Project Deliverable C: Group C11 Conceptual Design, Project Plan
GNG 2101
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Submitted by Team C11

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Abstract:

The following documents for this deliverable are the conceptual design and project plan of team C11's project. This document will contain the concepts created by each team member and will highlight the concepts, collectively chosen by the group, that will be used for the final product. The other documents for this deliverable will contain the updated gantt charts for the project plan and the functional decomposition.

Introduction:

The team was given the task of creating a mealtime, insulin calculator, that could solve many of the problems the client experiences on applications currently on the market. In order for the team to settle on what tools and options the team would want to have on the application, the team clarified core functionality using the functional decomposition method and tasked ourselves individually with creating at least three different concepts that the team could use for the application. As a team, the team evaluated the created designs based on the target specifications from the previous deliverable and selected which concepts the team would use for the application.

Group member concepts:

Khalil Aouadi:

1. **Saved Meal Category**

   One of the tabs the application will contain will be called: "Saved meals". Its purpose is to offer the user the ability to save their meal for future references after they have entered their meal information into the calculator. By default, meals can be saved in four categories: breakfast, dinner, supper, and snacks. The user can also add custom categories too! As the user clicks on a meal he previously saved, they will see the amount of carbohydrates and portion the meal contains. They will also have the opportunity to change some values of their saved meal to reflect the current meal they are currently eating, for example, changing the beverage or a portion of the meal and saving those small changes into presets.

2. **Customization options**

   The simplicity of an application often comes with its design. A good way to implement a great design would be to offer the client the privilege of choosing the design. In the setting section of the application, the client would be able to choose various options concerning the look of the app such as putting the application into dark mode and vice versa, changing the colour palette and the overall layout of the app.

3. **Calendar mode for the meal history**

    When the client finishes calculating the amount of carbohydrate in a meal or checks into a previously saved meal, the meal and the timestamp of that meal are stored by the application. In the application settings, the client will have the option to see his meal history that will show up in a calendar layout. The advantage of that layout is that it's easier to see your meal history and the ability to remove the accidental meals that get saved in the history when the client only wanted to see the amount of carbohydrates in a meal without actually taking the meal. Once the client looks over his meal history, he will have the option to export it under the same calendar format.

Mounira Nihad Zitouni :

1. **Food Pie Chart and Sugar Intake Bar**

    The home page of the app has a nutrition pie that breaks down the total food intake with a sugar intake bar at the top. The purpose of this is for the user to know easily where he is in his sugar intake. The layout would be easy to understand and let the user know visually their daily sugar intake breakdown. Also, the user can choose which units the sugar intake bar and the nutrition pie is calculated with. If possible, when clicking on the pie, the user can know more information about his food intake

2. **A plus button at the bottom to add food**

    At the bottom of the calculation section of the application, there will be a plus button that will allow the user to add the food he just calculated to the saved meals. When clicking on that button a list will appear with several options such as: breakfast, lunch, dinner, snacks, and "skip a meal". Once the user chooses the proper eating time, he will be able to add his food intake into that category.

3. **Add custom food (if the team have a list of food pre-established)**

    In the case where the user can not find the food they want to add into their daily intake, the user will be able to add a custom food at the end of the list. When the user chooses that option, a couple of questions will be asked to the user. For example, the name of the food and the main nutritional values (serving and sugar). Once the user adds his food, the application will add his food in his history bar or recent food for the next time the user uses the application.

James Couture:

1. **Simple export system**

    The idea is that a simple export system will take the meals of the day, put the information into an excel sheet and email a health care provider or even simply save on

the device itself. This allows for easy access and sharing of meal information to the user and the health care provider.

2. **Log In Account**

Using accounts, the user can log in and have access to their meal history information from multiple sources. Switching information from devices will help ease the change of phones so that the user can keep all prior meal information to the new device.

3. **Color Blind Options**

Some users can have a harder time reading if they have color blindness where certain colours might be harder to see. This allows the user to choose theme settings that best suit their needs. This will allow the application to be available to more people.

Regina Mayani:

1. **Food illustration**

For the home page, there could be a place where the client could enter their meal and after that meal is entered, on the top of the screen will appear the quantity of sugar in his previous meal. This could help the client to be aware more quickly of what he ate and allow him to better manage his sugar level. Also, there could be in the corner some circles that denote the number of meals that the client has taken through the day.

2. **Grocery**

There could be an extra option for the future if the client likes to cook and do their grocery there could be an option where the app can analyze the quantity of sugar in his grocery and allow him to avoid food that could be bad for his condition. Also, this application could allow the client to plan his meal that could allow him to even better control his sugar level.

3. **Emergency alert**

The application could have an option that contains the client's information and if the quantity of sugar in his blood could be dangerous for the client's health. The app could send a notification to the client and if there is no response after a certain moment that could be sent to people that possess the right to see his information so that they could contact the client and that could avoid any severe consequences.

Spencer Henry:
1. **Profile page**

Users will have the option to enter their body weight/height, add their diabetes type, choose their insulin therapy, and adjust their insulin range to determine their target range, and their hypoglycemia and hyperglycemia values. Users can also change the units they wish to use to measure insulin and carbs.

2. Ability to connect to a Bluetooth meter

Some users may have a Bluetooth meter on them, such as the Accu-Chek Guide, so being able to connect to these meters and allowing them to talk to the app and read their data on the app would be super beneficial to the user.

3. Notification system

Adding a notification system will allow users to remind themselves when their last insulin injection was, also when should be their next meal and other useful information they provide.

Introduction:

To evaluate concepts the team decided to come up with different metrics that were more suitable. These new metrics are less subjective, allowing for a better evaluation and appropriate vision of future milestones.

Table 1: Remastered Version of Target Specification to Better Evaluate Developpement of Application

#	Metric	Units	Margin	Value
1	Feasibility	binary	True	True
2	Appropriate to Customer Needs	# of customer meet needs met	>5	7
3	Simplicity	# of questions asked to user	<8	<5
4	Likelyhood of success	Subjective (1-5 rating) (low - high)	4-5	5
5	Time to Create Function (estimation in days)	Days (d)	<8	<5
6	Usage Frequency (of the function)	time/day	4	5
7	Practicality	Subjective (1-5 rating) (low - high)	2-4	3-4

Table 2: First Table Representative of Simple Calculation to Evaluate Concepts Using Target Specification Metrics

Concept Criteria:	E12 Application (Reference)	Saved Meal Category	Customization options	Calendar mode for the meal history	Food Pie Chart and Sugar Intake Bar	A + button at the button to add food
Feasibility	0	-	-	-	-	-
Appropriate to Customer Needs	0	+	0	0	+	+
Simplicity	0	+	0	+	+	+
Likelyhood of success	0	0	0	0	-	0
Time to Create Function (seconds)	0	-	-	-	-	-
Usage Frequency (of the function)	0	+	0	+	+	+
Practicality	0	+	+	+	+	+
Accessibility	0	+	+	0	0	0
Number of +	0	5	2	3	4	4
Number of 0	0	1	4	3	1	2
Number of -	0	2	2	2	3	2
Total Score	0	3	0	1	1	2

Table 3: Second Table Representative of Simple Calculation to Evaluate Concepts Using Target Specification Metrics

Concept Criteria:	E12 Application (Reference)	Create new Food In pre-Established List	Simple Export System	Log In Account	Color Blind Options	Show your food
Feasibility	0	0	-	-	-	-
Appropriate to Customer Needs	0	+	+	0	0	0
Simplicity	0	0	+	+	+	+
Likelyhood of success	0	0	+	0	+	0
Time to Create Function	0	-	-	-	-	-
Usage Frequency (of the function)	0	+	0	+	-	+
Practicality	0	0	+	+	+	+
Accessibility	0	0	+	+	+	+
Number of +	0	2	5	4	4	4
Number of 0	0	5	1	2	1	2
Number of -	0	1	2	2	3	2
Total Score	0	1	3	2	1	2

Table 4: Third Table Representative of Simple Calculation to Evaluate Concepts Using Target Specification Metrics

Concept Criteria:	E12 Application (Reference)	Grocery	Emergency alert	Simple profile page	Connection to bluetooth meter	Notification
Feasibility	0	-	-	0	-	+
Appropriate to Customer Needs	0	0	0	0	0	0
Simplicity	0	-	0	+	0	0
Likelyhood of success	0	-	0	+	0	0
Time to Create Function	0	-	-	0	-	-
Usage Frequency (of the function)	0	+	0	+	0	+
Practicality	0	+	+	+	0	+
Accessibility	0	0	+	+	+	+
Number of +	0	2	2	5	1	4
Number of 0	0	2	4	3	5	3
Number of -	0	4	2	0	2	1
Total Score	0	-2	0	5	-1	3

For this project, the team decided to go with a simple calculator obtained by comparing the concepts to the reference of a previous year's project. The team used new metrics to better quantify and better access the concepts. Once the pros and cons of the concepts are added together, values are obtained. The value 2 was given to the minimum requirement to clear cut ideas that are not profitable or irrelevant to the project.

One exception was made to this rule for the Food Pie Chart. The Food Pie Chart was given an exception due to how interested the client was to have this feature and the challenge that it will provide the team to grow and learn new concepts.

Promising Solutions:

The five promising solutions below that the team have chosen as a group would further accomplish the client's wants and needs. Every solution that was selected had a score of 2 or higher, except for the Food Pie Chart and Sugar Intake Bar.

1. Saved Meal category v: The client has specified he wanted to have a saved meal category to find easily his favorite food.
2. Food Pie Chart and Sugar Intake Bar: This solution will give a visual representation of the client's carbohydrate intake. Indeed, as per the previous meeting, the client wanted an easy to understand and practical food pie to get a global idea of his daily intakes. On the other hand, the team added as a group a food intake bar that will give a specific number of his sugar intake. Therefore, when the user enters the application, he can numerically and visually see his glucose intake. Food Pie Chart and Sugar Intake Bar was made into an exception, as the reason this concept got a low score, was due to the challenges it creates for us. These challenges include creating pie chart libraries and being able to make them flexible to the specific user's meal specification.
3. A + button at the bottom to add food:The team has chosen this for the client to practically and efficiently add his food. In the meeting, the client said that most of the applications in the market, as of now, are complicated and hard to follow. Indeed, the team has arrived at the same conclusion when the team benchmarked insulin calculator apps. Therefore, the team took this solution for him to feel unburdened by the app.
4. Simple export System: This solution was specified in the client meeting. The client wanted it possible for him to share his information with his doctor or dietician. Hence, this solution was mandatory for the prototype.
5. Notification: This solution will allow the user to turn on or off the notifications to remind him to eat at specific period ranges. In fact, in the meeting, he commented that he needed, as a diabetic, to eat every four hours. Also, he added that he would forget to eat from time to time, therefore, he would appreciate a reminder. In that case, the notification solution is perfect for the client's needs in that specific matter.

Design Concept:

The team has decided to make a simple design. The solution options that were considered have a rating of 2 or higher. Part of this rating comes from satisfying client's needs and simplicity. Currently, the team is planning to have a main page, where there will be a food pie chart, a sugar intake bar, and a "+" button where the user can add their meal(s). The second page will contain more specific pie charts showing where the different carbohydrates are coming from. This will hopefully help ease the user's diabetes

management. On top of the page, carbohydrates are going to be shown, making them easily accessible to the user. There will be an option to view the meal page. The meal page will allow the user to save their current meal, so the user may later choose their meals when calculating their carbohydrates. The meals will be stored in a local file allowing for later access. A setting page will allow the user to make the application fit better their needs (e.i: using notifications). On the page, there will be a button to access the different notification option settings. On the notification page, there will be a button that will open the privacy policies.

The current concept integrates the best selection of concepts that were conceived by the team in order to create a product that meets the client's needs. Even though the team can now visualize the final goal, time and lack of programming experience will definitely be challenging.

Visual Representation:
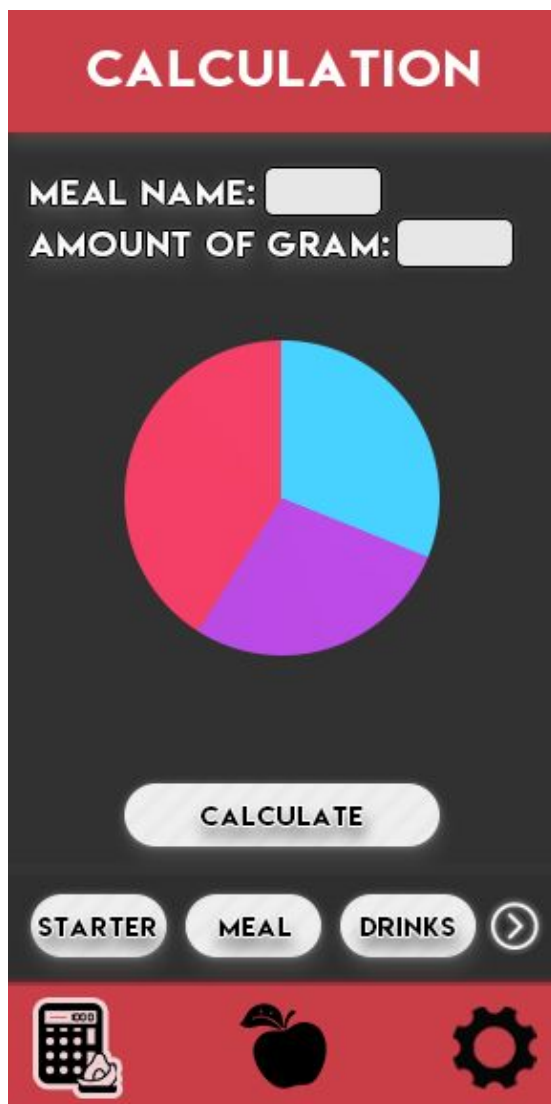
Home/Calculation page

The client would add all the elements that compose his meals by navigating through the scroll bar at the bottom, through the pie chart he would be able to specify specific elements of his meal and adjust their value. Once he is done, he can click on the calculate button, a pop up will appear to ask the client to confirm his choice.


When the meal is calculated

After the meal is calculated, the application will output the amount of carbohydrates in the total meal and the user will be able to check the amount of carbohydrates on every part of the meal. Then he can add the meal to the saved meals, a pop up will ask for the meal's name and the category the meal should go in.
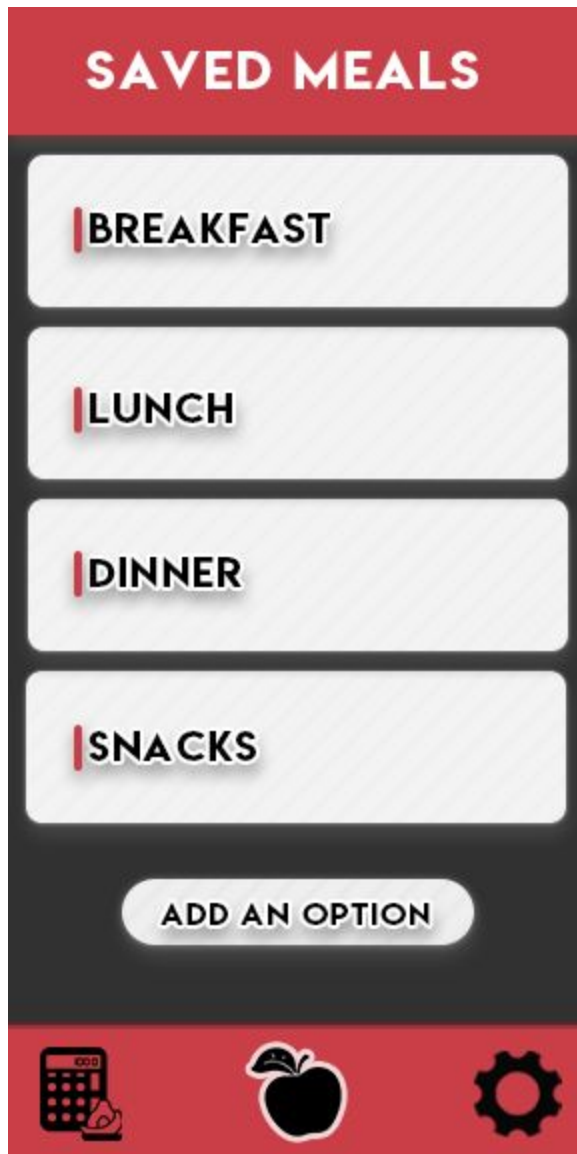
Saved meals

This is the saved meals section of the application, by default there are four categories but the user can add other options to suit his meal management. When clicking on a category, the user will have access to every meal that was put in that category. When clicking on a specific meal, he will see the same pie charts as when the meal was just calculated and will be able to change some values so that his current meals are more accurate.
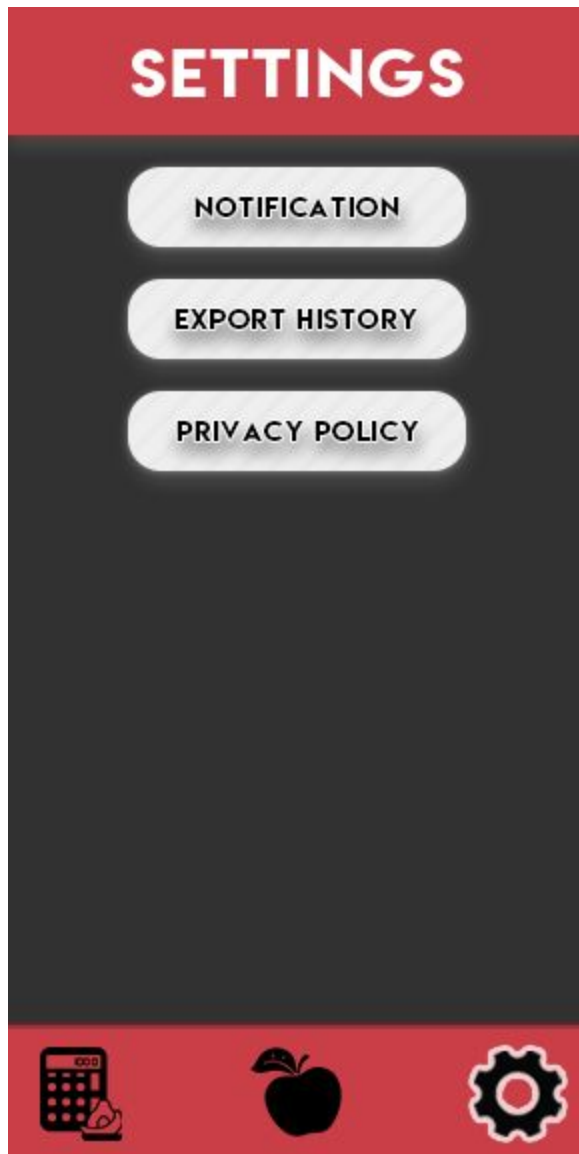
Settings

This is the settings page of the application, the user would have the option to change how the notifications work, to export his meal history, and a privacy policy to see how the application will use his information and in which context it is used.
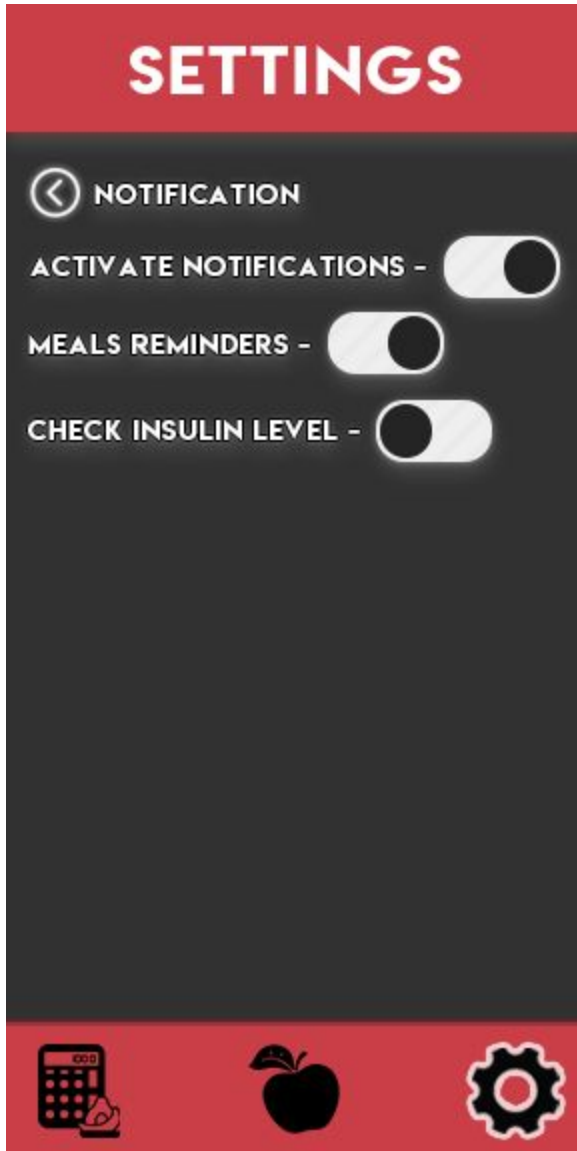
Notification settings
This is an in-depth look at how the settings would be against. For example for the notification, you can choose to disable or activate notification from the application, if the client wants meals, reminders or not, and reminders to check insulin levels or not.

Material/part costs:
As the main part of the team project is to create a mobile application, the team doesn't have any material to buy. Also, the team is not going to hire employees as the team will have to be the ones creating the app or pay to release the application in the android store. Therefore, the team has concluded that the cost of this project will be none.

Relationship to Specifications:

The design concepts resulting from the meticulous selection are closely related to the client's specifications. Indeed, the design concept has a simple design, easy to use, and contains only useful characteristics such as the main page calculate button. The design is also simple to navigate through different sections of the application. As mentioned before in the document, the cost for this application will be none and will, therefore, not be costly for the client. The client needed the application to not direct on the calculations of the quantity of insulin he needed to take but to focus on the amount of carbohydrates he consumes. Therefore, the design is mainly centered on visually representing the amount of carbohydrates. The team has concluded on food/liquid pies and the amount of food/liquid carbs presented in percentage at the top. The design also includes notification settings as per the client's request. This concept design will allow the client to get reminded of the important everyday tasks as a diabetic. Moreover, the client asked the team to create a saved meal section in the application to allow him to input his favorite food. Not only a saved meal category but also an export history option. Both concepts were added to the design concept of the prototype. This will allow the consumer to effortlessly find his previous meals and keep his doctor informed of his carbohydrate intake.

Conclusion:

Based on the concepts team has brainstormed and discussed and the tables the team has created to evaluate the concepts, the team settled on the following concepts: A saved meal category so users' can easily find food, a pie chart that will contain the users food with a sugar intake bar, a button on the main menu to add food to the calculator, a simple export meal history system and a notification system. The concepts chosen were all considered necessary as the client specifically asked for these, and will be the primary focus throughout the development of the application, Other concepts such as a colour blind mode and themes for the menus will be considered once the primary concepts are implemented first. Through the use of photoshop, the team was able to get a visual representation of what the team hopes the application will look like for the upcoming prototypes. The team wants to achieve the goal of making the application simple yet appealing to the client through a simple user interface that won't strain the client's eyes or cause users to be confused about where certain options are. For the next meeting with the client, the team will provide the concepts and ideas the team has brainstormed so far, and using the feedback gathered, will begin working on the prototype.