



Macro Manager High Level Design

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Executive Summary

The following document will outline the high-level design of the Macro Manager platform. We will discuss the requirements of this project by looking at the business requirements, the current situation surrounding calorie tracking apps, the pain points associated with these apps, the scenario should the project succeed as well as all assumptions, constraints, dependencies and risks which should be pointed out before development starts.

Following this, the required features of the project will be illustrated with user stories.

Further illustration of the overall process and development of the platform will be provided through a use case diagram, a flowchart and, an entity relationship diagram.

A project backlog list will also be provided.

The main aim of the project will be to provide users with a platform to track their calories easier than existing apps allow, with a focus on eating out and tracking on the go. Several minor risks exist in the project with the largest risks being scope creep and securing partnerships with restaurants which is crucial to the development of accurate tools.

The main features of the project included in the backlog are the abilities to scan barcodes of food for nutritional data, scan menus in restaurants for nutritional data, create recipes out of food that has been scanned, filter and search a list of local restaurants by calories and/or dietary requirements and, register as user and login.

Requirements Analysis

Business Requirements

The main goal of Macro Manager is to provide users with an accurate way to calculate and track their calories in a “diary” while on the go whether they are consuming food from a gourmet restaurant or a fast-food place. To this end another goal is to provide users with a way to track the calories from store bought, packaged foods with barcodes and to amalgamate these items into custom recipes which can be saved and entered into the diary at any time, allowing them to make their favourite foods regularly without having to input everything again and being able to edit ingredients within these recipes on the fly. Finally, Macro Manager aims to give users a platform to find places to eat in their locality which will suit their dietary requirements and demands.

As-Is Scenario

Currently, there exist many apps to track calories such as MyFitnessPal, Fitbit, HealthyOut, Lost it!, Nutriotionix Track (Picard, 2020) but, to the best of my knowledge, there exists no app to calculate the calories contained in food from restaurants. The apps also do not feature functionality to add scanned ingredients together in a single recipe. Users scan ingredients and enter these individually into the diary. Users may also create custom foods by manually entering the calories and, optionally, nutritional data.

Pain Points

The experience of using these calorie tracking apps can be incredibly tedious. Because the app does not allow users to create recipes using ingredients which have already been scanned, tracking all of the calories consumed in a day becomes irritating and long-winded. As mentioned above, some of the apps allow custom recipes to be created but only through the manual input of calories and nutritional data. This means that users must also manually calculate the calories and nutritional data for the foods they create which is time consuming and can lead to demotivation. Finally, the biggest pain point of these apps is that none of them provide any way for a user to calculate the calories in food from restaurants. This often causes people to do one of a two things with varying results:

- **Intuitive eating:** This is where a person looks at food and uses their intuition to estimate the calories within the food based on previous food that they have eaten. This is often vastly inaccurate, with people more often than not underestimating the number of calories in the food, causing their progress towards their goal (weight loss, physique etc.) to stall.
- **Manually Calculating Calories:** A person may look at all of the ingredients in a menu item, search for each ingredient’s calories in a search engine and add these all together and add it to their diary. This is incredibly tedious and time-consuming and will usually cause people to give up on tracking their calories at all or even eating out at all. A person may perceive the amount of effort required to have one meal in a restaurant and calculate the calories as too great and forego the meal altogether,

opting instead to cook all of their own food, potentially missing out on events with friends and family and/or developing an unhealthy relationship with tracking calories.

To-Be Scenario

Macro Manager will remove the pain points from these existing apps and provide users with a seamless, enjoyable experience. With Macro Manager, users will login to the app and scan the ingredients they have. These ingredients will now be saved in their “pantry” and available to be added to their food diary or a custom recipe at any time. Users may scan a menu item in a restaurant and the app will calculate the calories of the item as accurately as possible and add it to their diary. This meal can be added to the diary again at any point in the future. Users will also find a restaurant list which they will be able to filter based on diet and menu items within certain calorie ranges.

Assumptions

There are several assumptions which should be made in developing this software.

1. Users of the system familiar with one or more calorie tracking apps.
2. The app will be developed using Android studio in Kotlin, the API will be developed in Golang with libraries and API's which are compatible and data will be stored in a MySQL database.
3. Deadline dates are final and will not be moved.
4. All third party libraries and frameworks used in this project will available throughout the duration of the project
5. Any flaws in the design of the project will be discovered early on and alternatives will be devised

Constraints

The project will be developed under the supervision of the BIS department. Due to the nature of this assignment there will be a number of constraints to the development of the system.

1. **Cost:** All third party libraries, frameworks and API's must be free to license, open source, freeware, public domain software, or any combination of the above.
2. **Time:** The system must be developed within the allotted time frame. The due date for the final system is 11th March 2022.
3. **Resource:** The assignment is individual and so the system must be developed with a team size of one. This limits the hours which may be used to work on the project and prevents the workload from being split.
4. **Scope:** The system will provide functionality to do that which is stated in this document and the previous proposal. Any features outside of this remit will undergo an evaluation to determine its viability or pushed to a Phase Two of development.

Dependencies

Macro Manager will be dependant on several API's, frameworks and features within the project itself.

1. **Logical** The project cannot start development until approved by Dr. Tom Butler. There are several dependencies which cannot be avoided and will be recursive. For

example, the ability to save the calories from food in restaurants is dependant on the food diary feature.

2. **Preference:** Due to the time constraints within this project, certain features which may be easier to implement earlier but would not provide the functionality required by the app will be implemented later in the project, namely certain user functionalities will be left until last.
3. **Resource Based:** The whole project will be heavily dependant on one or several food API's which must be publicly available.

Risks

		Likelihood		
		Low	Medium	High
Consequence	High	Low	Medium	High
	Medium	Low	Medium	Medium
	Low	Low	Low	Low

- **Schema Changes:** Medium Risk. It may occur that the database schema changes. This will have a knock on effect on the API that will be developed and potentially to the app as well, requiring more changes within these parts of the project.
- **Scope Creep:** High Risk. Scope creep is a huge issue in any project and several parts of this project may require more work than planned due to the many third party dependencies within the project, underestimation of the existing scope and several other unforeseen events. (Indeed Editorial Team, 2021)
- **Bugs and Errors:** Low Risk. Bugs and errors will be found in every project. This is non-negotiable. However, it is very unlikely that these bugs and errors will be impactful enough to cause any large delays.
- **Health and Safety:** Medium Risk. While unlikely to happen, in the event of any serious illness or injury all development will be stalled temporarily as the team is only member large.
- **Skills:** Medium Risk. Team incompetence and inexperience may cause delays in development.
- **Restaurant Partnerships:** High Risk. In the event of failure to secure partnership with any local restaurants, providing data to users which is accurate will become more challenging and will likely cause the feature to filter local restaurants to fail completely.
- **College Work:** Medium Risk. It is quite possible that an overload of college assignments will occur at some point throughout the development of this project, resulting in a decrease of time allocated to development.

User Stories

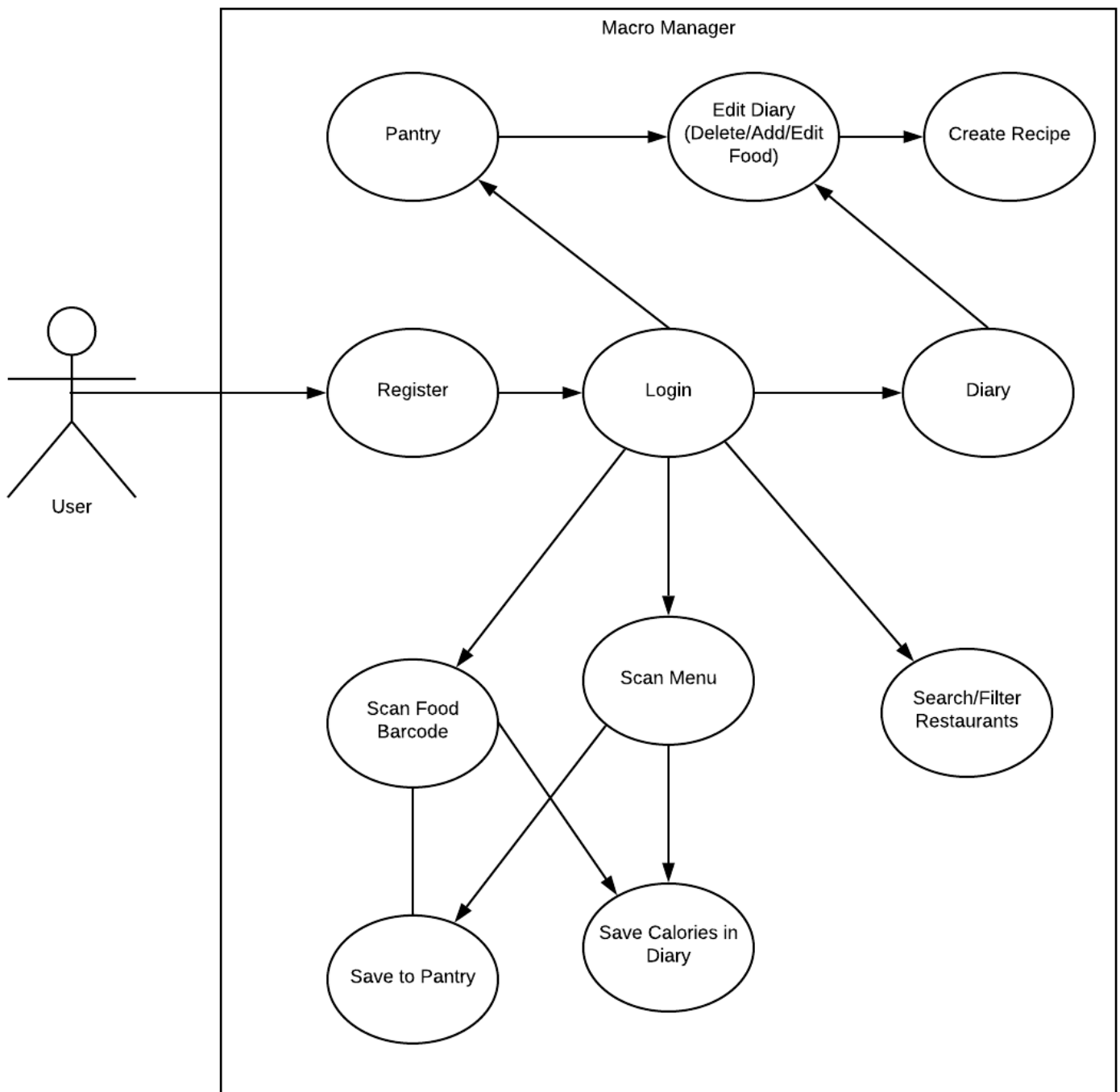
To better demonstrate the required functionality of the proposed software, below are a number of user stories, outlining simple needs of target users. These are only reflective of requirements, not features which will be implemented in future phases or

1. As someone who tracks calories I want to be able to scan barcodes on food and receive calorie and macro nutrient contents so that I can track my calories quickly and easily.
2. As someone who tracks calories I want to be able to create custom recipes with these scanned foods so that I can track my calories quickly and easily.
3. As someone who tracks calories I want to be able to scan menus in restaurants and receive the calorie content so that I can make better food choices while eating out.
4. As a diabetic I want to be able to scan menus in restaurants and receive macro nutrient content so that I can make better food choices while eating out.
5. As someone who tracks calories I want to be able to filter a list of local restaurants based on calorie content so that I can make better decisions about where to eat.
6. As a coeliac I want to be able to filter a list of local restaurants based on ingredients used so that I can go out to eat.
7. As someone who tracks calories I want to be able to register and login so that I can save the foods that I scan and calories from these foods.

The user stories involving allergies or dietary requirements may be switched for any other allergy or dietary requirements (nut allergy, keto, vegan, vegetarianism, halal, kosher etc.)

Use Case

Use Case Diagram



Description

With Macro Manager, users will register and login to the app and scan the ingredients they have. These ingredients will now be saved in their “pantry” and available to be added to their food diary or a custom recipe at any time. Users may scan a menu item in a restaurant and the app will calculate the calories of the item as accurately as possible and add it to their diary. This meal can be added to the diary again at any point in the future.

Users will also find a restaurant list which they will be able to filter based on diet and menu items within certain calorie ranges.

Project Backlog List

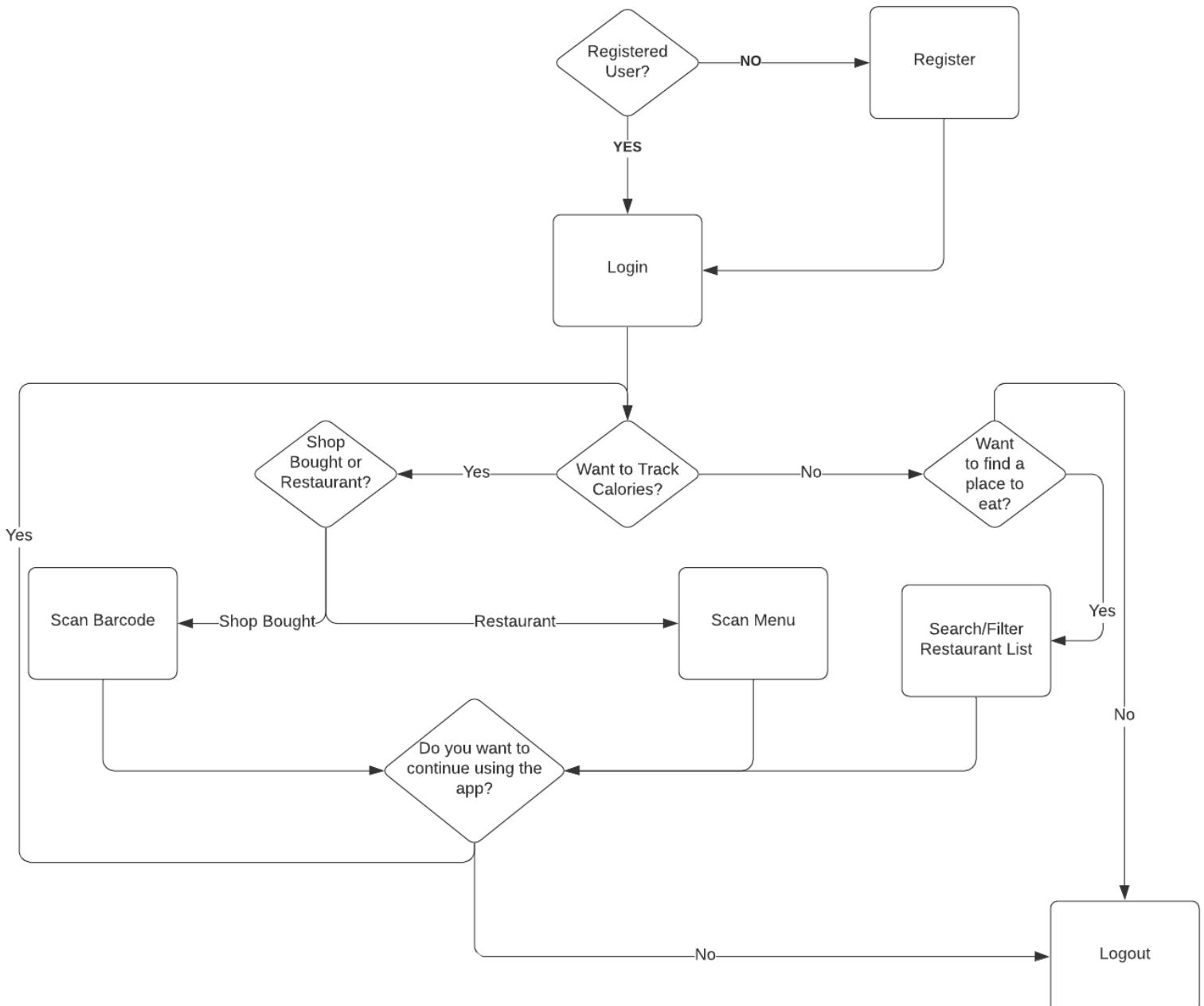
Below is the Backlog list of features to be implemented in this project. Anything with a priority of 10 is not a requirement but rather a feature which would be nice to have, should time allow for their development.

User Story	Estimated Size	Priority
As someone who tracks calories I want to be able to scan barcodes on food and receive calorie and macro nutrient contents so that I can track my calories quickly and easily.	Small	1
As someone who tracks calories I want to be able to scan menus in restaurants and receive the calorie content so that I can make better food choices while eating out.	Large	1
As a diabetic I want to be able to scan menus in restaurants and receive macro nutrient content so that I can make better food choices while eating out.	Large	1
As someone who tracks calories I want to be able to create custom recipes with these scanned foods so that I can track my calories quickly and easily.	Medium	3
As someone who tracks calories I want to be able to filter a list of local restaurants based on calorie content so that I can make better decisions about where to eat.	Large	5
As a coeliac I want to be able to filter a list of local restaurants based on ingredients used so that I can go out to eat.	Large	5
As someone who tracks calories I want to be able to register and login so that I can save the foods that I scan and calories from these foods.	Small	7
As someone who owns a Fitbit/uses the Fitbit app I want to integrate my Macro Manager diary with the Fitbit app so I can track everything in one place.	Medium	10
As someone who likes to create recipes I want to be able to share my recipes with other users so they can enjoy them as well.	Medium	10

Logical Design

Flowchart

Macro Manager Flowchart

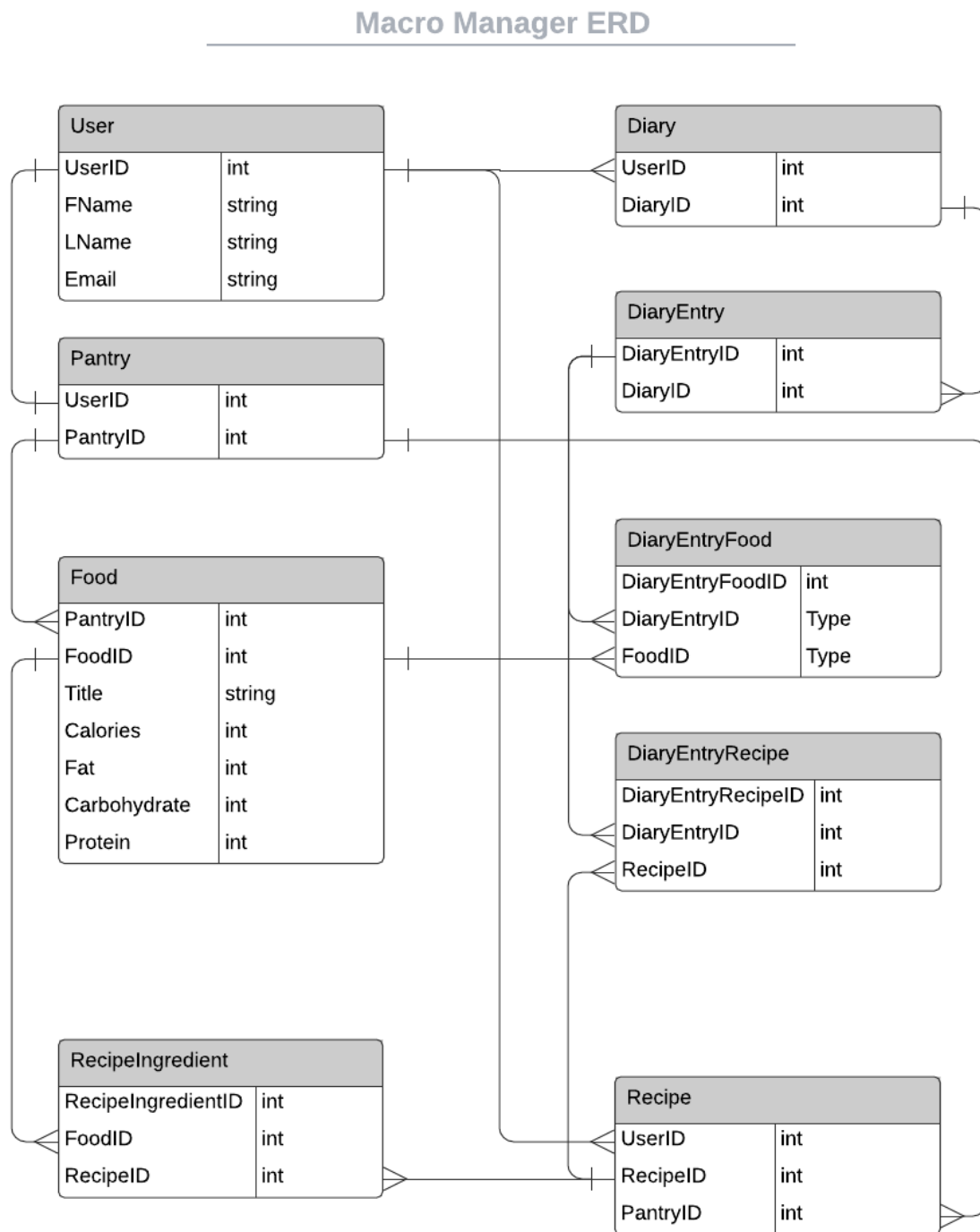


Description

The flowchart above depicts the decisions and processes a user will go through when using Macro Manager. When a user opens the app their next move will be based on their registration status. If not registered, the user must register and login, if they are already

registered they may login straight away. Once the user is logged in they can decide to track calories by scanning barcodes of shop bought food or by scanning the menu of a restaurant. If they are not looking to track their calories they most likely want to find a place to eat. To do this they can filter the list of restaurants in their locality. After this they can either continue using the app and do a loop of the flowchart or they can logout of the app and end the flow.

Entity Relationship Diagram



Assumptions

- No upper limit of users
- Multiple recipes can appear in any one diary entry
- A recipe can appear in multiple diary entries
- A recipe can appear multiple times in the same diary entry
- A food item in a pantry can appear in multiple recipes
- A food item in a pantry can appear in multiple diary entries
- A food item in a pantry can appear multiple times in the same diary entry

Description

The above entity relationship diagram shows the schema for the database to be used by Macro Manager. The tables to be present are as follows:

- User
- Diary
- DiaryEntry
- Pantry
- Food
- Recipe
- DiaryEntryRecipe
- DiaryEntryFood
- RecipeIngredient

The User, Diary, Recipe and, Pantry tables are to contain the details of the user, each days calorie entries (contained within each individual entry in the DiaryEntry table), a users recipes and, a users scanned foods (contained within each individual entry in the Food table) respectively. The DiaryEntryRecipe, DiaryEntryFood and, RecipeIngredient tables are there to eliminate the many to many relationships which would occur otherwise. These relationships are due to multiple ingredients/food items (Food table entries) being present in a recipe and each ingredient being present in multiple recipes [PantryRecipe], multiple recipes appearing in any one diary entry, recipes appearing in multiple diary entries and, diary entries containing the same recipe more than once [DiaryEntryRecipe] and, finally, food items in the pantry appearing in multiple diary entries or multiple times in the same diary entry [DiaryEntryFood].

Conclusion

In conclusion, the development of Macro Manager has been thoroughly thought out and the development team eagerly awaits its start. The project will be developed using several technologies and languages including Golang, Kotlin, Android Studio and MySQL as well as several third party libraries and API's, all of which will be free to use. Several risks have been identified and the team will be vigilant in offsetting the risks mentioned, specifically that of scope creep as it is the largest risk which we have a high degree of control over. Finally, the design of the entity relationship diagram indicated several many to many relationships within the database which have now been dealt with and this early discovery should speed up development of the project overall.

References

Indeed Editorial Team. (2021, March 9). *12 Causes of Scope Creep (and How To Avoid Them)*. Retrieved from Indeed.com: <https://www.indeed.com/career-advice/career-development/scope-creep>

Picard, C. (2020, Oct 12). *6 Best Calorie Counting Apps, According to Nutritionists*. Retrieved from Good House Keeping: <https://www.goodhousekeeping.com/health-products/g28246667/best-calorie-counting-apps/>