

# YourFitnessFriend



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Advanced Higher  
Computing Science  
Project  
Documentation

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# Analysis

## Description of the Problem

I intend to make a fitness tracker that will track the end user's fitness, calculate a fitness goal and provide an action plan which includes a diet plan depending on their actual fitness goal. The program takes in the users' data and will use this to calculate their BMR and then a calorie deficit or a calorie surplus depending on the user's goals. The program will also show diet plans depending on their end goal and will create an action plan for them. To calculate the user's BMR I will be using the Harris-Benedict formula to do this. I will be implementing Software Design and Development and will executing my project by using Object-Oriented Programming which will carry out an array of Objects and Records which will store the data for the user's fitness goals. My main features will include a login system containing a register account page and login page which will direct the user to the home page. The homepage will contain a menu which will direct the user to a page where they can enter their data by using their username. This will display a unique ID to the user so they can view their action plan which include their goal, action steps and diet plan. The home page will also include a help section and include advice on what the user needs assisting with regards to their health. When the user is finished, they can also logout of the program if they are done.

My projects meets all of the Advanced Higher Computing requirements because it will have an easy to use user interface, it will be maintainable and also robust. It will also meet all of the Advanced Higher Computing requirements as my project integrates with a Database using MySQL for the login system. It will store all the user login details in the database and will also store the fitness data. My project will make use of a standard algorithm and I will use an insertion sort algorithm as I believe it will be the best way to organise the fitness data and then display that to the user. I have made sure that my insertion sort will sort through an array of records and specifically sort through the fitness goals to ensure I run into no errors.

## Scope

The Scope of my project will include:

1. A full deep analysis on my project detailing things such as a description of my program. It will also go into detail about Advanced Higher concepts and integration, scope, boundaries and any constraints use case diagram, requirements and a fully detailed project plan.
2. A completed design including:
  - Pseudocode for my program to design the data flow and enhancements of the Advanced Higher concepts.
  - A Complete data dictionary for my tables in my database.
  - List of MySQL Queries Designs that I will be using in my program.
  - Wireframe designs for all of my User Interfaces including all inputs, validation and with annotations. All showing the intended user interface for my fitness tracker.
  - Class Diagram for Array of Objects showing Class Name, Encapsulation, Data Types, Constructor, Properties and Methods.
3. A well-designed and successfully implemented fitness tracker with a functional login system and will allow users to track their fitness goals. With all of my project code showing. I will also include Ongoing Testing during implementation showing Research and Development of any New Skills or Knowledge during my Implementation.
4. A finalised test plan with a summary of final testing including a persona, test cases, test results and requirements testing which will show all evidence of testing including screenshots of my program and screenshots of database output tables generated by the MySQL statements.
5. An evaluation report which will evaluate my program in terms of fitness for purpose. Showing how closely my program matches the functional requirements and how my results of my testing show this. It will also how the maintainability and robustness of my program

## Constraints

When it comes to my constraints for my project there are a few factors that apply for this project:

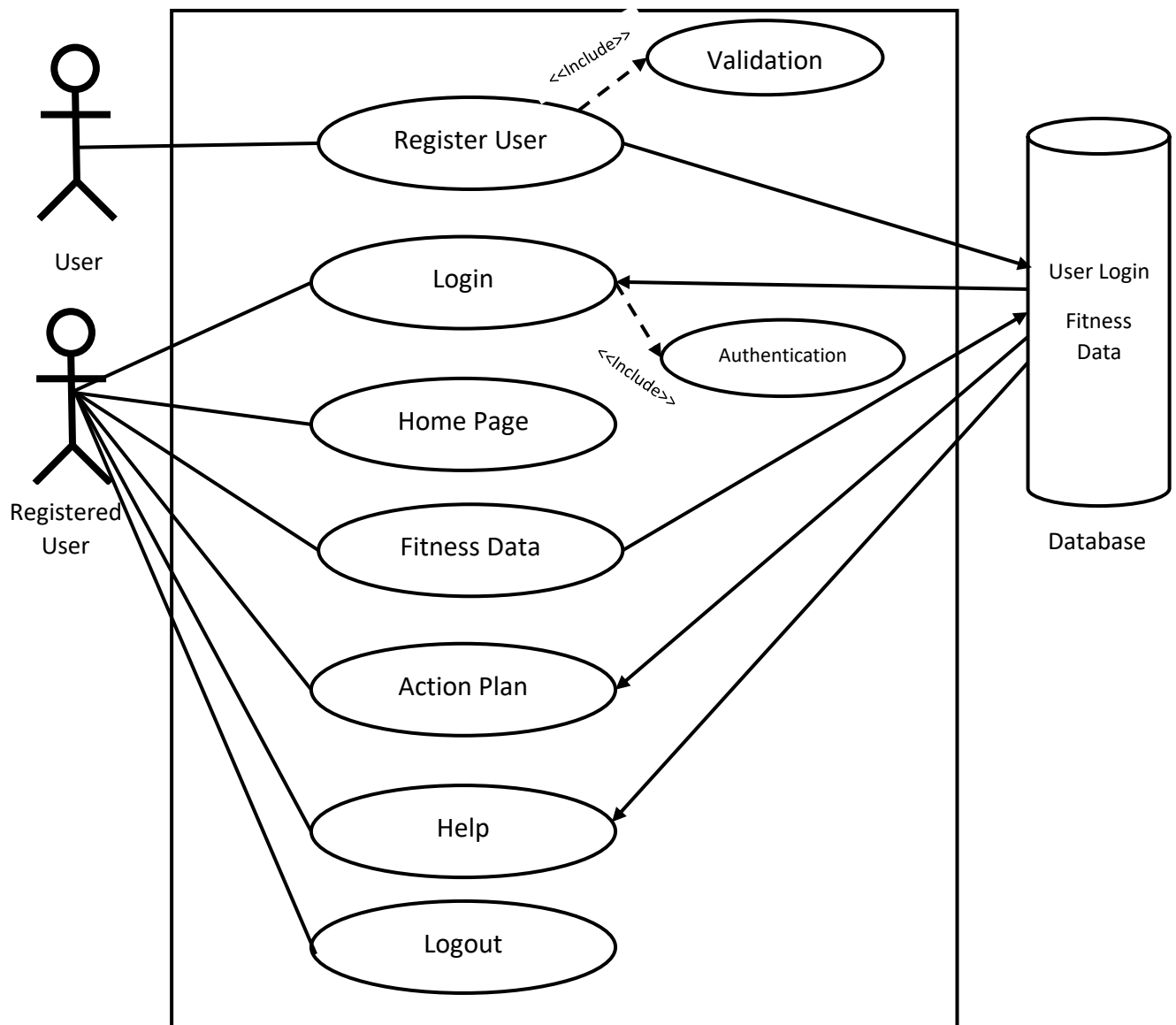
- My full completed project must be completed by the deadline of the 4<sup>th</sup> of March 2022.
- I ensure that I do not run into any copyright issues when it comes to the name of my project “YourFitnessFriend” and must to comply with the Copyright, Design and Patents Act 1988.
- I must ensure that there will be no costs involved during the course of my project as all of the software and materials are supplied by the school.
- I will be programming in Visual Basic within the Visual Studio 2010 software as I have several years of experience using this and I will be using EasyPHP as my Database Server while coding in MySQL as I believe it will be most suitable for my project.

## Boundaries

The boundaries of my program will include:

- A login system which allow the end user to register a new username and password of their choice.
  - The username and password must contain more than 8 characters.
- The login system will use input validation, which will verify the credentials that the user has entered and allow them to be directed to the home page.
- When entering data users will not be able to:
  - Enter an Age less than 16, Weight less than 45kg or an Height less than 120cm
- The data will be calculated and stored within a Database to allow the fields to be stored externally rather than an array so it can be reused without re-entering.
- An insertion sort will be used to sort the fitness data, which will be displayed to the user.

## UML: Use Case Diagram



# Requirements Specification

For my program to be able to satisfy the requirements, it must meet several

Criteria:

## **End User Requirements:**

- The users for my system will be able to register a unique username and password of their choice.
- The user will be allowed to login using their own chosen username and password.
- The user will be able to easily navigate throughout my program.
- The user will be able to input their own fitness data into their program and be able to see their action plan.
- The user will also be able to access a help screen for tips to reach their desired goal.

## **Functional Requirements:**

- My program will be able to store user credentials in an external database.
- My program will be able to validate all user inputs to make sure they are fit for purpose.
- My program will store the users data in an external database
- My program will display the user's action plan and a help screen.

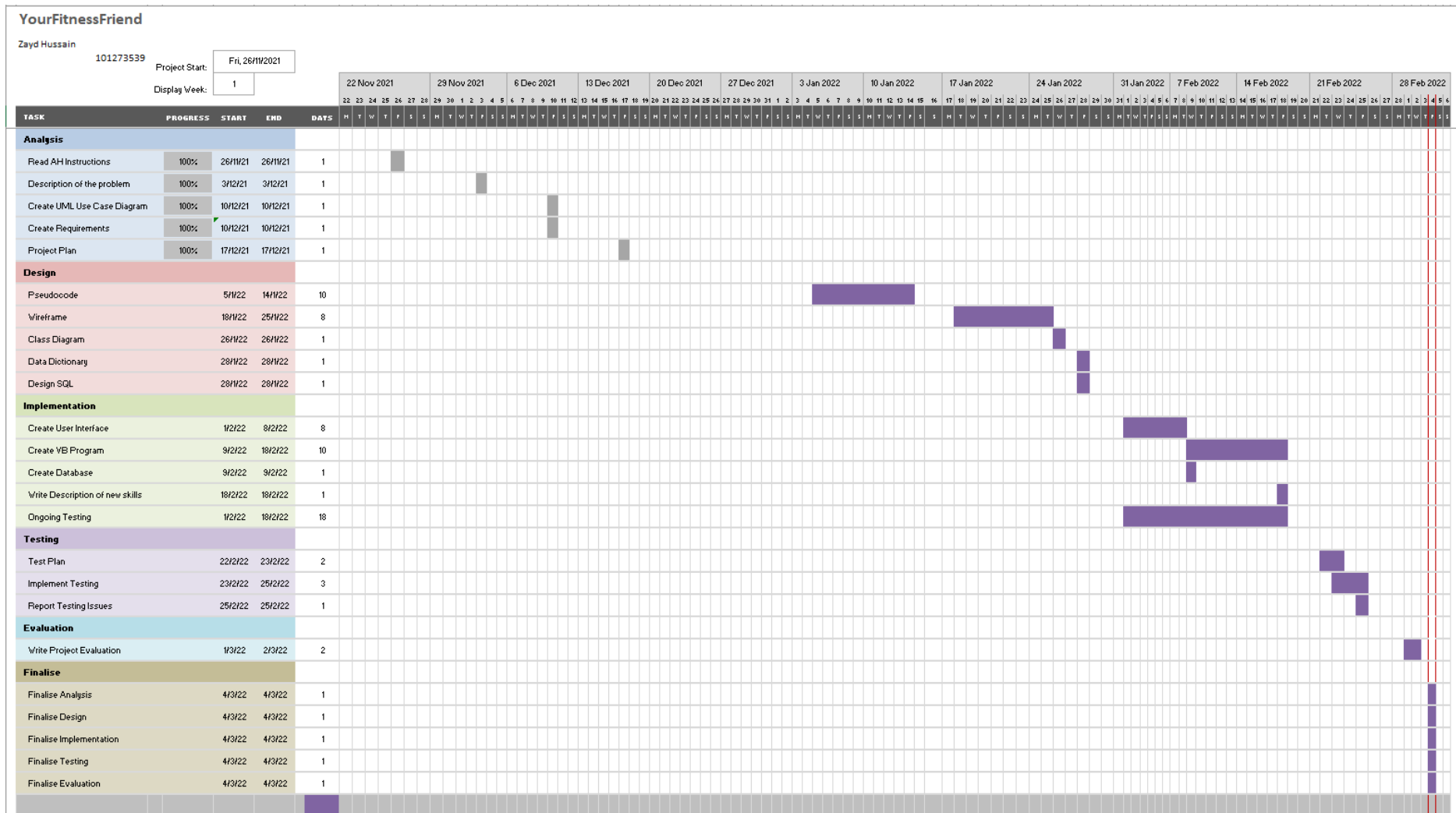
## Project Plan

Task	Sub Task	Duration	Start Date	Target Date
<b>Analysis:</b>  <b>4 Hours And 30 Minutes</b>  <b>(Over the course of 4 Days)</b>	Read AH Instructions for candidates and then generate my project idea	1 Hour	26 <sup>th</sup> November	26 <sup>th</sup> November
	Description of the problem:	1 Hour 30 Minutes	3 <sup>rd</sup> December	3 <sup>rd</sup> December
	Outline of problem, Scope, Boundaries and Constraints			
	Create UML Use Case Diagram	45 Minutes	10 <sup>th</sup> December	10 <sup>th</sup> December
	Create Requirements Specifications for End User and Functional Requirements	45 Minutes	10 <sup>th</sup> December	10 <sup>th</sup> December
	Project Plan	30 Minutes	17 <sup>th</sup> December	17 <sup>th</sup> December
<b>Design:</b>  <b>11 Hours And 15 Minutes</b>  <b>(Over the course of 11 Days)</b>	Project Design - Pseudocode	4 Hour 30 Minutes	5 <sup>th</sup> January	14 <sup>th</sup> January
	User-interface Design – Wireframe	3 Hours	18 <sup>th</sup> January	25 <sup>st</sup> January
	Class Diagram	45 Minutes	26 <sup>th</sup> January	26 <sup>th</sup> January
	Design Data Dictionary	45 Minutes	28 <sup>th</sup> January	28 <sup>th</sup> January
	Design SQL	45 Minutes	28 <sup>th</sup> January	28 <sup>th</sup> January
<b>Implementation:</b>  <b>8 Hours And 15 Minutes</b>  <b>(Over the course of 9 Days)</b>	Create User Interface	3 Hours	1 <sup>st</sup> February	8 <sup>th</sup> February
	Create VB Program	3 Hour 45 Minutes	9 <sup>th</sup> February	18 <sup>th</sup> February
	Create Database	45 Minutes	9 <sup>th</sup> February	9 <sup>th</sup> February
	Write Description of new skills	45 Minutes	18 <sup>th</sup> February	18 <sup>th</sup> February
	Log of all ongoing testing	*Ongoing through implementation	1 <sup>st</sup> February	18 <sup>th</sup> February



<b>Testing:</b>  <b>3 Hours And 45 Minutes</b>  <b>(Over the course of 3 Days)</b>	Test Plan including Test Cases and Persona	1 Hour 30 Minutes	22 <sup>th</sup> February	23 <sup>rd</sup> February
	Implement Testing	1 Hour 30 Minutes	23 <sup>rd</sup> February	25 <sup>th</sup> February
	Report Testing Issues	45 Minutes	25 <sup>th</sup> February	25 <sup>th</sup> February
<b>Evaluation:</b>  <b>1 Hours And 30 Minutes</b>  <b>(Over the course of 2 Days)</b>	Write Project Evaluation	1 Hour 30 Minutes	1 <sup>st</sup> March	2 <sup>nd</sup> March
<b>Finalise Project:</b>  <b>45 Minutes</b>  <b>(Over the course of 1 Day)</b>	Finalise analysis	45 Minutes	4 <sup>th</sup> March	4 <sup>th</sup> March
	Finalise design			
	Finalise implementation			
	Finalise testing and evaluation			
	Submit Project	-----	4 <sup>th</sup> March	4 <sup>th</sup> March

# Gantt chart



## List of Resources

Analysis	<ul style="list-style-type: none"><li>• Microsoft Word 2016</li><li>• Google Chrome</li><li>• Microsoft Excel 2016</li></ul>
Design	<ul style="list-style-type: none"><li>• Microsoft Word 2016</li><li>• Google Chrome</li><li>• <a href="https://wireframe.cc/">https://wireframe.cc/</a></li></ul>
Implementation	<ul style="list-style-type: none"><li>• Microsoft Word 2016</li><li>• Google Chrome</li><li>• Visual Basic</li><li>• EasyPHP – MySQL</li><li>• <a href="https://iconscout.com/">https://iconscout.com/</a></li><li>• <a href="https://www.tailorbrands.com/">https://www.tailorbrands.com/</a></li></ul>
Testing	<ul style="list-style-type: none"><li>• Microsoft Word 2016</li><li>• Visual Basic</li><li>• EasyPHP - MySQL</li></ul>
Evaluation	<ul style="list-style-type: none"><li>• Microsoft Word 2016</li></ul>

# Design

## Pseudocode

Create FitnessData Class:

```
Class FitnessData IS {INTEGER id, STRING Gender, INTEGER Weight, INTEGER Height, INTEGER Age, STRING Exercise, STRING LoseOrGain, INTEGER BMR, INTEGER ExerciseBMR, INTEGER FitnessGoal}
```

METHODS

```
CONSTRUCTOR (INTEGER id, STRING Gender, INTEGER Weight, INTEGER Height, INTEGER Age, STRING Exercise, STRING LoseOrGain, INTEGER BMR, INTEGER ExerciseBMR, INTEGER FitnessGoal)
```

```
    DECLARE THIS.id INITIALLY id
```

```
    DECLARE THIS.Gender INITIALLY Gender
```

```
    DECLARE THIS.Weight INITIALLY Weight
```

```
    DECLARE THIS.Height INITIALLY Height
```

```
    DECLARE THIS.Age INITIALLY Age
```

```
    DECLARE THIS.Exercise INITIALLY Exercise
```

```
    DECLARE THIS.LoseOrGain INITIALLY LoseOrGain
```

```
    DECLARE THIS.BMR INITIALLY BMR
```

```
    DECLARE THIS.ExerciseBMR INITIALLY ExerciseBMR
```

```
    DECLARE THIS.FitnessGoal INITIALLY FitnessGoal
```

```
END CONSTRUCTOR
```

```
PROCEDURE UpdateWeight(INTEGER newWeight)
```

```
    SET THIS.Weight To newWeight
```

```
END PROCEDURE
```

```
PROCEDURE UpdateAge(INTEGER newAge)
```

```
    SET THIS.Age To newAge
```

```
END PROCEDURE
```

```
PROCEDURE UpdateExercise(INTEGER newExercise)
```

```
    SET THIS.Exercise To newExercise
```

```
END PROCEDURE
```

```
FUNCTION GetId() RETURNS id
    RETURN THIS.id
END FUNCTION
```

```
FUNCTION GetGender() RETURNS STRING
    RETURN THIS.Gender
END FUNCTION
```

```
FUNCTION GetWeight() RETURNS STRING
    RETURN THIS.Weight
END FUNCTION
```

```
FUNCTION GetHeight() RETURNS STRING
    RETURN THIS.Height
END FUNCTION
```

```
FUNCTION GetAge() RETURNS STRING
    RETURN THIS.Age
END FUNCTION
```

```
FUNCTION GetExercise() RETURNS STRING
    RETURN THIS.Exercise
END FUNCTION
```

```
FUNCTION GetLoseOrGain() RETURNS STRING
    RETURN THIS.LoseOrGain
END FUNCTION
```

```
FUNCTION GetBMR() RETURNS STRING
    RETURN THIS.BMR
END FUNCTION
```

```
FUNCTION GetExerciseBMR() RETURNS STRING  
RETURN THIS.ExerciseBMR  
END FUNCTION
```

```
FUNCTION GetFitnessGoal() RETURNS STRING  
RETURN THIS.FitnessGoal  
END FUNCTION  
END CLASS
```

#### Register Account:

- 1.1 Create Connection String
- 1.2 Open Database Connection with Connection String
- 1.3 GET Username AND Password from USER
- 1.4 IF Username >= 8 AND Password >= 8 THEN
- 1.5 SEND Username AND Password TO DATABASE
- 1.6 Run Insert Query into Database
- 1.7 DISPLAY Register Successful
- 1.8 ELSEIF Username <> "" AND Password <> "" THEN
- 1.9 DISPLAY Register Unsuccessful As characters where not greater than 8
- 1.10 ELSEIF Username = "" AND Password = "" THEN
- 1.11 DISPLAY Register Unsuccessful as no characters where entered
- 1.12 ELSE DISPLAY Register Unsuccessful
- 1.13 END IF
- 1.14 Close Database Connection

## Login:

- 2.1 Create Connection String
- 2.2 Open Database Connection
- 2.3 Load Records from Database
- 2.4 Run Select Query to Select Usernames and Passwords
- 2.5 GET Username and Password from USER
- 2.6 If Username = Username in Database AND Password = Password in Database THEN
- 2.7 DISPLAY Login Successful
- 2.8 ELSEIF Username <> Username in Database AND Password <> Password in Database THEN
- 2.9 DISPLAY Login Unsuccessful as no characters where entered
- 2.10 ELSE Login Unsuccessful
- 2.11 END IF
- 2.12 Close Database Connection

## Calculate Fitness Data:

- 3.1 Create Connection String
- 3.2 Open Database Connection with Connection String
- 3.3 Run Query that Checks Username
- 3.4 GET Username from USER
- 3.5 GET Gender from USER
- 3.6 GET Weight from USER
- 3.7 GET Height from USER
- 3.8 GET Age from USER
- 3.9 GET Exercise from USER
- 3.10 GET LoseOrGain from USER
- 3.11 Run Query that Checks Username
- 3.12 Close Connection
- 3.13 If Weight < 45 THEN
- 3.14 Display Error
- 3.15 If Height < 120 THEN
- 3.16 Display Error
- 3.17 If Age < 16 THEN
- 3.18 Display Error

```
3.19 IF Gender = "Male" THEN
3.20 BMR = 66 + (13.7 * Weight) + (5 * Height) - (6.8 * Age)
3.21 ELSEIF Gender = "Female" THEN
3.22 BMR = 655 + (9.6 * Weight) + (1.8 * Height) - (4.7 * Age)
3.23 END IF
3.24 IF Exercise = "Sedentary" THEN
3.25 ExerciseBMR = BMR * 1.2
3.26 ELSEIF Exercise = "Lightly" THEN
3.27 ExerciseBMR = BMR * 1.375
3.28 ELSEIF Exercise = "Moderately" THEN
3.29 ExerciseBMR = BMR * 1.55
3.30 ELSEIF Exercise = "VeryActive" THEN
3.31 ExerciseBMR = BMR * 1.725
3.32 ELSEIF Exercise = "ExtraActive" THEN
3.33 ExerciseBMR = BMR * 1.9
3.34 END IF
3.35 IF LoseOrGain = "Lose" THEN
3.36 FitnessGoal = ExerciseBMR - 300
3.37 ELSEIF LoseOrGain = "Gain" THEN
3.38 FitnessGoal = ExerciseBMR + 300
3.39 END IF
3.40 Open Connection with Connection String
3.41 Run Insert Query that Inserts Fitness Data
3.42 Displays UserID
3.43 Close Database Connection
```



Show Fitness Data / Action Plan:

```
4.1 RECORD Fitness
4.2 Public id As Integer
4.3 Public Gender As String
4.4 Public Weight As Integer
4.5 Public Height As Integer
4.6 Public Age As Integer
4.7 Public Exercise As String
4.8 Public LoseOrGain As String
4.9 Public BMR As Integer
4.10 Public ExerciseBMR As Integer
4.11 Public FitnessGoal As Integer
4.12 End RECORD

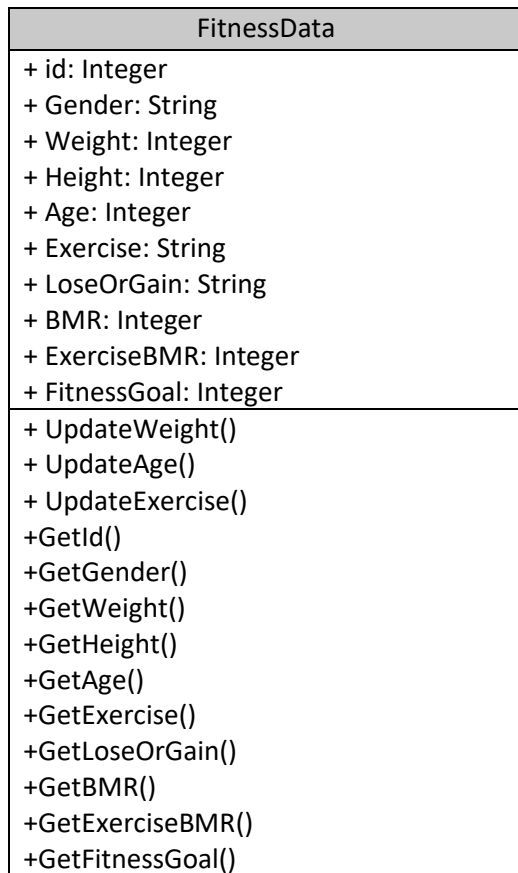
4.1 Create Connection String
4.1 Open Database Connection with Connection String
4.2 Run Query that selects UserID
4.3 Display FitnessGoal
4.4 Call FitnessData()
4.5 Display Action Steps
4.6 Generate Random Number between 1 and 5
4.7 Run IF To determine meal plan
4.8 Display Meal Plan
4.9 Sub FitnessData()
4.10 Dim fitness(9) As Fitness
4.11 DECLARE tempFitness As Fitness
4.12 DECLARE currentPosition As Integer
4.13 DECLARE newPosition As Integer
4.14 For currentPosition = 1 To 9
4.15 tempFitness = fitness(currentPosition)
4.16 newPosition = currentPosition
4.17 While newPosition > 0 AndAlso fitness(newPosition - 1).FitnessGoal >
tempFitness.FitnessGoal
4.18 fitness(newPosition) = fitness(newPosition - 1)
4.19 newPosition = newPosition - 1
```

```
4.20 End While
4.21 fitness(newPosition) = tempFitness
4.22 Next
4.23 SEND FitnessData TO DISPLAY
```

Show Help:

```
5.1 Create Connection String
5.2 Open Database Connection with Connection String
5.3 Run Query that selects UserID
5.4 Display LoseOrGain
5.4 Display FitnessGoal
5.6 DISPLAY How to Lose / Gain weight
5.7 DISPLAY How to Gain Muscle
5.8 DISPLAY Gym work outs
5.9 DISPLAY Cardio Workouts
5.10 Close Database Connection
```

## UML Class Diagram



## Data Dictionary (Database Integration)

### User Login Table:

Entity: User Login					
Attribute Name	Key	Type	Size	Required	Validation
UsernameData		Varchar	20	Y	
PasswordData		Varchar	20	Y	
UserID	PK	Integer		Y	

Sample Data: User Login		
UserID	UsernameData	PasswordData
1	Zayd3030	LetMeIn54!
2	BilartCoin45	Password123

## Fitness Data Table:

Entity: Fitness Data					
Attribute Name	Key	Type	Size	Required	Validation
id	PK	Integer		Y	AUTO_INCREMENT
Gender		Varchar	6	Y	Restricted Choice Male or Female
Weight		Integer		Y	Range Check Weight >= 45
Height		Integer		Y	Range Check Height >= 120
Age		Integer		Y	Range Check Age >= 16
Exercise		Varchar	20	Y	
LoseOrGain		Varchar	4	Y	
BMR		Integer		Y	
ExerciseBMR		Integer		Y	
FitnessGoal		Integer		Y	
UserID	FK	Integer		Y	

Sample Data: Fitness Data										
id	UserID	Gender	Weight	Height	Age	Exercise	LoseOrGain	BMR	ExerciseBMR	FitnessGoal
1	1	Male	75	176	35	VeryActive	Lose	1736	2995	2695
2	2	Male	61	168	18	Moderately	Gain	2526	2526	2526

## Query Design

### Register User:

<b>INSERT</b>	UserLogin
<b>VALUES</b>	UsernameData, PasswordData

### Login User:

<b>SELECT</b>	*
<b>FROM</b>	UserLogin
<b>WHERE</b>	UsernameData = EnterUsername.Text AND PasswordData = EnterPassword.Text <FROM LOGIN FORM>

### Select User ID:

<b>SELECT</b>	UserId
<b>FROM</b>	UserLogin
<b>WHERE</b>	UsernameData = UsernameEnter.Text <FROM ENTER FITNESS DATA FORM>

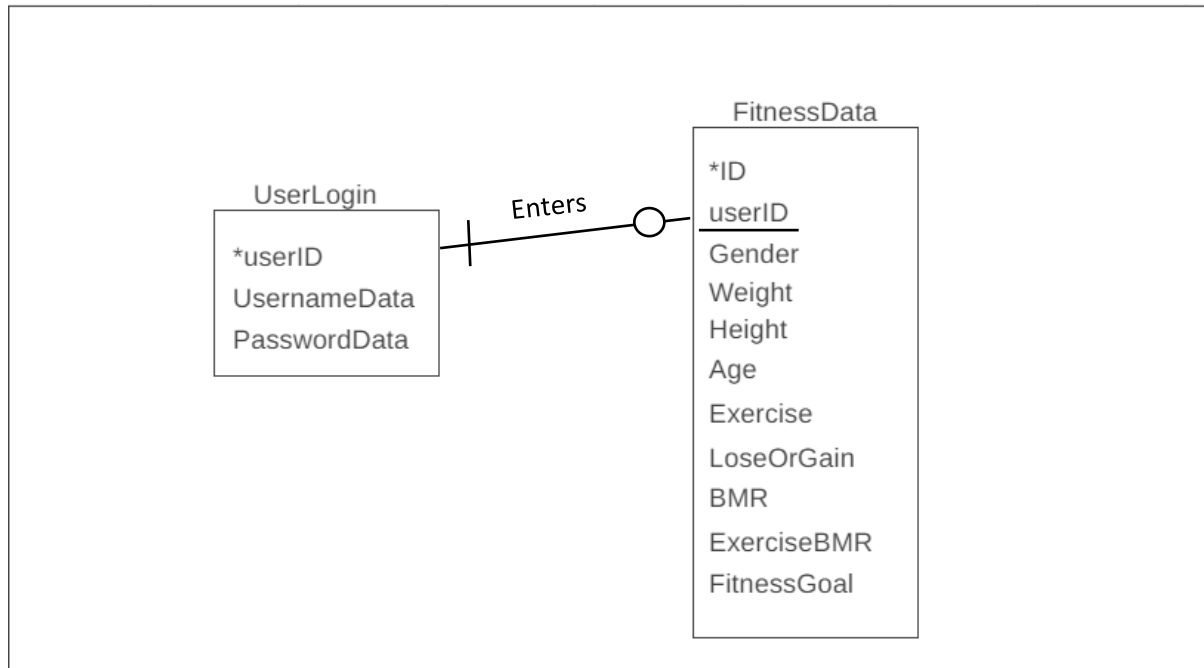
### Insert Fitness Data:

<b>INSERT</b>	FitnessData
<b>VALUES</b>	UserId, Gender, Weight, Height, Age, Exercise, LoseOrGain, BMR, ExerciseBMR, FitnessGoal

### Select Fitness Data For Action Plan:

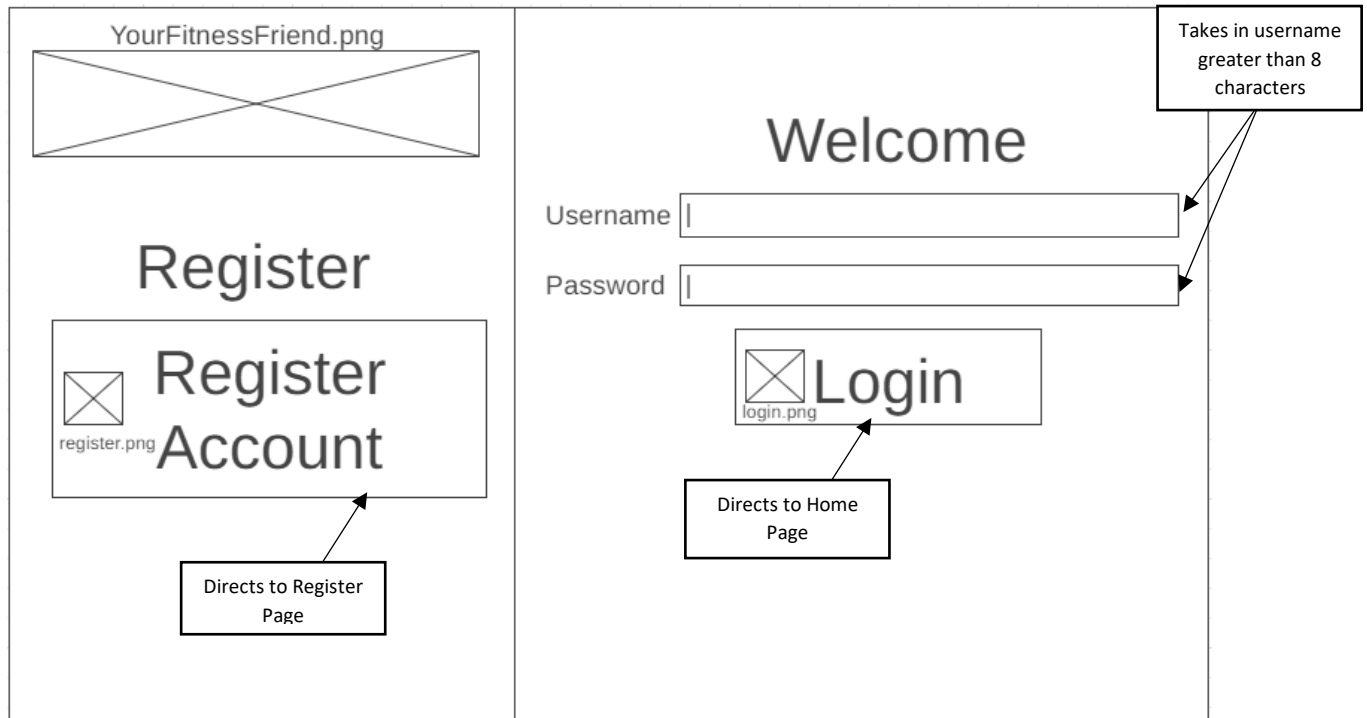
<b>SELECT</b>	*
<b>FROM</b>	FitnessData, UserLogin
<b>WHERE</b>	FitnessData.userId = UserLogin.userId AND FitnessData.userId = EnterID.Text <FROM ACTION PLAN FORM>

## Entity Relationship Diagram



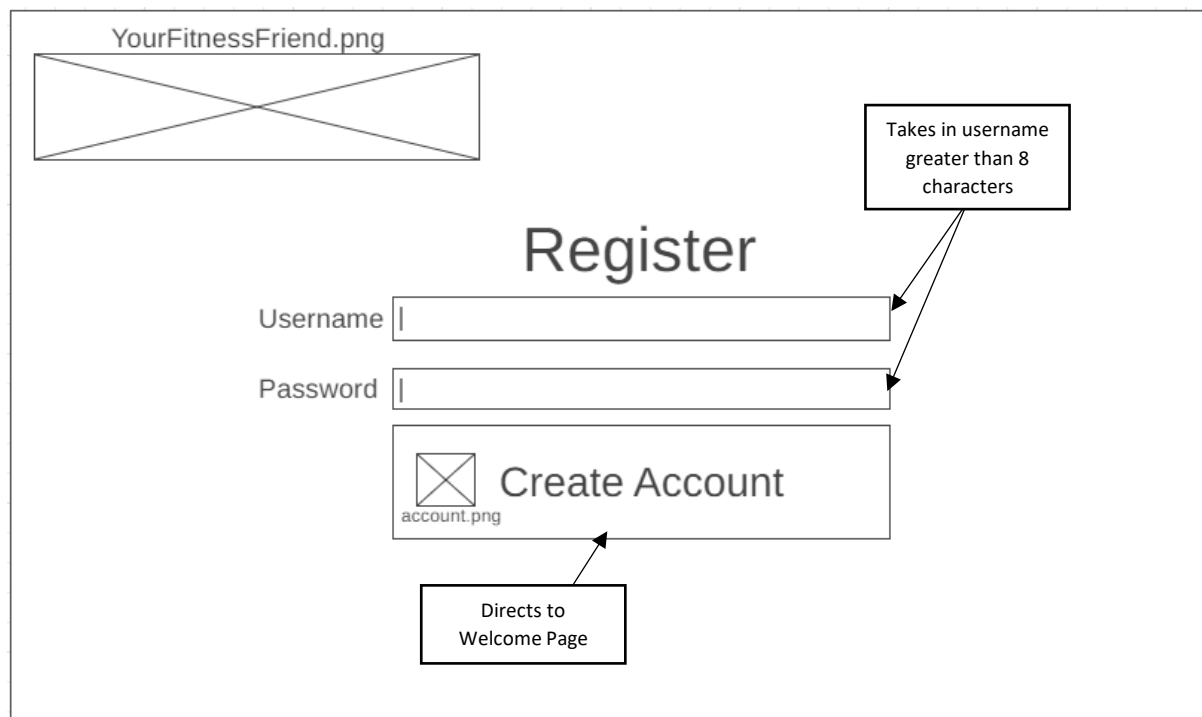
## User Interface (Wireframes)

### Welcome Page:



The Welcome Page wireframe is divided into two main sections. The left section features a header image labeled 'YourFitnessFriend.png' and a large 'Register' heading. Below this is a button labeled 'Register Account' with a placeholder icon 'register.png'. An annotation box 'Directs to Register Page' points to this button. The right section features a 'Welcome' heading, followed by 'Username' and 'Password' input fields. An annotation box 'Takes in username greater than 8 characters' points to the Username field. Below the input fields is a 'Login' button with a placeholder icon 'login.png'. An annotation box 'Directs to Home Page' points to this button.

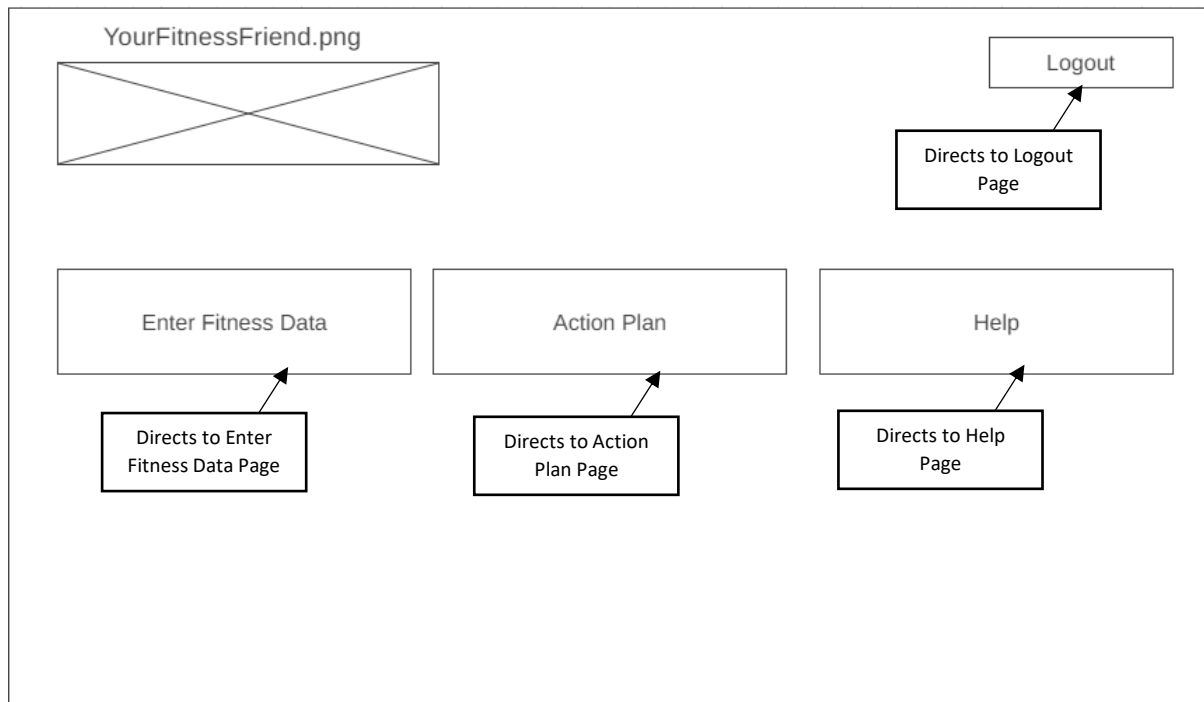
### Register Page:



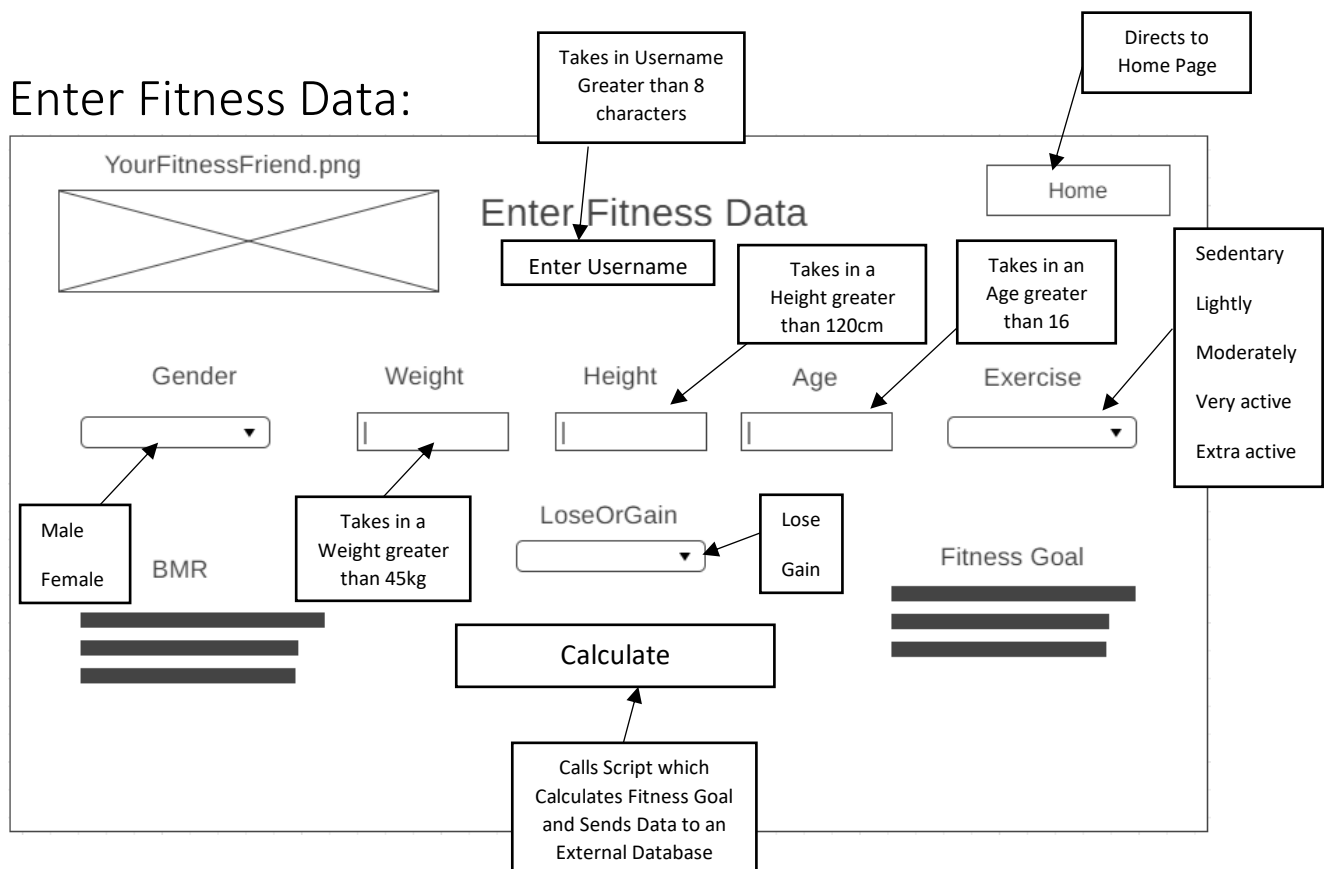
The Register Page wireframe features a header image labeled 'YourFitnessFriend.png' and a large 'Register' heading. Below this are 'Username' and 'Password' input fields. An annotation box 'Takes in username greater than 8 characters' points to the Username field. Below the input fields is a 'Create Account' button with a placeholder icon 'account.png'. An annotation box 'Directs to Welcome Page' points to this button.



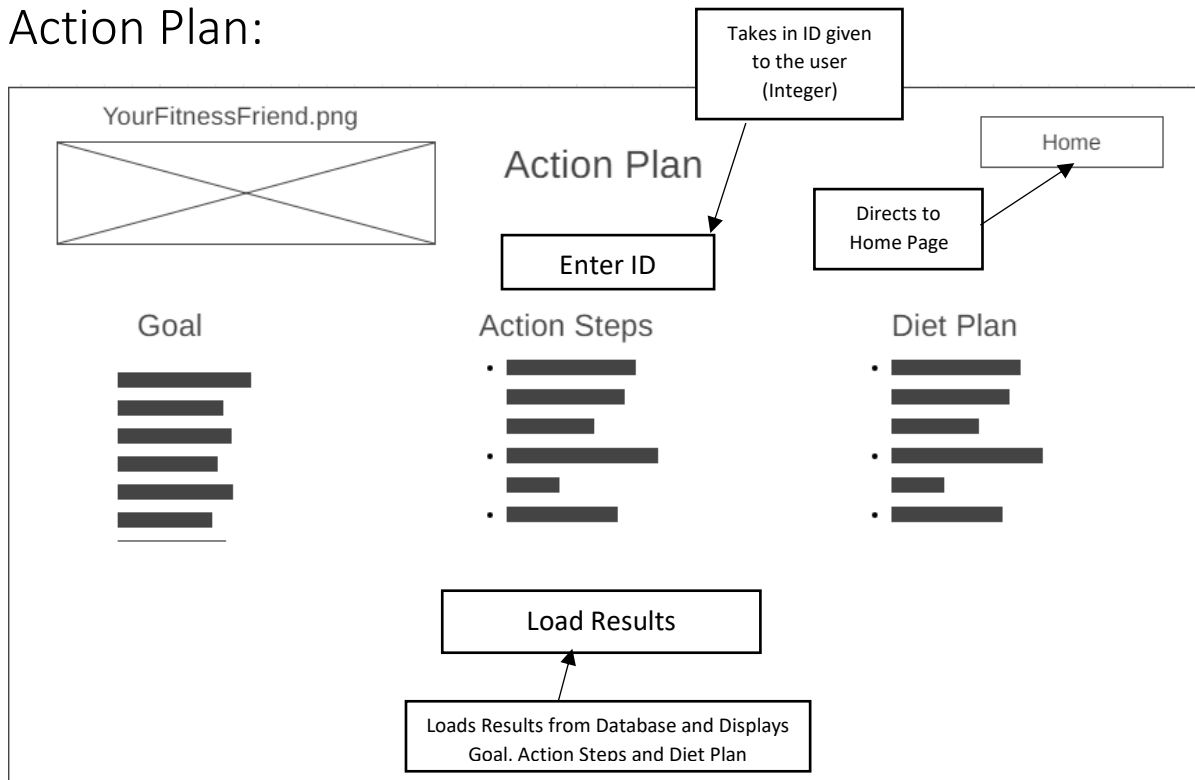
## Home Page:



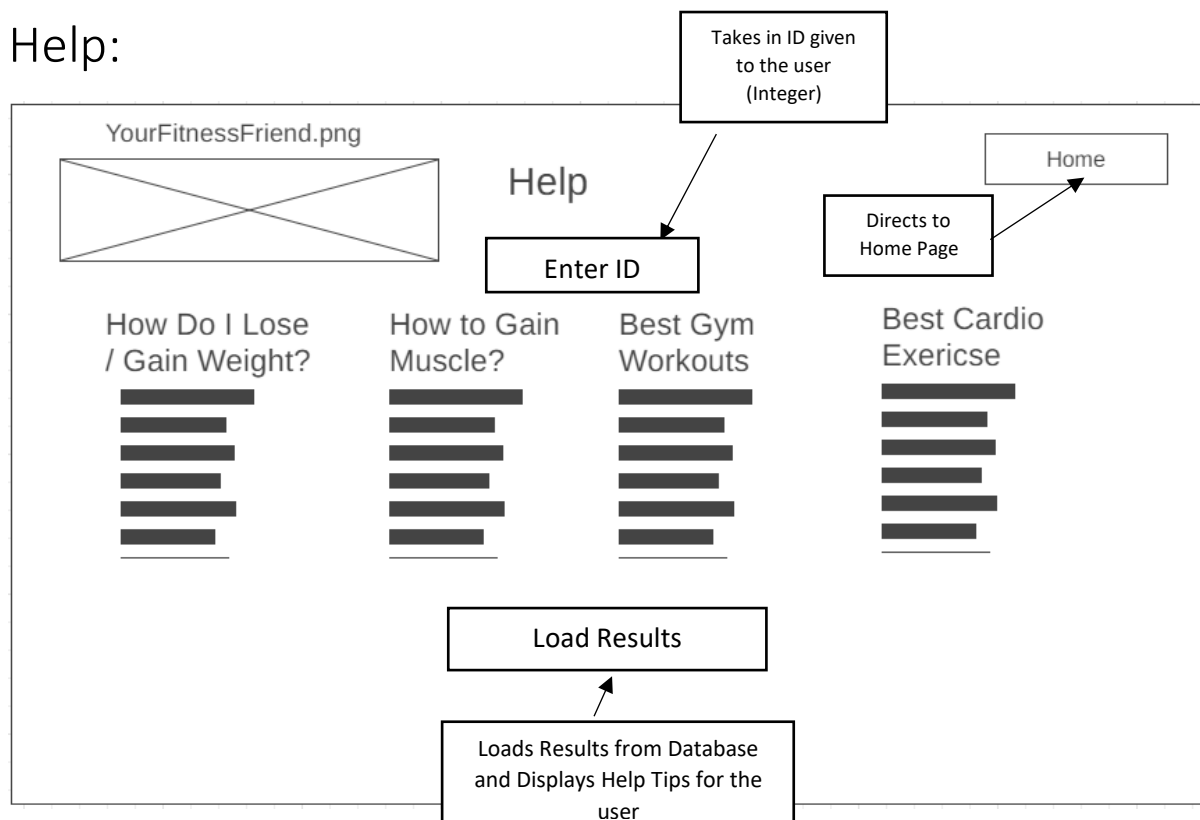
## Enter Fitness Data:



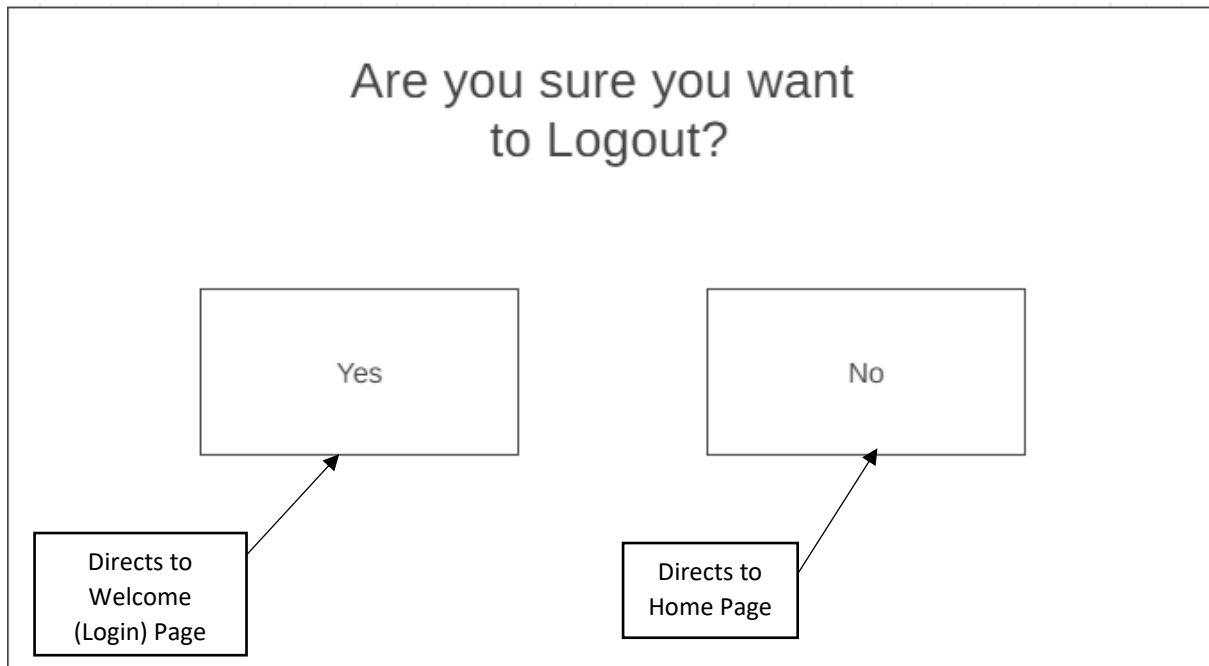
## Action Plan:



## Help:



Logout:



# Implementation

## Software Design and Development User Interface

### Welcome (Login) Page:

The screenshot shows a Windows application window titled "Form1" with a blue background. In the top-left corner, there is a logo consisting of a stylized 'Y' inside a blue square, followed by the text "YOURFITNESSFRIEND" in white. Below the logo, the text "New Here?" is displayed in large white font, followed by "Register your account so you can Explore the world of fitness!" in smaller white font. A grey button with a user icon and the text "Register" is positioned below this text. On the right side of the window, the text "Welcome Back!" is displayed in large white font, followed by "Please Login to your account" in smaller white font. Below this, there are two input fields: "Username" with the value "Zayd3030" and "Password" with masked characters. A grey button with a right-pointing arrow icon and the text "Login" is positioned below the password field.

### Register Page:

The screenshot shows a Windows application window titled "Form2" with a blue background. In the top-left corner, there is a logo consisting of a stylized 'Y' inside a blue square, followed by the text "YOURFITNESSFRIEND" in white. In the top-right corner, there is a grey button with a house icon and the text "Home". Below the logo, the text "Welcome!" is displayed in large white font, followed by "Please Register to your account" in smaller white font. Below this, there are two input fields: "Username" with the value "NewAccount" and "Password" with masked characters. A grey button with a user icon and the text "Create Account" is positioned below the password field.

## Home Page:

The Home Page is displayed in a window titled "Form3". It features a blue background. At the top left is a logo with a stylized 'Y' and the text "YOURFITNESSFRIEND". At the top right is a "Log Out" button with a right-pointing arrow icon. Below the header, there are three main buttons: "Enter Fitness Data" with a dumbbell icon, "Action Plan" with a bar chart icon, and "Help" with a question mark icon.

## Enter Fitness Data Page:

The Enter Fitness Data page is displayed in a window titled "Form5". It features a blue background. At the top left is the same logo as the home page. At the top right is a "Home" button with a house icon. The main heading is "Enter Fitness Data". Below this, there is a form with the following fields: "Enter Username" (text input with "Zayd3030"), "Gender" (dropdown menu with "Male"), "Weight (KG)" (text input with "75"), "Height (CM)" (text input with "176"), "Age" (text input with "35"), and "Exercise" (dropdown menu with "VeryActive"). Below these fields, there is a "Lose Or Gain?" section with a dropdown menu showing "Lose". To the left of this section is a box labeled "BMR", and to the right is a box labeled "Fitness Goal". At the bottom center is a "Calculate" button with a calculator icon.

## Action Plan Page:

The screenshot shows a web application window titled 'Form6'. The header is blue with a logo on the left and a 'Home' link on the right. The main content area is white and divided into three columns: 'Goals', 'Action Steps', and 'Diet Plan'. The 'Goals' column contains a text box with 'Your Fitness Goal is 2695 Calories'. The 'Action Steps' column contains a list of instructions. The 'Diet Plan' column contains a detailed meal plan. At the bottom, there is a 'Load Results' button.

**Form6**

**YOURFITNESSFRIEND**

**Action Plan**

Enter ID  
1

**Goals**

Your Fitness Goal is 2695 Calories

**Action Steps**

- You Should be increasing your exercise and aim to go to the gym 5 Times a Week
- Do your best to record your calories and try to hit your calorie goal everyday
- Start off slow. Slow, steady progress is better than no progress at all. We must crawl before we walk, and walk before we run
- Make sure to keep accountable at all times

**Diet Plan**

Diet Plan:

Breakfast - 1 cup of oats, 1 cup low-fat milk, 1.5 cups of coffee, 1 tbsp half and half cream, 2 medium oranges and 1 tsp of sugar.

Snack - 1 medium-sized banana and 3 tbsp of peanut butter

Lunch - 1 medium-sized apple, 3 slices of whole wheat bread, 28 g of cheddar cheese, 1 lettuce leaf, 1.5 cups of tea, 57 g of turkey breast

Snack - 2 slices of rye bread, 1 tbsp of mayonnaise, 1/2 cup of tuna and 1 medium peach.

Dinner - 113 g of salmon, 1 cup of brown rice, 2 cups of skim milk, 1 large garden salad and 4 tbsp honey mustard.

Total intake for the day: Calories: 2568, Fat: 72 g, Carbs: 385 g, Protein: 118.2 g

Load Results

## Help Page:

The screenshot shows a web application window titled 'Form7'. The header is blue with a logo on the left and a 'Home' link on the right. The main content area is white and divided into four columns: 'How to lose / Gain Weight?', 'How To Gain Muscle:', 'Gym Work Outs', and 'Best Cardio Exercise'. Each column contains text and lists of exercises or foods. At the bottom, there is a 'Load Results' button.

**Form7**

**YOURFITNESSFRIEND**

**Help**

Enter ID  
1

**How to lose / Gain Weight?**

To lose weight you must be on a calorie deficit by eating the same amount of calories as your fitness goal. You should aim to eat around 2695 calories per day.

Top that off with regular exercise, accountability and patience

**How To Gain Muscle:**

To gain muscle you must eat alot of protein

Here are some high protein foods you can incorporate into your diet:

- Eggs
- Chicken
- Beef
- Fish

**Gym Work Outs**

Push:

- Bench Press
- DB Press
- Shoulder Press
- Tricep Cable Pulldown

Pull:

- Bicep Curls
- Rows
- Deadlift
- Lat Pulldown

Legs:

**Best Cardio Exercise**

Best Low Intensity Cardio Exercises

- Cycling
- Walking on Incline
- Stair Climbing

Load Results

## Logout Page:

The screenshot shows a web application window titled 'Form4'. The background is blue. In the center, there is a white text box with the message 'Are you sure you want to Logout?'. Below the text box, there are two white buttons: one with a black checkmark and one with a black X.

**Form4**

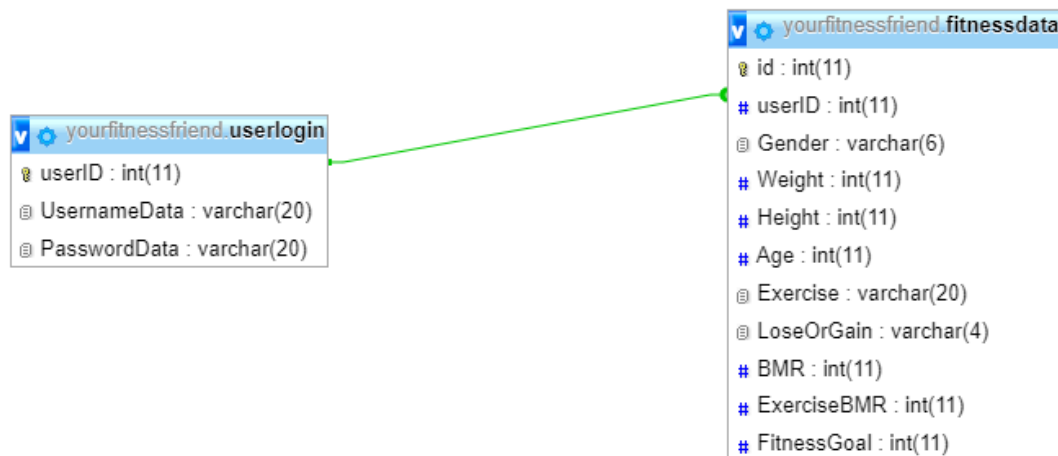
**Are you sure you want to Logout?**

✓

✗

## Database Design and Development Implemented Tables














### Table Relationship:
















### Database Contents:

Server: 127.0.0.1 » Database: yourfitnessfriend									
Structure SQL Search Query Export Import Operations Privileges Routines									
Table	Action				Rows	Type	Collation	Size	Overhead
<input type="checkbox"/> fitnessdata	Browse	Structure	Search	Insert Empty Drop	4	MyISAM	latin1_swedish_ci	3.2 KiB	-
<input type="checkbox"/> userlogin	Browse	Structure	Search	Insert Empty Drop	4	MyISAM	latin1_swedish_ci	2.1 KiB	-
<b>2 tables</b>	<b>Sum</b>				<b>8</b>	<b>MyISAM</b>	<b>latin1_swedish_ci</b>	<b>5.4 KiB</b>	<b>0 B</b>

## User Login Sample Data:

		userID	UsernameData	PasswordData
<input type="checkbox"/>	 Edit  Copy  Delete	1	Zayd3030	LetMeIn54!
<input type="checkbox"/>	 Edit  Copy  Delete	2	BilartCoin45	Password123
<input type="checkbox"/>	 Edit  Copy  Delete	3	TheUsername	ThePassword
<input type="checkbox"/>	 Edit  Copy  Delete	4	Admin12345	qwerty1234

## Fitness Data Sample Data:

		id	userID	Gender	Weight	Height	Age	Exercise	LoseOrGain	BMR	ExerciseBMR	FitnessGoal
<input type="checkbox"/>	 Edit  Copy  Delete	1	1	Male	75	176	35	VeryActive	Lose	1736	2995	2695
<input type="checkbox"/>	 Edit  Copy  Delete	2	2	Male	61	168	18	Lightly	Gain	1619	2226	2526
<input type="checkbox"/>	 Edit  Copy  Delete	3	3	Female	50	150	23	ExtraActive	Lose	1297	2464	2164
<input type="checkbox"/>	 Edit  Copy  Delete	4	4	Male	45	160	18	ExtraActive	Gain	1360	2584	2884



## Software Design and Development Program Code

### FitnessData Class:

```
Public Class FitnessData
    Public id As Integer
    Public Gender As String
    Public Weight As Integer
    Public Height As Integer
    Public Age As Integer
    Public Exercise As String
    Public LoseOrGain As String
    Public BMR As Integer
    Public ExerciseBMR As Integer
    Public FitnessGoal As Integer

    Public Sub New(ByVal id As Integer, ByVal Gender As String, ByVal Weight As Integer,
        ByVal Height As Integer, ByVal Age As Integer, ByVal Exercise As String, ByVal LoseOrGain
        As String)
        Me.id = id
        Me.Gender = Gender
        Me.Weight = Weight
        Me.Height = Height
        Me.Age = Age
        Me.Exercise = Exercise
        Me.LoseOrGain = LoseOrGain
    End Sub

    Public Sub UpdateWeight(ByVal NewWeight As Integer)
        Me.Weight = NewWeight
    End Sub

    Public Sub UpdateAge(ByVal NewAge As Integer)
        Me.Age = NewAge
    End Sub

    Public Sub UpdateExercise(ByVal NewExercise As String)
        Me.Exercise = NewExercise
    End Sub

    Public Function GetId(ByVal id As Integer)
        Return id
    End Function

    Public Function GetGender(ByVal Gender As String)
        Return Gender
    End Function

    Public Function GetWeight(ByVal Weight As String)
        Return Weight
    End Function

    Public Function GetHeight(ByVal Height As String)
        Return Height
    End Function

    Public Function GetAge(ByVal Age As String)
        Return Age
    End Function

    Public Function GetExercise(ByVal Exercise As String)
        Return Exercise
    End Function
End Class
```

## Welcome (Login) Page:

```
Imports MySql.Data.MySqlClient
Public Class Form1

    Private Sub Button1_Click(ByVal sender As System.Object, ByVal e As System.EventArgs)
Handles BtnLogin.Click
        Dim connection As MySqlConnection
        Dim command As MySqlCommand
        Dim connectionString As String =
"server=localhost;user=root;password=;database=YourFitnessFriend"
        Dim reader As MySqlDataReader

        connection = New MySqlConnection(connectionString)
        connection.Open()
        command = New MySqlCommand("SELECT * FROM UserLogin WHERE UsernameData='" &
EnterUsername.Text & "' AND PasswordData='" & EnterPassword.Text & "'")
        command.Connection = connection
        reader = command.ExecuteReader()

        While reader.Read()
            Dim GetUsername As String = reader.GetString(1).ToString
            Dim GetPassword As String = reader.GetString(2).ToString

            If GetUsername = EnterUsername.Text And GetPassword = EnterPassword.Text Then
                MsgBox("Login Successful")
                EnterUsername.Clear()
                EnterPassword.Clear()
                Me.Hide()
                Form3.Show()
            ElseIf GetUsername <> EnterUsername.Text Or GetPassword <> EnterPassword.Text
Then
                MsgBox("Login Failed")
            End If

        End While
        connection.Close()
    End Sub

    Private Sub RegisterBtn_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles RegisterBtn.Click
        Me.Hide()
        Form2.Show()
    End Sub
End Class
```

## Register Page:

```
Imports MySql.Data.MySqlClient
Public Class Form2
    Private Sub Button1_Click(ByVal sender As System.Object, ByVal e As System.EventArgs)
Handles BtnCreate.Click
        Dim connection As MySqlConnection
        Dim command As MySqlCommand
        Dim connectionString As String =
"server=localhost;user=root;password=;database=YourFitnessFriend"

        connection = New MySqlConnection(connectionString)
        Dim Username = EnterUsername.Text
        Dim Password = EnterPassword.Text

        connection = New MySqlConnection(connectionString)
        command = New MySqlCommand("INSERT INTO UserLogin (UsernameData, PasswordData)
VALUES(' & Username & ',' & Password & ')")
        command.Connection = connection

        connection.Open()
        If Len(Username) >= 8 Or Len(Password) >= 8 Then
            command.ExecuteNonQuery()
            MsgBox("Account Created")
            Me.Hide()
            Form1.Show()
        ElseIf Username <> "" Or Password <> "" Then
            MsgBox("Error - Please Enter a Username and Password Greater Than 8
Characters")
        ElseIf Username = "" Or Password = "" Then
            MsgBox("Error - Please Enter a Username and Password")
        End If
        connection.Close()
    End Sub

    Private Sub BtnHome_Click(ByVal sender As System.Object, ByVal e As System.EventArgs)
Handles BtnHome.Click
        Me.Hide()
        Form1.Show()
    End Sub
End Class
```

## Home Page:

```
Public Class Form3
```

```
    Private Sub BtnLogOut_Click(ByVal sender As System.Object, ByVal e As  
System.EventArgs) Handles BtnLogOut.Click  
        Me.Hide()  
        Form4.Show()  
    End Sub
```

```
    Private Sub BtnFitnessData_Click(ByVal sender As System.Object, ByVal e As  
System.EventArgs) Handles BtnFitnessData.Click  
        Me.Hide()  
        Form5.Show()  
    End Sub
```

```
    Private Sub BtnAction_Click(ByVal sender As System.Object, ByVal e As  
System.EventArgs) Handles BtnAction.Click  
        Me.Hide()  
        Form6.Show()  
    End Sub
```

```
    Private Sub BtnHelp_Click(ByVal sender As System.Object, ByVal e As System.EventArgs)  
Handles BtnHelp.Click  
        Me.Hide()  
        Form7.Show()  
    End Sub  
End Class
```

## Enter Fitness Data Page:

```
Imports MySql.Data.MySqlClient
Public Class Form5
    Private Sub BtnFitnessData_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles BtnFitnessData.Click
        Dim Person1 As New FitnessData(0, ComboBoxGender.Text, TextBoxWeight.Text,
TextBoxHeight.Text, TextBoxAge.Text, ComboBoxExercise.Text, ComboBoxLoseOrGain.Text)
        If Person1.Gender = "Male" Then
            Person1.BMR = 66 + (13.7 * Person1.Weight) + (5 * Person1.Height) - (6.8 *
Person1.Age)
        ElseIf Person1.Gender = "Female" Then
            Person1.BMR = 655 + (9.6 * Person1.Weight) + (1.8 * Person1.Height) - (4.7
* Person1.Age)
        End If

        If Person1.Exercise = "Sedentary" Then
            Person1.ExerciseBMR = Person1.BMR * 1.2
        ElseIf Person1.Exercise = "Lightly" Then
            Person1.ExerciseBMR = Person1.BMR * 1.375
        ElseIf Person1.Exercise = "Moderately" Then
            Person1.ExerciseBMR = Person1.BMR * 1.55
        ElseIf Person1.Exercise = "VeryActive" Then
            Person1.ExerciseBMR = Person1.BMR * 1.725
        ElseIf Person1.Exercise = "ExtraActive" Then
            Person1.ExerciseBMR = Person1.BMR * 1.9
        End If

        If Person1.LoseOrGain = "Lose" Then
            Person1.FitnessGoal = Person1.ExerciseBMR - 300
        ElseIf Person1.LoseOrGain = "Gain" Then
            Person1.FitnessGoal = Person1.ExerciseBMR + 300
        End If

        LstDisplayBMR.Items.Add("Your Natural BMR is = " & Person1.BMR)
        LstDisplayBMR.Items.Add("Your BMR is = " & Person1.ExerciseBMR)
        LstDisplayFG.Items.Add("Your Fitness Goal is = " & Person1.FitnessGoal)

        Call SendData(Person1)
    End Sub

    Private Sub BtnHome_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles BtnHome.Click
        EnterUsername.Clear()
        TextBoxHeight.Clear()
        TextBoxWeight.Clear()
        TextBoxAge.Clear()
        ComboBoxExercise.SelectedIndex = -1
        ComboBoxGender.SelectedIndex = -1
        ComboBoxLoseOrGain.SelectedIndex = -1
        LstDisplayBMR.Items.Clear()
        LstDisplayFG.Items.Clear()
        Me.Hide()
        Form3.Show()
    End Sub
    Sub SendData(ByVal Person1 As FitnessData)

        Dim id = Person1.id
        Dim Gender = Person1.Gender
        Dim Weight = Person1.Weight
        Dim Height = Person1.Height
```

```

Dim Age = Person1.Age
Dim Exercise = Person1.Exercise
Dim LoseOrGain = Person1.LoseOrGain
Dim BMR = Person1.BMR
Dim ExerciseBMR = Person1.ExerciseBMR
Dim FitnessGoal = Person1.FitnessGoal
Dim Newid As Integer
Dim UsernameEnter As String = EnterUsername.Text

Dim connection As MySqlConnection
Dim command As MySqlCommand
Dim connectionString As String =
"server=localhost;user=root;password=;database=YourFitnessFriend"
Dim reader As MySqlDataReader

connection = New MySqlConnection(connectionString)

connection.Open()
command = New MySqlCommand("SELECT UserId FROM UserLogin WHERE UsernameData
='" & UsernameEnter & "'")
command.Connection = connection
reader = command.ExecuteReader

While reader.Read()
    Newid = reader.Item("UserId")
End While
connection.Close()

connection.Open()
command = New MySqlCommand("INSERT INTO FitnessData(UserId, Gender, Weight,
Height, Age, Exercise, LoseOrGain, BMR, ExerciseBMR, FitnessGoal) VALUES('" & Newid &
"', '" & Gender & "', '" & Weight & "', '" & Height & "', '" & Age & "', '" & Exercise &
"', '" & LoseOrGain & "', '" & BMR & "', '" & ExerciseBMR & "', '" & FitnessGoal & "'")
command.Connection = connection
If Person1.Weight < 45 Then
    MsgBox("Error - Please Enter a Weight Over 45 KG")
ElseIf Person1.Height < 120 Then
    MsgBox("Error - Please Enter a Height Over 120 CM")
ElseIf Person1.Age < 16 Then
    MsgBox("Error - Please Enter an Age Over 16")
Else
    command.ExecuteNonQuery()
    MsgBox("Data Added")
    MsgBox("Your ID is " & Newid)

    EnterUsername.Clear()
    TextBoxHeight.Clear()
    TextBoxWeight.Clear()
    TextBoxAge.Clear()
    ComboBoxExercise.SelectedIndex = -1
    ComboBoxGender.SelectedIndex = -1
    ComboBoxLoseOrGain.SelectedIndex = -1
    LstDisplayBMR.Items.Clear()
    LstDisplayFG.Items.Clear()

End If

connection.Close()
End Sub
End Class

```

## Action Plan Page:

```
Imports MySql.Data.MySqlClient
Public Structure Fitness
    Public id As Integer
    Public Gender As String
    Public Weight As Integer
    Public Height As Integer
    Public Age As Integer
    Public Exercise As String
    Public LoseOrGain As String
    Public BMR As Integer
    Public ExerciseBMR As Integer
    Public FitnessGoal As Integer
End Structure
Public Class Form6
    Private Sub BtnHome_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles BtnHome.Click
        LstDisplayGoal.Items.Clear()
        LstDisplayAS.Items.Clear()
        LstDisplayDP.Items.Clear()
        EnterID.Clear()
        Me.Hide()
        Form3.Show()
    End Sub

    Private Sub BtnLoad_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles BtnLoad.Click
        Dim fitness As Fitness
        Dim connection As MySqlConnection
        Dim command As MySqlCommand
        Dim connectionString As String =
"server=localhost;user=root;password=;database=YourFitnessFriend"
        Dim reader As MySqlDataReader
        Dim myRnd As Integer
        Dim days As Integer

        connection = New MySqlConnection(connectionString)
        connection.Open()

        command = New MySqlCommand("SELECT * FROM FitnessData, UserLogin WHERE
FitnessData.userId = UserLogin.userId AND FitnessData.userId = '" & EnterID.Text &
"'")
        command.Connection = connection
        reader = command.ExecuteReader

        While reader.Read()
            fitness.FitnessGoal = reader.Item("FitnessGoal")
            Call InsertionSort()
            LstDisplayGoal.Items.Add("Your Fitness Goal is " & fitness.FitnessGoal & "
Calories ")

            fitness.Exercise = reader.Item("Exercise")

            If fitness.Exercise = "Sedentary" Then
                days = 3
            ElseIf fitness.Exercise = "Lightly" Then
                days = 3
            ElseIf fitness.Exercise = "Moderately" Then
                days = 4
            ElseIf fitness.Exercise = "VeryActive" Then
                days = 5
            End If
        End While
    End Sub
End Class
```

```

ElseIf fitness.Exercise = "ExtraActive" Then
    days = 6
End If

LstDisplayAS.Items.Add("Action Steps: ")
LstDisplayAS.Items.Add("")
LstDisplayAS.Items.Add("- You Should be increasing your exercise and aim
to go to the gym " & days & " Times a Week")
LstDisplayAS.Items.Add("")
LstDisplayAS.Items.Add("- Do your best to record your calories and try to
hit your calorie goal everyday")
LstDisplayAS.Items.Add("")
LstDisplayAS.Items.Add("- Start off slow. Slow, steady progress is better
than no progress at all. We must crawl before we walk and walk before we run")
LstDisplayAS.Items.Add("")
LstDisplayAS.Items.Add("- Make sure to keep accountable at all times")

myRnd = CInt(Int((5 * Rnd()) + 1))

If fitness.FitnessGoal > 2500 Then
    LstDisplayDP.Items.Add("Diet Plan: ")
    LstDisplayDP.Items.Add("")
    If myRnd = 1 Then
        LstDisplayDP.Items.Add("Breakfast - One scoop of whey protein, 20
grams of blueberries, 2 whole eggs and 5 egg whites.")
        LstDisplayDP.Items.Add("")
        LstDisplayDP.Items.Add("Snack - 2 small bananas and one scoop of
protein powder")
        LstDisplayDP.Items.Add("")
        LstDisplayDP.Items.Add("Lunch - 125 g of cooked brown rice, 198 g
of cooked chicken breast, 80 g of mixed salad (vegetables of your choice).")
        LstDisplayDP.Items.Add("")
        LstDisplayDP.Items.Add("Afternoon snack- 4 boiled egg whites, 1
apple and 2 scoops of whey protein powder (mixed with water).")
        LstDisplayDP.Items.Add("")
        LstDisplayDP.Items.Add("Dinner - 198 g of chicken breast, 60 g of
sweet potato and 80 g of mixed salad.")
        LstDisplayDP.Items.Add("")
        LstDisplayDP.Items.Add("Total intake for the day: Calories: 2,347.
Fat: 32 g, Carbs: 159 g, Protein: 285.8 g")
    ElseIf myRnd = 2 Then
        LstDisplayDP.Items.Add("Breakfast - 268 g of egg whites, two
slices of sprouted bread, reduced sugar jam and sugar-free ketchup.")
        LstDisplayDP.Items.Add("")
        LstDisplayDP.Items.Add("Snack - Protein bar (68 g) and black
coffee.")
        LstDisplayDP.Items.Add("")
        LstDisplayDP.Items.Add("Lunch - 74 g of oats, one medium-sized
banana, 10 g of coconut flakes and 3 pieces of 70% dark chocolate.")
        LstDisplayDP.Items.Add("")
        LstDisplayDP.Items.Add("Snack - One large nectarine.")
        LstDisplayDP.Items.Add("")
        LstDisplayDP.Items.Add("Lunch #2 - 150 g lean ground beef, 1 cup
of cauliflower florets, 150 g of Jasmine rice and 1 tbsp hoisin sauce.")
        LstDisplayDP.Items.Add("")
        LstDisplayDP.Items.Add("Dinner - 1 cup of broccoli florets, 1 can
of tuna and one medium-size sweet potato (baked).")
        LstDisplayDP.Items.Add("")
        LstDisplayDP.Items.Add("Dessert - 2 low-calorie ice cream bars.")
        LstDisplayDP.Items.Add("")
    End If
End If

```



```

        LstDisplayDP.Items.Add("Total intake for the day: Calories:
2,413. Fat: 69.3 g, Carbs: 311.9 g, Protein: 193.7 g")
    ElseIf myRnd = 3 Then
        LstDisplayDP.Items.Add("Breakfast - 2 6-inch buttermilk pancakes,
2 slices bacon, 2 pats butter, 3 tbsp pure maple syrup.")
        LstDisplayDP.Items.Add("")
        LstDisplayDP.Items.Add("Snack - 1 medium banana and 1 cup
oatmeal.")
        LstDisplayDP.Items.Add("")
        LstDisplayDP.Items.Add("Lunch - 1 bagel, 113 g sliced turkey, 2
slices tomato, 1 lettuce leaf, 1 slice cheddar cheese, 1 tsp mustard, 2 slices
avocado.")
        LstDisplayDP.Items.Add("")
        LstDisplayDP.Items.Add("Snack - 1 container Greek yogurt, 1/2 cup
raspberries and 28 g pretzels.")
        LstDisplayDP.Items.Add("")
        LstDisplayDP.Items.Add("Dinner - 113 g chicken breast, 1 cup white
rice, 1/2 chopped bell pepper, green onion, 1/2 red onion, 1/2 cup mushrooms, 2 tbsp
soy sauce and 1 egg")
        LstDisplayDP.Items.Add("")
        LstDisplayDP.Items.Add("Total intake for the day: Calories: 2448.
Fat: 79 g, Carbs: 301 g, Protein: 134 g")
    ElseIf myRnd = 4 Then
        LstDisplayDP.Items.Add("Breakfast - 1 cup of oats, 1 cup low-fat
milk, 1.5 cups of coffee, 1 tbsp half and half cream, 2 medium oranges and 1 tsp of
sugar.")
        LstDisplayDP.Items.Add("")
        LstDisplayDP.Items.Add("Snack - 1 medium-sized banana and 3 tbsp
of peanut butter")
        LstDisplayDP.Items.Add("")
        LstDisplayDP.Items.Add("Lunch - 1 medium-sized apple, 3 slices of
whole wheat bread, 28 g of cheddar cheese, 1 lettuce leaf, 1.5 cups of tea, 57 g of
turkey breast")
        LstDisplayDP.Items.Add("")
        LstDisplayDP.Items.Add("Snack - 2 slices of rye bread, 1 tbsp of
mayonnaise, 1/2 cup of tuna and 1 medium peach.")
        LstDisplayDP.Items.Add("")
        LstDisplayDP.Items.Add("Dinner - 113 g of salmon, 1 cup of brown
rice, 2 cups of skim milk, 1 large garden salad and 4 tbsp honey mustard.")
        LstDisplayDP.Items.Add("")
        LstDisplayDP.Items.Add("Total intake for the day: Calories: 2568.
Fat: 72 g, Carbs: 385 g, Protein: 118.2 g")
    ElseIf myRnd = 5 Then
        LstDisplayDP.Items.Add("Breakfast - 1/2 cup of oats, 1 cup of
strawberries, 1 large egg and 3 egg whites (boiled), 1.25 cups of almond milk and 1
scoop of whey protein.")
        LstDisplayDP.Items.Add("")
        LstDisplayDP.Items.Add("Snack - 227 g of shredded chicken breast,
2 low-carb whole-wheat wraps and 1 cup of bell peppers.")
        LstDisplayDP.Items.Add("")
        LstDisplayDP.Items.Add("Lunch - 4 cups of romaine lettuce and
spinach mix, 12 grape tomatoes, 2 reduced-fat cheese sticks, 150 g Greek yogurt and 1
cup of roasted almonds.")
        LstDisplayDP.Items.Add("")
        LstDisplayDP.Items.Add("Snack - 1.25 cups of unsweetened almond
milk, 1 scoop of whey protein, 150 g of greek yogurt and 1 cup of mixed frozen
fruits.")
        LstDisplayDP.Items.Add("")
        LstDisplayDP.Items.Add("Snack - 1 scoop of whey protein mixed with
water.")
        LstDisplayDP.Items.Add("")

```

```

        LstDisplayDP.Items.Add("Dinner - 226 g of lean ground beef, 1/2
cup of brown rice and 2 cups of steamed broccoli.")
        LstDisplayDP.Items.Add("")
        LstDisplayDP.Items.Add("Dessert: 1 cup of low-fat cottage cheese
and 1 cup of strawberries.")
        LstDisplayDP.Items.Add("")
        LstDisplayDP.Items.Add("Total intake for the day: Calories: 2,456.
Fat: 67 g, Carbs: 208 g, Protein: 281 g")
    End If
    ElseIf fitness.FitnessGoal > 2000 Then
        LstDisplayDP.Items.Add("Diet Plan: ")
        LstDisplayDP.Items.Add("")
        If myRnd = 1 Then
            LstDisplayDP.Items.Add("Breakfast - 2 eggs, 20g of spinach, 24g of
mushrooms, 23g of broccoli, 205g of sautéed sweet potatoes, 1 tablespoon of olive
oil")
            LstDisplayDP.Items.Add("")
            LstDisplayDP.Items.Add("Snack - Apple, 2 tablespoons of peanut
butter")
            LstDisplayDP.Items.Add("")
            LstDisplayDP.Items.Add("Lunch - 1 pita, 140g of tuna, chopped red
onion, 1/4 avocado, 1 tablespoon of feta cheese")
            LstDisplayDP.Items.Add("")
            LstDisplayDP.Items.Add("Snack - 56g of cheddar cheese, 92g of
grapes")
            LstDisplayDP.Items.Add("")
            LstDisplayDP.Items.Add("Dinner - 140g of baked salmon, 2
tablespoons of olive oil, 82g of rice, 180g of asparagus, 100g of roasted eggplant")
            LstDisplayDP.Items.Add("")
            LstDisplayDP.Items.Add("Total intake for the day: Calories: 2,027.
Fat: 22 g, Carbs: 129 g, Protein: 185.8 g")
        ElseIf myRnd = 2 Then
            LstDisplayDP.Items.Add("Breakfast - 2 slices of whole-grain toast,
2 tablespoons of almond butter, 1 banana, cinnamon")
            LstDisplayDP.Items.Add("")
            LstDisplayDP.Items.Add("Snack - 3/4 cup milk, 20g of spinach, 42g
of protein powder, 123g of frozen blueberries, 1 tablespoon of hemp seeds")
            LstDisplayDP.Items.Add("")
            LstDisplayDP.Items.Add("Lunch - 1/2 avocado, 140g of tuna, 75g of
tomatoes 100g of mixed greens")
            LstDisplayDP.Items.Add("")
            LstDisplayDP.Items.Add("Snack - fresh carrot and celery sticks, 2
tablespoons of hummus")
            LstDisplayDP.Items.Add("")
            LstDisplayDP.Items.Add("Dinner - 140g of chicken 176g of broccoli,
82g of cooked brown rice, 1 tablespoon of soy sauce")
            LstDisplayDP.Items.Add("")
            LstDisplayDP.Items.Add("Total intake for the day: Calories:
1,913. Fat: 29.3 g, Carbs: 211.9 g, Protein: 153.7 g")
        ElseIf myRnd = 3 Then
            LstDisplayDP.Items.Add("Breakfast - 200g of yogurt, 74g of
blueberries, 76g of sliced strawberries, 30g of granola")
            LstDisplayDP.Items.Add("")
            LstDisplayDP.Items.Add("Snack - 1 banana, 1 and 1/2 tablespoons of
almond butter")
            LstDisplayDP.Items.Add("")
            LstDisplayDP.Items.Add("Lunch - 132g of cooked rice noodles, 141g
of tofu, 2 teaspoons tamari, 1/2 teaspoon of Sriracha, 2 teaspoons of honey")
            LstDisplayDP.Items.Add("")
            LstDisplayDP.Items.Add("Snack - protein bar of choice")
            LstDisplayDP.Items.Add("")

```

```

        LstDisplayDP.Items.Add("Dinner - 3 corn tortillas, 170g of grilled
cod, 1/2 avocado, 2 tablespoons of pico de gallo")
        LstDisplayDP.Items.Add("")
        LstDisplayDP.Items.Add("Total intake for the day: Calories: 2005.
Fat: 49 g, Carbs: 201 g, Protein: 124 g")
        ElseIf myRnd = 4 Then
            LstDisplayDP.Items.Add("Breakfast - 1/2 avocado, 2 slices of
toast, 1 tablespoon of olive oil, 1 egg")
            LstDisplayDP.Items.Add("")
            LstDisplayDP.Items.Add("Snack - 200g of plain Greek yogurt, 125g
of strawberries")
            LstDisplayDP.Items.Add("")
            LstDisplayDP.Items.Add("Lunch- 93g of cooked quinoa, 142g of
grilled chicken, 1 tablespoon of olive oil, 180g of mixed vegetables")
            LstDisplayDP.Items.Add("")
            LstDisplayDP.Items.Add("Snack - 2 squares of dark chocolate, 15-20
almonds")
            LstDisplayDP.Items.Add("")
            LstDisplayDP.Items.Add("Dinner - 30g of kidney beans, 103g of
butternut squash, 75g of cooked sweet corn, 1/4 of a jalapeño pepper")
            LstDisplayDP.Items.Add("")
            LstDisplayDP.Items.Add("Total intake for the day: Calories: 1945.
Fat: 32 g, Carbs: 185 g, Protein: 108.7 g")
            ElseIf myRnd = 5 Then
                LstDisplayDP.Items.Add("Breakfast - 80g of steel-cut oats, 1
tablespoon of hemp seeds, 1 tablespoon of flax seeds, 2 tablespoons of dried cherrie")
                LstDisplayDP.Items.Add("")
                LstDisplayDP.Items.Add("Snack - 1/2 bell pepper, 1 cup of carrots,
4 tablespoons of guacamole")
                LstDisplayDP.Items.Add("")
                LstDisplayDP.Items.Add("Lunch - 1 tortilla, 60g of red peppers, 5
slices of grilled zucchini, 84g of fresh mozzarella")
                LstDisplayDP.Items.Add("")
                LstDisplayDP.Items.Add("Snack - 170g of chia pudding, 1/2 of a
sliced banana")
                LstDisplayDP.Items.Add("")
                LstDisplayDP.Items.Add("Dinner - 2 tablespoons of pesto, 1/2 cup
of whole-wheat or brown-rice penne, 170g of shrimp, 1 tablespoon of Parmesan cheese")
                LstDisplayDP.Items.Add("")
                LstDisplayDP.Items.Add("Total intake for the day: Calories: 2,017.
Fat: 22 g, Carbs: 129 g, Protein: 185.8 g")
            End If
        End If
    End While
    connection.Close()
End Sub

```

## Insertion Sort Algorithm (Inside Action Plan Page):

```
Sub InsertionSort()  
    Dim fitness(9) As Fitness  
    Dim tempFitness As Fitness  
    Dim currentPosition As Integer  
    Dim newPosition As Integer  
  
    For currentPosition = 1 To 9  
        tempFitness = fitness(currentPosition)  
        newPosition = currentPosition  
        While newPosition > 0 AndAlso fitness(newPosition - 1).FitnessGoal >  
tempFitness.FitnessGoal  
            fitness(newPosition) = fitness(newPosition - 1)  
            newPosition = newPosition - 1  
        End While  
        fitness(newPosition) = tempFitness  
    Next  
    MsgBox("Data Sorted")  
End Sub  
End Class
```

## Help Page:

```
Imports MySql.Data.MySqlClient
Public Class Form7
    Private Sub BtnLoad_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles BtnLoad.Click
        Dim fitness As Fitness
        Dim connection As MySqlConnection
        Dim command As MySqlCommand
        Dim connectionString As String =
"server=localhost;user=root;password=;database=YourFitnessFriend"
        Dim reader As MySqlDataReader
        Dim calories As Integer

        connection = New MySqlConnection(connectionString)
        connection.Open()

        command = New MySqlCommand("SELECT * FROM FitnessData, UserLogin WHERE
FitnessData.userId = UserLogin.userId AND FitnessData.userId = '" & EnterID.Text &
"'")
        command.Connection = connection
        reader = command.ExecuteReader

        While reader.Read()
            fitness.LoseOrGain = reader.Item("LoseOrGain")
            fitness.FitnessGoal = reader.Item("FitnessGoal")
            calories = fitness.FitnessGoal

            If fitness.LoseOrGain = "Lose" Then
                LstDisplayLoseOrGain.Items.Add("To lose weight you must be on a
calorie deficit by eating the same amount of calories as your fitness goal.")
                LstDisplayLoseOrGain.Items.Add("You should aim to eat around " &
calories & " calroies per day.")
                LstDisplayLoseOrGain.Items.Add("")
                LstDisplayLoseOrGain.Items.Add("Top that off with regular exercise,
accountability and patience")
            ElseIf fitness.LoseOrGain = "Gain" Then
                LstDisplayLoseOrGain.Items.Add("To gain weight you must be on a
calorie surplus by eating the same amount of calories as your fitness goal.")
                LstDisplayLoseOrGain.Items.Add("You should aim to eat around " &
calories & " calroies per day.")
                LstDisplayLoseOrGain.Items.Add("")
                LstDisplayLoseOrGain.Items.Add("Top that off with regular exercise,
accountability and patience")
            End If
        End While

        LstDisplayMuscle.Items.Add("To gain muscle you must eat alot of protein")
        LstDisplayMuscle.Items.Add("")
        LstDisplayMuscle.Items.Add("Here are some high protein foods you can")
        LstDisplayMuscle.Items.Add("incorporate into your diet:")
        LstDisplayMuscle.Items.Add("")
        LstDisplayMuscle.Items.Add("- Eggs")
        LstDisplayMuscle.Items.Add("- Chicken")
        LstDisplayMuscle.Items.Add("- Beef")
        LstDisplayMuscle.Items.Add("- Fish")

        LstDisplayGym.Items.Add("Push:")
        LstDisplayGym.Items.Add("")
        LstDisplayGym.Items.Add("Bench Press")
        LstDisplayGym.Items.Add("DB Press")
        LstDisplayGym.Items.Add("Shoulder Press")
    End Sub
End Class
```

```

        LstDisplayGym.Items.Add("Tricep Cable Pulldown")
        LstDisplayGym.Items.Add("")
        LstDisplayGym.Items.Add("Pull:")
        LstDisplayGym.Items.Add("Bicep Curls")
        LstDisplayGym.Items.Add("Rows")
        LstDisplayGym.Items.Add("Deadlift")
        LstDisplayGym.Items.Add("Lat Pulldown")
        LstDisplayGym.Items.Add("")
        LstDisplayGym.Items.Add("Legs:")
        LstDisplayGym.Items.Add("")
        LstDisplayGym.Items.Add("Squats")
        LstDisplayGym.Items.Add("Lunge")
        LstDisplayGym.Items.Add("Leg Extention")
        LstDisplayGym.Items.Add("Calf Raises ")

        LstDisplayCardio.Items.Add("Best Low Intensity Cardio Exercises")
        LstDisplayCardio.Items.Add("")
        LstDisplayCardio.Items.Add("Cycling")
        LstDisplayCardio.Items.Add("Walking on Incline")
        LstDisplayCardio.Items.Add("Stair Climbing")

        connection.Close()
    End Sub

    Private Sub BtnHome_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles BtnHome.Click
        LstDisplayLoseOrGain.Items.Clear()
        LstDisplayGym.Items.Clear()
        LstDisplayMuscle.Items.Clear()
        LstDisplayCardio.Items.Clear()
        EnterID.Clear()
        Me.Hide()
        Form3.Show()
    End Sub
End Class

```

## Logout Page:

```
Public Class Form4

    Private Sub BtnYes_Click(ByVal sender As System.Object, ByVal e As System.EventArgs)
Handles BtnYes.Click
        Me.Hide()
        Form1.Show()
    End Sub

    Private Sub BtnNo_Click(ByVal sender As System.Object, ByVal e As System.EventArgs)
Handles BtnNo.Click
        Me.Hide()
        Form3.Show()
    End Sub
End Class
```

## Database Design and Development SQL Code

Create Database:

```
CREATE DATABASE YourFitnessFriend;
```

Create UserLogin Table:

```
CREATE TABLE UserLogin (  
  userID int NOT NULL AUTO_INCREMENT,  
  UsernameData Varchar(20) NOT NULL,  
  PasswordData Varchar(20) NOT NULL  
  PRIMARY KEY(userID)  
);
```



## Create FitnessData Table:

```
CREATE TABLE FitnessData (  
  id int NOT NULL AUTO_INCREMENT,  
  userID int NOT NULL,  
  Gender Varchar(6) NOT NULL CHECK (Gender IN ("Male", "Female")),  
  Weight Int NOT NULL CHECK (Weight >=45),  
  Height Int NOT NULL CHECK (Height >=120),  
  Age Int NOT NULL CHECK (Age >=16),  
  Exercise Varchar(20) NOT NULL,  
  LoseOrGain Varchar(4) NOT NULL,  
  BMR Int NOT NULL,  
  ExerciseBMR Int NOT NULL,  
  FitnessGoal Int NOT NULL  
  
  PRIMARY KEY(id)  
  FOREIGN KEY REFERENCES UserLogin(userID)  
);
```

### Login SQL:

```
("SELECT * FROM UserLogin WHERE UsernameData='" & EnterUsername.Text & "'  
AND PasswordData='" & EnterPassword.Text & "'")
```

### Register SQL:

```
("INSERT INTO UserLogin (UsernameData, PasswordData) VALUES('" & Username  
& "', '" & Password & "'")
```

### Verify User SQL:

```
("SELECT UserId FROM UserLogin WHERE UsernameData ='" & UsernameEnter &  
"'")
```

### Insert Fitness Data SQL:

```
("INSERT INTO FitnessData(UserId, Gender, Weight, Height, Age, Exercise,  
LoseOrGain, BMR, ExerciseBMR, FitnessGoal) VALUES('" & Newid & "', '" &  
Gender & "', '" & Weight & "', '" & Height & "', '" & Age & "', '" & Exercise  
& "', '" & LoseOrGain & "', '" & BMR & "', '" & ExerciseBMR & "', '" &  
FitnessGoal & "'")
```

### Verify ID SQL:

```
("SELECT * FROM FitnessData, UserLogin WHERE FitnessData.userId =  
UserLogin.userId AND FitnessData.userId = '" & EnterID.Text & "'")
```

## Research and Development of New Skills and Knowledge

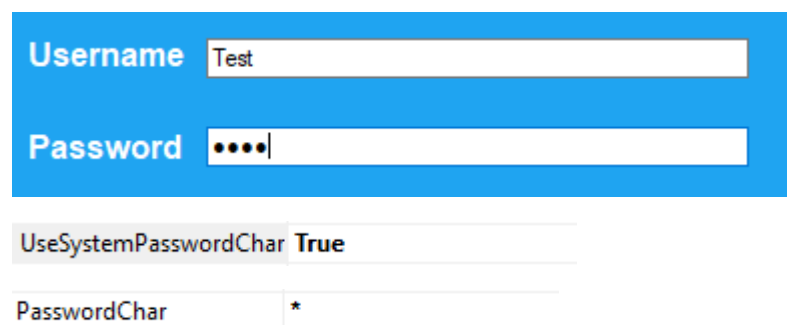
To create my project, I had to research skills that weren't taught as part of the Advanced Higher course. Here are a list of things I had to research:

### VB User Interface:

I wanted the users of my program to have a great experience when using my program and wanted to have a successful UI design which contributes to a positive user experience as I feel my users will feel more comfortable while using my application. I wanted it to have a blue background as I felt like it has connotations of health and fitness. I did some research online and found that you can change the VB Forms BackColor in the properties section which allowed me to change the colours. So I implemented this by changing the background colour to be a light blue colour to differentiate my program so it didn't look generic.

### VB PasswordChar:

I wanted to make sure my login system was secure so I had to make sure to hide the password field with asterisks for security purposes. I did some research online and found that you can enable UseSystemPasswordChar and set it to True as it will disable people to copy and paste the textbox. I then found out by adding an asterisks (\*) in the PasswordChar field, it will replace whatever letter I typed with an asterisks. So when I type a letter it comes with asterisks.



The image shows a screenshot of a Visual Basic login form and its Properties window. The form has a light blue background and contains two text boxes. The first text box is labeled 'Username' and contains the text 'Test'. The second text box is labeled 'Password' and contains four asterisks '\*\*\*\*'. Below the form, the Properties window is open, showing the 'UseSystemPasswordChar' property set to 'True' and the 'PasswordChar' property set to '\*'. The Properties window has a light gray background and a white border.

### VB Add Icon to Button:

I wanted to make my buttons to look attractive so I wanted to add a style to it. I wanted to add icons as it can be a great way to bring essential content to the point. They are a great attention grabber and they will help the users of my program to find and scan content. I had to use royalty free icons online for my project to make sure I did not run into any Copyright infringements. So I went on to a website called Icon Scout to find some copyright free icons for my program.

### VB Add Image:

I wanted to add in a logo into my program to ensure that it helps to establish credibility. I wanted it to be on every page except from the logout page. I did some research online and found that you can add images by adding in a PictureBox via the VB tool box. So then I added the logo onto each form except from by logout form.

### Sources:

- [https://www.techotopia.com/index.php/Visual Basic and Forms#:~:text=To%20change%20the%20background%20color,%2C%20Yellow%2C%20Cyan%20etc](https://www.techotopia.com/index.php/Visual_Basic_and_Forms#:~:text=To%20change%20the%20background%20color,%2C%20Yellow%2C%20Cyan%20etc)
- <https://docs.microsoft.com/en-us/office/vba/language/concepts/forms/passwordchar-property>
- <https://www.homeandlearn.co.uk/NET/nets4p12.html#:~:text=Run%20your%20programme%20and%20Click,and%20then%20click%20File%20%3E%20Open.>
- <https://iconscout.com/>

## On Going Testing

What I tested	How did I test it?	What happened?	Notes
Register Account	I entered a username and password greater than 8 characters and It showed an error.	Register account was not successful  See Table Below	After Looking at Documentation I managed to get it working
Login Account	I entered the username and password I used to register an account	Login was successful and it directed me to the home page	N/A
Enter Fitness Data	I entered my fitness data but could not get my ID to display. But all of my data appeared in the database.	Entering Fitness Data  See Table Below	After Looking at School Recourses and Documentation I managed to get it working and the ID was displayed to the user
Action Plan	I Entered the ID that the program gave to me but threw an error as the fields from the database were not assigning to the record structure	Viewing action plan not successful  See Table Below	After Looking at Documentation I managed to get it working and then I could pass values from a database to a record variable
Insertion Sort	I tested this by seeing what is displayed. But I found that it would not sort through the fitness goal and would end up sorting the whole record.	Insertion Sort was successful but didn't sort through the fitness data  See Table Below	Later I found that if you declare a temporary variable under the fitness record. It allows you to insert the data into the right order.
Help Page	I entered my ID and it worked as planned as before I fixed up all of the errors regarding declaring variables from database values and connection issues	Test was successful and the help page showed all of the details	N/A
Logout	I clicked the Logout button and pressed the tick	Logout was successful and directed me back to the Login page	N/A

## Log of Ongoing Testing Errors

What I tested	Description of Issues	How I Resolved	References
Login System	When I tried to register my login details by using an INSERT statement. It had many errors saying that I could not establish a connection and my data did not enter any table.	I looked up VB documentation on database connection to resolve my issue and get it working.	<ul style="list-style-type: none"> <li><a href="https://docs.microsoft.com/en-us/troubleshoot/developer/dotnet/framework/general/open-database-by-sql-server-dotnet-data-provider">https://docs.microsoft.com/en-us/troubleshoot/developer/dotnet/framework/general/open-database-by-sql-server-dotnet-data-provider</a></li> </ul>
SQL Connection + UserID	When I tried to insert my fitness data into my database there was more connection issues that were different to the one previous. I also had to find a way on how to give the UserID to the user after the entered their username.	I had to use multiple SQL statements and connections to allow this to work.	<ul style="list-style-type: none"> <li><a href="https://docs.microsoft.com/en-us/troubleshoot/developer/dotnet/framework/general/open-database-by-sql-server-dotnet-data-provider">https://docs.microsoft.com/en-us/troubleshoot/developer/dotnet/framework/general/open-database-by-sql-server-dotnet-data-provider</a></li> <li>School Resources and Notes</li> </ul>
Reading Data From Database into a Record	When I tried to read the database from the table and select the Fitness Goal and declare it into a record. I ran into many errors regarding passing value from database to a variable.	I had to look up a source on how to do this and implement it.	<ul style="list-style-type: none"> <li><a href="https://www.daniweb.com/programming/software-development/threads/388157/passing-value-from-database-to-a-variable">https://www.daniweb.com/programming/software-development/threads/388157/passing-value-from-database-to-a-variable</a></li> </ul>

Using an Insertion Sort for an Array of Records	I tried to sort the fitness goals from the fitness data by using an insertion sort algorithm. But I could not find a way on how to sort through an array of records.	I found that if you declare a temporary variable under the fitness record. It allows you to insert the data into the right order.	<ul style="list-style-type: none"><li>• N/A</li></ul>
VB Rnd Function	I wanted to give the users of my program a random meal plan depending on their fitness goal. So I wanted to generate a number between 1 and 5. I used the Rnd function but I found that It would display the same number over and over again.	I looked up VB documentation on generating random variables to resolve my issue and get it working so that it generates a different number each time.	<ul style="list-style-type: none"><li>• <a href="https://docs.microsoft.com/en-us/office/vba/language/reference/user-interface-help/rnd-function">https://docs.microsoft.com/en-us/office/vba/language/reference/user-interface-help/rnd-function</a></li></ul>

## Testing the Solution

### Final Test Plan

#### Persona

My Persona for my program is someone who wants to improve their fitness. They will be an 18 year old male who is in university studying Computing Science and has a part time job at a Tech Start Up so he is very experienced and has no problem navigating around systems. He is around 60kg, 167cm tall and does exercise 3 to 5 times a week. He will be able to register a unique username and password of their choice greater than 8 characters. He will also be able to login with their chosen username and password. He will also be able to easily navigate around my program. He will then be able to enter his fitness data and read his action plan created for him. On top of this, he will be able to view a help page that will help to him reach his desired goal. He has no issues with accessibility and can easily use a keyboard and mouse.

In return the program should be able to store his credentials onto a database, validate all of his inputs to make sure it's all fit for purpose. The program will be able to store all of the user's fitness data onto an external database and finally display an action plan for the user and a help screen. The program should be able to sort through all of the fitness data using the Insertion Sort Algorithm.

For this test the persona will be doing Integrative Testing and will be testing the whole programs performance together. So all of the components of my program will be tested together to see if all systems work with each other.



## Test Table

Test Requirements	Description	Test Case	Type of Testing	Expected Output
Register Account	Create New Account	<p>Click on register and register an account</p> <p>Username &amp; password must be greater than 8 characters</p> <p>After registering an account click home</p>	<p>Normal: Greater than 8 characters</p> <p>Exceptional: Letters, symbols and numbers and less than 8 characters</p> <p>Extreme: Equal to 8 characters</p>	<p>Normal: Account will be created and will show message</p> <p>Exceptional: Account will not be created</p> <p>Extreme: Account will be created and will show message</p>
Login Account	Login into New Account	Login using your account details that you used previously	<p>Normal: Exact Details</p> <p>Exceptional: Wrong Details</p> <p>Extreme: Different Capitalisation</p>	<p>Normal: Login will be successful and will direct you to the home page</p> <p>Exceptional: Login will not be successful</p> <p>Extreme: Login will not be successful</p>

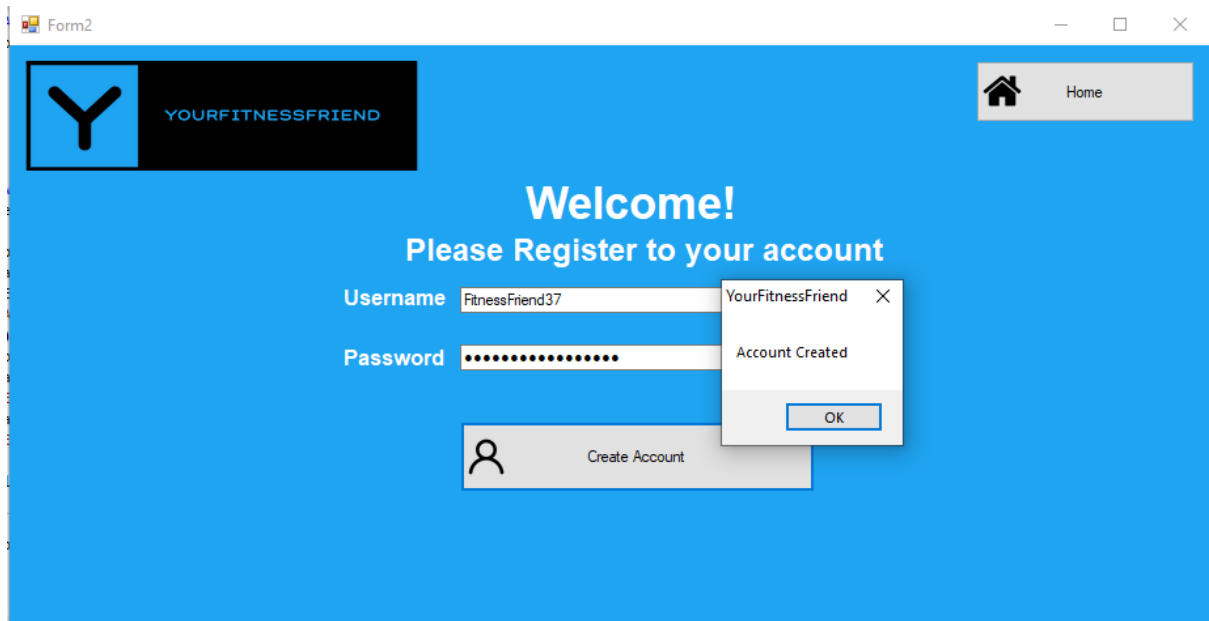
Enter Fitness Data	<p>Enter Username and Calculate Fitness data by Entering Biometric Data.</p> <p>Program will display ID</p>	<p>Enter your username and Enter your data for the program to calculate your fitness goal.</p> <p>Make sure you use your account details that you used previously</p> <p>Age must be greater than or equal to 16</p> <p>Weight must be greater than or equal to 45</p> <p>Height must be greater than or equal to 120</p> <p>After Entering Data Click Home</p>	<p>Normal: Age is greater than 16</p> <p>Weight is greater than 45</p> <p>Height is greater than 120</p> <p>Exceptional: Letters, symbols and numbers and less than 16, 45, 120</p> <p>Extreme: Equal to 16, 45, 120</p>	<p>Normal: Entering details will be successful and will display a message.</p> <p>The program will display your ID.</p> <p>Exceptional: Entering details will not be successful and will display an error.</p> <p>The Program will not display your ID.</p> <p>Extreme: Entering details will be successful and will display a message.</p> <p>The program will display your ID.</p>
--------------------	---	---	--	--

Action Plan	View Action Plan with ID	<p>Enter your ID into the program to view your action plan.</p> <p>Make sure you use your ID that was shown previously</p> <p>After viewing Action Plan click Home</p>	<p>Normal: ID that was assigned to user</p> <p>Exceptional: Letters and Symbols</p> <p>Extreme: Blank</p>	<p>Normal: Showing action plan will be successful and will display a message saying that data has been sorted.</p> <p>Exceptional: Showing action plan will not be successful and will not display message saying that data has been sorted</p> <p>Extreme: Showing action plan will not be successful and will not display message saying that data has been sorted</p>
Help	View Help Page with ID	<p>Enter your ID into the program to view your action plan.</p> <p>Make sure you use your ID that was shown previously.</p> <p>After viewing Help Page click Home</p>	<p>Normal: ID that was assigned to user</p> <p>Exceptional: Letters and Symbols</p> <p>Extreme: Blank</p>	<p>Normal: Showing Help will be successful</p> <p>Exceptional: Showing Help will not be successful</p> <p>Extreme: Showing Help will not be successful</p>
Logout	Click Logout to Exit to the Login Page	<p>On the home page. Click Logout.</p> <p>Click the tick to Logout</p>	<p>Normal: Click the tick to Logout</p> <p>Click the cross to Cancel</p> <p>Exceptional: N/A</p> <p>Extreme: N/A</p>	<p>Logout will be a success and will direct you to the Welcome Page (Login Page)</p> <p>Or</p> <p>Will take you back to the Home Page</p>

## Requirements Testing

### Register User (Normal):

#### Screenshot of Input:

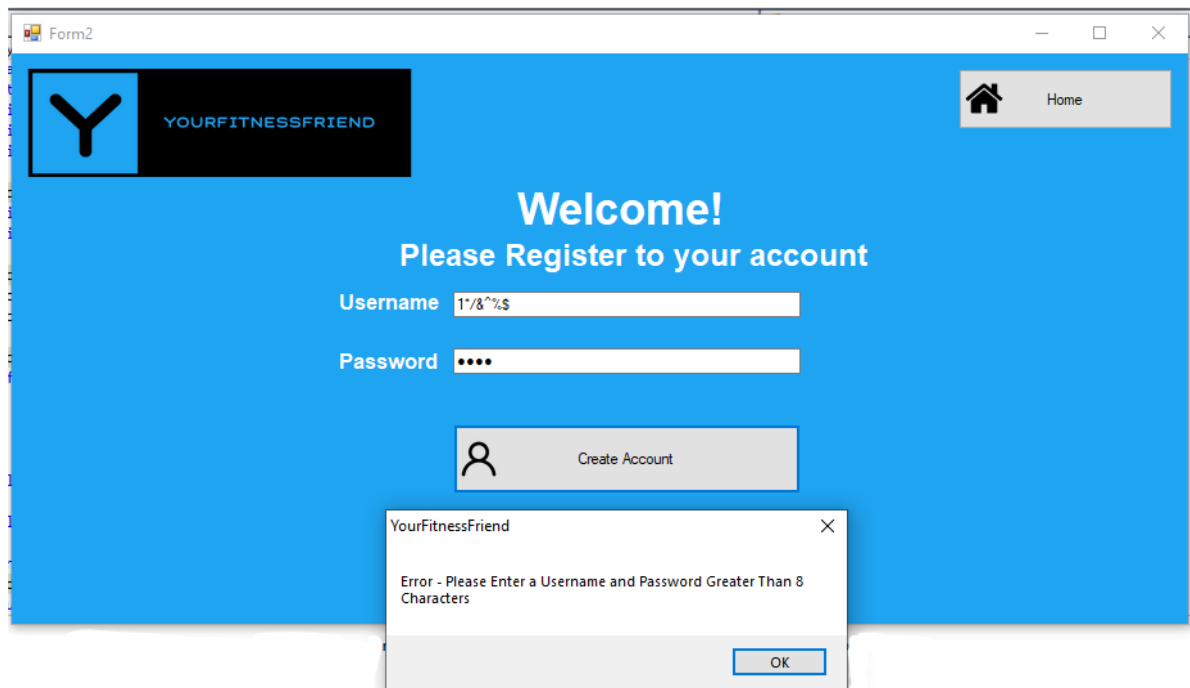


#### Database Table Output:

<input type="checkbox"/>	Edit	Copy	Delete	5	FitnessFriend37	FitnessPassword12
--------------------------	------	------	--------	---	-----------------	-------------------

Register User (Exceptional):

Screenshot of Input and Output:



Register User (Extreme):

Screenshot of Input:

Form2

YOURFITNESSFRIEND


Home

# Welcome!

Please Register to your account

Username

Password

 Create Account

YourFitnessFriend X

Account Created

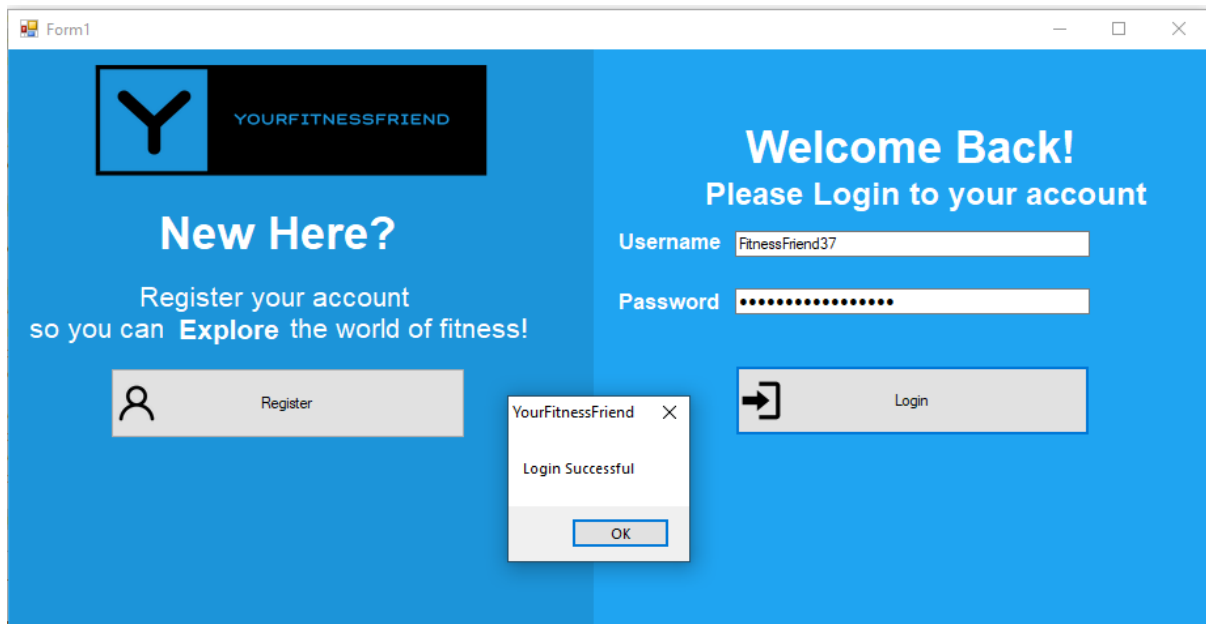
OK

Database Table Output:

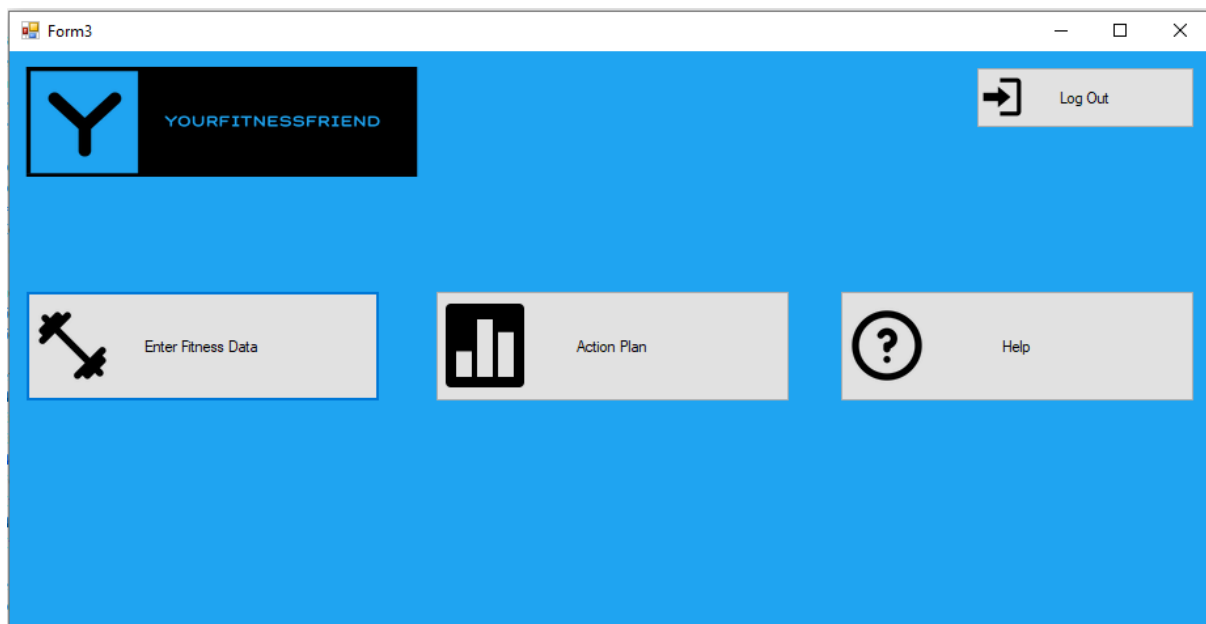
<input type="checkbox"/>	Edit	Copy	Delete	6	Fitness1	Password
--------------------------	------	------	--------	---	----------	----------

Login (Normal):

Screenshot of Input:

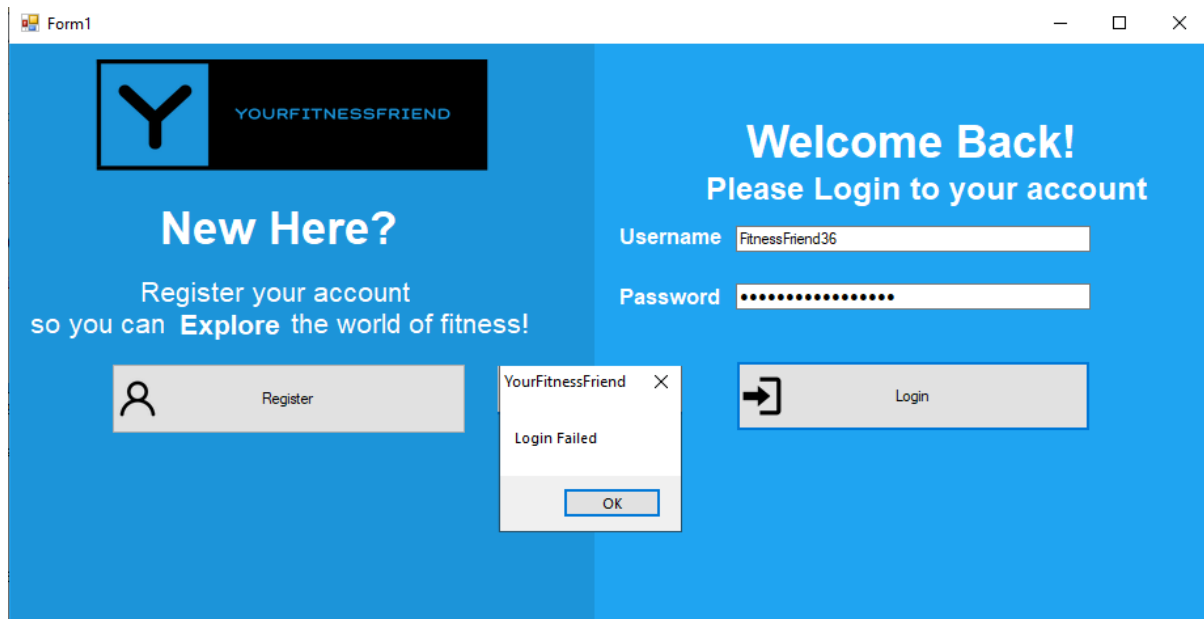


Screenshot of Output:



Login (Exceptional):

Screenshot of Input:



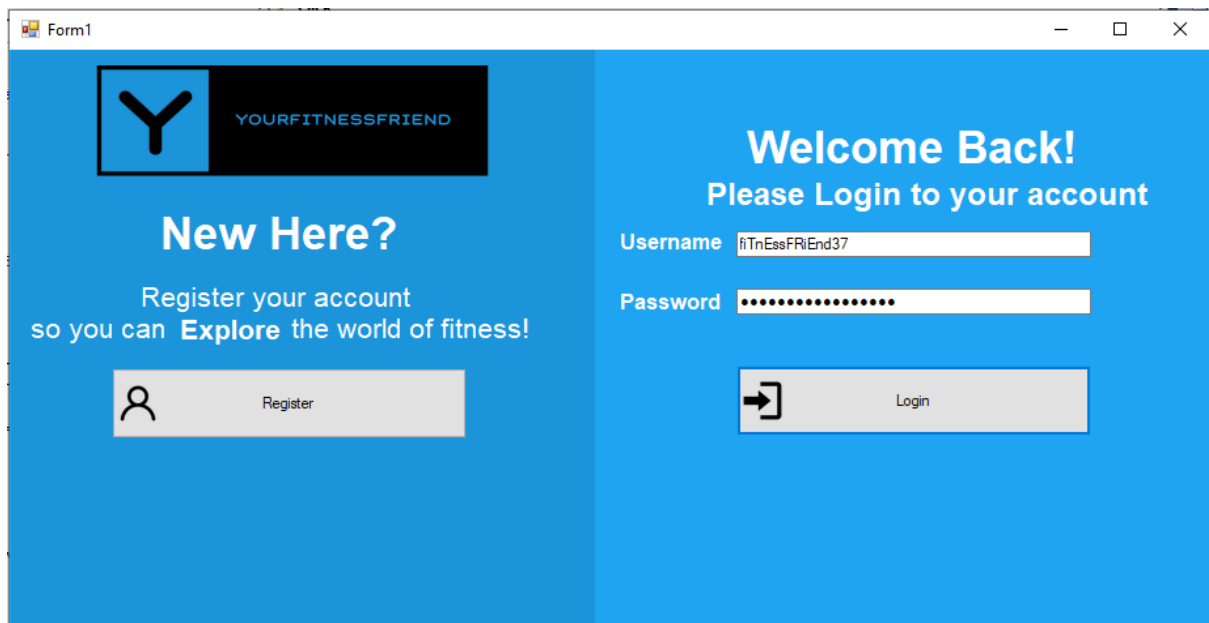
Screenshot of Output:

N/A



Login (Extreme):

Screenshot of Input:



The screenshot shows a web application window titled "Form1" with a blue background. The interface is split into two main sections. On the left, under the "YOURFITNESSFRIEND" logo, is a "New Here?" section with the text "Register your account so you can Explore the world of fitness!" and a "Register" button with a user icon. On the right, a "Welcome Back!" section prompts the user to "Please Login to your account". It features a "Username" field containing "fiTnEssFRiEnd37" and a "Password" field with masked characters. Below these is a "Login" button with a key icon.

Screenshot of Output:

N/A

Enter Fitness Data (Normal):

Screenshot of Input:

The screenshot shows a web form titled "Enter Fitness Data" with a blue background. The form includes a logo "YOURFITNESSFRIEND" and a "Home" button. Input fields are provided for Username (FitnessFriend37), Gender (Male), Weight (60 KG), Height (167 CM), Age (18), and Exercise (Moderately). Below these are fields for "Lose Or Gain?" (Gain), "BMR" (Your Natural BMR is = 1601, Your BMR is = 2482), and "Fitness Goal" (Your Fitness Goal is = 2782). A modal dialog box titled "YourFitnessFriend" is open, displaying "Data Added" and an "OK" button.

Screenshot of Output:

The screenshot shows the same "Enter Fitness Data" form. The input fields remain the same. A modal dialog box titled "YourFitnessFriend" is open, displaying "Your ID is 5" and an "OK" button. The "Calculate" button is visible below the "Lose Or Gain?" field.

Database Table Output:

<input type="checkbox"/>	Edit	Copy	Delete	5	5	Male	60	167	18	Moderately	Gain	1601	2482	2782
--------------------------	------	------	--------	---	---	------	----	-----	----	------------	------	------	------	------

Enter Fitness Data (Exceptional):

Screenshot of Input:

The screenshot shows a web application window titled 'Form5'. The main heading is 'Enter Fitness Data'. The application logo 'YOURFITNESSFRIEND' is in the top left. A 'Home' button is in the top right. The form contains the following fields:

- Enter Username:** A text input field containing 'FitnessFriend37'.
- Gender:** A dropdown menu with 'Male' selected.
- Weight (KG):** A text input field containing '12'.
- Height (CM):** A text input field containing '12'.
- Age:** A text input field containing '12'.
- Exercise:** A dropdown menu with 'Sedentary' selected.
- Lose Or Gain?:** A dropdown menu with 'Lose' selected.
- BMR:** A large empty text area.
- Fitness Goal:** A large empty text area.

An error message is displayed in a modal box over the form:

YourFitnessFriend  
Error - Please Enter a Weight Over 45 KG  
OK

Screenshot of Output:

N/A

Database Table Output:

N/A

Enter Fitness Data (Extreme):

Screenshot of Input:

The screenshot shows a web application window titled 'Form5' with a blue background. The header includes a logo 'Y' and the text 'YOURFITNESSFRIEND'. The main heading is 'Enter Fitness Data'. Below this, there are input fields for 'Enter Username' (containing 'Fitness1'), 'Gender' (dropdown menu showing 'Male'), 'Weight (KG)' (text input '45'), 'Height (CM)' (text input '120'), 'Age' (text input '16'), and 'Exercise' (dropdown menu showing 'Sedentary'). A 'Calculate' button with a calculator icon is present. To the left, a 'BMR' section displays 'Your Natural BMR is = 1174' and 'Your BMR is = 1409'. To the right, a 'Fitness Goal' section displays 'Your Fitness Goal is = 1709'. A modal dialog box titled 'YourFitnessFriend' is open, showing 'Data Added' and an 'OK' button.

Screenshot of Output:

This screenshot is identical to the previous one, showing the 'Enter Fitness Data' form with the same inputs. The modal dialog box now displays 'Your ID is 6' instead of 'Data Added'.

Database Table Output:

<input type="checkbox"/>	Edit	Copy	Delete	6	6	Male	45	120	16	Sedentary	Gain	1174	1409	1709
--------------------------	------	------	--------	---	---	------	----	-----	----	-----------	------	------	------	------

## Action Plan (Normal):

## Screenshot of Input:

Form6

YOURFITNESSFRIEND

Action Plan

Enter ID  
5

Data Sorted  
OK

Goals

Action Steps

Diet Plan

Load Results

## Screenshot of Output:

Form6

YOURFITNESSFRIEND

Action Plan

Enter ID  
5

Goals

Your Fitness Goal is 2752 Calories

Action Steps

- You Should be increasing your exercise and aim to go to the gym 4 Times a Week
- Do your best to record your calories and try to hit your calorie goal everyday
- Start off slow. Slow, steady progress is better than no progress at all. We must crawl before we walk and walk before we run
- Make sure to keep accountable at all times

Diet Plan

Diet Plan:

Breakfast - 1 cup of oats, 1 cup low-fat milk, 1.5 cups of coffee, 1 tbsp half and half cream, 2 medium oranges and 1 tsp of sugar.

Snack - 1 medium-sized banana and 3 tbsp of peanut butter

Lunch - 1 medium-sized apple, 3 slices of whole wheat bread, 28 g of cheddar cheese, 1 lettuce leaf, 1.5 cups of tea, 57 g of turkey breast

Snack - 2 slices of rye bread, 1 tbsp of mayonnaise, 1/2 cup of tuna and 1 medium peach.

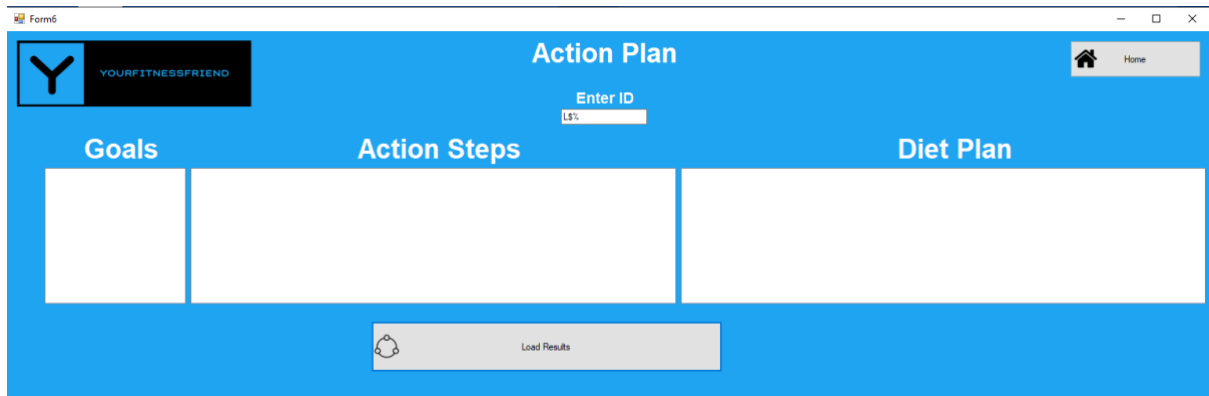
Dinner - 113 g of salmon, 1 cup of brown rice, 2 cups of skim milk, 1 large garden salad and 4 tbsp honey mustard.

Total intake for the day: Calories: 2568, Fat: 72 g, Carbs: 385 g, Protein: 118.2 g

Load Results

Action Plan (Exceptional):

Screenshot of Input:



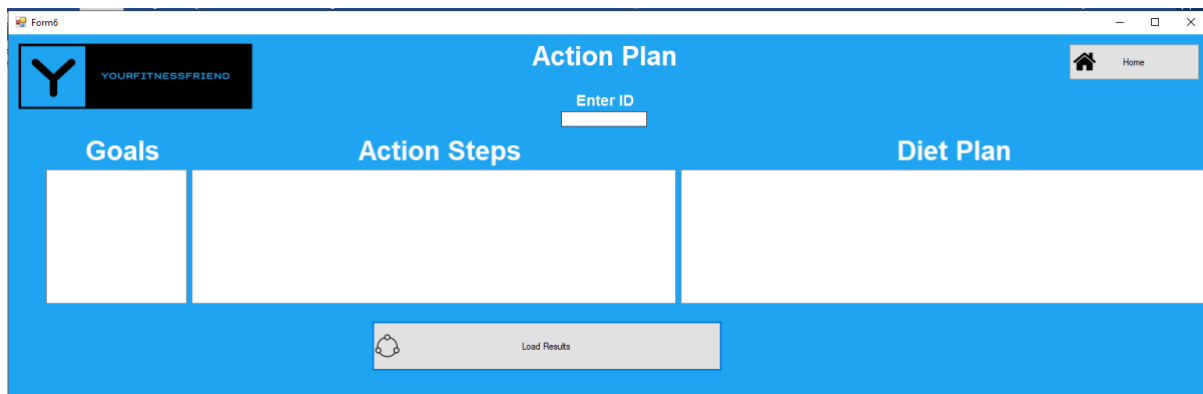
The screenshot shows a web browser window titled 'Form6'. The page has a blue header with the 'YOURFITNESSFRIEND' logo on the left and a 'Home' button on the right. The main title 'Action Plan' is centered in the header. Below the title is an 'Enter ID' label and a text input field containing 'LS1'. The main content area is divided into three columns: 'Goals', 'Action Steps', and 'Diet Plan'. Each column contains a large, empty white rectangular box for input. At the bottom of the page, there is a 'Load Results' button with a circular arrow icon.

Screenshot of Output:

N/A

Action Plan (Extreme):

Screenshot of Input:



The screenshot shows a web application titled "Action Plan" with a blue header. On the left, there is a logo with a stylized 'Y' and the text "YOURFITNESSFRIEND". In the center of the header, there is a text input field labeled "Enter ID". On the right, there is a "Home" button with a house icon. Below the header, the main content area is divided into three columns: "Goals", "Action Steps", and "Diet Plan". Each column contains a large, empty white rectangular box for input. At the bottom center, there is a "Load Results" button with a circular arrow icon.

Screenshot of Output:

N/A

Help (Normal):

Screenshot of Input:

Form7

**Y** YOURFITNESSFRIEND

**Help**

Enter ID  
5

**How to lose / Gain Weight?**  
To gain weight you must be on a calorie surplus by eating the same amount of calories as your fitness goal. You should aim to eat around 2782 calories per day.  
Top that off with regular exercise, accountability and patience

**How To Gain Muscle:**  
To gain muscle you must eat alot of protein  
Here are some high protein foods you can incorporate into your diet:  
- Eggs  
- Chicken  
- Beef  
- Fish

**Gym Work Outs**  
Push:  
Bench Press  
DB Press  
Shoulder Press  
Tricep Cable Pulldown  
Pull:  
Bicep Curls  
Rows  
Deadlift  
Lat Pulldown  
Legs:

**Best Cardio Exercise**  
Best Low Intensity Cardio Exercises  
Cycling  
Walking on Incline  
Stair Climbing

Load Results

Help (Exceptional):

Screenshot of Input:

Form7

**Y** YOURFITNESSFRIEND

**Help**

Enter ID  
L's

**How to lose / Gain Weight?**

**How To Gain Muscle:**  
To gain muscle you must eat alot of protein  
Here are some high protein foods you can incorporate into your diet:  
- Eggs  
- Chicken  
- Beef  
- Fish

**Gym Work Outs**  
Push:  
Bench Press  
DB Press  
Shoulder Press  
Tricep Cable Pulldown  
Pull:  
Bicep Curls  
Rows  
Deadlift  
Lat Pulldown  
Legs:

**Best Cardio Exercise**  
Best Low Intensity Cardio Exercises  
Cycling  
Walking on Incline  
Stair Climbing

Load Results



Help (Extreme):

Screenshot of Input:

Form7

**Y** YOURFITNESSFRIEND

**Help**

Enter ID

**How to lose / Gain Weight?**

**How To Gain Muscle:**

To gain muscle you must eat alot of protein

Here are some high protein foods you can incorporate into your diet:

- Eggs
- Chicken
- Beef
- Fish

**Gym Work Outs**

Push:

- Bench Press
- DB Press
- Shoulder Press
- Tricep Cable Pulldown

Pull:

- Bicep Curls
- Rows
- Deadlift
- Lat Pulldown

Legs:

**Best Cardio Exercise**

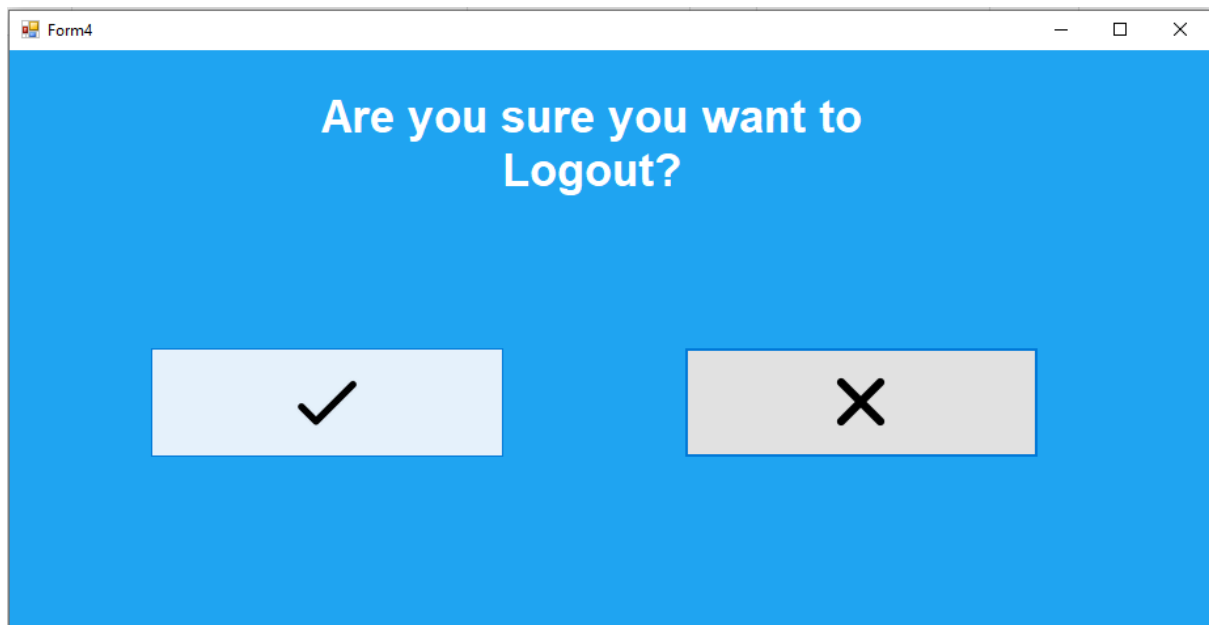
Best Low Intensity Cardio Exercises

- Cycling
- Walking on Incline
- Stair Climbing

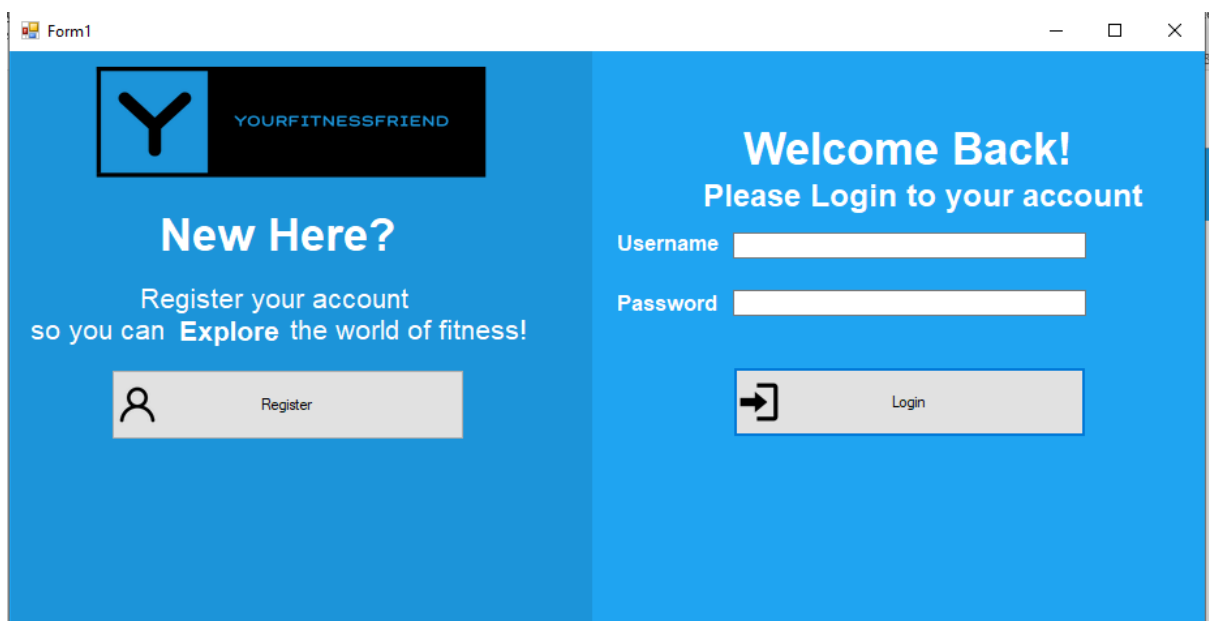
Load Results

Logout (Normal) [Tick]:

Screenshot of Input:

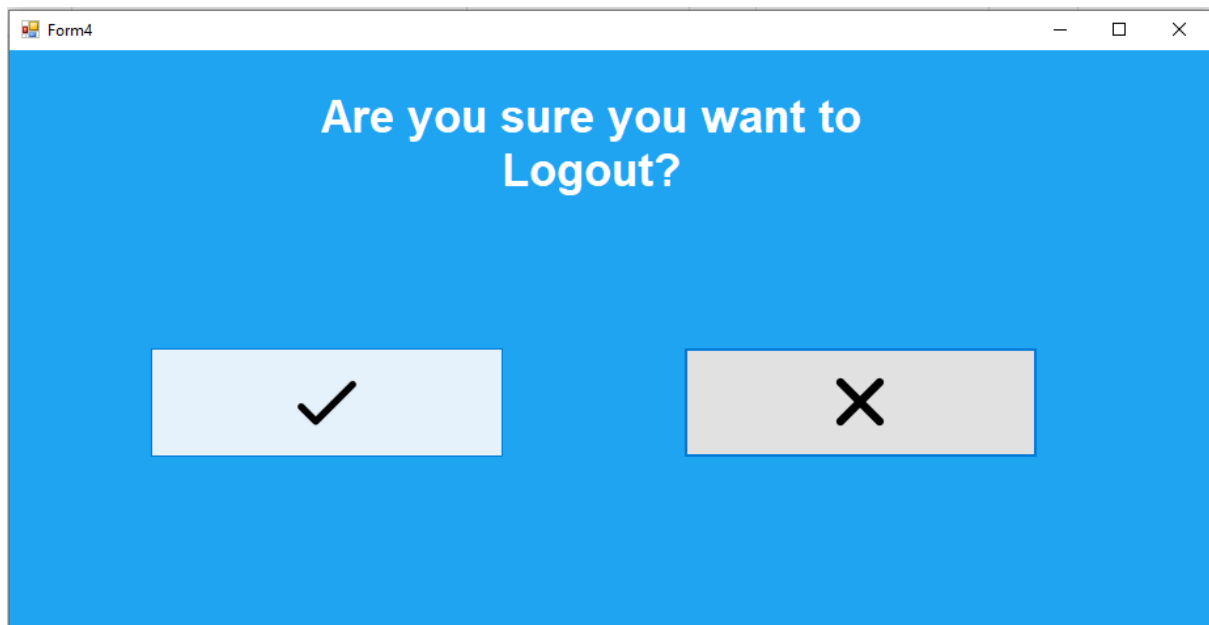


Screenshot of Output:

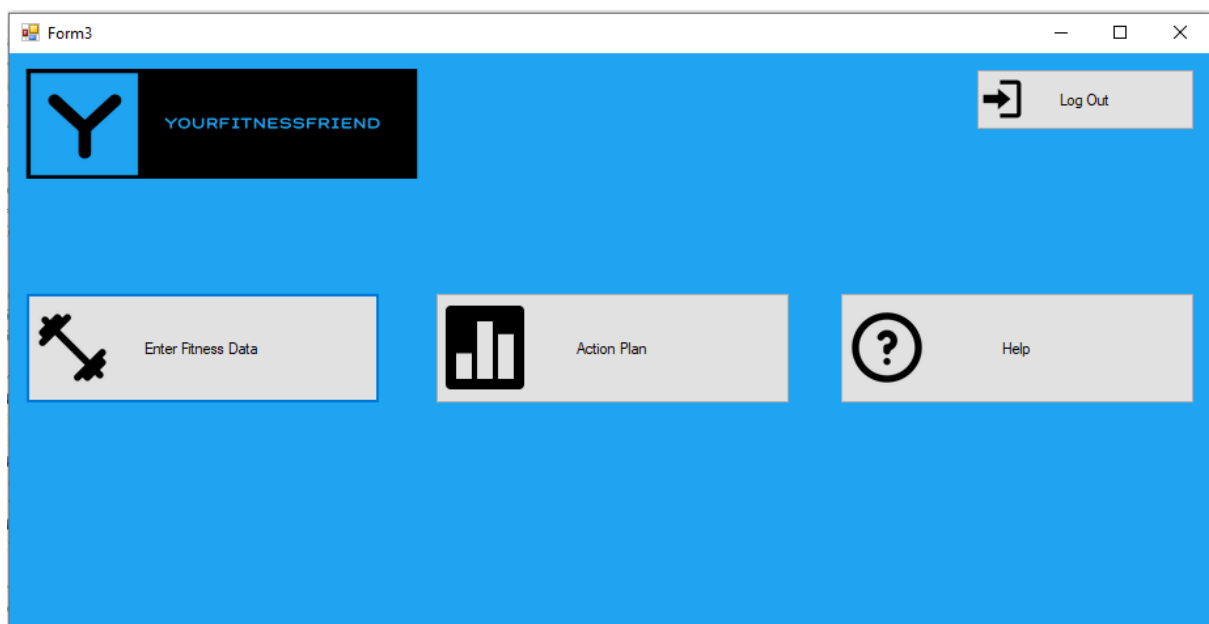


Logout (Normal) [Cross]:

Screenshot of Input:



Screenshot of Output:



## Test Results

Test Case	Actual Result
Register	
Register (Normal)	Account is created with unique username and password
Register (Exceptional)	Account is not created and shows error
Register (Extreme)	Account is created with unique username and password
Login	
Login (Normal)	Login is successful and directs to home page
Login (Exceptional)	Login failed and shows error
Login (Extreme)	Login failed. No error shown
Enter Fitness Data	
Enter Fitness Data (Normal)	Data is entered successfully and ID is shown and data is sent to Database
Enter Fitness Data (Exceptional)	Data is not entered and shows error. Data is not sent to Database
Enter Fitness Data (Extreme)	Data is entered successfully and ID is shown and data is sent to Database
Action Plan	
Action Plan (Normal)	Action Plan is shown
Action Plan (Exceptional)	Action Plan is not shown
Action Plan (Extreme)	Action Plan is not shown
Help	
Help (Normal)	Help Page is shown
Help (Exceptional)	Help Page is partly shown. How to Lose / Gain Weight is not shown
Help (Extreme)	Help Page is partly shown. How to Lose / Gain Weight is not shown
Logout	
Logout (Normal) [TICK]	Logout successful and user is directed to Login Page
Logout (Normal) [CROSS]	Logout is not successful and user is directed to Home page

## Evaluation of the solution

### Fitness for Purpose

After testing my project I now know and confirm that my project meets all of the end user and functional requirements.

The results of my testing show that users are able to register a unique username and password of their choice greater than 8 characters, login with their chosen username and password, navigate around my program, enter their fitness data, read their action plan created for them and will also be able to view a help page that will help to reach their desired goal. After testing, it showed that my program can store the user's login details and fitness data in an external database.

All inputs have been validated to ensure they are fit for purpose and match my requirements. The program will also display the action plan and help page.

My program successfully makes use of the AH concepts we learned in class: The Insertion Sort Algorithm and an Array of Objects. It reads the fitness data from the database and sorts them in order and displays the correct Fitness Goal. The Class was called in an external script and was implemented throughout the program. Throughout testing it showed that both the sort algorithm and the class worked and met the requirements.

My program does the integration of the SQL database effectively for my implementation. The connection string was created and the data was inserted and read effectively each time and stored all of my data while giving each row a unique identifier by using auto increment.

After testing with the test cases it showed that my persona was able to successfully complete all tasks given to them. I also managed to complete all of the tests in my test plan and then show evidence for each of the tests. I am confident that my project meets all of the requirements listed in the end user and functional requirements.

## Requirements Check List

<b>End User Requirements:</b>		<b>Completed</b>
The users for my system will be able to register a unique username and password of their choice.		✓
The user will be allowed to login using their own chosen username and password.		✓
The user will be able to easily navigate throughout my program.		✓
The user will be able to input their own fitness data into their program and be able to see their action plan		✓
The user will also be able to access a help screen for tips to reach their desired goal		✓
<b>Functional Requirements:</b>		
My program will be able to store user credentials in an external database.		✓
My program will be able to validate all user inputs to make sure they are fit for purpose.		✓
My program will store the users data in an external database		✓
My program will display the user's action plan and help page.		✓

## Maintainability

I believe that my solution is maintainable. I have used meaningful variable names for all of my VB class and record structures and also for the SQL database fields. This allows for Improved Code integration, clarity and consistency. Making meaningful distinctions in my code allows me to identify what each variable does. Here is a screenshot showing some of the variables names I used in my VB Class.

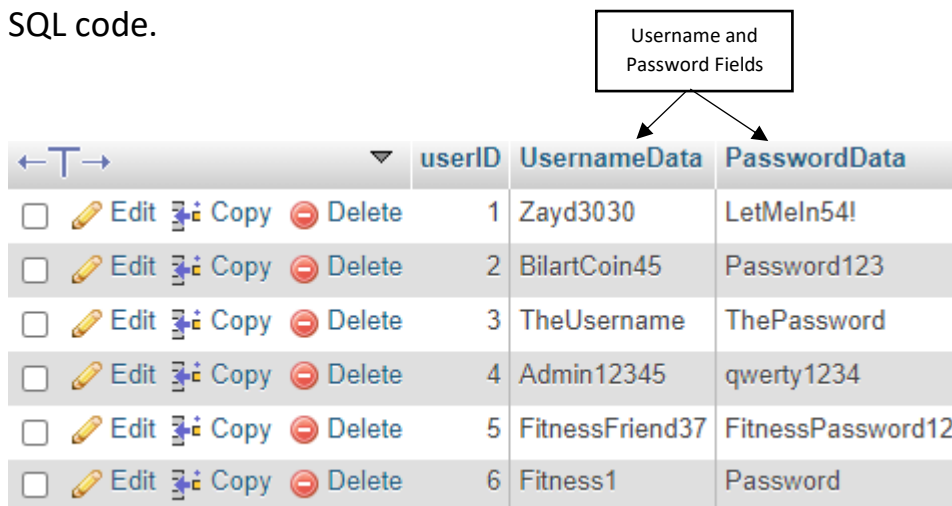
```
Public Class FitnessData
    Public id As Integer
    Public Gender As String
    Public Weight As Integer
    Public Height As Integer
    Public Age As Integer
    Public Exercise As String
    Public LoseOrGain As String
    Public BMR As Integer
    Public ExerciseBMR As Integer
    Public FitnessGoal As Integer
```

For example:

The variable name BMR is distinguishable from ExerciseBMR

BMR relates to the raw BMR which has been calculated for the user. The ExerciseBMR relates to the updated BMR after how much exercise the user has done is been accounted for. Having distinguishable names allows me to recognise and identify different sections of my code. Since it's held in a class this also means that I can reuse my code for other future developments or updates required, it will be easier as it has held strong maintenance.

Here is a screenshot showing some of the database field's names I used in my SQL code.



	userID	UsernameData	PasswordData
<input type="checkbox"/> Edit <input type="image"/> Copy <input type="image"/> Delete	1	Zayd3030	LetMeIn54!
<input type="checkbox"/> Edit <input type="image"/> Copy <input type="image"/> Delete	2	BilartCoin45	Password123
<input type="checkbox"/> Edit <input type="image"/> Copy <input type="image"/> Delete	3	TheUsername	ThePassword
<input type="checkbox"/> Edit <input type="image"/> Copy <input type="image"/> Delete	4	Admin12345	qwerty1234
<input type="checkbox"/> Edit <input type="image"/> Copy <input type="image"/> Delete	5	FitnessFriend37	FitnessPassword12
<input type="checkbox"/> Edit <input type="image"/> Copy <input type="image"/> Delete	6	Fitness1	Password

I made sure to use the names UsernameData and PasswordData to ensure I did not run into any errors in my program code as having a field name "Password" will have its own authentication and will flag up an error.



I also used a lot of white space in my code into split the code into several sections and I have also called in sub procedures so that my code is clean and can perform the right procedures.

Here is a section of my code which shows all of that.

```
Public Class Form6
    Private Sub BtnHome_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles BtnHome.Click
        LstDisplayGoal.Items.Clear()
        LstDisplayAS.Items.Clear()
        LstDisplayDP.Items.Clear()
        EnterID.Clear()
        Me.Hide()
        Form3.Show()
    End Sub

    Private Sub BtnLoad_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles BtnLoad.Click
        Dim fitness As Fitness
        Dim connection As MySqlConnection
        Dim command As MySqlCommand
        Dim connectionString As String = "server=localhost;user=root;password=;database=YourFitnessFriend"
        Dim reader As MySqlDataReader
        Dim myRnd As Integer
        Dim days As Integer

        connection = New MySqlConnection(connectionString)
        connection.Open()

        command = New MySqlCommand("SELECT * FROM FitnessData, UserLogin WHERE FitnessData.userId = UserLogin.userId AND FitnessData.userId = '" & EnterID.Text & "'")
        command.Connection = connection
        reader = command.ExecuteReader

        While reader.Read()
            fitness.FitnessGoal = reader.Item("FitnessGoal")
            Call InsertionSort()
            LstDisplayGoal.Items.Add("Your Fitness Goal is " & fitness.FitnessGoal & " Calories ")

            fitness.Exercise = reader.Item("Exercise")

            If fitness.Exercise = "Sedentary" Then
                days = 3
            ElseIf fitness.Exercise = "Lightly" Then
                days = 3
            ElseIf fitness.Exercise = "Moderately" Then
                days = 4
            ElseIf fitness.Exercise = "VeryActive" Then
                days = 5
            ElseIf fitness.Exercise = "ExtraActive" Then
                days = 6
            End If
        End While
    End Sub
End Class
```

Multiple Sub Routines

Calls in Insertion Sort Sub routine

White Space to separate code into sections for readability

## Robustness

All of my inputs for my program are robust as every input is validated to ensure the user encounters no errors when using my program. When registering an account I implemented this code to ensure that the username and password is greater than 8 characters, is not under 8 characters and is not left blank.

```
connection.Open()  
If Len(Username) >= 8 Or Len>Password) >= 8 Then  
    command.ExecuteNonQuery()  
    MsgBox("Account Created")  
    Me.Hide()  
    Form1.Show()  
ElseIf Username <> "" Or Password <> "" Then  
    MsgBox("Error - Please Enter a Username and Password Greater Than 8 Characters")  
ElseIf Username = "" Or Password = "" Then  
    MsgBox("Error - Please Enter a Username and Password")  
End If  
connection.Close()
```

Also when logging into an account I implemented this code to ensure that the username and password is converted to a string to make sure I do not encounter any errors and made sure it matched the username and password entered into the text box matched the one in the database.

```
While reader.Read()  
    Dim GetUsername As String = reader.GetString(1).ToString  
    Dim GetPassword As String = reader.GetString(2).ToString  
  
    If GetUsername = EnterUsername.Text And GetPassword = EnterPassword.Text Then  
        MsgBox("Login Successful")  
        EnterUsername.Clear()  
        EnterPassword.Clear()  
        Me.Hide()  
        Form3.Show()  
    ElseIf GetUsername <> EnterUsername.Text And GetPassword <> EnterPassword.Text Then  
        MsgBox("Login Failed")  
    End If  
  
End While
```

When entering data I wanted to ensure that my program maintained robustness so I added input validation to every input. I added combo boxes to reduce the user's choice to make sure they are no errors and showed error messages to tell the user if they don't meet the requirement.

```
If Person1.Weight < 45 Then
    MsgBox("Error - Please Enter a Weight Over 45 KG")
ElseIf Person1.Height < 120 Then
    MsgBox("Error - Please Enter a Height Over 120 CM")
ElseIf Person1.Age < 16 Then
    MsgBox("Error - Please Enter an Age Over 16")
Else
    command.ExecuteNonQuery()
    MsgBox("Data Added")
    MsgBox("Your ID is " & Newid)
```

String Collection Editor

Enter the strings in the collection (one per line):

Male  
Female

String Collection Editor

Enter the strings in the collection (one per line):

Sedentary  
Lightly  
Moderately  
VeryActive  
ExtraActive

String Collection Editor

Enter the strings in the collection (one per line):

Lose  
Gain

## Final Evaluation

I am very confident that my implemented project matches my design and requirements as shown from my Testing and Evaluation. I have made sure that my full completed project was completed by the deadline of the 4<sup>th</sup> of March 2022. I believe, I have not run into any copyright issues by using royalty free icons and creating my logo on a free logo making website. Also, when it came to the name of my project “YourFitnessFriend”, I had to comply with the Copyright, Design and Patents Act 1988 so it wasn’t similar to “MyFitnessPal” by Under Armour. I made sure that there was no costs involved during the course of my project as all of the software and materials are supplied by my school. I made sure to do my programming with the Visual Basic Language within the Visual Studio 2010 software as I have several years of experience using this and used EasyPHP as my Database Server while coding in MySQL. As I believe that this was most suitable for my project. Therefore I am confident that my project matches the design and requirements as shown by my evaluation of my project.