

# **PROJECT PROPOSAL MacroCalc**

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## Project Proposal

### Project Abstract

This document proposes an application which can calculate the nutrient breakdown of any recipe. Users can give the application a recipe with ingredients and their amounts which will then be converted to its nutrient breakdown per serving based on values from an existing database. Additionally, meals can be saved and modified and compared to each other. User meals can be logged and compared against a preset macronutrient limit to help users reach their goals.

### Conceptual Design



The project will be an application with a search tool for selecting ingredients as well as an entry field to submit full recipes. Depending on the selected ingredients a visual demonstration will display the nutrient amounts compared against your personal daily limit. This project will use the R programming language (specifically the Shiny package) and python. The Shiny package is for constructing interactive web applications from R with easy-to-understand graphics such (bar graphs, charts, etc. Python will be used to create and store user profiles or allow sign-ins through other methods as this is not available through R. Code from the open source will need to be moved and reformatted so that a proper menu and tabs can be created rather than having all the information on one page.

### Proof of Concept

[https://github.com/yihanwu/Nutrient\\_Calculator](https://github.com/yihanwu/Nutrient_Calculator)

This GitHub user created a nutrient calculator which breaks down the nutrient values of specific ingredients. Additionally, users can manually combine several ingredients together and view their total breakdown. This creator uses the same language and package I plan to use. The program will use this base functionality along with the features I specified to create a personal nutrition planning tool.

## **Background**

MacroCalc will function as a nutrition planning web application. It will allow users to upload recipes or individual ingredients and in return receive a detailed nutrient breakdown. These meals can be saved and compared to each other. User meals will be compared against preset macronutrient goals. The application will be fully functional on and offline and allows for customization and conversion in terms of amounts.

This is similar to paid closed-source nutrition tools such as Noom or MyFitnessPal. Unlike these tools, MacroCalc has a focus on offline usability, quantity customization, and simplicity to give users greater freedom and accessibility in achieving their personal nutrition goals.

## **Required Resources**

To complete this project, I will need to find a large database of ingredients and their nutrient values I can use as a base data source in addition to personal ingredients that a user may add. These are publicly available on government funded resource pages. In terms of software resources, I will just need RStudio to make use of the R programming language and an installation of the Shiny package. No specific hardware resource will be needed other than a device that can utilize RStudio.

## **Project Members:**

**Gevork Dramgotchian**

**Patrick Brady**

**Son Tran**

**Justin Kuruvilla**

## **Project Links:**

**GitHub:** <https://github.com/cis3296s23/MacroCalc704>

**Jira:** <https://temple-cis-projects-in.cs.atlassian.net/jira/software/c/projects/MAC/boards/43/backlog?issueLimit=10>

## **0 Project Design**

### **Initial List of User Features:**

- Personalized user profile with macro goals/specified units
- Ability to upload custom recipes or ingredients to database/ modify existing recipes • Detailed nutrient/calorie breakdown of recipes or individual ingredients • Activity page with total breakdown/ meal log for progress tracking
- Simple to use interface
- Mobile use/ Offline Usability

## **Vision**

FOR individuals who want to improve their nutrition and overall health, WHO struggle to make healthy food choices and track their nutrient intake accurately, THE MacroCalc is a user-friendly application THAT provides personalized nutrient tracking, recipe input, and macronutrient info. UNLIKE other nutrition and meal tracking apps out there, OUR PRODUCT provides a free way to input your data and track your goals without having to pay a subscription

## **Personas:**

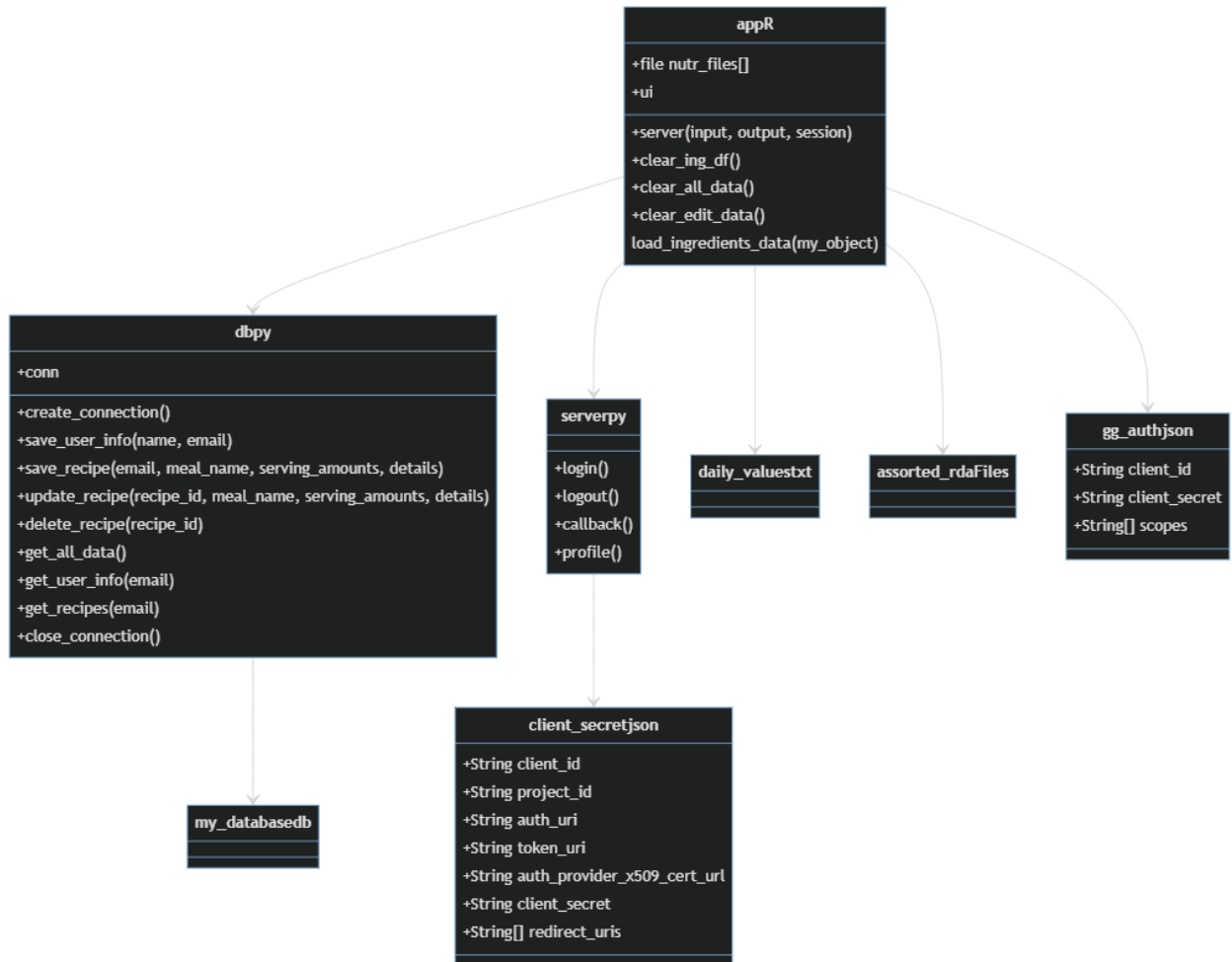
Jane (28) is a marketing manager at a small company. She has a Bachelor's degree in marketing and is passionate about health and fitness. She has a busy work schedule that leaves her with limited time to prepare meals, so she is always looking for ways to improve her nutrition. She is aware of her macro and micronutrient intake and currently tracks her meals on a spreadsheet. Jane is looking for a tool that can help her quickly calculate the nutrient breakdown of her meals, make modifications, and compare different meals. She wants a user friendly interface application that is easily accessible and can work offline.

Dee (34) is a Doctor who has had multiple patients ask for help with health and weight. Dee has many patients and cannot give specific advice for everyone, let alone be their fitness coach. Many patients also complain that a personal fitness instructor is too much time and money. She decides to try and find an app that allows patients to help track their own food intake. This was so Dee would have a free app that she could recommend to her patients. She herself sometimes uses the app but has encouraged many to start tracking their journey through the app with what they eat.

Sarah (35) is a working mother who wants to improve her health and feel more confident in her body. She has a busy schedule and limited time for meal prep, which makes it hard for her to maintain a healthy diet. Sarah has tried various diets in the past, but has struggled to stick to them long-term. She is looking for a tool that can help her track her calorie and nutrient intake, provide healthy meal options, and offer personalized recommendations. The app should be easy to use and accessible so that she can use it while on the go. Sarah wants to see quick feedback on her daily progress so that she can stay motivated and reach her goals.

Tannor (26) is an aspiring bodybuilder who hopes to one day compete in bodybuilding competitions. To reach this goal he knows it is imperative to optimize his diet as well as his training regimen. He is highly motivated, detail oriented, and enjoys tracking his progress in the gym. Despite this Tannor finds it challenging to stay consistent with tracking his food intake. He has tried using journals and other tracking apps but found them to be tedious or difficult to use. For these reasons Tannor is looking for a tracking app that is simple to use but still provides him with the detailed macronutrient breakdown of his meals.

## Class Diagram



This is the UML Diagram as of 4/18/23. Classes are separated to show how different problems were handled. Most code is within one file (app.R) and it pulls from various other files for help to function properly. Some of these include various .rda files, daily\_values.txt, and some .json files. The .json and .db files handle the user login and storage, the .txt and .rda files are for information about the food, the .py files handle the server side/online capability, and most of the hard work to display the app and allow for things to work are within the app.R.

## Sequence Diagram



Sequence 1: The user wants to search for a specific ingredient and add it to their intake for the day. They type the item into the search bar, which prompts the app to list the item or things close to it. Then buttons appear where one, which the user clicks, adds the item to the intake for the day. Once it is clicked the program saves data from the ingredient and stores it into that day's database following the `server()` function.



Sequence 2: The user stopped at McDonalds on the way home from work today and thought of ordering a BigMac. Wanting to see how this would impact their daily values, they search BigMac into the search bar which then prompts the user with options. The user selects view nutrient information and decided the BigMac would put them over some of their daily goals and decides against getting it.



## Testing Report

### Project Information

- MacroCalc - Justin Kuruvilla, Son Tran, Patrick Brady, Gevork Dramgotchian

### Test Objectives

- Testing Executed:
- Unit tests
- RStudio testthat function testing
- Unit testing within directories and code
- Functional testing
- Testing of the actual application once features were added
- Testing of a workflow once a new feature was implemented

The goal of unit testing was to ensure that all functions were working throughout the project. This was vital as the project was not started from scratch and we needed to ensure that nothing broke while we were added to it. We performed functional testing to ensure that all items were working properly once implemented together.

### Test Execution Details

- Used the RStudio/R testthat function to run multiple tests, the man pages for the testthat function were useful in learning how to create the tests and implementing them.
- There were also tests written into the code to verify that things were setup properly and to make sure the functions were not returning empty values.
- The functional testing was performed by navigating through the various pages of the application to ensure the results were as expected.

### Test Execution Results

- Since most of the project was previously written we focused on making unit tests for the new added functions only.
- The RStudio testthat feature ran for quite some time before it completed, there were multiple warning and all tests passed.
- The unit tests were either written into the code by whoever performed that section or it was written into a testthat test.
- R is not typically a programming language that is object oriented, so it does not have a ton of testing methods which made it difficult to run tests like we would in a C or Java program
- The functional tests were performed by all the members of the group periodically to ensure that all pull requests were not interfering with other sections of the code.

Snippet of testing using the testthat library –

```
library(testthat)

test_that("global variables test", { server(NULL, NULL, FALSE)

  # check that the values are initialized correctly
  expect_equal(g_user_email(), "tranbaoson2005@gmail.com")
  expect_equal(g_user_name(), "son tran")
  expect_equal(g_authenticated(), FALSE)
  expect_equal(g_food_id(), 0)
  expect_equal(g_measure_unit(), "")
  expect_equal(g_quantity(), 0)
})
```

The code that was being tested –

```
# Define server logic required to draw a histogram
server <- function(input, output, session) {

  ##### Global Var here
  g_user_email <- reactiveVal("tranbaoson2005@gmail.com")
  g_user_name <- reactiveVal("son tran")
  # define a reactive value to track authentication state
  g_authenticated <- reactiveVal(FALSE)
  g_food_id <- reactiveVal(0)
  g_measure_unit <- reactiveVal("")
  g_quantity <- reactiveVal(0)
```

### Test Summary

- The testing process for the project was effective. The team performed both unit tests and functional tests to ensure the quality and functionality of the app. The RStudio testthat function was used, as well as tests written directly into the code/directories, and functional testing was performed of the application. While there were some challenges due to the limitations of R as a programming language, the test execution indicates that all tests passed. Overall, the testing process helped ensure the quality and functionality of the project, and it seems that we were able to achieve the testing objectives. With these methods, we were able to uncover minor bugs and reformat our project to ensure a successful outcome when needed.

## **Project Progress**

### **Week 2 Progress**

This week was spent preparing for how different aspects of the program would be implemented. First, we chose the reticulate interface for running python scripts within r. We decided user info would be stored either in classes or a SQL database depending on what was possible with reticulate.

**Sprint Goal:** The main goal of this sprint was to establish what tools we would use to create this project.

### **Backlog Features**

**User Login**

**Macro Visuals**

**Tool Selection**

**Getting Ready**

## Week 3 Progress

**Sprint Goal:** The goal this sprint was to set up the webapp framework as well as the database.

### Backlog Features

Tab Switching

User profile data addition

Size	Task Status at end of Sprint
5	Done
5	Done
8	Done
5	Done
3	Done
3	Done
3	Done
3	unused

### Tasks in Sprint Assigned To:

Create user profile	ST
Add a way to store info on user profile	JK
Split proof of concept Create buttons to switch pages	JK
Uml class diagram	PB
2 Uml sequence diagrams	PB
Documentation	JK
Setup python (did not end up being needed)	GD
Estimated Velocity (At beginning of Sprint): 43	
Calculated Velocity (At end of Sprint): 34	

## Week 4 Progress

**Sprint Goal:** The goal this sprint was to finish everything that we could. This includes task such as fixing the user interaction with the app, how the user is stored and logins, support for custom recipes, etc.

## Backlog Features

Size	Task Status at end of Sprint
8	Done
5	Done
8	Done
3	Done
3	Done
3	In Review
5	In Progress
3	In Progress
8	In Progress
5	In Progress
8	In Progress
8	In Progress
8	Done
5	In Progress

### Tasks in Sprint Assigned To:

Add ingredients recipes	ST
Figure out how a user's data will be stored on their profile	UNKNOWN
User wants to edit meals	ST
Figure out how to deploy a release	ST
Update Class Diagram	PB
Update project documentation	PB
Setup docusaurus	PB
User wants simple breakdown of meals in home	JK
User wants to view their food log	JK
User wants to remove a meal from their log	JK
User wants to view their total breakdown	JK
User wants to compare one meal to another	JK
Integrate sign in with the webapp	GD
Storytesting report	GD
Estimated Velocity (At beginning of Sprint): 113	
Calculated Velocity (At end of Sprint): 90	