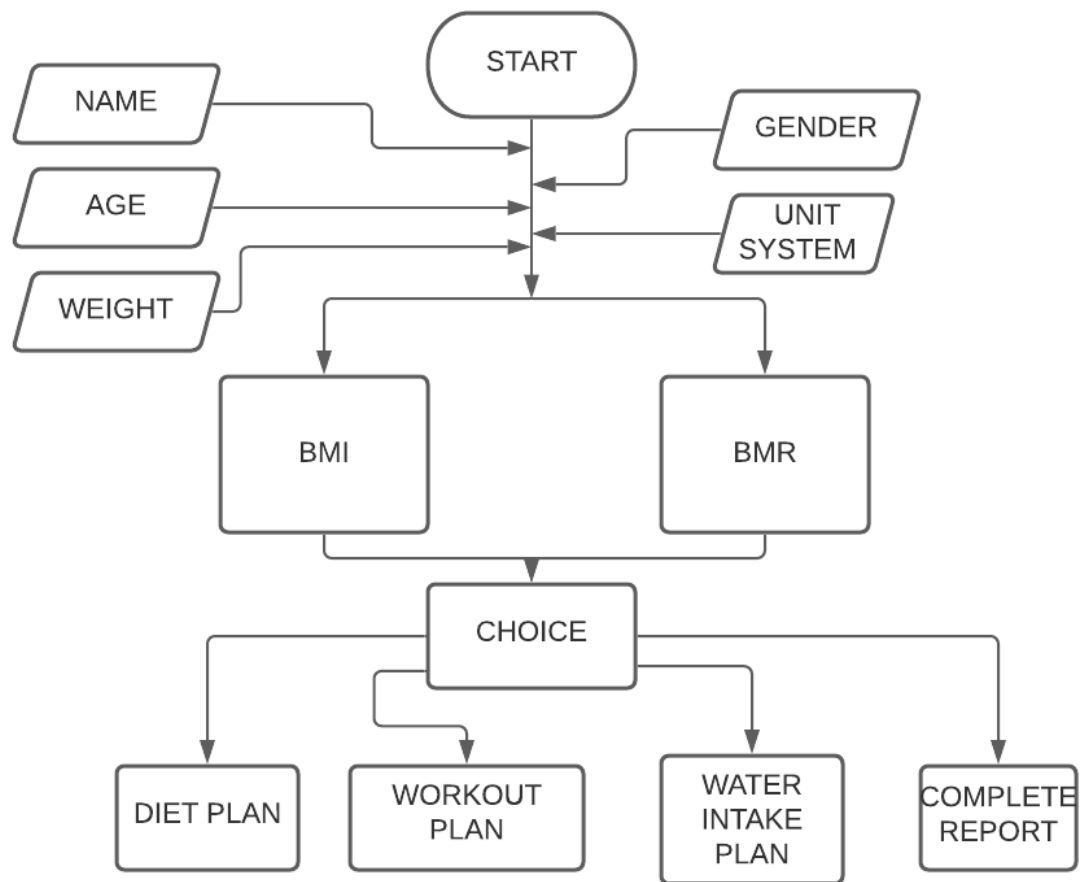
ID	Description	Status (Implemented/Future)
LR.01	User should be able to enter weight, height, age and gender to calculate BMI and BMR	Implemented
LR.02	User should be able to select SI/Imperial units as per their requirement	Implemented
LR.03	System should allow the user to choose if they want to generate new report or view previous reports	Implemented
LR.04	User should be able to choose the report they want to generate	Implemented
LR.05	System should be able to plan a diet chart based on the calorie requirements for a specific BMI	Implemented
LR.06	System should be able to plan out a workout regime based on users body type	Implemented
LR.07	System should be allow the user to choose diets and workouts based on their body type and requirements	Implemented
LR.08	System should be able to provide long and short term workout plans	Implemented
LR.09	User should be able to view the water intake considering their workout schedule	Implemented
LR.10	System should be able to consider the workout time session in Hrs and minutes	Implemented

ID	Description	Status (Implemented/Future)
LR.11	System should be able to output the water intake user must have in a day	Implemented
LR.12	User should be able to keep track of their health history reports	Implemented
LR.13	User should be able to view and track the records on a dedicated mobile application	Future
LR.14	Enhanced database for different varieties of foods & drinks and the calories it contains	Future
LR.15	System should be able to give notification alerts to remind the user to drink more water	Future
LR.16	System should provide the nutritional contents and calories of food items consumed across the world	Future

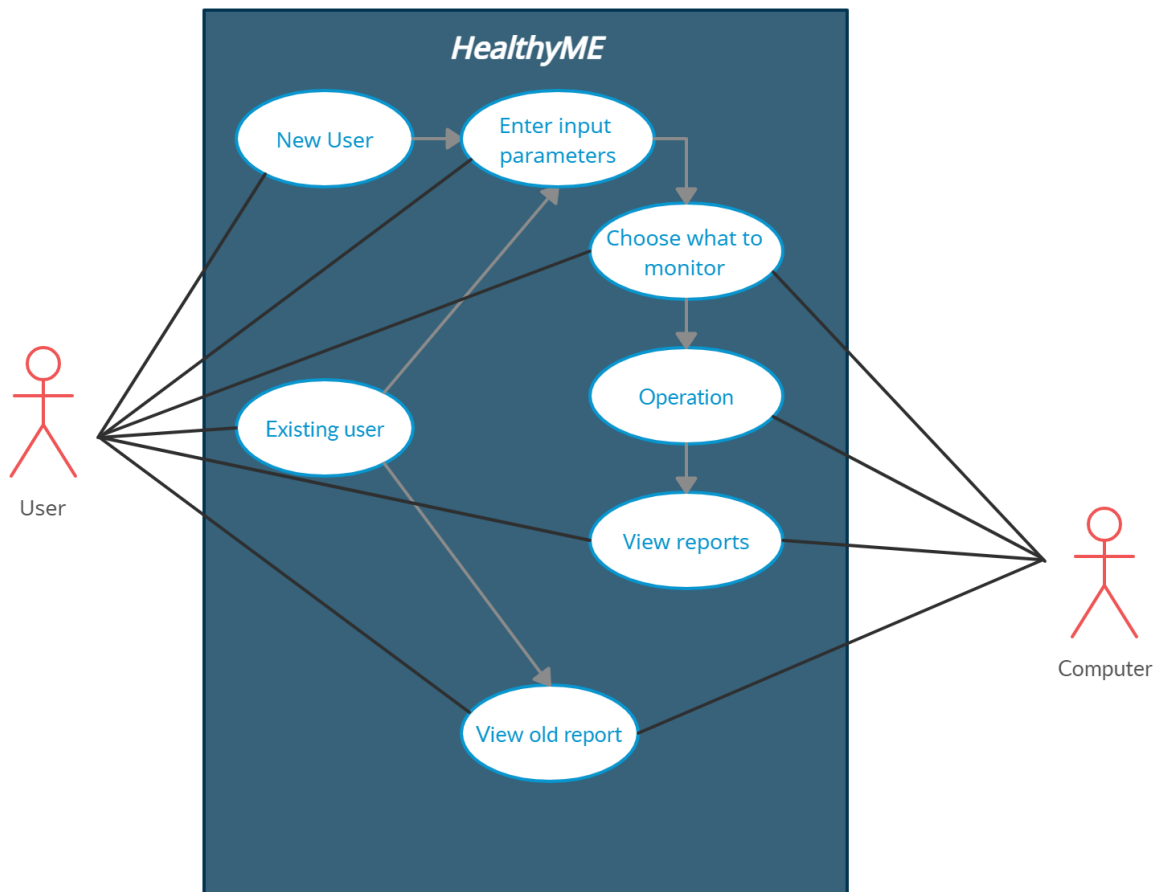
Design

High Level Design

Architecture Design

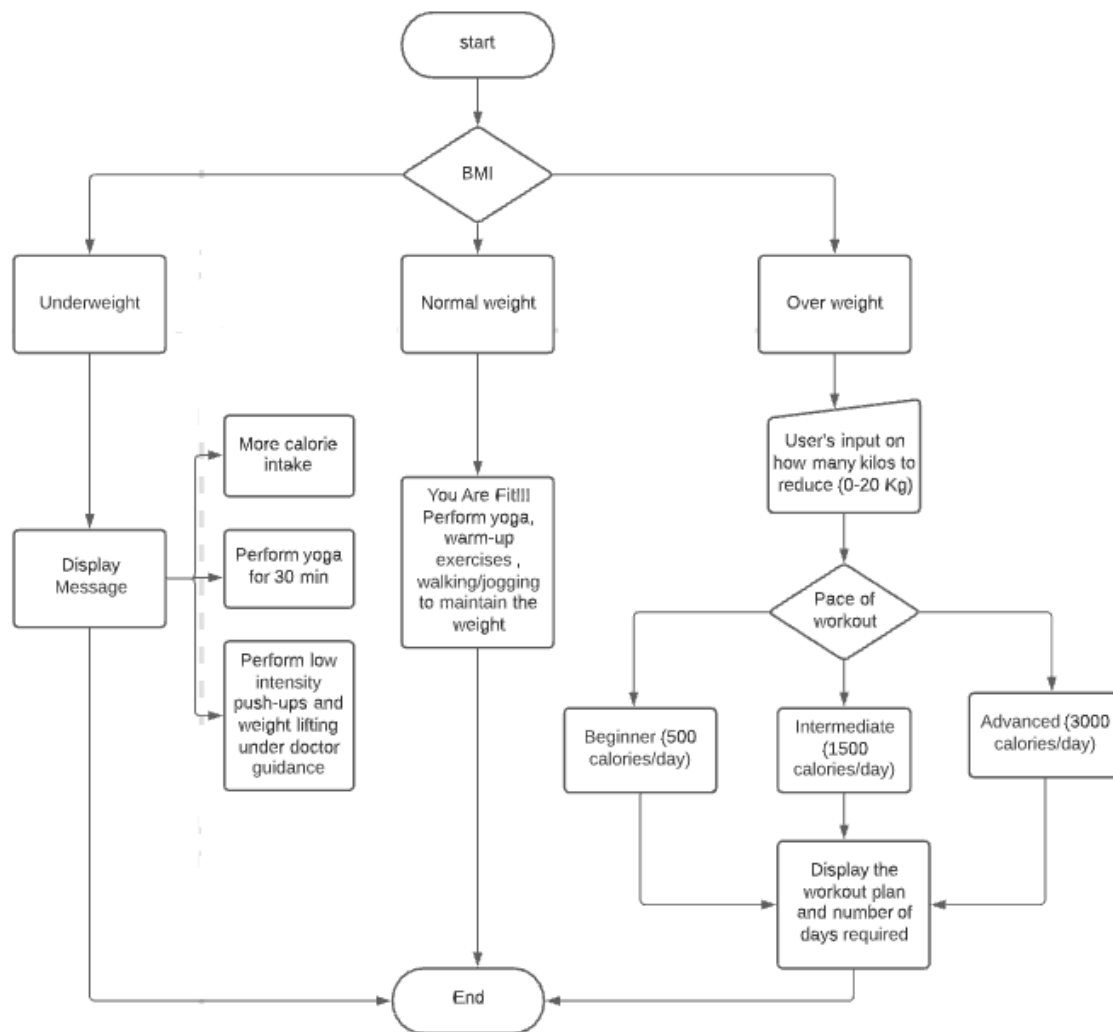


Use Case diagram

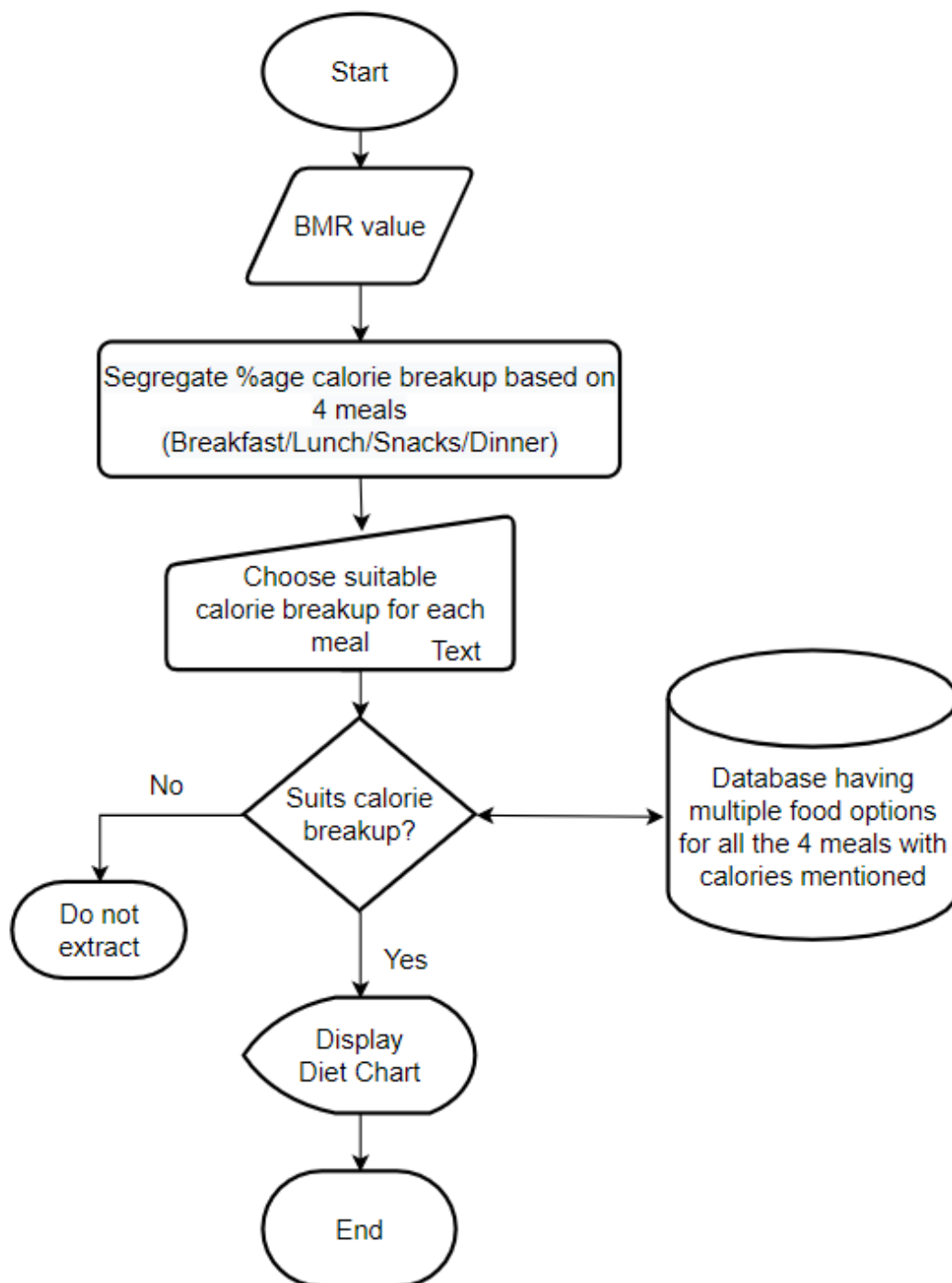


Low Level Design

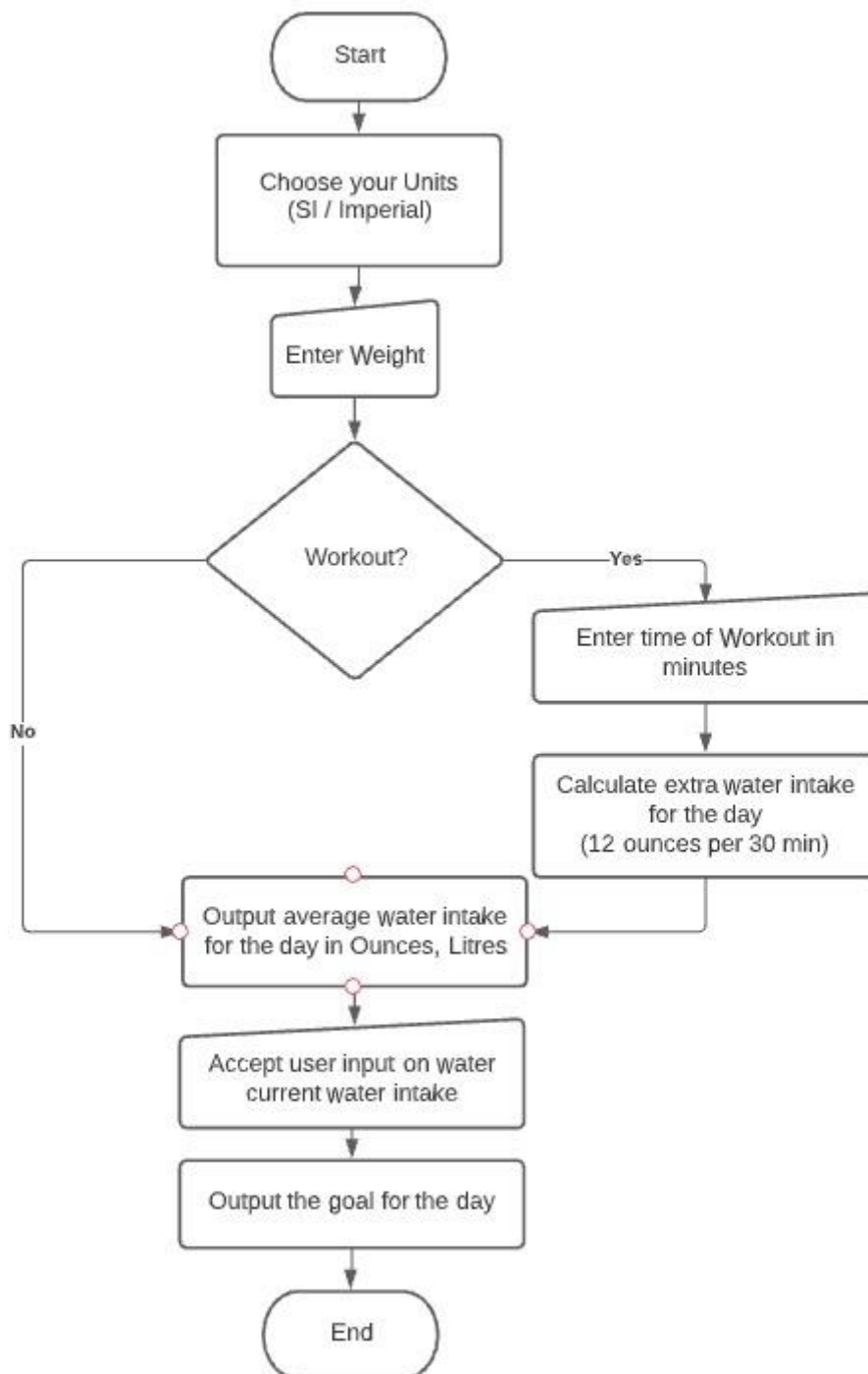
Workout Plan



Diet Plan



Water In-take



Test Plan

High level Test Plan

Test ID	Description	Exp o/p	Exp i/p	Actual o/p	Type of test
HT01	Check functionality of the BMI and BMR calculation module	BMI 28.73, BMR 1680.00 Cal	Age 50, Height 172 cm, Weight 85 Kg, Gender male	BMI 28.73, BMR 1680.00 Cal	Technical
HT02	Check functionality of the Diet Plan and Calorie intake module	User should be asked to plan their meal	User's choice to view dietplan	User is asked to plan their meal	Technical
HT03	Check functionality of the Water intake module	Water intake is measured for the user	User's choice to view water intake	Water intake report generated	Technical
HT04	Check functionality of the Workout module	Workout plan generated	User's choice to view workout plan	Workout plan generated	Technical
HT05	Check if the program fetches details of existing user	Details of Users BMR,BMI values, Dieta and workout plan should be fetched	User enters their ID, enters ID 0	Fetches all details of User with ID 0	Scenario based

Test ID	Description	Exp o/p	Exp i/p	Actual o/p	Type of test
HT06	Check functionality of the Report generation module	Report should be generated	User selects to generate a report and enters 2	Personalized report is generated	Scenario based
HT07	Check if the program exits with proper Exit Code	Program must exit	User chooses to exit and enters 3	Program exits	technical

Low level Test Plan

Test ID	Description	Exp o/p	Exp i/p	Actual o/p	Type of test
LT-1.1	Check if user is able to choose between Imperial and SI unit system	SI system	Selects 1	Data in SI system	technical
LT-1.2	Check if user is alerted when height or weight exceeds the limit given	Inconsistent Data	Weight 1200kg	Inconsistent Data	technical
LT-1.3	Check if user falls under correct weight category for BMI index	Overweight	28	Overweight	technical
LT-1.4	Check if user is able to choose gender	Female	Selects 1	Female	technical

Test ID	Description	Exp o/p	Exp i/p	Actual o/p	Type of test
LT-1.5	Check if user is alerted when weight or height exceeds limit	Inconsistent Data	Weight 1200 kg	Inconsistent Data	technical
LT-2.1	Check if the system correctly outputs diet choices below calorie intake specified	Food items below 1200 cal should be listed	1200 cal	Food items below 1200 cal is listed	technical
LT-2.2	Check if the user is alerted of the weight category they belong to	Overweight	BMI is 40	Overweight	technical
LT-3.1	Check if the system accurately accounts the units used SI/Imperial	System allows user to enter data in SI unit system	selects 1	Enters data in SI unit system	technical
LT-3.2	Check if the system can keep a track of user workout duration	Splits hours and minutes and passes values for calculation to the next module	Enters 1:20	Splits hours and minutes	technical
LT-3.3	Estimate recommended water intake for the day based on user data	Water intake should be 2.4 L	User's BMI is 22.6 and selects NO to workout	Water intake is be 2.4 L	technical
LT-3.4	Allow user to enter their workout status before water intake calculation	Water Intake should be increased to account for the	Selects YES to workout	EWater Intake is be increased to account for the	technical

Test ID	Description	Exp o/p	Exp i/p	Actual o/p	Type of test
		water loss during workout		water loss during workout	
LT-4.1	Check if the user is able to provide the workout intensity choices	User is healthy, no workout plan should be created	User's BMI is 22.6	No workout plan created	technical
LT-4.2	Check if the system is able to provide the maximum range of weight needed to shed by the user	Maximum weight to be shed by user should be 38 Kgs	User's BMI is 37.1	User is asked to reduce weight upto 38 Kgs only	technical
LT-5.1	Check if the user has chosen the correct index and choice or not	Incorrect entry	User enters ID o instead of 0	Incorrect entry	technical
LT-5.2	Check if the user has selected the correct choice	CalcBMI,CalcBMR functions called	1	Calculate BMI and BMR values	technical
LT-5.3	Check if the user has selected the correct choice	CalcBMR,calorie functions called	2	Calculate BMR and calorie values	technical
LT-5.4	Check if the user has selected the correct choice	calcwaterquant and workoutcheck functions called	3	Calculate water quantity and workout of user	technical
LT-5.5	Check if the user is able to select the correct choice	CalcBMI,CalcBMR functions called	4	Calculate BMI and BMR values	technical
LT-5.6	Check if the user user had chosen a choise which is not present	Incorrect entry	6	Incorrect entry	technical

Test ID	Description	Exp o/p	Exp i/p	Actual o/p	Type of test
LT-6.1	Check if the user had not sent data	NULL	NULL	Incorrect entry	technical

Contributors List and Summary

PS No.	Name	Features	Issues Raised	Issues Resolved	#Test Cases	# Test Case Passed
99005666	Archana R Bailkeri	worked on workout Module and created test plan and created flowcharts for Workout Module	*	1	*	*
99005586	Jenikaben Rajendrakumar Patel	Creating Report,Creating Standup Meetings,Added File Handling		1	*	*
99005387	Varna M	worked on BMi Module and created test plan and created flowcharts for Bmi Module		1	*	*
99005668	Suraj Kumar	createed Architectural and High level digrams,	*	1	*	*

PS No.	Name	Features	Issues Raised	Issues Resolved	#Test Cases	# Test Case Passed
		worked on bmi bmr modules				
99005644	Madhura M	Activioty diagrams, Reprt generation tool and utility program	1	1	1	1
99005650	Gopika H	worked on BMR Module and created essentials function and its respective test cases	*	1	*	*
99005690	Paras Panda	Code Integration , Bug Fix , Workflows Makefile	3	2	2	2
99005596	Pallavi Sharma	Calorie module and respective test cases,Uses case Diagrams	1	2	2	2
99005590	Ajay Victor	Water Intake Module,Unified Data Structure to be used by all modules	2	3	2	2
99005608	Manasa K	Made the flowchart for Workout Plan and Improved and	*	2	*	*

PS No.	Name	Features	Issues Raised	Issues Resolved	#Test Cases	# Test Case Passed
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development of
Workout module

Git Inspector

```

19  ===== Git Inspector =====
20  Statistical information for the repository 'SDLC_Team4_HealthyMe' was gathered
21  on 2021/08/24.
22  The following historical commit information, by author, was found:
23
24  Author                Commits    Insertions    Deletions    % of changes
25  257546                  6          190           68           4.72
26  262795                  5          85           213          5.45
27  99Pp                   35         1189          566          32.08
28  AjV1999                45         718           88           14.73
29  Gopika.H               3          7            7            0.26
30  Madhura M              3          131           3            2.45
31  ManasaKarur            16         207           31           4.35
32  Pallavi-2500           36         604           332          17.11
33  Varna-M                15         129           678          14.75
34  surajkumar             1          224           0            4.10
35
36  Below are the number of rows from each author that have survived and are still
37  intact in the current revision:
38
39  Author                Rows       Stability    Age          % in comments
40  257546                119        62.6         0.3          1.68
41  262795                39         45.9         0.1          2.56
42  99Pp                 778        65.4         0.2          6.30
43  AjV1999              897        124.9        0.3          3.57
44  Gopika.H             4          57.1         0.0          0.00
45  Madhura M            99         75.6         0.2          3.03
46  ManasaKarur          234        113.0        0.4          0.00
47  Pallavi-2500         4179       691.9        0.3          9.60
48  Varna-M              55         42.6         0.1          3.64

```

Challenges Faced and How Was It Overcome

1. Selection of common programming language
 - With the amount of varied expertise brought in by the team setting on a common language was challenging. We finally settled on C programming.
2. Integration of developed modules
 - Integration of individual modules was challenging as each member had their own approach and coming up with a common structure based approach was both challenging and time consuming.
3. Testing of modules
 - Testing of each individual modules and also ensuring that each function adhered to the common structure format required re-work on everyone's part.
4. Setting up of Git workflows
 - Setting up of individual workflows for the various batches and ensuring the required criteria was met required bug fixes and improvement on code quality.

