

# Fresh Fridge System Design

Group 10

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# Requirements Analysis

## Purpose of the system

The purpose of the system is to provide users with an application that aids in organising and monitoring calorie intake based upon certain health goals in mind. All tedious components of calorie counting, and health monitoring in terms of food intake are made simple to the user to minimise time required to research recipes tailored to their ideals.

## Problems we addressed/problem statements:

### *Overall Problem Statement*

People who have some knowledge of food health can become discouraged from pursuing their dietary goals. This is due to the time consuming nature of monitoring daily nutrition intake, and finding tasty and healthy recipes. This discourages individuals as they are frustrated and unsatisfied with the amount of time and effort that they have to spend to achieve their goals.

1. Nutritional breakdowns are widely lacking in recipes shared on online platforms
2. Individuals to an extent have knowledge based around their food intake, but requirements are often neglected or poorly addressed in existing recipe sharing platforms
3. Meal "Calorie counting" (for lack of a better word) is a tedious and time consuming process.
4. Quite commonly do individuals opt for more convenient yet unhealthy food choices due to their lack of planning and knowledge of healthier alternatives.

## Features:

The features of the application include:

- Login/Logout
- Personalised dashboard containing recommended recipes for the user.
- Ability to search for recipes by title, macro nutrition, and body goals.
- User profile customisation to set concrete goals
- BMI calculation to suggest and help tailor the application to the user's goals.
- Recipes
  - Viewing, adding, editing and removing
- Meal Planners: to help organise meals throughout the week and provide a weekly and daily breakdown. Allows user to keep on track according to their recommended intake.
  - Viewing, adding, editing, and removing
- Bookmarking recipes that a user wishes to view later.
- Reviewing recipes

**User Stories**

**Feature:** Edit profile to update goals or personal information

**As a:** body conscious person

**So that:** I can change any information from my user profile

**I want to:** be able to edit my personal user profile through the 'profile' page.

**GIVEN** that I have logged in and I am on the 'Profile' page

**WHEN** I click on the 'Edit profile' button

**THEN** I am redirected to an 'Edit profile' page, which contains a form with my current user profile details prefilled.

**WHEN** I click on any fields in the form

**THEN** I can edit the content of the field

**WHEN** I click on the 'Save' Button under the form

**THEN** I am redirected to the 'Profile' page

Profile

Email	lorenz@gmail.com	ⓘ
Username	Lorenz	ⓘ
Password	*****	ⓘ
BMI	25.5	ⓘ
	Suggested goals	ⓘ
	<a href="#">Increase</a> <a href="#">Decrease</a>	
Personal Goals	<a href="#">Increase</a> <a href="#">Maintain Status</a> <a href="#">Decrease/Reduce</a>	ⓘ

**Feature:** Collation of recipes which is personalised to the user, on the dashboard

**As a:** body conscious person

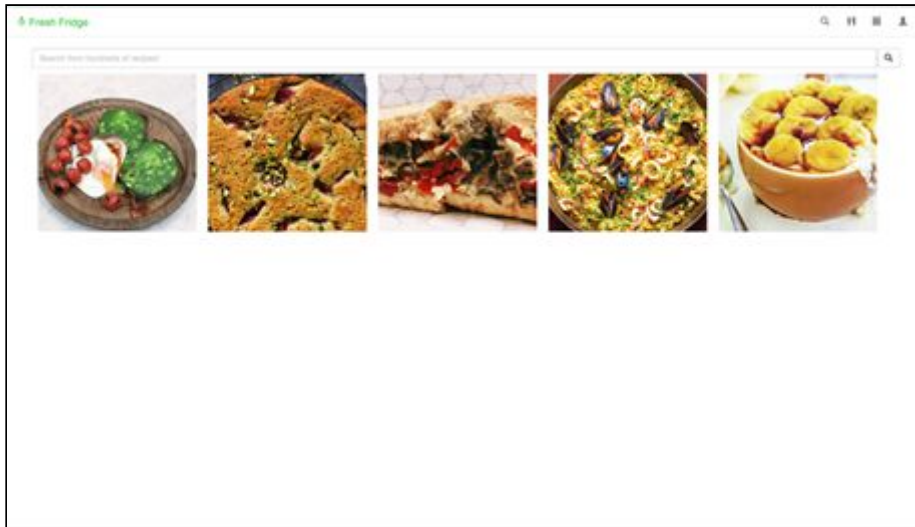
**So that:** I can see recipes which are relevant and recommended to me

**I want to:** access a personalised dashboard

**GIVEN** that I am a user and I am logged in or initially logged in

**WHEN** I click on the home button

**THEN** I am redirected to my dashboard, containing a list of recipes relevant to my food/body goals.



**Feature:** Advanced search by body setting goals, on the search page.

**As a:** body conscious person

**So that:** I can quickly find recipes that match my fitness needs.

**I want to:** do an advanced search by specific body setting goals.

**GIVEN** that I am logged in and I am on the 'Search' page

**WHEN** I click on the 'Advanced Search' button

**THEN** an 'Advanced Search' tab will appear

**WHEN** I select a body setting goal option according to macronutrient and goals.

**AND** I click the advance search button

**THEN** I am redirected to a 'search' page, containing the search results.

A screenshot of the 'Fresh Fridge' web application showing the 'Advanced Search' form. The form is titled 'Advanced Search' and has a search bar at the top. Below the search bar, there are five input fields for macronutrients: 'Energy (kCal)', 'Carbohydrates (g)', 'Protein (g)', 'Fats (g)', and 'Sodium (g)'. Each field has a 'Minimum' and 'Maximum' label. Below these fields, there are two buttons: 'Macro Limits' and 'Goal Options'. At the bottom right of the form is an 'Advanced Search' button. Below the form, there is a section labeled 'Search results for:' followed by a large empty space for displaying results. The application has a clean, modern design with a white background and a green header.

**Feature:** Add a recipe to share with others.

**As a:** recipe sharer

**So that:** I can share my health-orientated recipes

**I want to:** share a recipe by filling out a form on the 'Add Recipe' page.

**GIVEN** that I am logged in and I am on the 'My Recipes' page

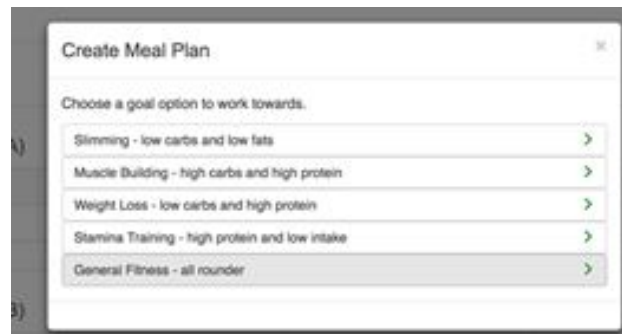
**WHEN** I click on the 'Create Recipe' button

**THEN** I am redirected to the 'Add Recipe' page, containing the responsive recipe form.

**WHEN** I fill in the name, method, instructions, calories, macronutrients, and time of the recipe

**AND** I click on the 'Save' button

**THEN** I am directed to the 'My Recipes' page, and my new recipe should be saved and shared.

A screenshot of the 'New Recipe' form in the 'Fresh Fridge' application. The form is titled 'New Recipe' and has a search bar at the top right. It contains several input fields: 'Title' (with a placeholder 'Recipe title'), 'Ingredients' (with a placeholder 'amount e.g. 1' and a unit selector 'of ingredient'), and 'Method' (with a placeholder 'Add method...'). Below these fields is a section for 'Recipe Images' with three slots labeled 'Image 1', 'Image 2', and 'Image 3'. Each slot has a 'Choose file' button and the text 'No file chosen'. At the bottom right of the form are 'Cancel' and 'Create' buttons.

**Feature:** Edit pre-existing recipes that the user has made

**As a:** recipe sharer

**So that:** I can make my recipes even better or fix any mistakes

**I want to:** edit my already existing recipes

**GIVEN** that I am logged in and I am on the 'My Recipes' page

**WHEN** I click on the edit button next to any of my recipes

**THEN** I am redirected to the 'Edit Recipe' page for the corresponding recipe

**WHEN** I change the recipe details

**AND** I click the save button

**THEN** I am directed to the 'My Recipes' page, and my recipe should be updated.

**Edit Recipe**

Title: Popeye toast with eggs

Ingredients: amount e.g. 1 of Ingredient

- 100 g of cherry tomatoes
- 4 of wholemeal bread
- 3 large eggs
- 80 g of baby spinach

Method: Preheat the grill to high. Lay the tomato slices in a large baking tray, prick each tomato with the tip of a sharp knife and grill for 4 minutes, then add the bread to the tray to toast on both sides. Meanwhile, crack 1 egg into a blender, add the ham, spinach, a good pinch of black pepper and the milk and blitz until smooth. Take the tray from under the grill and divide the green egggy mixture between the four pieces of toast, spreading it right out to the edges.

Recipe Images

Image 1: Choose file No file chosen

Image 2: Choose file No file chosen

Current image:

**Feature:** Delete recipes from the 'my posted' and 'booked' recipe lists.

**As a:** body conscious person

**So that:** I can remove some of the recipes I no longer use

**I want to:** choose selected recipes to remove from the 'My Posted Recipes' page.

**GIVEN** that I am logged in and on the 'My Posted Recipes' page

**WHEN** I click on a cross symbol next to a recipe

**THEN** an alert box appears for the chosen recipe

**WHEN** I click on the 'remove' button

**THEN** the associated recipe will be removed from the page

**My Recipes**

**Popeye toast with eggs**

Energy (kCal)	Carbs (g)	Protein (g)	Fats (g)	Sodium (g)
600	40	16	12	2

**Muscles and chives paella**

Energy (kCal)	Carbs (g)	Protein (g)	Fats (g)	Sodium (g)
676	73	43	22	1

**Remove Recipe**

Delete 'Popeye toast with eggs' from my recipes?

Cancel Remove

**Feature:** Add a meal plan to keep track of meals and nutrition for the week.

**As a:** body conscious person

**So that:** I can see the recipes that I will make over the week

**I want to:** Create a meal plan

**GIVEN** that I am logged in and on the 'My Meal Plans' page

**WHEN** I click on the 'Add Meal Plan' button

**THEN** I am redirected to the 'Add Meal Plan' page

**WHEN** I fill in all the details of the meal plan by adding recipes and the meal plan name

**AND** I click on the 'save' button

**THEN** I am redirected to the updated 'My Meal Plans' page

**New Meal Plan**

Title:

	MON	TUE	WED	THU	FRI	SAT	SUN
BREAKFAST							
LUNCH							
DINNER							

	Energy (kCal)	Carbs (g)	Protein (g)	Fats (g)	Sodium (g)
Goal	18000	1000	100	1000	100
Current	0	0	0	0	0

	Energy	Carbs	Protein	Fats	Sodium
MON	0 kCal	0 g	0 g	0 g	0 g
TUE	0 kCal	0 g	0 g	0 g	0 g
WED	0 kCal	0 g	0 g	0 g	0 g
THU	0 kCal	0 g	0 g	0 g	0 g
FRI	0 kCal	0 g	0 g	0 g	0 g
SAT	0 kCal	0 g	0 g	0 g	0 g
SUN	0 kCal	0 g	0 g	0 g	0 g

**MACROS**

Energy: 0 kCal Carbs: 0 g Protein: 0 g Fats: 0 g Sodium: 0 g

**Recipes**

Cancel Create

**Feature:** Edit pre-existing meal plan that user has made.

**As a:** body conscious person

**So that:** I can improve an existing meal plan to suit my current needs

**I want to:** edit an existing meal plan.

**GIVEN** that I am logged in and on the 'My Meal Plans' page

**WHEN** I click on the 'Edit Meal Plan' button

**THEN** I am redirected to the 'Edit Meal Plan' page, displaying the current version of the meal plan

**WHEN** I edit the meal details of the given meal plan

**AND** I click on the 'save' button

**THEN** I am redirected to the updated 'My Meal Plans' page



**Feature:** Save a selected recipe to an 'bookmarked recipes' list.

**As a:** body conscious person

**So that:** I can view my favorited recipes later

**I want to:** be able to save recipes to a "Bookmarked recipes" page.

**GIVEN** that I am on a recipe detail page

**WHEN** I click the 'Bookmark' button

**THEN** I am directed to the "Bookmarked Recipes" page, and my favorite recipe should be saved to the "Bookmark recipes" page.



**Feature:** Review recipes to share users' experiences.

**As a:** recipe experimentalist

**So that:** I review a recipe

**I want to:** be able to give comment and rating to a selected recipe.



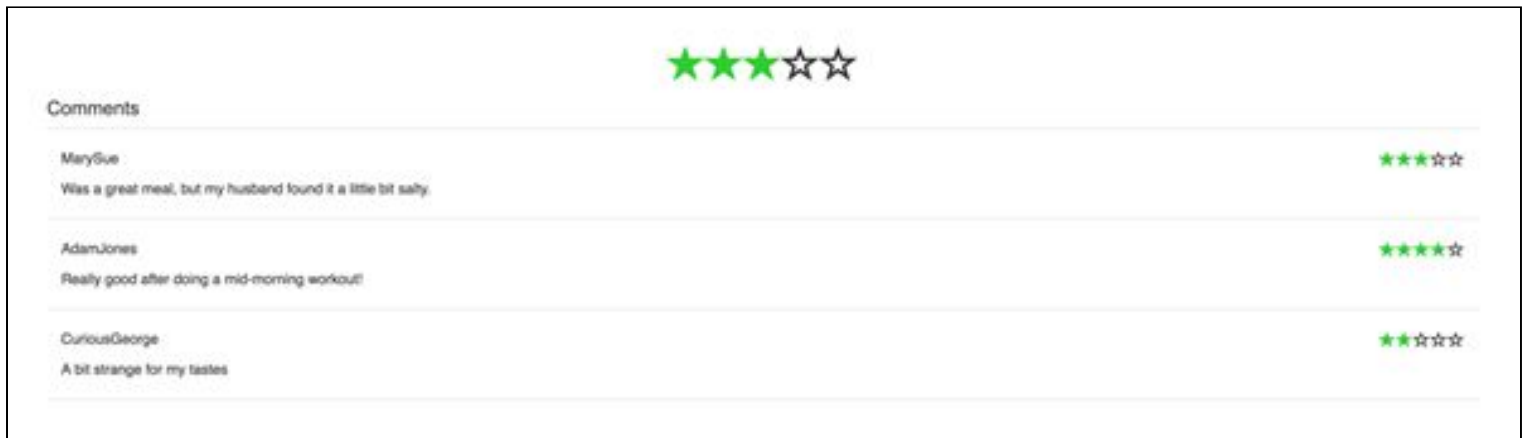
**GIVEN** that I am on the recipe's page

**THEN** comment input box and comments from other users shows below the recipe detail on that page

**WHEN** I fill out the comment form and rating

**AND** press submit button

**THEN** my review should appear on the top of other comments on that recipe page.



## View Recipe

**Feature:** View recipes and its nutritional information

**As a:** body conscious person

**So that:** I can view health-orientated recipes (my own or others)

**I want to:** view a recipe by clicking over a meal in my 'dashboard or search page'

**GIVEN** that I am logged in and I am on the 'My Dashboard' page or 'search for a recipe'

**WHEN** I click a recipe photo

**THEN** I am redirected to the details page, containing the appropriate recipe information.

**As a:** body conscious person

**So that:** I can view my created meal planners

**I want to:** view a planner by clicking over a meal planner in 'my meal plans' page

**Fresh Fridge**

Popeye toast with eggs by Loreen


Energy (kCal)	Carbs (g)	Protein (g)	Fats (g)	Sodium (g)
620	40	16	12	2

**Ingredients**

- ☐ 160 g of cherry tomatoes
- ☐ 4 of wholemeal bread
- ☐ 3 large eggs
- ☐ 80 g of baby spinach

**Method**

1. Preheat the grill to high.
2. Lay the tomato vines in a large baking tray, prick each tomato with the tip of a sharp knife and grill for 4 minutes, then add the bread to the tray to toast on both sides.
3. Meanwhile, crack 1 egg into a blender, add the ham, spinach, a good pinch of black pepper and the milk and blitz until smooth.
4. Take the tray from under the grill and divide the green egg mixture between the four pieces of toast, spreading it right out to the edges.
5. Dry fry the remaining 2 eggs in a non-stick frying pan on a medium heat, covering the pan with a lid to steam and coddle the eggs on the top – cook to your liking.



★★★★☆

**Comments**

MarySue ★★★★☆  
Was a great meal, but my husband found it a little bit salty.

AdamJones ★★★★☆  
Really good after doing a mid-morning workout!

**GIVEN** that I am logged in and I am on the 'my meal plans page'

**WHEN** I click a meal plan

**THEN** I am redirected to the details page, containing the appropriate plan information.

**AND** when I click on a recipe

**THEN** the appropriate instructions for cooking the recipe are displayed

**Fresh Fridge**

Bodybuilding plan (PART A)

	MON	TUE	WED	THU	FRI	SAT	SUN
BREKIE							
LUNCH							
DINNER							

**MACROS**

	MON	TUE	WED	THU	FRI	SAT	SUN
Energy	0 kCal	1296 kCal	790 kCal	790 kCal	896 kCal	0 kCal	620 kCal
Carbs	0 g	113 g	63 g	63 g	99 g	0 g	40 g
Protein	0 g	59 g	12 g	12 g	48 g	0 g	16 g
Fats	0 g	34 g	15 g	15 g	33 g	0 g	12 g
Sodium	0 g	3 g	1 g	1 g	2 g	0 g	2 g

**View Recipe**  
muscles and chives pasta

Sum (kCal)	Carbs (g)	Prot (g)	Fats (g)	Sodm (g)
676	73	43	22	1

**Ingredients**

- ☐ 1000 g of muscles
- ☐ 2 g of chives
- ☐ 500 g of chicken
- ☐ 1 tbsp of olive oil

**Method**

1. Heat a large heavy-based frying pan over medium-high heat. Add sausage. Cook for 4 minutes, turning, or until browned. Remove to a plate. Cut into 1cm-thick slices.
2. Reduce heat to medium. Add oil and chicken to frying pan. Cook for 2 to 3 minutes each side or until golden. Add onion, garlic and capsicum. Cook, stirring, for 2 to 3 minutes or until soft.
3. Add turmeric, cumin, rice,

# Final Software Architecture

## External data sources

We will be accessing the United States Department of Agriculture (USDA) Food Composition Databases. This database allows us to extract nutritional information for foods including energy intake (kCal), protein (g), fat (g), carbohydrates (g), and much more. We require such data sources for our user to be able to calculate the nutritional breakdown of their recipe.

## Software components

The architecture that we have chosen to use is 3-tier software architecture, involving four main components during development:

- **The user interface:** The front-end of our application. Displays the app on a web browser for the user to interact with the system.
- **Business logic:** A part of the backend application server. This component will be used to implement the business models and rules to decompose and manipulate low level data. This layer also helps the construction of complex components out of simpler ones.
- **Data Storage:** Another layer running between business logic and database layers, in the backend part of the system. This component will be used to validate the incoming data and insert or update the data into the database in a secure way, as well as customise the response from the database to secure the data relating to the application.
- **Database:** Where all the data and the constraints are stored persistently. This layer is mainly for keeping the stored data accurate, consistent and secure during request, insert, update and delete functions.

The web-development stack that we have chosen for the above architecture is as follows:

**User interface:** *HTML, Bootstrap, ReactJS*

**Business logic:** *Node-js/Express + axios*

**Data Storage:** *node-postgres*

**Database:** *PostgreSQL*

## Summary of Key Benefits

Due to our software architectural decisions, we have a multi-tier system and each tier has its own responsibility, so that each component reduces the dependency on others. This benefits in managing and maintaining the code base. Also this design has abstracted the actual implementation within the API, which achieves low coupling, and high cohesion. It provides the flexibility in switch to different implementation for better performances and efficiency without much hassle.

We have chosen to develop the front-end of our application with ReactJS. React is a library which allows us to split up our pages into components, which are rendered and managed by Redux – a state management tool. The pair go hand in hand to allow us to create a seamless interaction between the user and the application. Another huge benefit which made us choose React was the instant update in changes made to the files. This allowed us to develop at a faster pace, as the server did not have to be restarted for every change made. To make requests for data from our

server, we have used *axios* – a package which allows for extremely simple HTTP requests in Javascript.

Node.js is a lightweight application runtime environment. Due to node package manager (npm), it is extremely simple to setup, the biggest benefit for its use is that the language used is JavaScript. This makes Node.js easier to develop in, as the syntax can be learnt when developing for Javascript in the front-end and vice versa.

We have chosen *node-postgres* as this allows for a smooth interaction between our business logic component and database. It offers easy syntax (JavaScript) to make queries to our database.

Of all the different choices of database interfaces, we decided to a relational database. PostgreSQL was decided to be used in our prototype, as it is an enterprise-level, object-relational DBMS that uses procedural languages like Perl and Python, in addition to SQL-level code. It is powerful and scalable, allowing us to run functions on our database when required in our system (possible for filtering etc). Benefits include ease of learning and use, as well as some of us having prior experience with it.

The stack above allows us to create an application which is sleek in the user's perspective, and with an efficient data processing structure. Most of the application will be designed in one language (JavaScript), allowing for reusable code in different layers, and ease of maintenance for the developers. Some of the software choices we have made allow for ease of implementation for features (e.g. the search feature, made easy due to using postgresSQL).

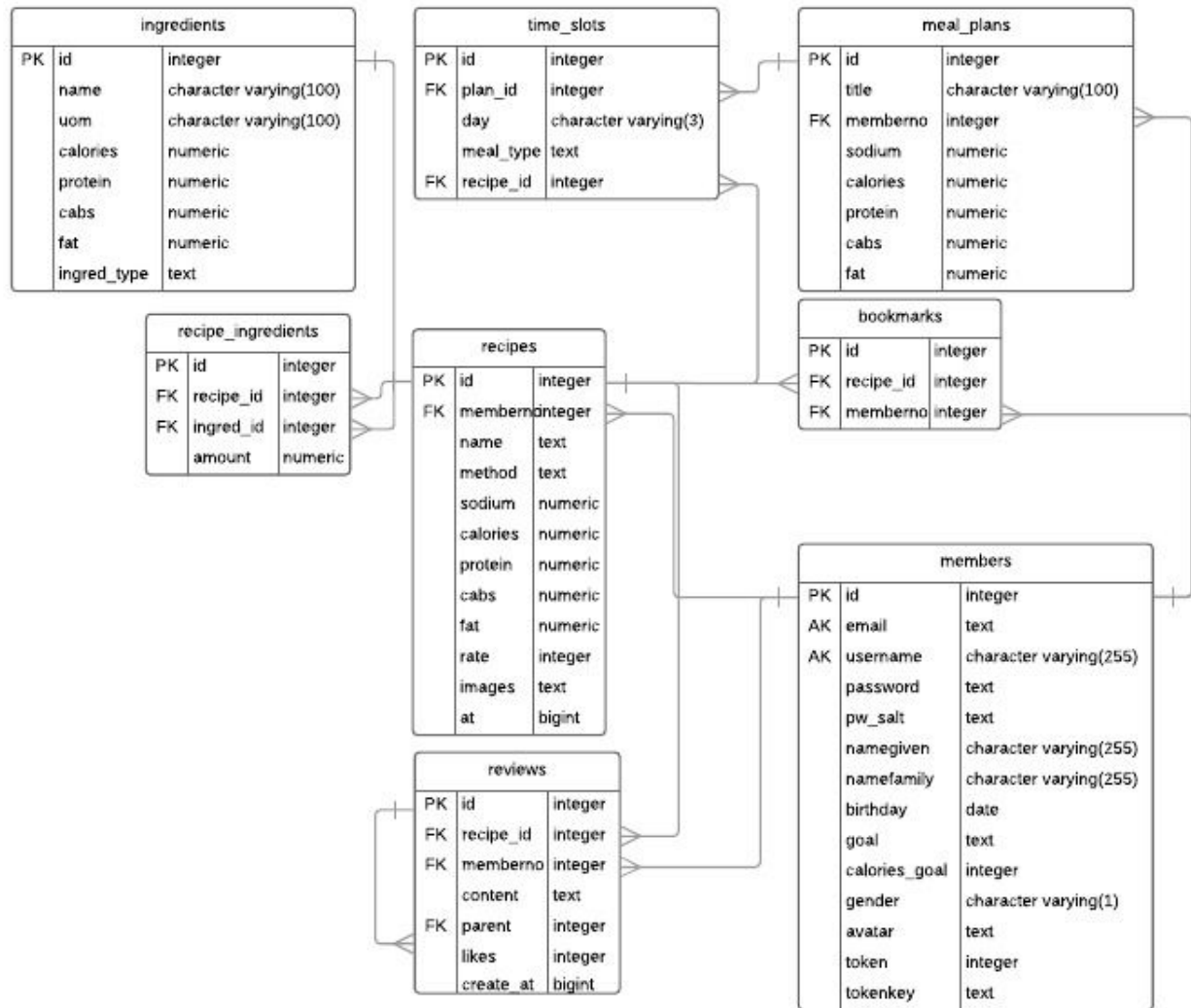
### **Other Technology and Framework**

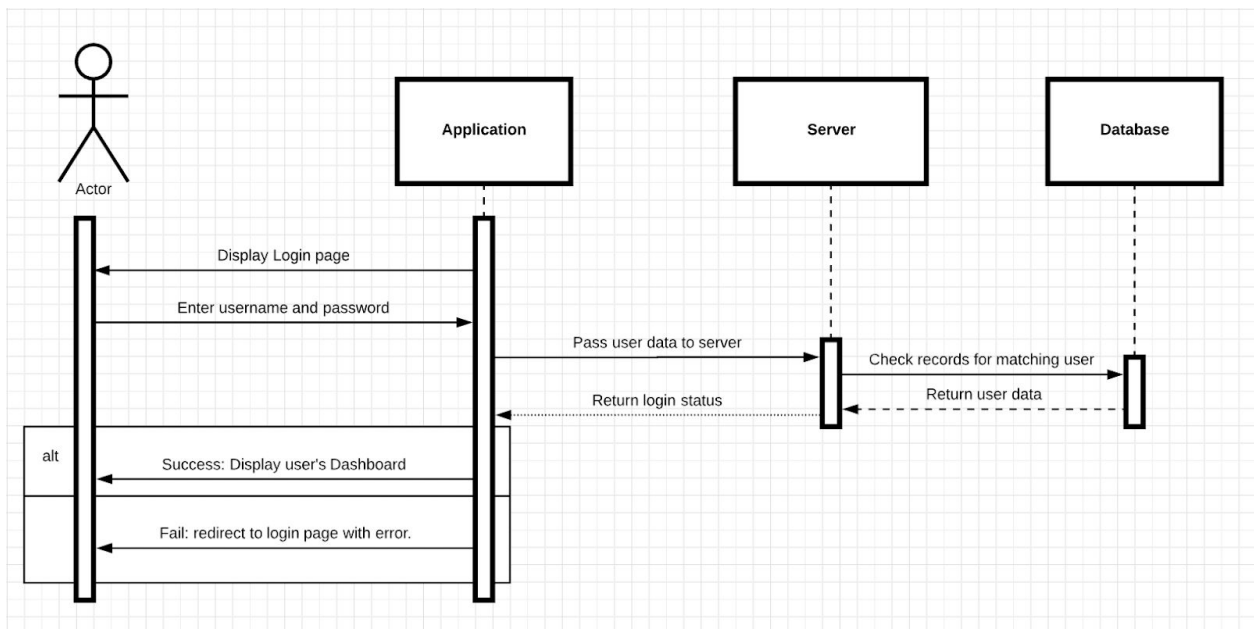
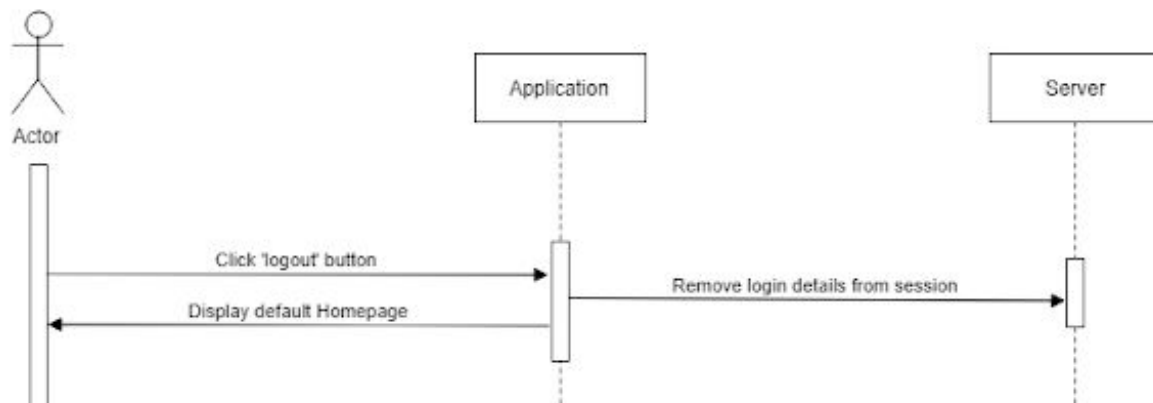
We have included a variety of other different packages to help implement our system. One of the more important packages is *Nodemon*: a package used to automatically restart your node application if any files changes during development of a node.js based application. This is extremely helpful for us when developing, as it prevented constant switching back and forth to restart the server every time a change was made. Another important package used is *node unit*. This provides asynchronous testing on the back-end part of our system.

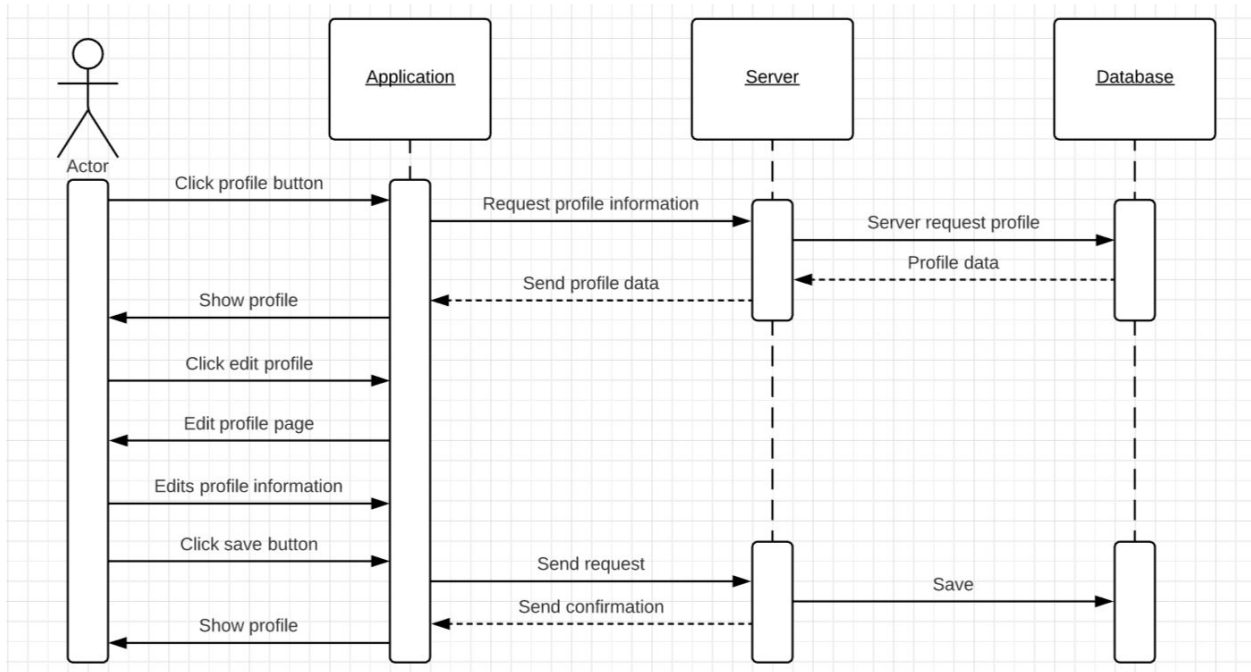
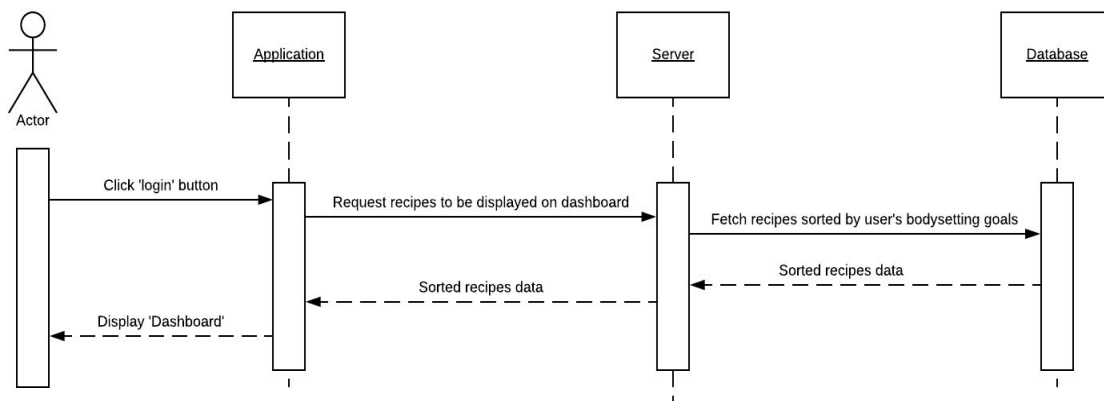
The minimum requirements for server hosting machine are as below:

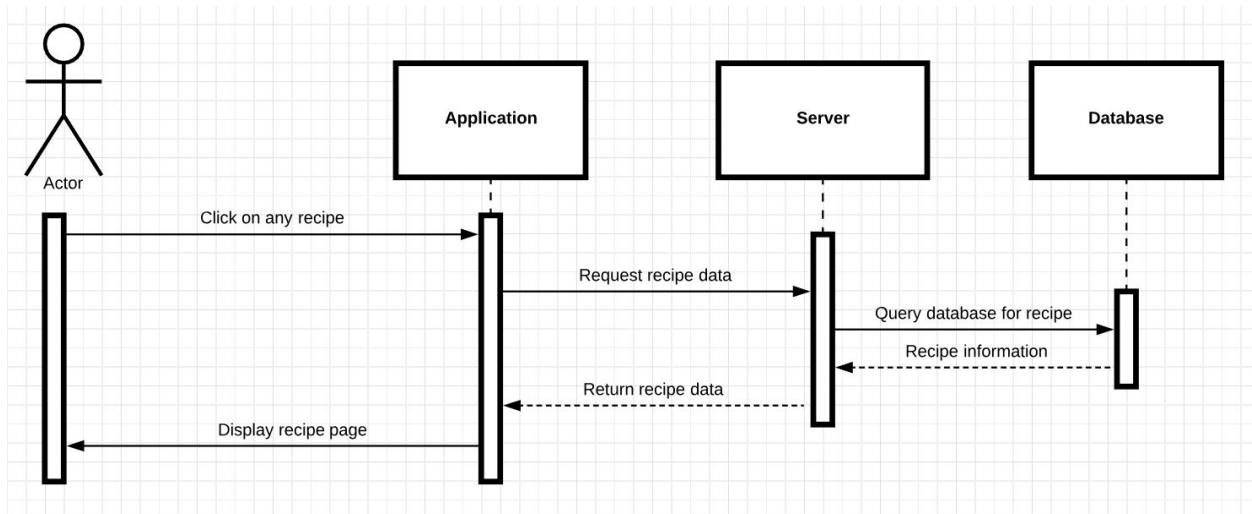
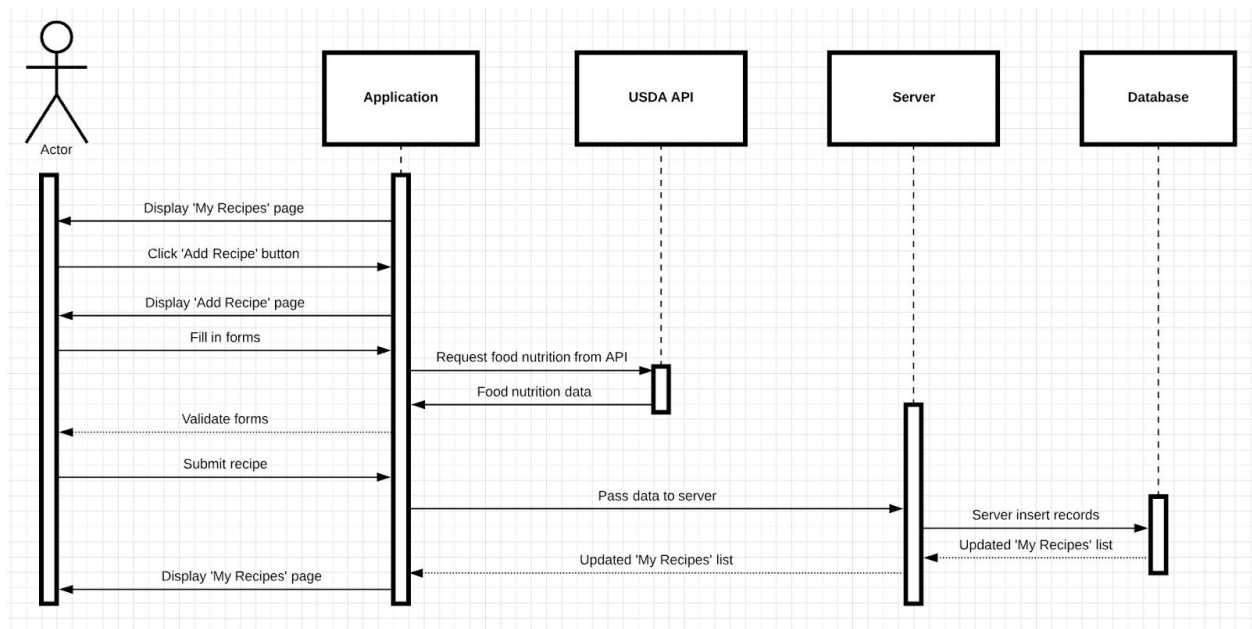
- 300 MHz x86 processor
- 256 MB of system memory (RAM)
- 1.5 GB of disk space
- Graphics card and monitor capable of 640x480

## Entity Relation Diagram

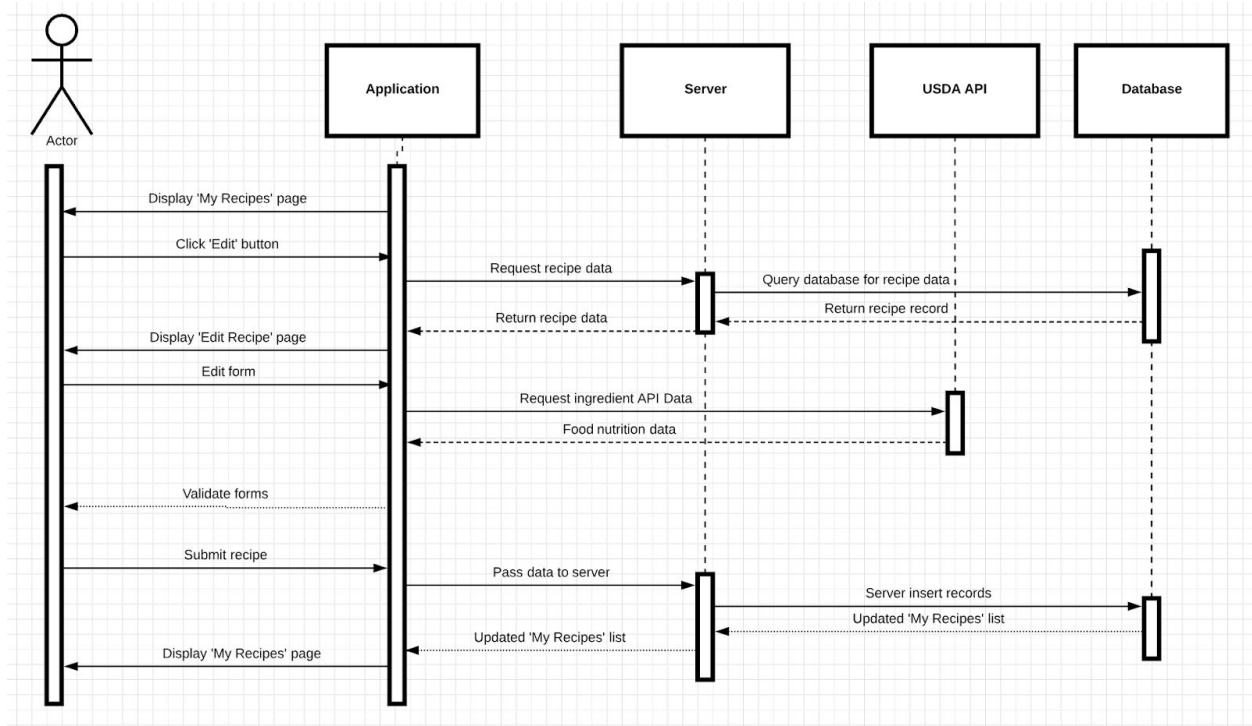
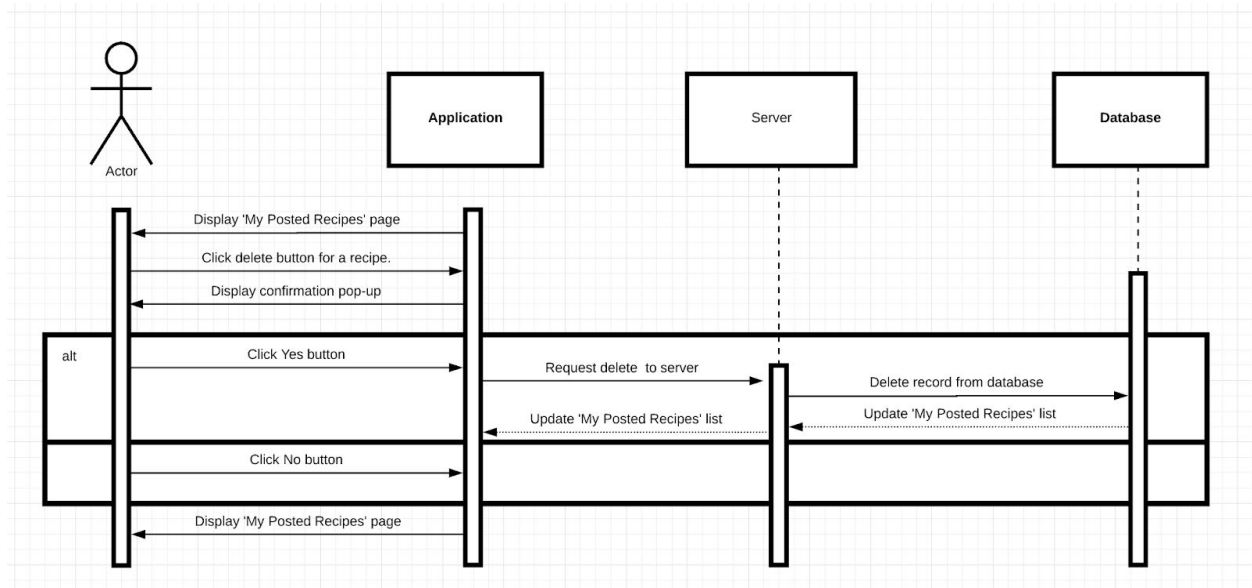


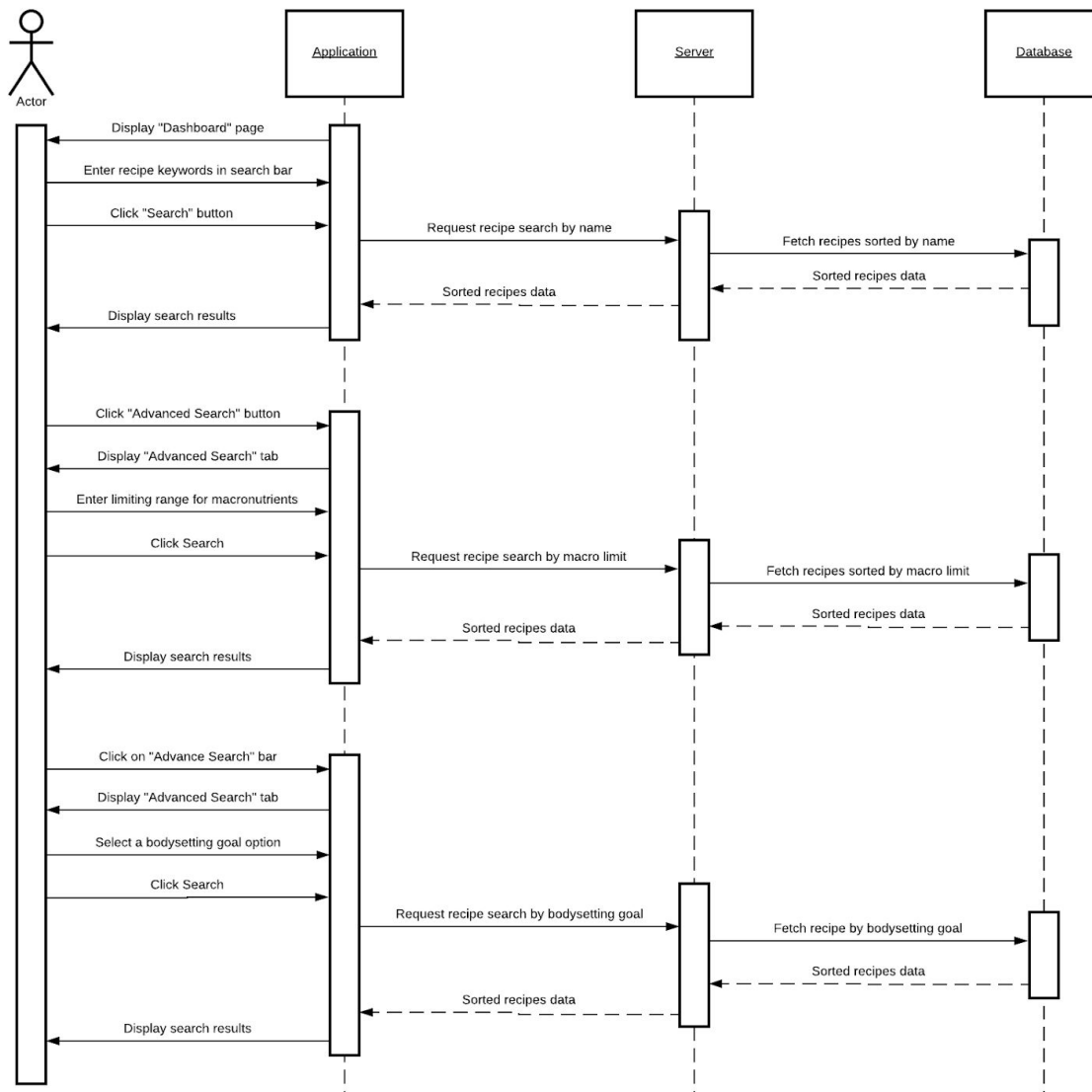
**Sequence Diagrams****Login****Logout**

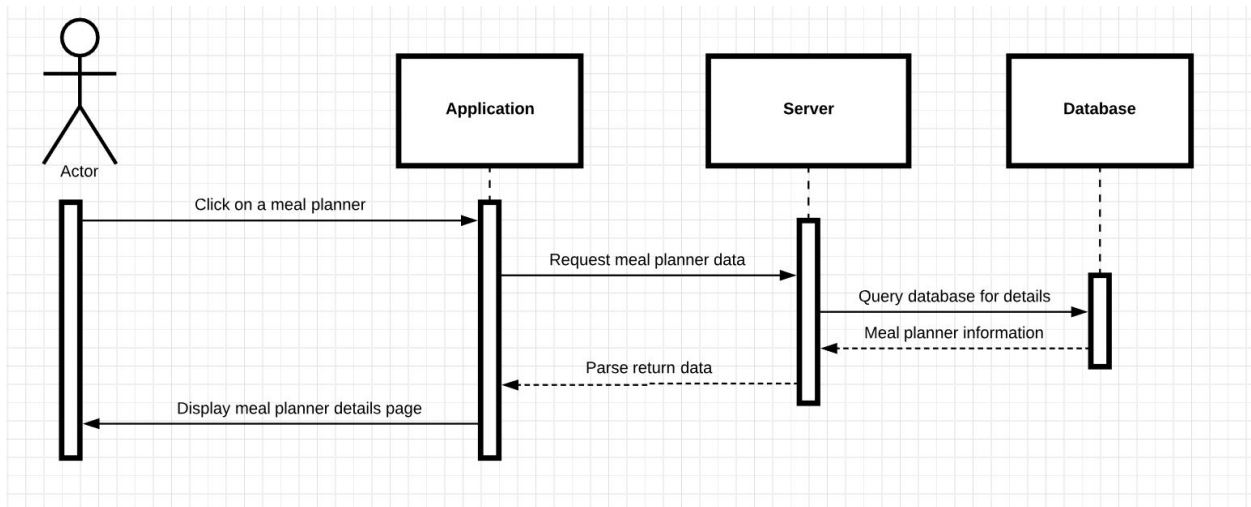
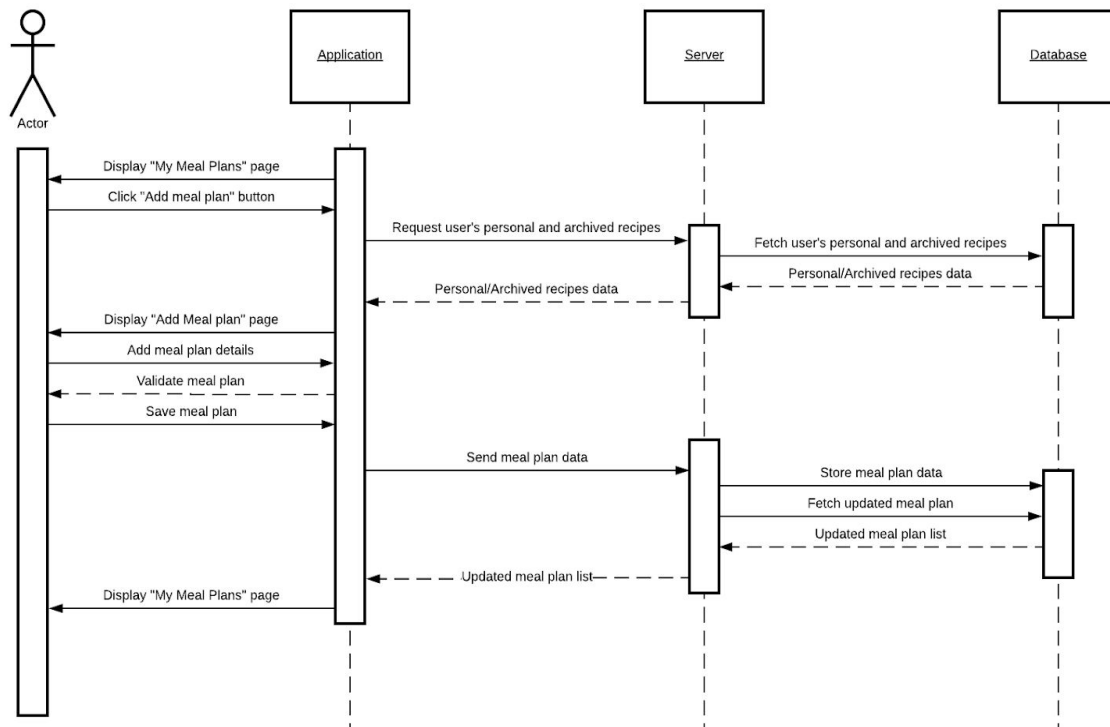
**Edit Profile****Dashboard**

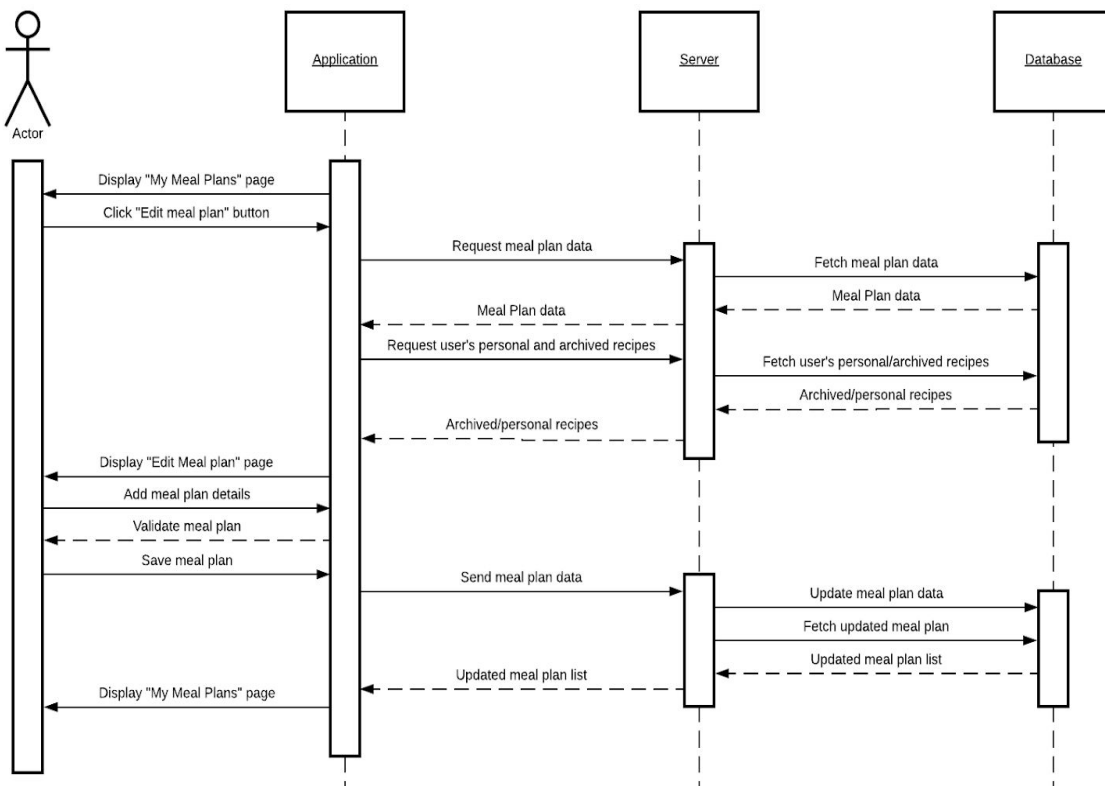
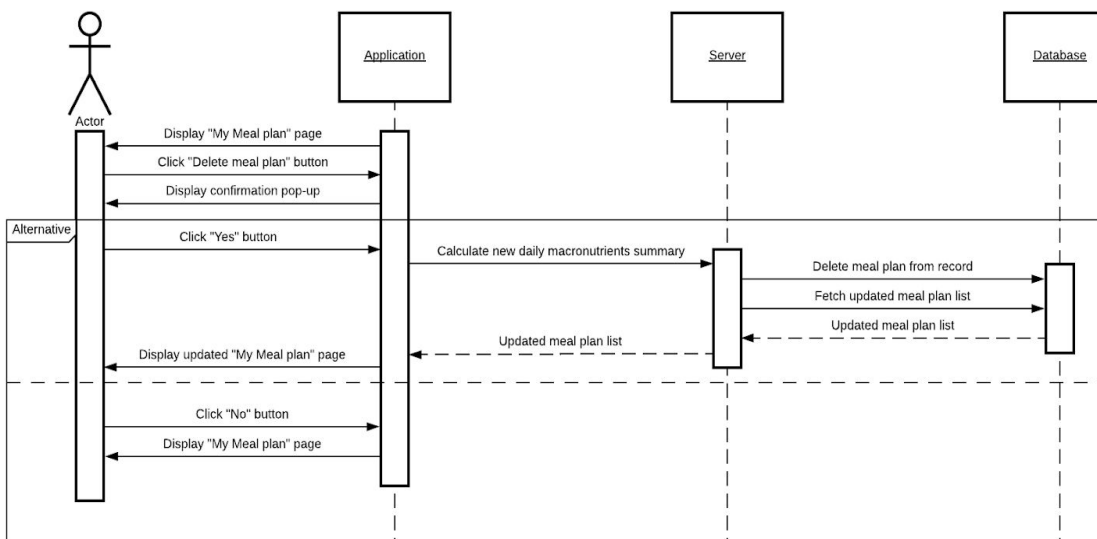
**View Recipe****Add Recipe**



**Edit Recipe****Delete Recipe**

**Search Recipe**

**View Meal Plan****Add Meal Plan**

**Edit Meal Plan****Delete Meal Plan**

**Review/Bookmark Recipe**