

**Project Deliverable D:  
Mealtime Food Tracker  
Detailed Design, Prototype 1, BOM, Peer  
Feedback and Team Dynamics  
“Mealtime”**

**GNG 2101D**

**Team D1**

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**Table of Contents:**

<b>Table of Contents</b>	page.1
<b>List of Figures &amp; Tables</b>	page.2
<b>List of Acronyms</b>	page.3
<b>Abstract</b>	page.4
<b>1. Introduction</b>	page.5
<b>2. Client Feedback</b>	page.5
<b>3. Updated Design Concept</b>	page.6
<b>4. Product Assumptions</b>	page.9
<b>5. Prototype 1</b>	page.10
<b>6. Bill of Materials</b>	page.17
<b>7. Client Meeting Presentation</b>	page.18
<b>8. Conclusion</b>	page.19

## **List of Figures & Tables:**

Fig. 3.1: Home Screen Concept:	page.6
Fig 3.2: Food Input Concept:	page.7
Fig 3.3: Settings and User Information	page.8
Fig 5.1 - Default Home Screen Design	page.10
Fig 5.2 - Food Input Concept	page.10
Fig 5.3 - Enter New Meal	page.11
Fig 5.4 - Result Page for Total Calculation	page.11
Fig 5.5 - Meal History and Log Keeping Button	page.12
Fig 5.6 - First Page of Meal History	page.12
Fig 5.7 - List of past meal dates	page.13
Fig 5.8 - Details regarding past meal when date is selected	page.13
Table 5.1: Performance of Prototype 1 with respect to Target Specifications	page.15
Table 6.1: BOM for Final Prototype	page.17

**List of Acronyms:**

ADD	Attention Deficit Disorder
BOM	Bill of Materials
IDE	Integrated Development Environment
OS	Operating System
UI	User Interface
WiFi	Wireless Fidelity

## **Abstract:**

This deliverable entails the team's updated design concept, prototype I, list of target specifications, BOM for the final prototype, and a Wrike project plan. First the client feedback from the second meeting was stated, and using that information, our team was able to derive an updated design concept. This meant our first prototype consisted of only the home screen, food input screen, and meal history of the user. Then, a digital version of the first prototype was constructed, in order for our team to test the two main functions of the app, as well as understand the overall layout and design of our application. The product assumptions were then made, and how our product validated each specific assumption was also explained. Then the prototype was tested, analyzed, and evaluated alongside the product's target specifications. Afterwards, our team derived a BOM for the final prototype, and explained the tasks that would be completed for the third and final client meeting. Finally, a Wrike project plan was attached that detailed the specific plans for each of the prototypes to come. All in all, our team has developed a thorough and detailed project plan which will allow us to create an application that will be suitable for our client.

## **1. Introduction:**

The primary goal of this deliverable is to provide design details and concepts, and then build a prototype that will test the product's most critical target specifications and functionality. Then this prototype will be used by others in order to get valuable feedback on the product, and what changes should be implemented. Then the updated design concept will be shown, that entails changes made from the client's feedback. Afterwards the prototype will be illustrated, alongside the product assumptions, how the prototype verifies each assumption, and then comparisons will be drawn with the list of target specifications. The last part will entail the tasks our team will complete for the third client meeting, and a BOM for the final prototype will be given as well, which outlines what components we need to use for further development of our application. Finally, a Wrike project plan will be attached that will illustrate the specific plans and subsequent tasks to be completed for each of the future prototypes.

## **2. Client Feedback**

During our second client meeting, our team had discussed with the client the main functions our app would provide. It was then clearly stated by the client that he did not want an insulin tracking application. This caused our team to change the name of the project and drop the largest focus we had thus far, but by doing this, the project had become much simpler. Our client stated he wanted an app that would keep track of the carbohydrates (i.e. starches, sugars, fibers) he was consuming on a daily basis. Initially the idea of having a photographic recognition software which could simply look at an image and recognize exactly the food and the amount, this proved to be extremely unfeasible especially for our project timeline and budget. The idea of an easy-to-use carbohydrate tracking app was conceptualized. This is a low-fidelity prototype app that would send notifications throughout the day to the user in order to remind the user of any foods they had not entered. This is very important to the diabetic user who is the focused demographic of this project. This app would also allow the user to store this information on the mobile device through the app on a zip file and would be able to be sent to their primary healthcare practitioner. This app is also simple-to-use with a minimalist interface so those with ADD are not easily distracted by such features.

### 3. Updated Design Concept:

Fig. 3.1: Home Screen Concept:

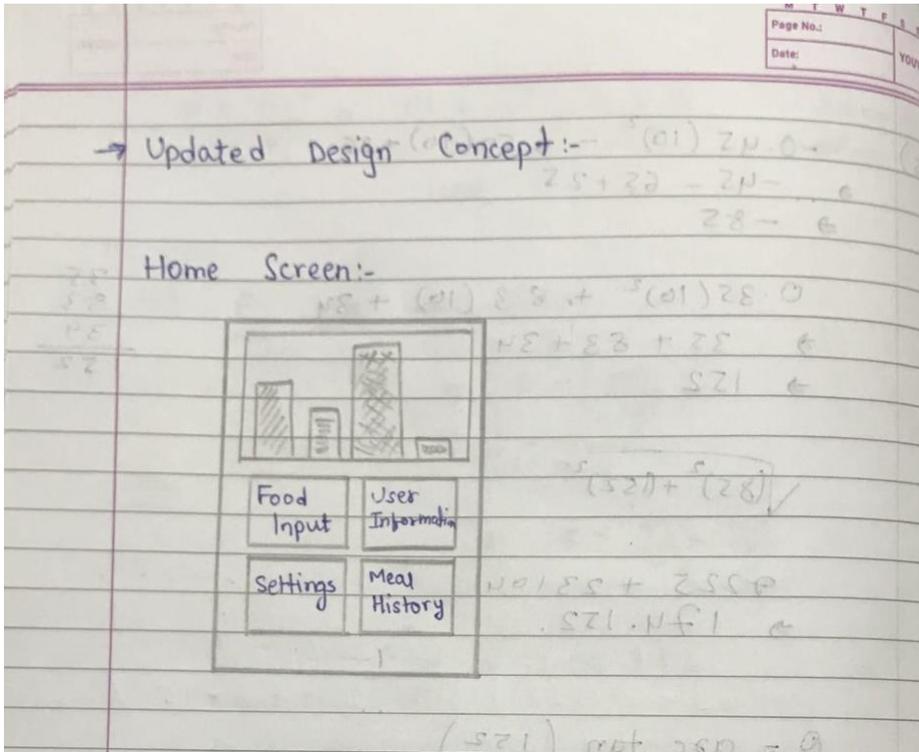


Fig 3.2: Food Input Concept:

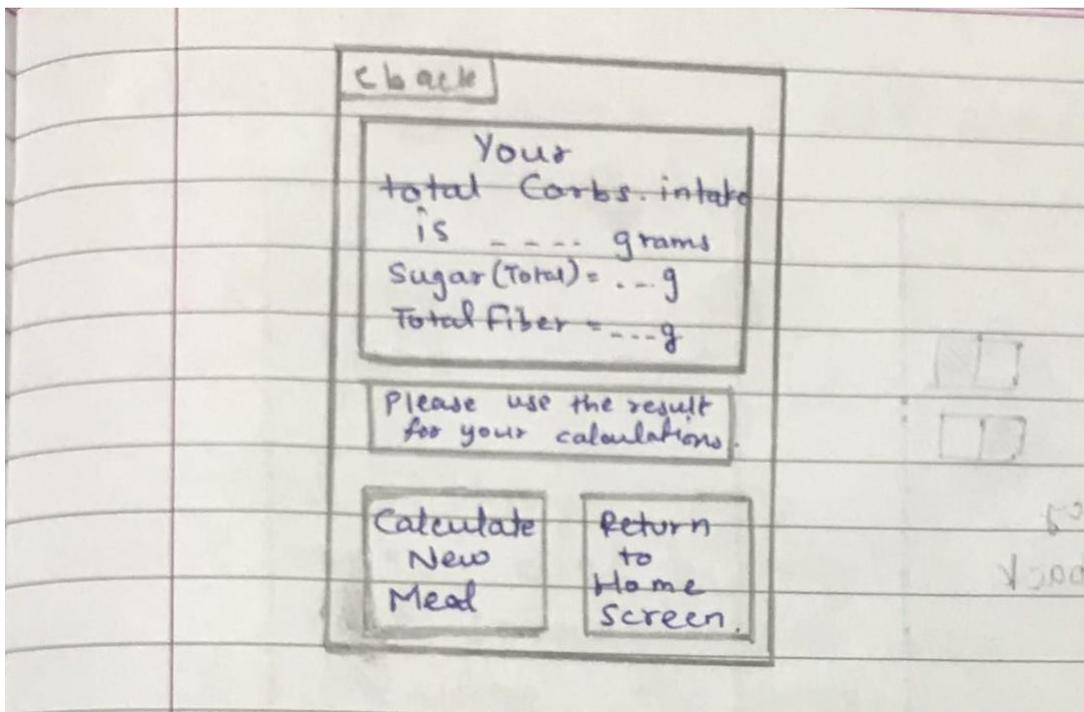
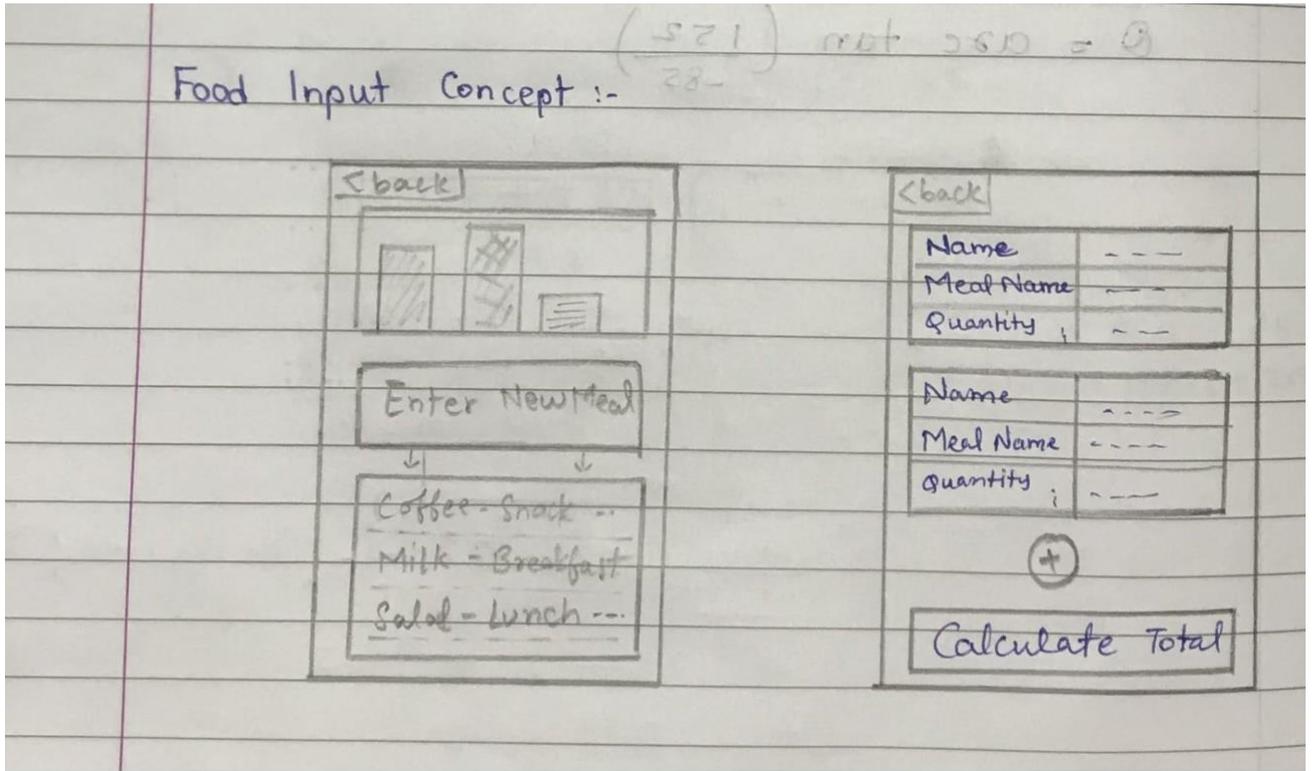
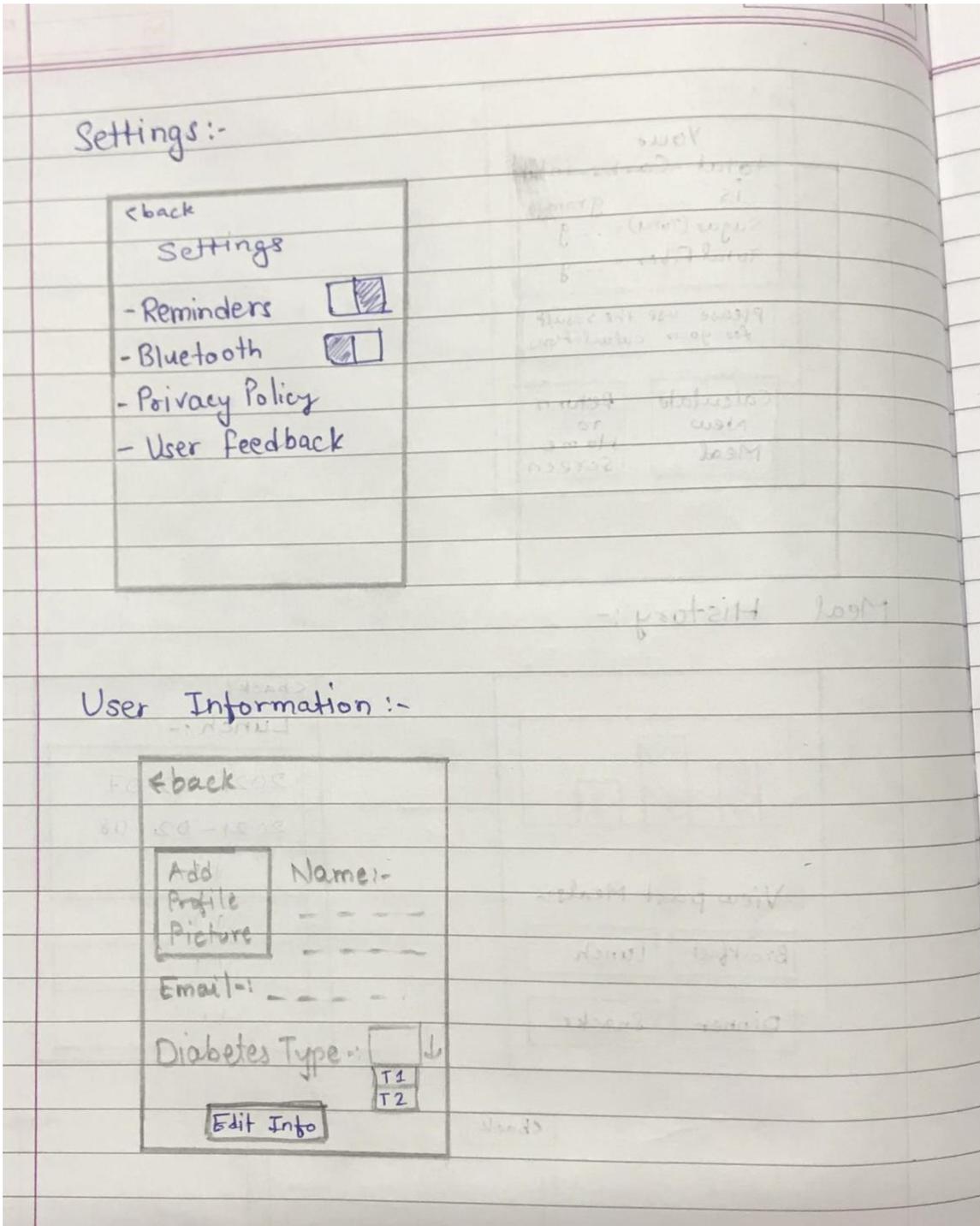


Fig 3.3: Settings Menu and User Information Menu Concept



We have updated our home screen with two new different functions. First one is our new color coordinated graph of meals which represent what the user eats throughout the day. We replaced the Insulin Calculation page with the Food Input page and now we are able to see the details of our meals through this function. In our new Food Input function, besides the meal tracker we have our new graph that shows the details of our foods with a color coordinated graph and one can also see what's inside their meal from this page. We also added a function where you can easily re-enter your past meals. A couple of changes were also made in the Settings page, which were that the "Gender" button was removed and replaced by "Email". The meal history page has been updated and now you can see your meal history on a daily basis with important details about each food consumed.

#### **4. Product Assumptions:**

Diabetes is expressed differently in everyone and each individual has a different functioning system. Because of this, every diabetic person has a specific lifestyle, meal plan and mealtime insulin. Therefore, some assumptions can be made in order to create an application which is effective, intuitive and unique.

Assumption 1: The application is accessible via Android devices.

Assumption 2: The app should accurately calculate the total carbohydrate intake.

Assumption 3: The app must store the user's personal and dietary data.

If the listed assumptions are correct, the main purpose of our application is to track the carbohydrate intake correctly. With the completion of prototype I, these assumptions can be proven as correct. Therefore, the first prototype will be built to test the following assumptions.

Assumption 4: History must be accessible through the application.

Assumption 5: The user can edit and add their meal of choice.

Assumption 6: It is ADD friendly and has a simple UI.

As this is the first prototype, it is not realistic to test more complicated assumptions from those listed above. Therefore, the above assumptions are realistic in order to develop our prototype for more complicated features. Accordingly, the following assumptions will be developed and tested in future prototypes.

Assumption 7: The app must send reminders and notifications.

Assumption 8: All of the app's functions are intuitive.

Assumption 9: The app should work with Bluetooth, and not be WiFi-dependent.

Given this list of developed assumptions, our team has a clear vision of how to implement our app. The team now has the ability to test the different functions in each prototype to determine which assumptions are successful. This ability creates a huge difference in prototype development, which will be utilised to its full potential.

## 5. Prototype I:

Fig 5.1 - Default Home Screen Design

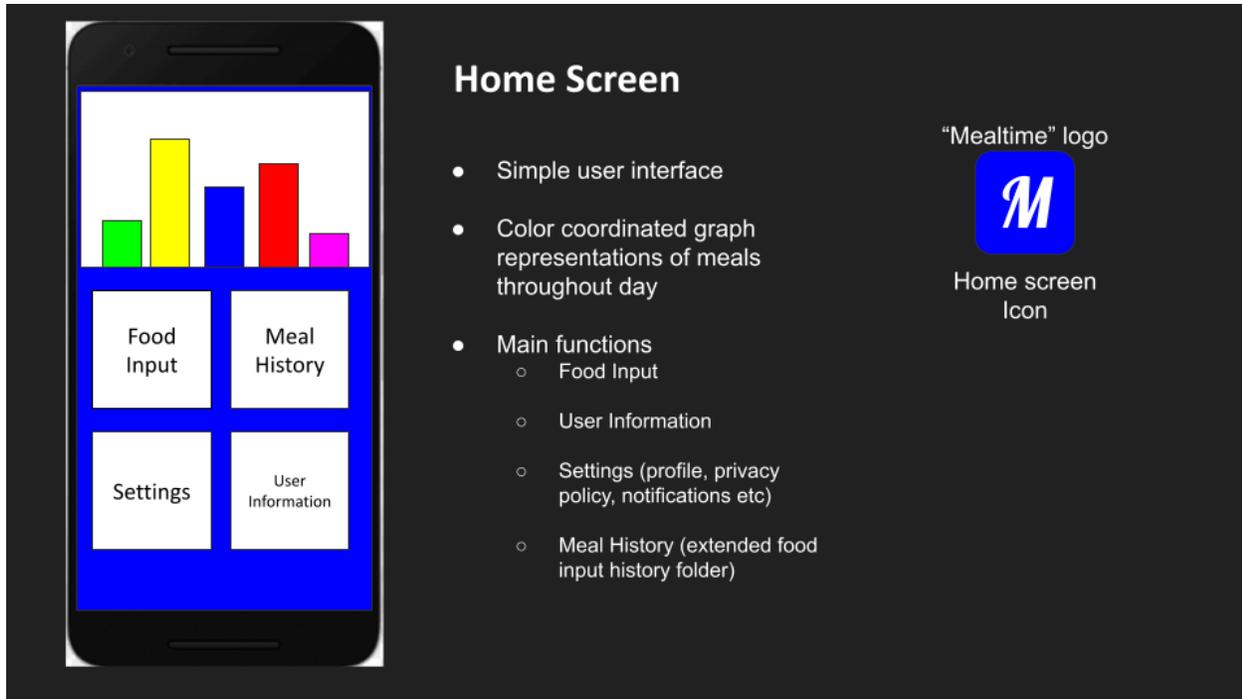


Fig 5.2 - Food Input Screen Design

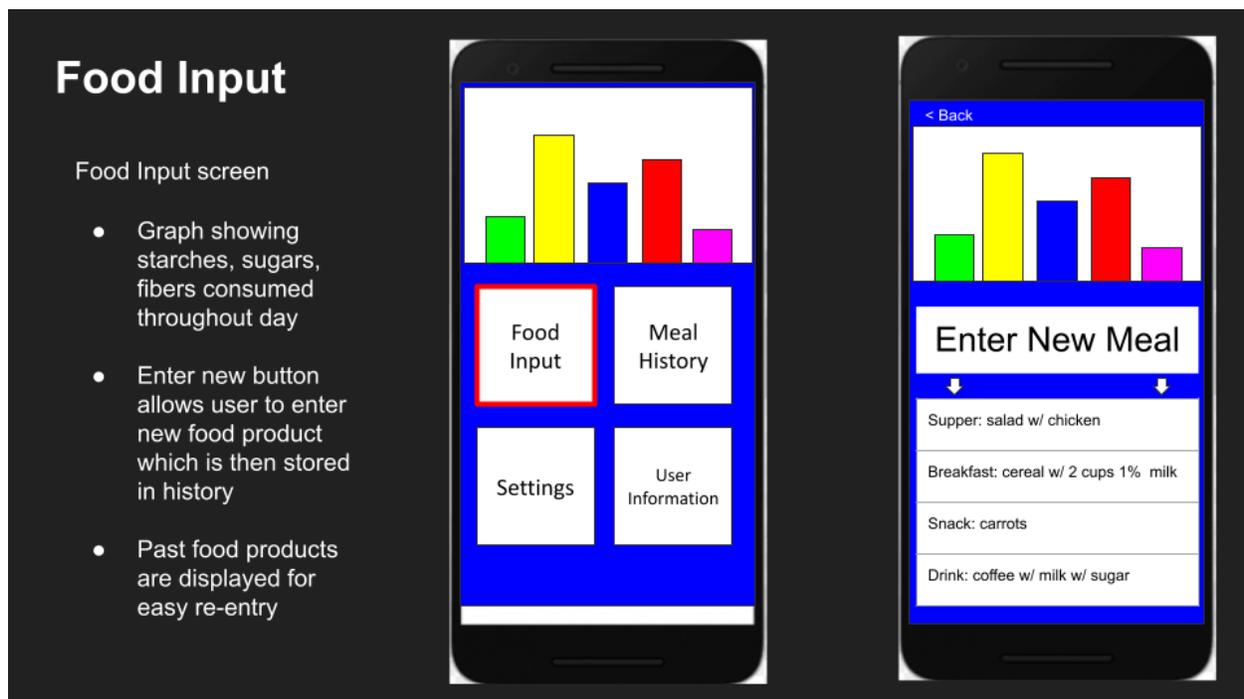


Fig 5.3 - Enter New Meal

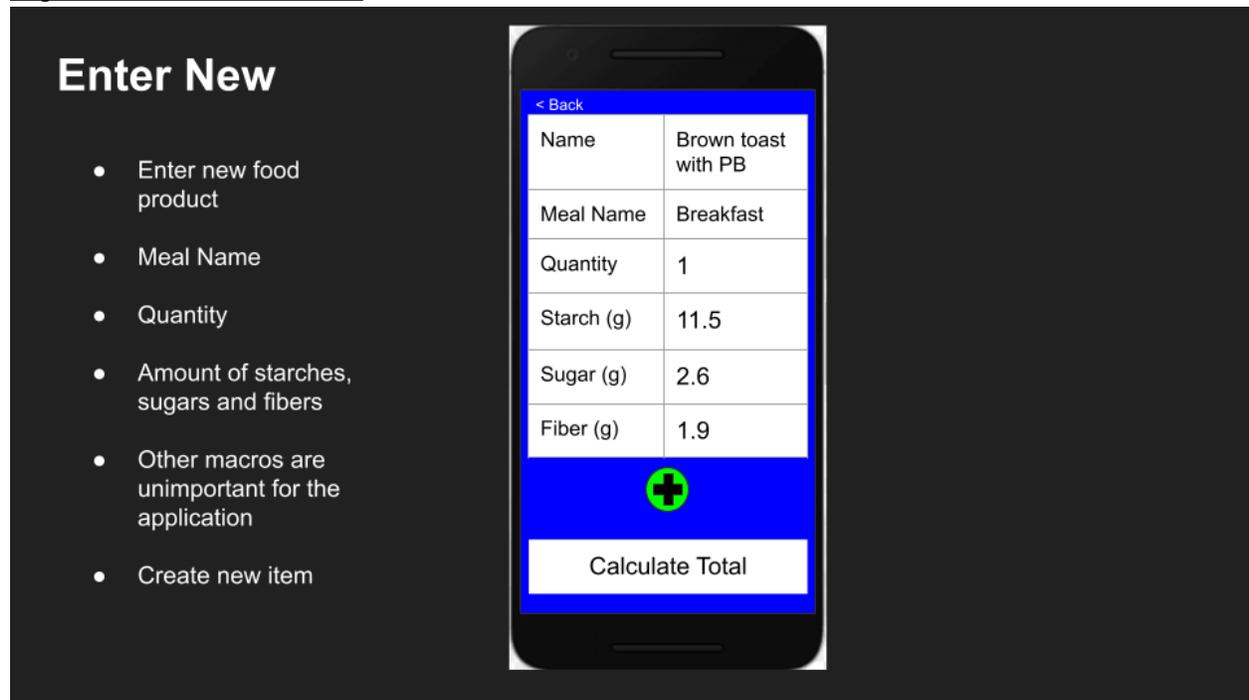


Fig 5.4 - Result Page for Total Calculation

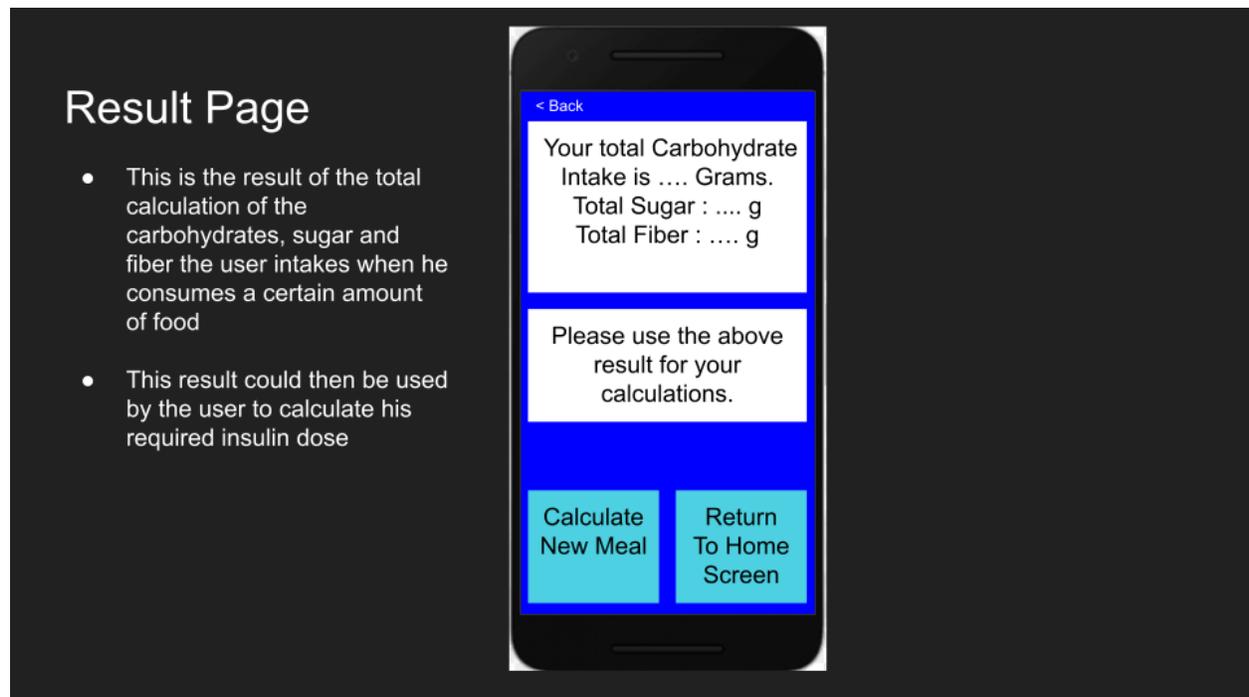


Fig 5.5 - Meal History and Log Keeping Button

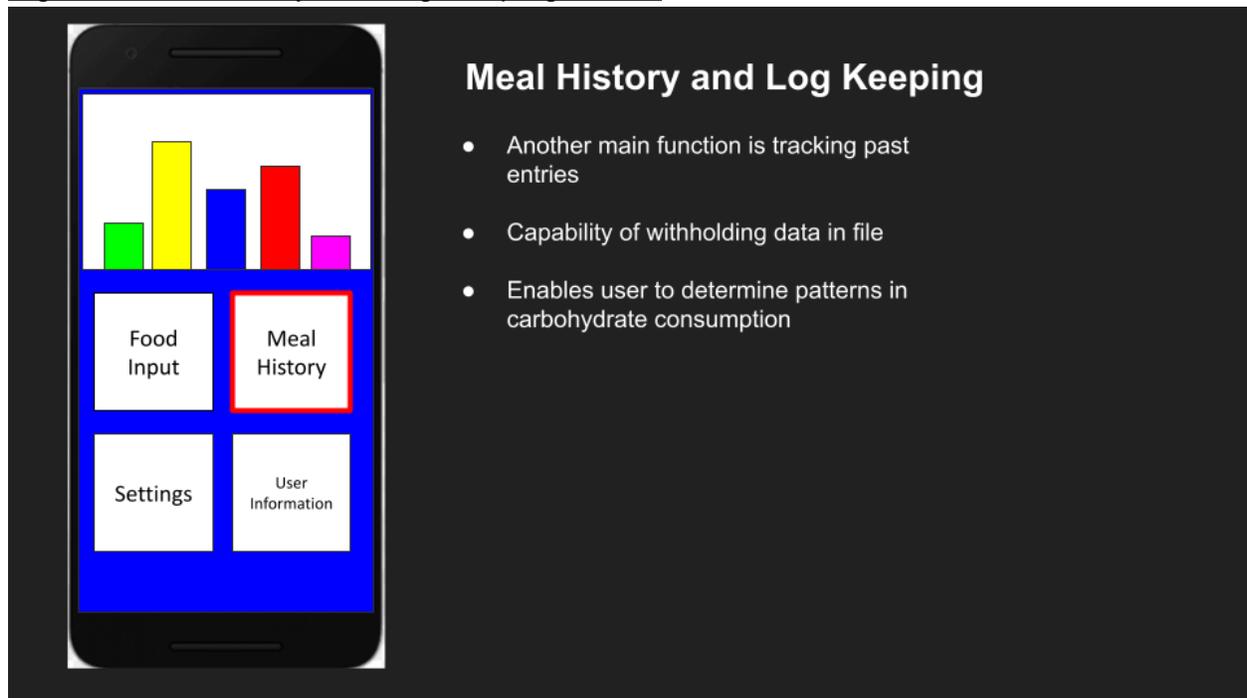


Fig 5.6 - First Page of Meal History

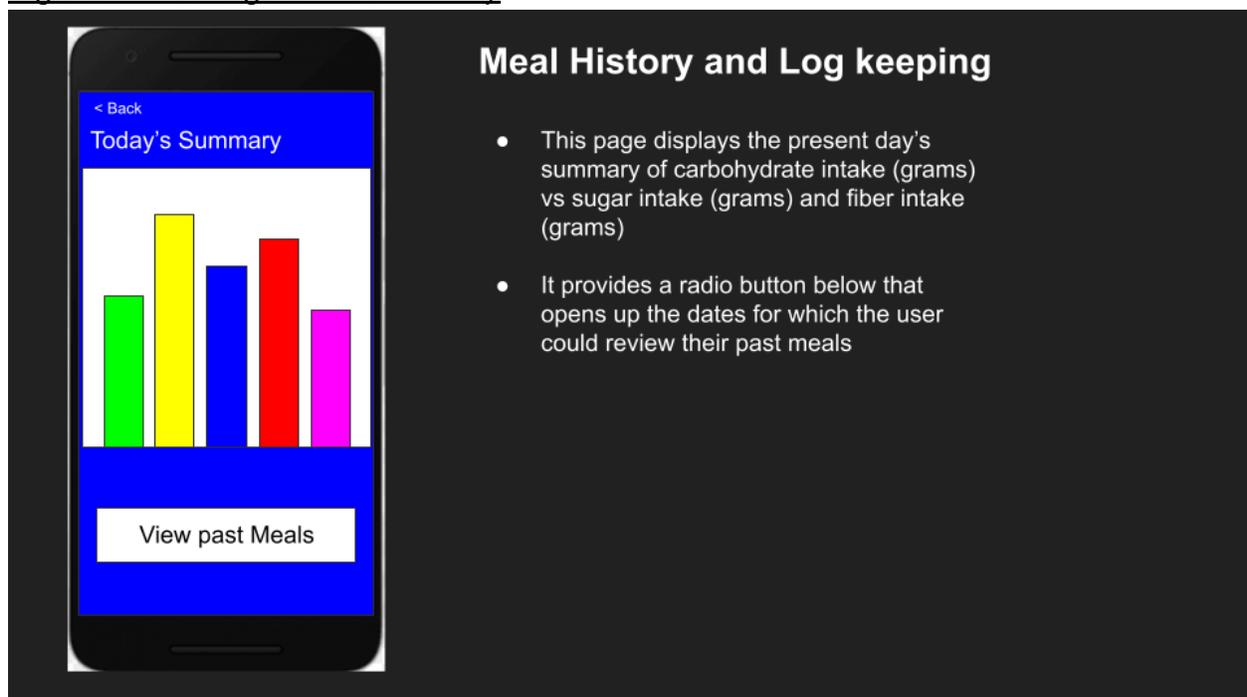


Fig 5.7 - List of past meal dates

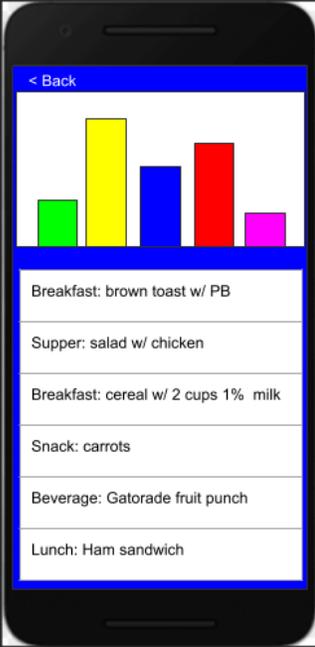


The screenshot shows a mobile application interface with a blue header containing a back arrow and the text "< Back". Below the header is a list of dates, each followed by a right-pointing chevron (>). The dates are: 2021-02-07, 2021-02-06, 2021-02-05, 2021-02-04, 2021-02-03, 2021-02-02, 2021-02-01, 2021-01-31, and 2021-01-30.

### Meal History and Log Keeping

- This is the display where all the past dates and the meals for the day are stored
- This could store up to 3 months of data depending on the size the meals of the user takes
- It is a scroll type interface that would be very easy-to-use and ADD friendly for our user

Fig 5.8 - Details regarding past meal when date is selected



The screenshot shows a mobile application interface with a blue header containing a back arrow and the text "< Back". Below the header is a bar chart with five bars of different colors (green, yellow, blue, red, pink). Below the chart is a list of food items, each on a separate line:

- Breakfast: brown toast w/ PB
- Supper: salad w/ chicken
- Breakfast: cereal w/ 2 cups 1% milk
- Snack: carrots
- Beverage: Gatorade fruit punch
- Lunch: Ham sandwich

### Meal History and Log keeping

- This page stores the details of the meal the user had on a particular date
- It displays all food including breakfast, lunch, dinner and snacks
- Also stores the total carbohydrate, sugar and fiber intake on that distinct day.

The team will use MIT App Inventor as well as Thunkable to develop the first prototype. The first prototype will accomplish the client's needs for simple graphics, easy-to-read interface, Android OS compatibility and calculating the total carbs in every meal. To achieve the completion of prototype I, all team members have come to a consensus on the work that will be done and the responsibilities that will be given to each individual member. Our prototype consists of a fully functioning home screen, food input options and the meal history. We have already completed the first half of the prototype, which entails the overall design and layout of our application, as can be seen in the images above. The next step is to complete the second half of the prototype, which is creating the application itself using MIT App Inventor. This will consist of two main functions, the food input options and meal history. The reason for implementing these two functions is because the client stressed the importance of being able to input the foods that he consumes, and then save these to the application. This is to prevent him from re-entering each meal, and instead, he is able to modify the existing food/beverage that he has consumed.

Comparing our prototype with the first assumption on the generated list in section three, the second half of the prototype will be created using MIT App Inventor, which is made for Android devices, therefore this assumption is satisfied. Going to the second assumption, our prototype accurately calculates the total carbohydrates intake as can be seen in Figure 4.4. The carbohydrates intake, sugar and fibers, all in grams, is displayed on the screen, with accurate precision. Moving onto the third assumption, our prototype does not fully validate this statement because in the first prototype, there is no settings menu. Hence, there are no notification reminders, or user information history to be stored. However, the user's meal history is stored as seen in Figure 4.7. Up to 3 months of data is stored in the app, although this depends on the size of meal the user consumes. Going onto the fourth assumption, from Figures 4.5 - 4.8, the meal history and activity log for each past and present food, corresponding to a specific date, is available to the user. For the fifth assumption, the user can add/edit a meal as seen in Figure 4.3. The app allows the user to add the meal name, quantity of the meal, and amount of starches, sugars and fibers associated with it. Moving onto the sixth assumption, our app is ADD friendly because of the implementation of primary colors (i.e. blue, red) and does not have too many radio buttons, thereby allowing for a simple UI. As aforementioned, for assumptions 7, 8 and 9, these characteristics will be implemented in future prototypes so as of right now, prototype I does not validate these assumptions.

Table 5.1: Performance of Prototype 1 with respect to Target Specifications

#	Target Specifications	Prototype 1
1	Accuracy of calculating the total carbohydrates intake, and sugar and fiber intake.	The main concept of our first prototype is to accurately calculate the total carbohydrate, sugar and fiber intake. It is very accurate because of the implementation of various calculations from the user's inputs, therefore providing an appropriate result for the diabetic patient.
2	User feedback	This feature is not a part of the first prototype, and will come into fruition when the settings menu will be introduced in prototype II.
3	Ease-of-use	Prototype I has a user-friendly environment with a simple interface, and color-coordinated graphs which makes the prototype aesthetically pleasing.
4	Software application testing	The client will test the first prototype over the course of a few days.
5	Cost	The app is free, with a price of \$0 because there are no paid resources used to build the app.
6	WiFi dependency	This feature is not a part of prototype I, and will be created when implementing the settings menu in prototype II.
7	Product quality	The prototype is made in such a way that it is easily available to the user through .apk file

8	ADD friendly	Pre-saved meals with color coordinated meal graphs which provides the user with an ADD friendly environment.
9	Data storage	Data will be stored in a .txt file

**6. Bill of Materials:**

Table 6.1: BOM for Final Prototype

Item Number	Application Type	Description	Quantity	Unit Cost	Extended Cost
1	Google Slides	An online application that allows for collaboration between people to create presentations	1	\$0	\$0
2	MIT App Inventor	Online web application (IDE) created by Google. It is designed to teach computational thinking concepts through creating mobile applications. Designed primarily for Android, and utilizes block components to create code.	1	\$0	\$0
3	Thunkable	Online web application (IDE) that allows users to create mobile apps which works on both IOS and Android. Designed for Android and iOS, and utilizes block components to create code.	1	\$21/month for Pro version annual subscription plan	\$63
Total	N/A	N/A	3	N/A	\$63

As outlined above, the BOM for this project is very small since our product is entirely software-based. The first application used is Google Slides, which our team utilized to

create the design and overall layout of the first prototype. For the first prototype, we have two different applications that we are going to test. These are named MIT App Inventor and Thinkable. MIT App Inventor was suggested because it is free-to-use and some of the team members already have experience with using the application in past courses. It is primarily used to create Android apps, but there are still ways to export web applications as iOS apps. The third and final application, Thinkable, was also suggested because it allows one to create both Android and iOS applications, allowing for cross-platform application making. Since there is a budget constraint of \$100, and there are no other expenses for our project, our team will use the Pro version annual subscription plan of \$21/month. This will be used for prototypes II and III, since there is no budget allocated for prototype I. Another reason we have decided to purchase the Pro version is because it entails personalized app branding, allows for the creation of unlimited private and personal projects, and much more. This BOM is subject to change throughout the developmental stages of the project because there may be more software applications that our team can use to create our mealtime tracking app.

## **7. Client Meeting Presentation:**

To be prepared for the third and final client meeting, our team will have completed the first prototype, which should be a low fidelity product. We will also have started developing our second prototype, which is a medium fidelity prototype. This will consist of additional features, including a settings menu and user information menu. The primary focus of the second prototype is the ability for the user to provide feedback on the app, through electronic means. Both of these prototypes will be presented to the client, and during the meeting, we will ask for extensive feedback on these products, and various aspects including the UI, ADD friendliness, and much more.

## **8. Conclusion:**

In Deliverable D, the team has developed an updated concept of the app by reviewing our client's feedback. Next, we made the relative changes to it and narrowed our plan to prototype I. Prototype I is the main prototype of the application. It consists of the Home Screen, Food Input and Meal History. All of this information was obtained from the second client meeting that helped better our understanding of his viewpoints and concerns. To add on, the client was very pleased with the graphical representation of the meal data and wanted that in the app as it looked attractive and easier to understand the meal intake. Our team looked at all possible options before arriving at a decision of making the food input and meal history first. Without teamwork and creativity it would be impossible to complete this project deliverable. Our team has also updated our Wrike project plan and set deadlines for finishing the tasks on time. Now, the team is preparing for PD E - Project Progress Presentation that is coming up. Overall, this deliverable helped the team members to create and analyze our first prototype using client feedback. The group will use the work in this deliverable as a foundation for the second prototype and the next client meeting.