



CS-E4400

Meal Planner

Final Document

Focus area - User Interface

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1. GENERAL DESCRIPTION

The idea of this project stems from our own concern and need for meal planning application. As students, we understand the difficulty in maintaining a healthy and budget-friendly diet with a busy work/study schedule. Common problems that students face include not having time to prepare and plan their meals or not balancing between necessary nutrient intakes and their tight budget. These are issues that our service aims to address.

We developed a web-based service to help students plan their meals, share recipes, and track their budgets and nutritional information. The main functionality of the service is to provide an easy and accessible platform for students to create and share recipes, to plan their meals with such recipes, and to view the budgets and nutrient intakes based on the plan. By combining all these features in our service with a simplistic design, we could achieve the goal of allowing students to thoroughly manage their meals with minimal time and effort required.

1.1. MAIN FUNCTIONALITY OF THE SERVICE

The main functionalities of the service include share and use recipes to plan meals, manage their budgets, and track their nutrient intakes.

1. Share and use recipes:

- Find recipes shared from other students with search and filter tools
- Publish (share) recipes of your own with your list of ingredients, instructions, and estimated cost, along with some additional information such as cover image, estimated cooking time, ...
- Use your own and others' recipes to construct daily meal plans

2. Manage budgets:

- Set an estimated cost for your own recipes
- Select one date to view total cost of recipes used to construct meal plan of that date in Home page
- Update estimated cost of your own recipes when price changes

3. Track nutrient intakes:

- Add ingredients (with amount) and view total protein, calories, and total fat intakes retrieved from an open API source
- Select one date to view total nutrient intakes of recipes used to construct meal plan of that date in Home page

1.2. EXISTING COMPETITORS / PREDECESSOR

1.2.1. *EAT THIS MUCH*

One of the competitors of our Meal Planner is a relatively similar application to create personalized diet plan with the name of 'eat**thi**smuch'. It is a meal planner that suggests recipes based on your body type and diet preferences; builds daily / weekly plan with selected recipes; and tracks your nutrient intakes.

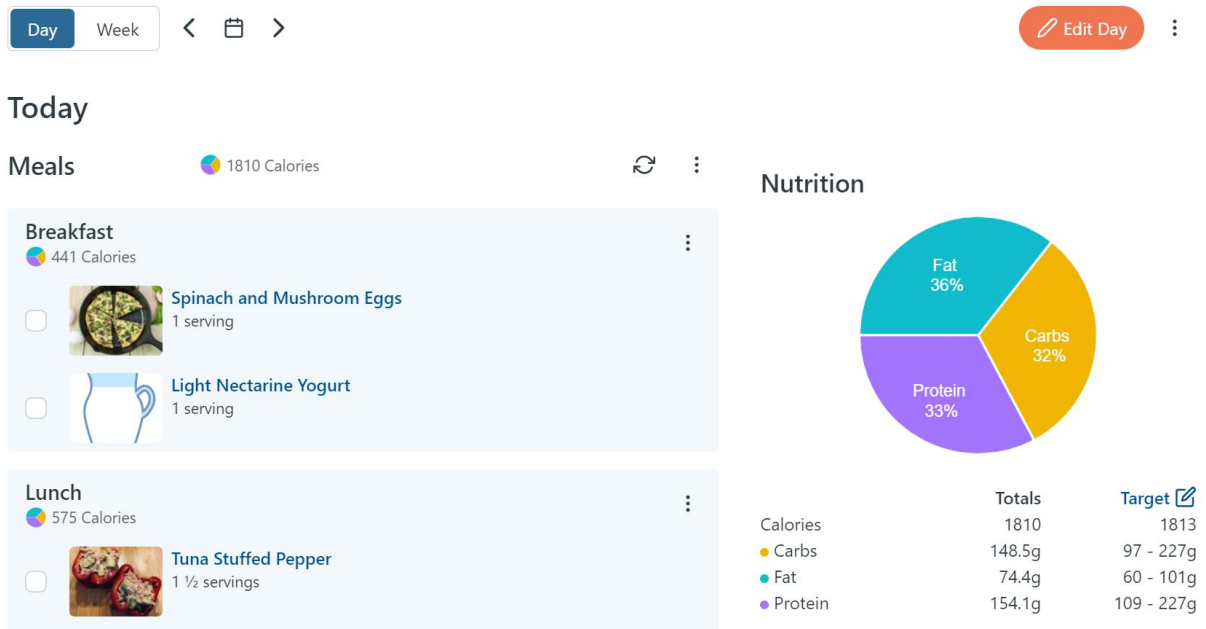


Figure 1. eat**thi**smuch website

eatthismuch features:

- A place with saved foods and plans according to your diet values
- A place to track your nutritional targets and goals where you input your specific weight target for instance
- You can link your apple health app with the tracker so that it can automatically synchronize with the information there
- You can save and add the recipes to your calendar

1.2.2. *BBC FOOD*

Another competitor of our Meal Planner is BBC FOOD, which rivals our application regarding the recipe exploring feature. The BBC FOOD publishes recipes from reliable sources and introduces recipes to users via collections and stories in a blog-like manner. Each recipes include its list of ingredients, instructions, and a rating aggregated from users' review.

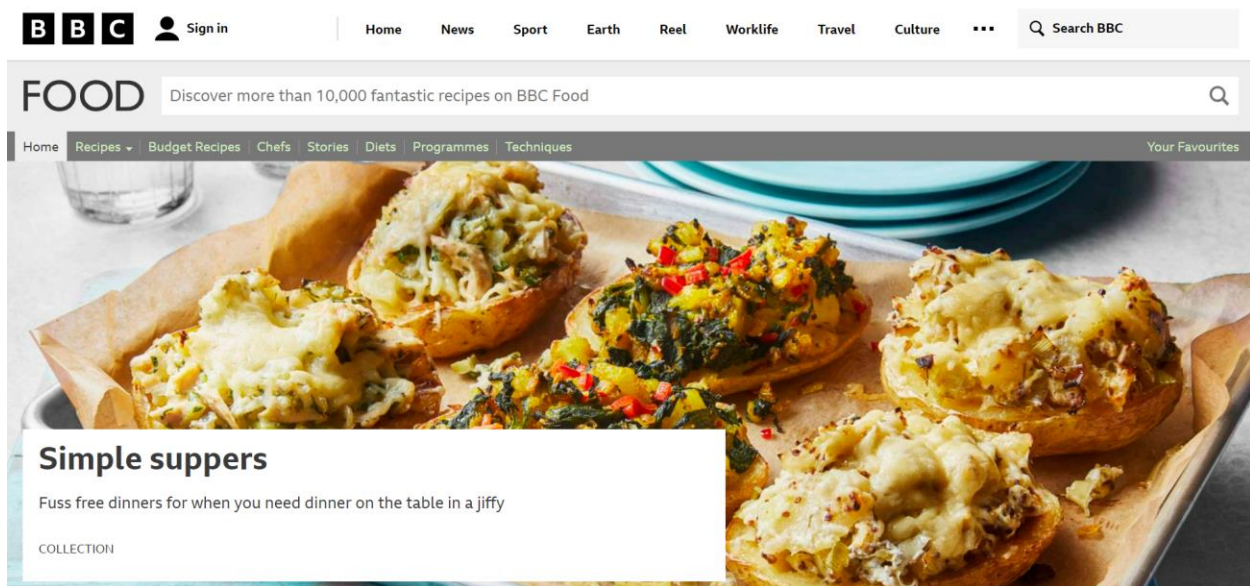


Figure 2. BBC FOOD website

BBC FOOD features:

- You can find collections of recipes by several categories such as recipes in season, recipes for special occasions, recipes of unique regional cuisine, ...
- You can explore stories about diet, interesting cuisine facts, questionnaires about food, ..., and access recipes relating to such stories
- You can save recipes by “Add to Favorites” and rate the recipe

1.3. COMPARISON WITH MEAL PLANNER

eatthismuch is mainly targeted to those that are health conscious or have diets that need to be catered to as they give specific plans that adhere with **users'** health goals. Meanwhile, Meal Planner is more relaxed in the sense that **users** do not have to have specific goals in mind, it is just a platform to make it easy for students to find recipes that fit their budget yet also provide with a nutritional tracker.

In addition, there are no budgeting options in **eatthismuch** which is one of the main features of Meal Planner, users will have to track the costs of the meals by themselves which can be more time-consuming than our service.

On the other hand, BBC FOOD focuses on recipes discovery. The website allows an extensive experience for users to explore recipes in different categories such as famous chefs' recipes, or recipes for special diet; and to read interesting food blogs, making the service suitable for gourmets and food enthusiasts. Contrarily, Meal Planner targets much more casual users, aiming to minimize time and effort required for users to manage their meal. Thus, the recipe sharing feature of MealPlanner is simpler and easier to navigate compared to BBC FOOD.

Another advantage of MealPlanner compared to both competitors is that our service supports user-created recipes. This feature gives more flexibility for users as it allows them to customize their list of recipes, further contributing to a more relaxed and personal touch to the user experience.

In this section, we modified the description of our features, as we simplified them from the original idea described in the Design document. In particular, the summary of budgets and nutrient intakes in our current service is only for a selected date, rather than for a selected week or date. This major change is discussed further in the Reflection section. On the other hand, we also investigated another competitor / predecessor of our service (BBC FOOD) which rivals MealPlanner on different feature (recipe exploration). By comparing our service with these competitors, we gain a solid understanding of our selling points, while identifying some weaknesses and potential improvements.

2. USER GROUPS AND USE CASES

This section describes our main user groups, their personas, and use cases.

2.1. USER GROUPS

The main user group of our service are students who are prone to time management and finance problems. We provide features to support meal planning, including summary of budget and nutrient details, and recipe sharing and saving in user community. Our service focuses on an intuitive design with straightforward functionalities to help users utilize it in the most efficient way possible.

Even though our service is mainly for students, other user groups can also use our service. Our expectation for a more generalized user group are people with little time to spend on meal planning or preparation, but still have a need for reasonable diet and budgeting. One example of such users is busy working mothers who can benefit from planning meals and being aware daily nutrient intakes.

2.2. PERSONAS

We have constructed some personas representing our main user groups as follows:

2.2.1. SARA – STUDENT WITH TIGHT SCHEDULE

- Name: Sara
- Age: 25
- Occupation: University student
- Degree: Master degree in Medicine, currently in her 2nd year
- Key characteristics: busy, tired, health-conscious
- Goal: Sara is a student with tight schedule who wants to have healthy diet without having to spend too much time and effort planning



Figure 3. Sara persona

Sara has a busy schedule packed with a lot of course work and assignment and does not have time to even think about what to do about her meals. She cannot help but resolve to unhealthy junk food and takeouts, which puts a toll on her health and finance.

One day as she heads home from lectures, she comes across MealPlanner application. She notices the bright orange theme and the app title of 'Meal planner', which seems like a solution to her current problem. Curious, she signs up and starts using the web service.

First thing she sees is the 'Home Page' which shows an empty schedule. She tries adding new meal to the current date, but there are no recipes to choose from. She then navigates to the 'My Recipes Page' at the bottom navigation bar, and notices an '+' button for adding recipes which redirects her to an empty recipe template. She then adds simple recipes, like Tomato Soup and Omellete. When she returns to the My Recipes Page, the added recipes are already in the 'Drafted Recipes' section, each displayed with its name, cover image, and cooking time and difficulty. She likes the presented information, thinking that this can be very useful when she wants to choose which recipe to prepare for the day.

Sara returns to the Home page and tries adding meals again. This time, she successfully adds meals to the plan with some of the recipes she drafted. She immediately notices the daily overview section changes according to her inputs. She is quite content with the overview, as it provides insights to how much she is spending and her nutrient intakes, which are some of the main concerns regarding her latest meals.

Later, Sara also tests the 'Explore Page' where she discovers recipes published by other users, and saves the ones she is most interested in. This further saves her some time filling her own recipes.

2.2.2. CARL – STUDENT WITH TIGHT BUDGET

- Name: Carl
- Age: 19
- Occupation: University student
- Degree: Bachelor degree in Engineering, currently in his 1st year
- Key characteristics: young, inexperienced with planning and cooking, on tight budget
- Goal: Carl is a first-year student who is adjusting to living alone, and struggles with planning his meals and budget. He wants to address these issues



Figure 4. Carl persona

Carl is a university student living on his own for the first time. He is inexperienced with cooking and planning his meal. After a week of eating out, his budget is running low and he is having difficulty deciding how to proceed.

He learns about Meal Planner from a friend, and they explore the page together. After logging in, he first tests the 'Explore Page'. As he clicks on the search and filter tool, he chooses several criteria, such as low difficulty level or low cost. With the filters, Carl easily finds recipes most suitable for him. Each recipe includes a list of ingredients and clear step-by-step instructions, which is very beneficial to Carl.

Carl returns to the 'Home Page' to add new meals. He is thrilled to learn that the total cost is summarized for daily plans, which significantly helps him to practice budgeting. With the service, Carl is both learning to cook with new recipes, and managing his budget effectively.

2.2.3. EMMA – WORKING MOM

- Name: Emma
- Age: 34
- Occupation: Nail technician
- Key characteristics: busy, likes cooking, caring for her family, unfamiliar with technology
- Goal: Emma is a working mother with 2 children. She likes cooking and cares about her family meals, but does not have much time.



Figure 5. Emma persona

Emma is working full-time as a newspaper editor. Outside of her job, she takes care of her family of four. She has been happily married for six years with two children, and her youngest son is only two years old. Although her husband is helping with their children, Emma and he are still struggling to keep up with household chores between their busy schedule. She likes cooking for her kids, but it is becoming increasingly tiring to come up with meals that construct a healthy diet for her family.

During a lunch break, she discovers MealPlanner while surfing the web. She clicks on the website link, thinking that it is related to her current problem. She tries adding new recipes, and uses them to build a meal plan for the day. She is amazed by how simple it is to create meal plans, and even getting a nutritional information summary. She decides to use the application immediately to prepare her family meals. The most convenient thing for her is that she can create, reuse, and cycle the recipes to make both a healthy and interesting diet for her husband and children.

When she goes to the Explore Page, she learns about the functionality for users to publish their own recipes. She finds this feature very exciting, as she is now having a community of home cooks who share her knack for cooking. In her free time, she tries out new recipes she discovered on the website, and starts to publish her own recipes.

2.3. MOST IMPORTANT SCENARIOS AND USE CASES

The most important scenarios and use cases are presented by the personas in the previous subheading.

Scenarios		Use cases
Sara	Sara wants to plan her meals efficiently without wasting too much time and effort	MealPlanner is easy to use and provide planning for created recipes. It displays information about cooking time and difficulty level of each recipe, helping her to choose the most suitable recipe. She can also choose from other users' recipes, saving her time to create her own.

	Sara is conscious about her health and wants to have a healthy eating habit.	MealPlanner retrieves nutritional information from the ingredients of a recipe, and provides a summary of daily nutrient intakes. All these features are automatic as the recipe is created.
Carl	Carl is inexperienced but wants to control his budget for meals.	MealPlanner offers the functionality to define a cost for each recipe, helping him to choose recipes that are suitable for his budget. Furthermore, it summarizes the daily total cost of planned meals based on the recipes.
	Carl is starting to cook and wants to improve his skills.	MealPlanner introduces him to other users' recipes, with also information about the difficulty level of each recipe. This allows to choose recipes of his level of difficulty.
Emma	Emma wants to create a healthy and interesting meal plan for her family.	MealPlanner provides a planning functionality which is simple and easy to use. The service also lets her customize the list of recipes, making it convenient for her to cycle the recipes for tasty meals without much repetition. Additionally, MealPlanner summarizes nutritional information of meals throughout the selected date, allowing her to track the family's nutrient intakes.
	Emma likes cooking but does not have much time to spend.	MealPlanner enables easy recipes sharing between its users, letting her view and explore new recipes. She can also share her own recipes and develop on her cooking habit.

Table 1. Scenarios and Use cases

In this section, we developed our personas further to identify their unique pain points and demonstrate how our service can benefit such users. More specific characteristics such as age, occupation, degree, ..., were taken into consideration to form more concrete personas that possessed a unique set of character traits, like how Carl's young age leading to his inexperience, or Emma's study making her busy but health conscious. These improvements not only made the scenarios more detailed but also pinpointed the crucial features and how the importance of such features might vary for different users. Additionally, we constructed the Emma persona alongside the student personas to represent another potential user group – working moms.

3. CONTENT

This section describes the site structure of our web service; the production, modifications, and deletion of our content; and copyright regulations.

3.1. SITE STRUCTURE

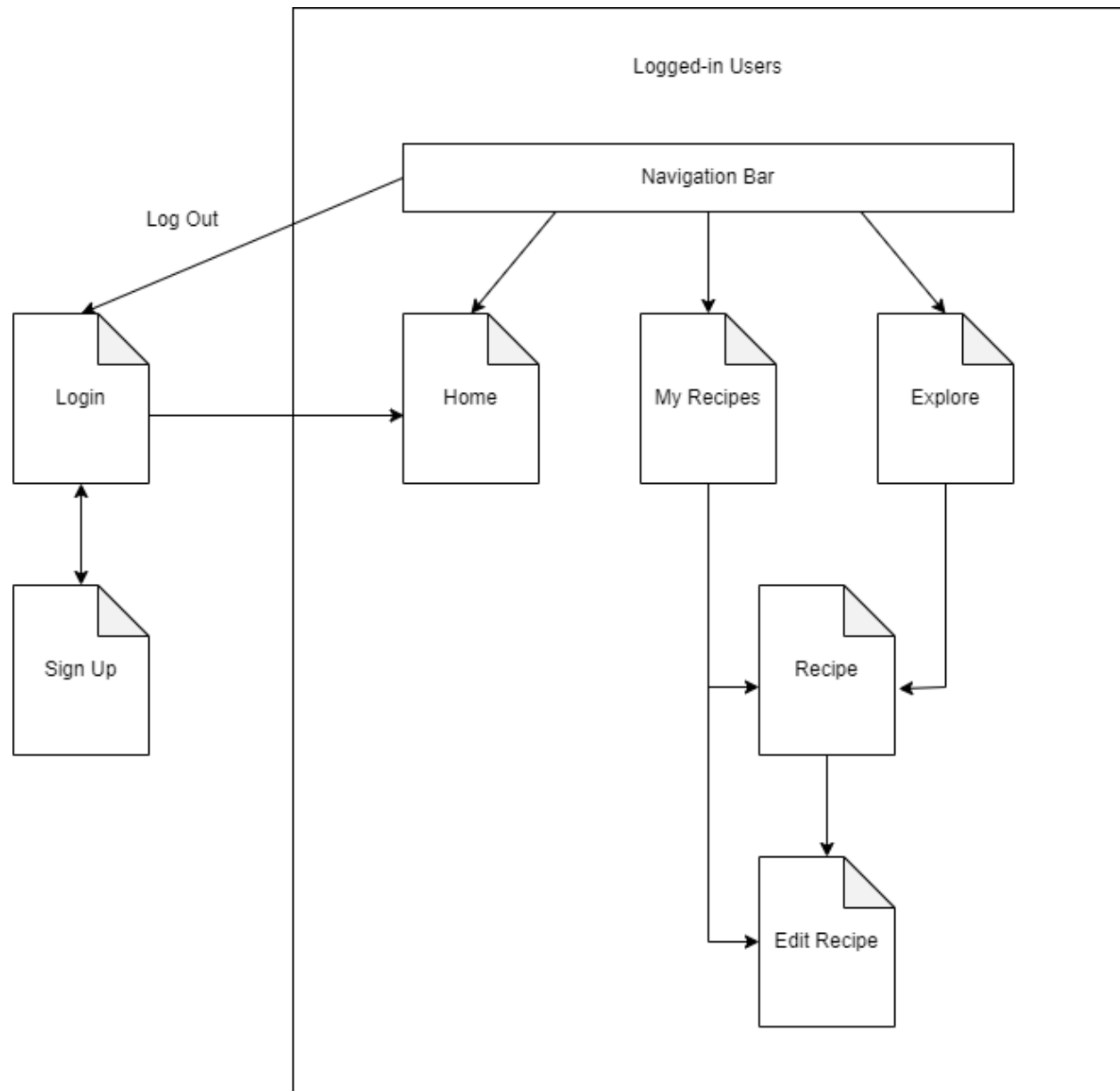


Figure 6. Site structure diagram

In total, the application has 7 pages for different functionalities. By default, the users are navigated to Login / Signup Page. Logged-in users are then redirected to the Home Page,

and can access the remaining pages. For logged-in users, a navigation bar is used throughout the user navigation through the main pages: Home Page, My Recipes Page, and Explore Page. The subpages (Recipe Page, Edit Recipe Page) are accessed via their parent pages.

3.2. PAGE TYPE AND DESCRIPTION

1. Login / Signup Page

- The page is available for guest or signed-out users, and can be accessed after signing out. Guest or sign-out users are automatically directed to the Login / Signup Page when accessing the application link.
- The page creates and checks the user's credentials for using the application.

2. Home Page

- The page is available for logged-in users, and can be accessed with the Navigation bar. Logged-in users are automatically directed to the Home Page after logging in or accessing the web application.
- The page displays a summary of nutritional values and budget of planned meals for one user-selected date. The page also displays specific meals planned for the date.
- The page has an Add button that prompts a pop-up window. The user can choose recipe and time slot to add new meals to the plan of selected date.

3. My Recipes Page

- The page is available for logged-in users, and can be accessed with the Navigation bar.
- The page displays the user's drafted and published recipes (available to other users), and saved recipes (recipes published by other users). Each list can be expanded or collapsed. Each recipe is represented by a card which displays its name, cover image, cooking time and difficulty, with a link redirecting the user to individual Recipe Page.
- The page has an Add recipe button which is a link redirecting the user to Edit Recipe Page

4. Recipe Page

- The page is available for logged-in users and can be accessed from recipe cards in My Recipes Page or in Explore Page.
- The page displays the information about a recipe, including title, cover image, ingredients, instructions, and other information.
- Depending on the type of recipe, the page has different types of action buttons. If the user is viewing other users' published recipes, the user can save or unsave such recipes. If the user is viewing his own published recipe, the user can unpublish it

(returning to My Recipes Page). If the user is viewing a drafted recipe, the user can edit it (redirecting to Edit Recipe Page) or publish it (returning to My Recipes Page).

5. Edit Recipe Page

- The page is available for logged-in users and can be accessed from the Add button from My Recipes Page or Edit button from Recipe Page for drafted recipes.
- The page input fields presenting the template of a recipe. The user can update recipe information including title, cover image, ingredients, instructions, ... The user can choose to save or cancel these changes.
- The page has a back button on the header returning to My Recipes Page, and both Save and Cancel buttons also return to My Recipes Page.

6. Explore Page

- The page is available to both logged-in and guest users and can be accessed with the navigation bar or from the landing page.
- The page presents a list of recipes sorted by publishing date. The page also allows users to search and filter the list of recipes. Each recipe is represented by a card with its title, cover image, and some basic information, as well as containing a link to the individual Recipe Page.

3.3. CONTENT PRODUCTION AND MAINTENANCE

As our application mainly concerns recipes sharing and meals planning, most of our content would be generated by the users. In particular, the users will produce content in the form of recipes (Explore Page, Recipe Page, **Edit Recipe Page**), and information to create their personalized meal schedule (Home Page & Planning Page). The users will also be eligible and responsible for updating such content.

Nevertheless, such a method of content production can result in a lack of content at application launching or during the early stages of production. Hence, our team has added recipes prior to launching the web application and at regular intervals after launching to ensure stable content volume for Explore Page & Recipe Page.

In addition to pre-launch content seeding and regular updates, our team would need to employ some quality control methods. We will be responsible for regular inspection of any inaccurate / inappropriate content in published recipes (e.g., copyrighted cover images). Additionally, we devised a **method** to recommend content of high quality: **recipes are sorted according to the number of users that saved them in the Explore Page**. This method of recommendation is relatively intuitive without requiring extra functionalities such as likes, ratings, or comments.

Apart from regular updates for the list of recipes, our team will also produce all the promotional materials used in the design of our web services, including designs, videos, and images. Our team is responsible for updating promotional content.

Another crucial piece of content used for our features is the nutritional values of each recipe, which would be provided by the Nutrition API of API Ninjas. This REST API allows

fetching nutritional information based on descriptions of the ingredients and their quantity. The API Ninjas holds the right to update and maintain information regarding its APIs without further notifications.

In summary, the content production and maintenance of our web application comprises:

1. User-generated content (Recipes and meal plans)
 - Content type: text, videos, images, ... for uploading recipes & plans
 - Production: users **creating and saving recipes**, and creating personalized plans
 - Update: users modifying or deleting their recipes and modifying meal plans
 - Control: development team checking for inappropriate content and recommending content of high quality **by users' activities**
2. Content seeding (Recipes)
 - Content type: text, videos, images, ... for uploading recipes
 - Production: development team uploading recipes before & after launching
 - Update: development team modifying, deleting inappropriate content, or adding new recipes at regular intervals after launching
3. Promotional content (promotional text, designs, videos & images)
 - Content type: text, videos, images, ...
 - Production: development team creating promotional content for service before & after launching
 - Update: development team modifying and updating new promotional content
4. Nutritional information
 - Content type: JSON
 - Production: nutrition content is fetched from Nutrient API of API Ninjas
 - Update: API Ninjas modifying or removing the content

3.4. COPYRIGHTS

Copyright regulations depend on the type of content and its creator. In particular:

1. User-generated content:
 - Ownership: users
 - Owner's rights: The users have ownership of the content they uploaded. The users have the right for attribution when their content is used. The users also have the right to modify and remove content they provided.
 - Platform rights: The platform can display and distribute content generated by user with proper attribution

2. Content seeding & Promotional content:

- Ownership: development team
- Owner's rights: The development team has the ownership of the content and can freely use, distribute, modify, and remove the content.
- Platform rights: The platform can use, distribute, modify, and remove the content

3. Nutritional information:

- Ownership: APIs Ninjas
- Owner's rights: API Ninjas own the nutritional information they provide and have the right to modify and remove the content.
- Platform rights: The platform can display and distribute the content

In this section, we modified the description of our site structure, because we omitted the Landing Page and Planning Page. The Landing Page was removed to prioritize convenience and simplicity. Similarly, the Planning Page was integrated into our Home Page as the summary functionality is simplified. Both modifications further improved the user experience, leaving little space for confusion. Furthermore, we did not develop the feature that allow guest users accessing published recipes because this requires much more complicated design and implementation while not contributing significantly to the competitive edges of our service: convenience, flexibility, and customizability. On the other hand, we developed a strategy for quality control of users' published recipes by utilizing the save functionality. This strategy is simple and does not require extra actions from the users' perspectives.

4. USER INTERFACE

This section describes user interface designs, interactions, and explanations for design choices.

4.1. USER INTERFACE DESIGNS AND INTERACTIONS

4.1.1. LOGIN / SIGN UP PAGE

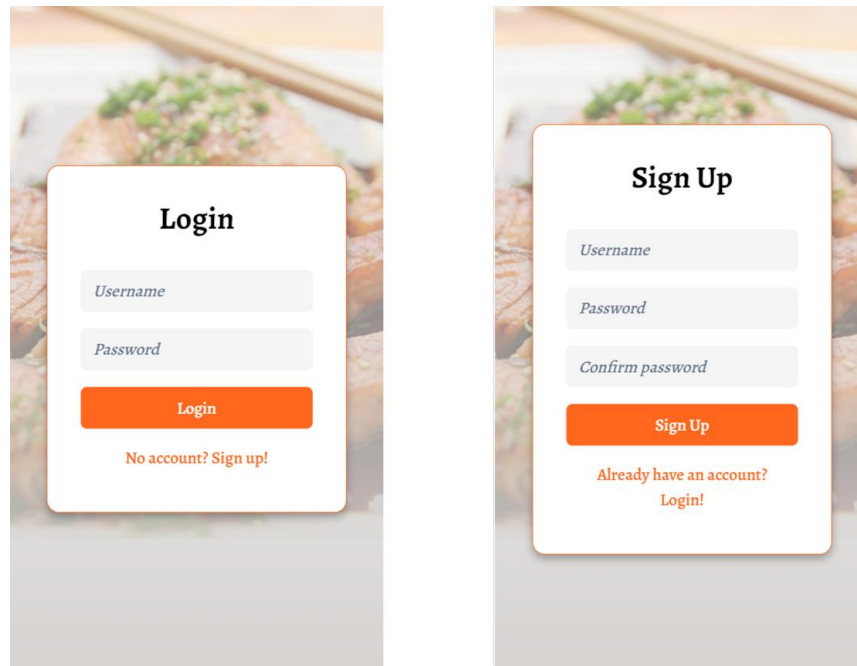


Figure 7. Login / Sign Up Page

The Login/Sign Up Page is used for creating credentials, while also serving as a first impression and prompt to action for users. Key design choices that support such purposes are:

- **Background:** The background is deliberately chosen to indicate that our application mainly concerns with cooking. The color of the background image also matches our color scheme.
- **Color:** The Login/Sign Up Page uses color contrast (gray gradient background and white login/sign up box) to highlight the content. It also utilizes the accent color (#FF671F) to emphasize the login/sign up buttons or links and evoke a strong call-to-action for users.

User interactions:

Type	Element	Interactions
Input	Username field	The user inputs their registered username
Input	Password field	The user inputs their registered password
Button	Login	The user sends information to the backend for authentication. If the user's credentials are valid, the user will be redirected to the Home Page.
Link	No account? Sign Up!	The user is redirected to Signup Page

Table 2. Login Page interactions

Type	Element	Interactions
Input	Username field	The user inputs a unique username
Input	Password field	The user inputs a valid password
Input	Confirm password field	The user confirms the password
Button	Sign up	The user sends information to the backend to register a new account, and is redirected to Login Page if registered username is unique
Link	Already have an account? Login!	The user is redirected to Login Page

Table 3. Sign Up Page interactions

4.1.2. HOME PAGE

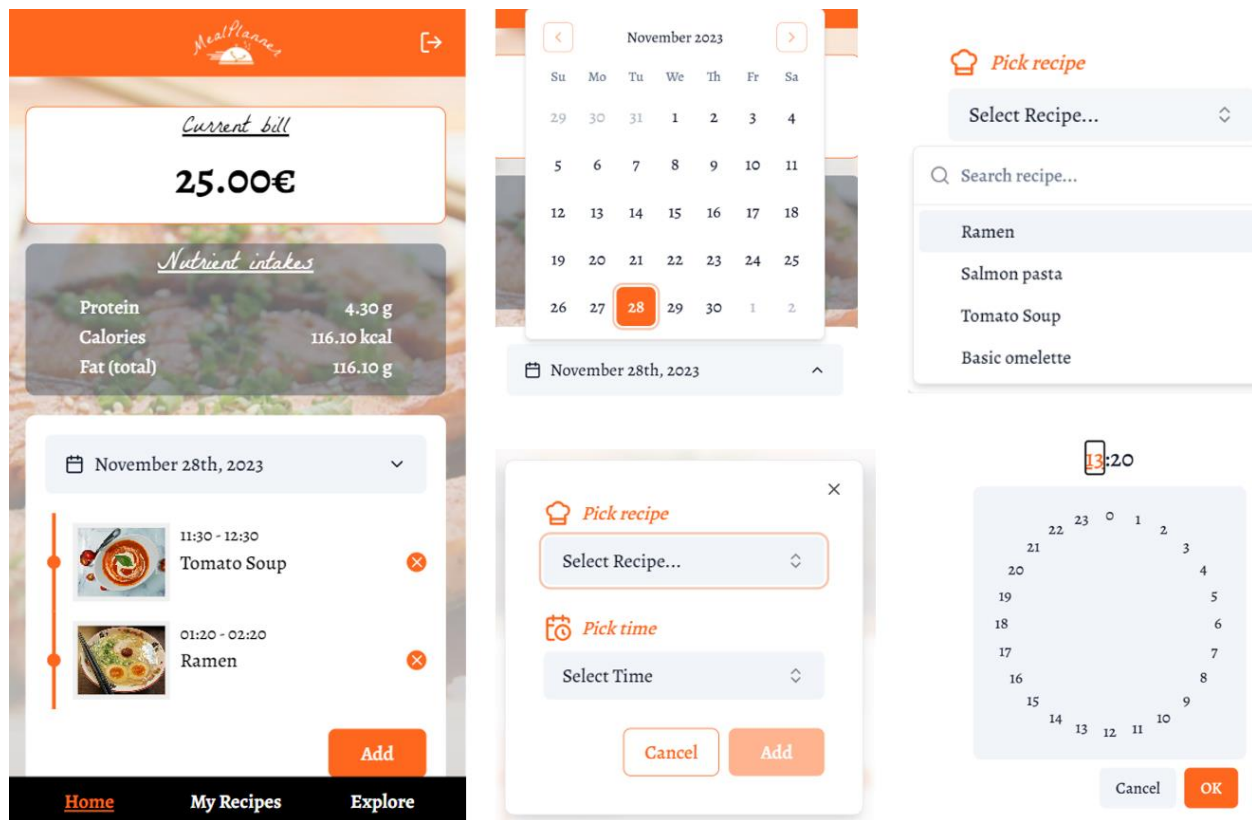


Figure 8. Home Page and Popup / Dropdown elements

The Home Page displays costs and nutrient intakes summary, as well as offering the planning functionality. As the Home Page, it should also be detailed, unique, and attractive. Key design choices that support such purposes are:

- **Background and “floating card”:** The Home Page expands on the design of Login/Sign Up Page and effectively sets the theme of our application. The design creates an impression of elements “floating” on the background, thereby establishing a sense of playfulness and artistry.
- **Color:** The Home Page uses color contrast between the elements of the content to highlight the difference pieces of information and functionalities. It also uses the accent color sparingly to emphasize the buttons and directs the user’s focus.
- **Font:** The Home Page uses 2 fonts – a sans serif font to display information, and a cursive font to highlight the title of summaries. Such design ensures that important details are easy to read, while still creating some visual stimulations for the user.
- **Popup:** Rather than displaying all interactive elements, the Home Page employs multiple popup/dropdown elements. Such design keeps the structure relatively simple despite complex functionalities, and allows the user to focus on one element at a time for a smooth user experience.

User interactions:

Type	Element	Interactions
Select	Date	<p>The user selects a date from the dropdown calendar.</p> <p>The displayed elements will change:</p> <ul style="list-style-type: none"> • Daily summary of meals (total cost and nutrient intakes) will change • Daily list of planned meals will change • Adding or removing meals will update the meal plan of the new chosen date
Link	Meal	The user is redirected to Recipe Page of the chosen meal.
Button	Meal - x	<p>The user removes the chosen meal from the plan.</p> <p>The displayed elements will change:</p> <ul style="list-style-type: none"> • Daily list of meals will be updated with the chosen meal removed • Daily summary of meal plan (total cost and nutrient intakes) will be updated
Button	Add	The user opens a pop-up window to add one new meal to the plan of selected date.
Select	Recipe (Popup)	<p>The user selects a recipe from the dropdown list of recipes from My Recipes Page. The selected recipe will be added to the meal plan.</p> <p>Once a recipe is chosen, the Add button of this pop-up window is enabled (choosing time slot is optional).</p>
Button	Timeslot (Popup)	The user opens a time selector. The meal will be added with the selected timeslot.
Button	Add (Popup)	<p>The user adds a meal to the plan of selected date.</p> <p>The displayed elements will change:</p> <ul style="list-style-type: none"> • Daily list of meals will be updated with the new meal • Daily summary of meal plan (total cost and nutrient intakes) will be updated

Table 4. Home Page interactions

4.1.3. MY RECIPES PAGE

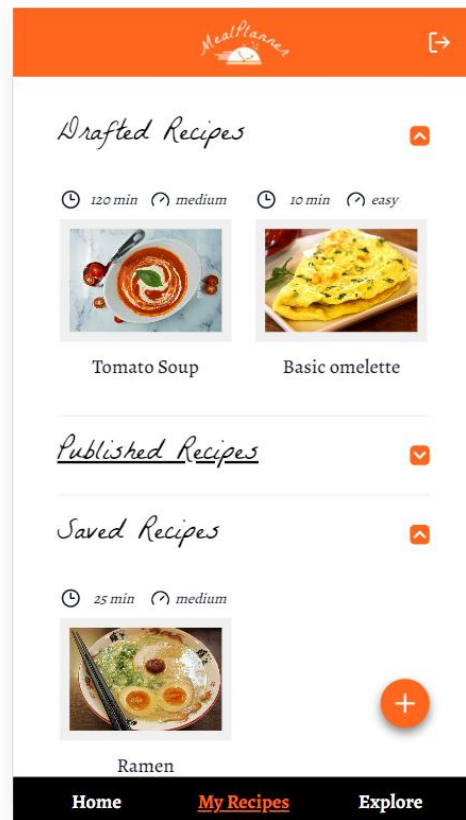


Figure 9. My Recipes Page

The My Recipes Page displays the lists of recipes that the user can choose to construct their meal plans. Key design choices to support its features are:

- **Color:** Unlike previous pages, the My Recipes Page uses a plain white background. This enhances readability, while also shifting the focus to the individual recipe cards. The background also highlights the accent color used for buttons, further prompting interactions from the user.
- **Font:** Like the Home Page, the My Recipes Page uses 2 fonts to add visual stimulations for the user without hindering readability.
- **Expandable lists:** The user can expand or collapse lists of recipes, making navigation between lists and searching for specific recipes more convenient.

User interactions

Type	Element	Interactions
Button	Drafted Recipes	The user expands or collapses the list of drafted recipes.
Button	Published Recipes	The user expands or collapses the list of published recipes.
Button	Saved Recipes	The user expands or collapses the list of saved recipes.
Link	Add ('+')	The user is redirected to Edit Recipe Page with empty template.
Link	Recipe	The user is redirected to Recipe Page of the chosen recipe.

Table 5. My Recipes Page interactions

4.1.4. EXPLORE PAGE

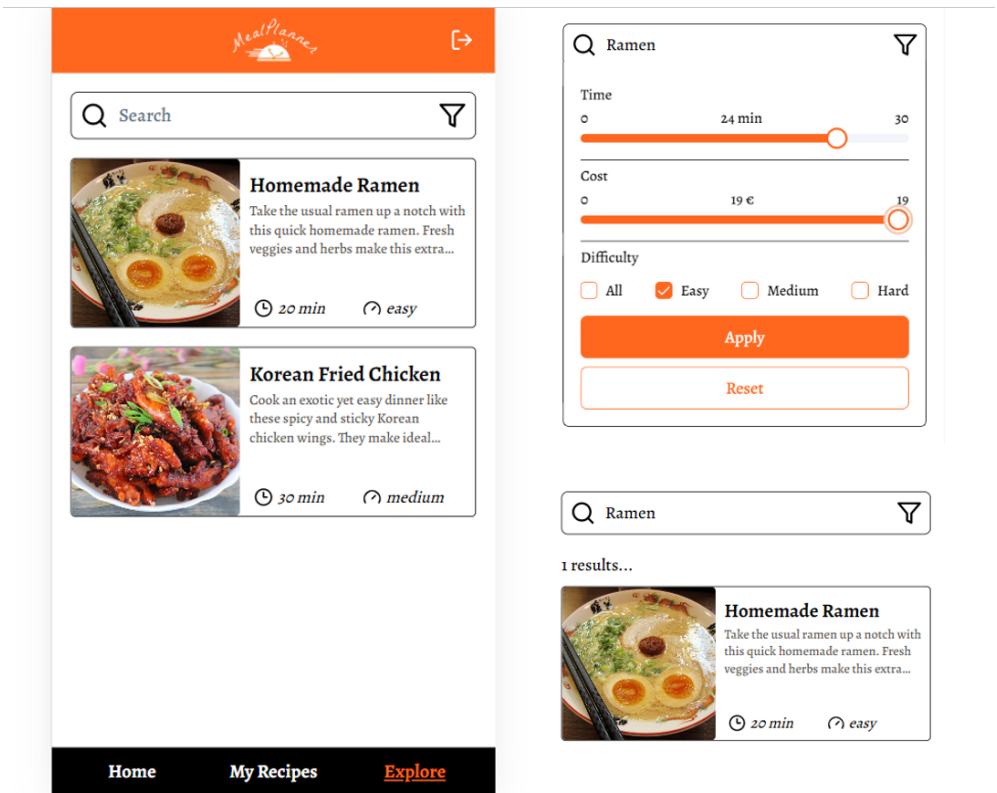


Figure 10. Explore Page and Dropdown elements

The Explore page displays the published recipes of other users, and provides utilities to help the user find suitable recipes. It should present individual recipes appealingly, and intuitive interactive elements. Key design choices that support such purposes are:

- “Floating card”: The design of the Explore Page expands on the “floating” card design of Home Page and Login/Sign Up Page. The outline of each card accentuates the recipe details and thereby captures the user’s attention.
- Color: The Explore Page uses a white background which creates contrast with the outline and cover image of recipe cards, directing the user’s focus to them. Additionally, the Explore Page utilizes the accent color for buttons and interactive elements in the filter dropdown.
- Dropdown: The Explore Page follows similar principle to the Home Page with the use of dropdown menu instead of overwhelming the user with all interactive elements displayed.

User interactions

Type	Element	Interactions
Input	Search	The user types in some keywords. By pressing the key <Enter> or Apply button (dropdown), the user searches for recipes with names containing the search phrase. The displayed list of recipes will be changed and the number of results will be displayed.
Button	Filter	The user opens a dropdown menu containing interactive elements to specify criteria and filter the list of recipes.
Slider	Time (Dropdown)	The user chooses the maximum cooking time of the filtered recipes.
Slider	Cost (Dropdown)	The user chooses the maximum cost of the filtered recipes.
Checkbox	Difficulty (Dropdown)	The user chooses the difficulty levels of the filtered recipes.
Button	Apply (Dropdown)	The user applies the specified filters to the list of recipes. The displayed list of recipes will be changed and the number of filtered results appears below the search bar.
Button	Reset (Dropdown)	The user removes search/filters. The displayed list of recipes will be reset and the number of results disappears.

Link	Recipe	The user is redirected to Recipe Page of the chosen recipe.
------	--------	---

Table 6. Explore Page interactions

4.1.5. RECIPE PAGE

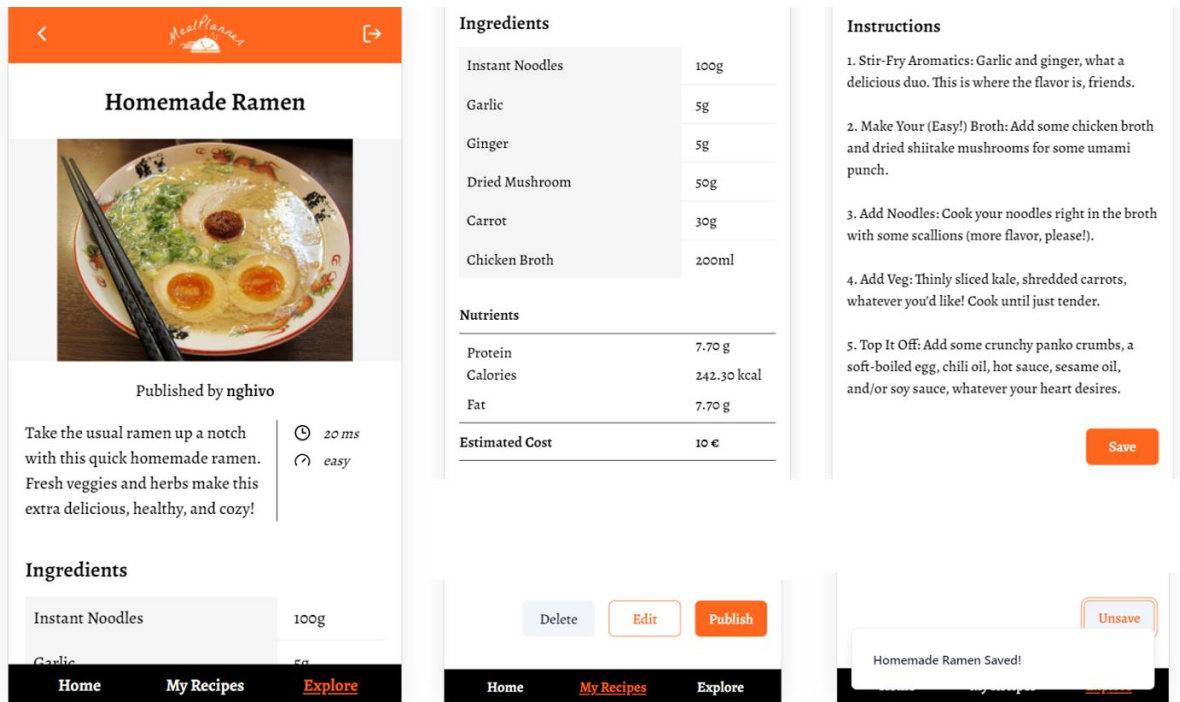


Figure 11. Recipe Page and different command buttons

The Recipe Page displays all details about one recipe, including name, cover image, description, ingredients, instructions, It should be informative while avoiding overwhelming the user with text. Key design choices that support such purposes are:

- **Grid and Table elements:** The Recipe Page uses lines and colors to separate information into multiple subsections. Such design enhances readability and flow of the document, while also creating visual stimulations for the user.
- **Color:** The Recipe Page uses a warm gray color as background for the Ingredients section to create a mild contrast with the white background for more variations visually while not negating readability. The Recipe Page also utilizes accent color to prompt some action buttons (publish and save), as contrast to less noticeable colors for other buttons (edit, delete, unsave).
- **Variation in buttons:** The Recipe Page can display all 3 types of recipes (drafted / published / saved) and automatically provide the suitable set of commands for each type.

User interactions

Type	Element	Interactions
Button	Save / Unsave	The user saves (click once) or unsaves (click twice) the recipe.
Button	Delete	The user deletes the recipe.
Button	Edit	The user is redirected to Edit Recipe Page with details of the recipe filled.
Button	Publish / Unpublish	The user publishes or unpublishes the recipe.

Table 7. Recipe Page interactions

4.1.6. *EDIT RECIPE PAGE*

MealPlanner

Tomato Soup

This warming vegan soup is made using juicy, ripe tomatoes, which come into season around September. It's a comforting recipe to make and eat throughout the

Time

120

Difficulty

Medium

Ingredients

Amount	Ingredient	
<input type="text"/>	<input type="text" value="Type a ingredient"/>	Add
100g	Tomato	
50g	Carrot	
1tsp	Tomato Puree	
10g	Bay Leaf	
1g	Pepper	

Instructions

1. Prepare your vegetables. If the tomatoes are on their vines, pull them off. Throw the vines and green bits away and wash the tomatoes. Cut each tomato into quarters and slice off any hard cores. Peel the onions and carrots, and chop them into small pieces.

2. Spoon olive oil into a large heavy-based pan and heat it over a low heat. Hold your

Cancel

Save

Nutrients

Protein	4.30 g
Calories	116.10 kcal
Fat	4.30 g

Cost

10

Instructions

Figure 12. Edit Recipe Page

The Edit Recipe Page includes a form to create / modify recipes, which should present interactive elements in a clear and pleasant manner. Key design choices for this purpose are:

- “Floating input”: The design of Edit Recipe Page also employs the “floating card” design by using multiple outlined input boxes in contrast of the white background. This choice accentuates each input field and remains consistent with the theme.
- Color: The Edit Recipe Page uses a white background to emphasize the “floating” input fields while maintaining readability. It also uses the accent color to highlight action buttons, as well as creating more visual stimulations.
- Expandable lists: The user can expand or collapse long sections (Ingredients, Nutrients, Instructions). This enables smooth navigation back and forth while editing.

User interactions:

Type	Element	Interactions
Input	Cover Image	The user provides the cover image.
Input	Name	The user inputs the recipe name.
Input	Description	The user inputs the recipe description.
Input	Time	The user inputs the estimated time of cooking.
Select	Difficulty	The user selects the difficulty level.
Input	Amount	The user inputs the amount of the ingredient.
Input	Ingredient	The user inputs the name of the ingredient.
Button	Add	The user adds the ingredient to the recipe. The displayed list of ingredients and summary of recipe nutrient intakes will be updated.
Button	Ingredient - X	The user removes the ingredient from the recipe. The displayed list of ingredients and summary of recipe nutrient intakes will be updated.
Input	Cost	The user inputs the estimated cost of ingredients.
Input	Instructions	The user inputs the recipe instructions.
Button	Save	The user saves the creation / modification.
Button	Cancel	The user removes the creation / modification.

Table 8. Explore Page Interactions

4.2. NAVIGATION

Logged-in users can navigate between our main pages with a bottom navigation bar. This design choice is made as the bar presents a simple and unmistakable method for choosing between our major features: planning meals in the Home Page; checking and creating recipes in the My Recipes Page; and exploring others' recipes in the Explore Page. Such approach also improves mobile experience, because it is more convenient than using dropdown menu on the top bar.



Figure 13. Bottom navigation bar

On the other hand, subpages are accessed via intuitive buttons or recipe cards, and exited with a back button on the top bar. The top bar also includes a button for logging out.

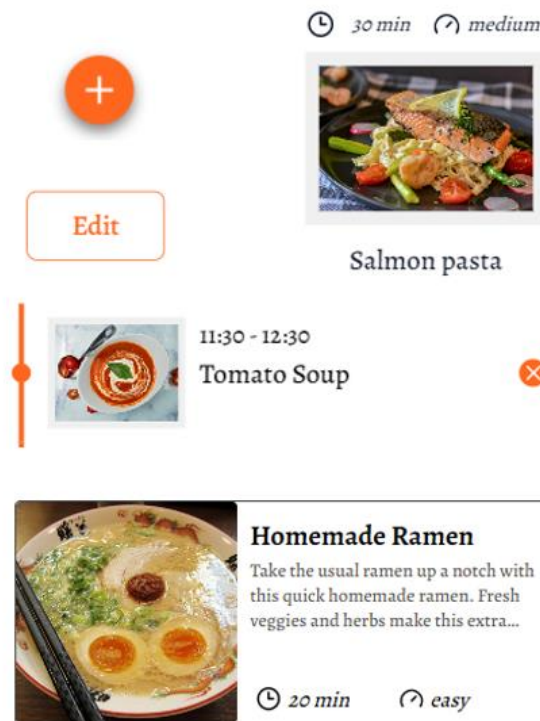


Figure 14. Link buttons and Recipe cards



Figure 15. Top Bar

4.3. FONTS AND COLORS

4.3.1. FONTS

Our service uses 2 fonts: Alegreya (serif) and La Belle Aurore (cursive).

Whereas disregard and
contempt for human rights have
resulted

*Whereas disregard and contempt
for human rights have resulted*

Figure 16. Fonts Alegreya (Left) and La Belle Aurore (Right)

Both are Google Fonts and therefore easily accessible. Font Alegreya serves the overall artistic and lively theme, while not negating readability as the serif font, It also comes with multiple font formats and weights (normal, bold, italic).

Similarly, font La Belle Aurore is chosen as it further establishes the theme. Unlike font Alegreya, this cursive font is flamboyant at the expense of readability, making it suitable for headings and logos.

4.3.2. COLORS

The color scheme used in our application is:



Figure 17. Color Scheme

The accent color is #FF671F, which perfectly matches the spirit of our service. The color is warm and bright, giving a friendly and welcoming impression while still being strong and noticeable enough for an accent color.

On the other hand, other colors are used only for specific elements:

- Color #E7E5E4 is used as background for images or text as its shade creates some variations but not diminishing readability or distracting the user.

- Color #E2E8F0 is used as background for inputs, buttons, or dropdown menu items. It nicely contrasts other colors while not being too discordant with the overall scheme.
- Color #475569 is used as background only for the card displaying nutrient intakes in the Home Page. It is used to differentiate this element from the background and from other elements.
- Color #000000 is used as the background for the bottom navigation bar. It creates strong contrast and draws focus to items on the bar (Links to Home Page, My Recipes Page, and Explore Page).

In this section, we adjusted the design in response to the changes in our features and site structures. We incorporated the Planning Page into the Home Page, while also simplifying the original features of the Home Page (display of weekly summary). We achieved this by adopting more extensive use of popup windows and dropdowns, which further enhanced user experience. On the other hand, we mainly polished the design of other pages while keeping their original structure. In terms of documentation, we included the reasonings behind certain design choices for each page, as well as explanation on the choice of fonts and colors.

5. TECHNOLOGIES AND ARCHITECTURE

This section describes the dynamic functionalities of the service, as well as technologies and architecture.

5.1. DYNAMIC FUNCTIONALITIES

- **Recipe creating and sharing:** The user can create recipes of their own and share them with other users. The system saves created recipes with pieces of information extracted from a detailed form. When the user publishes their recipe, the system makes it accessible to other users. When another user saves the recipe, the system saves the ID of that recipe in that user's list to readily construct link to that recipe when requested.
- **Budgeting:** The user can set a cost for each of their published / drafted recipes. When the user creates a meal plan with these recipes, the system aggregates the costs of all recipes for the selected date and displays the total cost of meals as planned for that date.
- **Nutritional information:** The system uses an API to fetch nutritional data for the products included in a recipe. When user adds ingredients to a recipe, the system aggregates the nutrient intakes of protein, calories, and total fat of all ingredients in the recipe. When the user creates a meal plan with these recipes, the system aggregates nutrient intakes of all recipes for the selected date and displays the nutritional information summary of meals as planned for that date.

5.2. TECHNOLOGY CHOICES

- **Client:** The client-side of our application is developed using React. To improve code quality and development experience Typescript is used. To efficiently create a responsive user interface, we utilize Tailwind CSS. For handling navigation, we use react-router.
- **Server:** The server is implemented with Express.js and Typescript. Express.js, which is built on Node, is a minimalistic framework for handling HTTP requests. This project uses Express for defining routes and middleware. To manage user authentication, we use JSON web tokens (JWT).
- **Database:** MongoDB, a popular NoSQL database, is used to store data. To interact with the data in the database mongoose is used on the server. Mongoose is an Object Data manager that allows defining own data models and performing CRUD operations on the MongoDB database.
- **Deployment:** Continuous deployment implemented using github actions. For hosting we use Fly.io.

5.3. DATABASE STRUCTURE

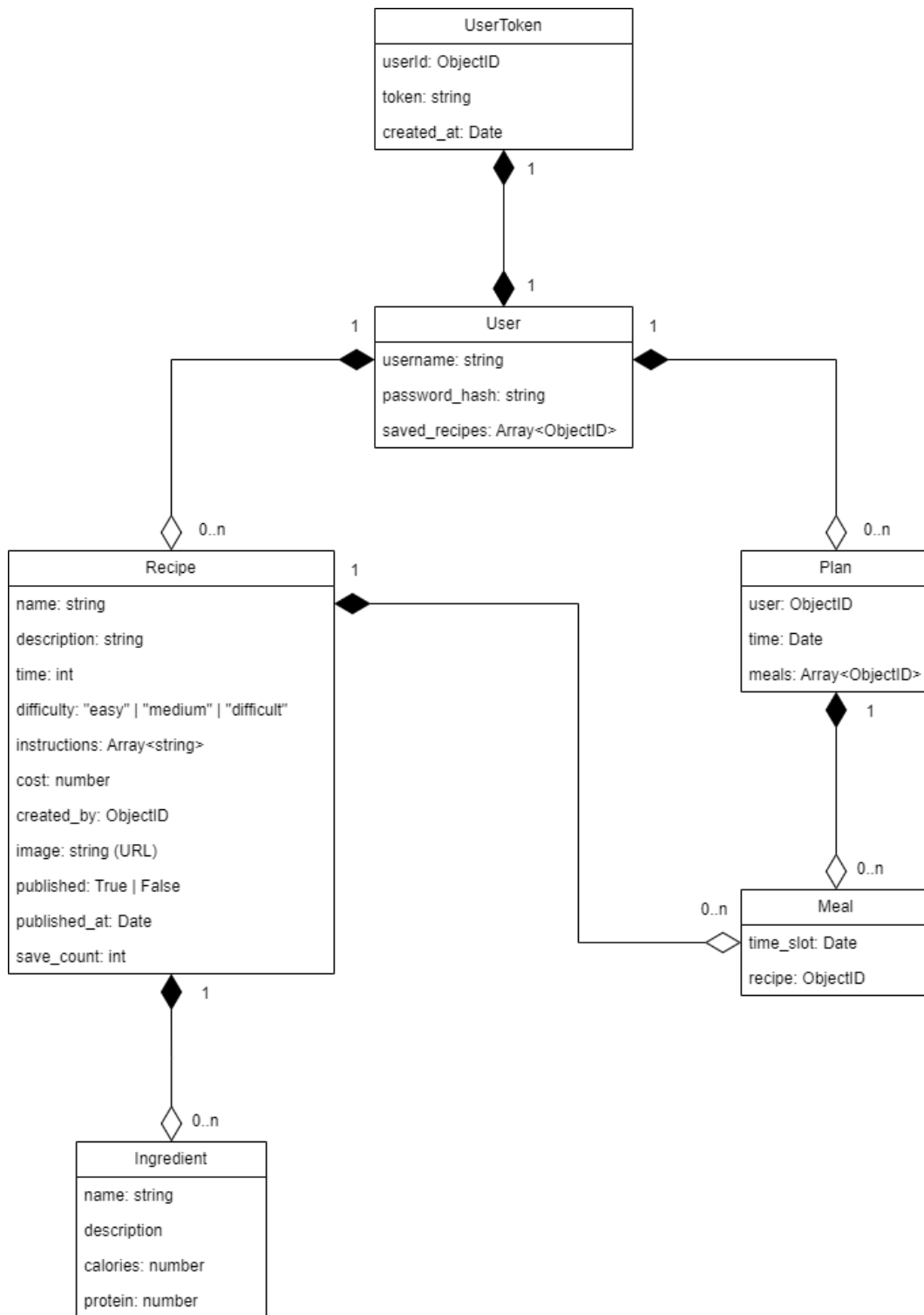


Figure 18. Database structure

5.4. SECURITY

The application has an authentication system using JSON web tokens with refresh token. Also, SHA-256 will be used for generating the password hashes.

On user sign up a password hash is generated from the submitted password and on login the password is encrypted and compared to the stored password hash. Then, an access token and a refresh token are generated for the user and sent to the client. On the client side the refresh token is stored in the local storage. This refresh token can be used to fetch the access token if it is not expired. The access token is attached to all requests made by the client in the authentication header. This way, the server can assure that the user making the requests is authenticated and has permission to view the requested data.

In this section, we modified the description of our dynamic functionality to remove the feature for selecting weekly summary and responsive design while providing details on our recipe sharing functionality . We also modified the technology used for our backend and settled on our deployment method. On the other hand, the original database structure remained suitable notwithstanding the addition of some attributes for each model.

6. PROJECT DESIGN

This section describes our project task breakdown, estimated and actual work hours, and time schedule.

6.1. PROJECT BREAKDOWN

	Task	Priority	Aron	Nghi	Vaneeza	Estimated Time	Actual time
Design	Site structures	1		10		10	10
	Designing interactions	2		10		8	10
	Polishing	3		5		15	5
	HTML/CSSFi	3				8	0
Backend	Setup	1	4			5	4
	Authentication	2	6			10	6
	Recipe model	2	2	3		3	5
	Recipes endpoints	2		6		7	6
	Meal planning model	2		4		5	4
	Meal planning endpoints	1		8		10	8
	Deploy platforms	3	8			2	8
	CI/CD	1	13			10	13
Frontend	Setup	1	6			8	6
	Authentication	3	8	1		8	9
	Recipe & Edit Recipe Page	1	12	4		15	16
	User's Recipe Page	2	6			10	6
	Home Page	1	16			20	16
	Explore Page	2	8			10	8
	Responsiveness	3	3	3		6	6
	Polishing	4	13	35		15	48
Documentation	Design Document	3	5	5	5	15	15
	Demo Gala + Document	2	2	4		10	6
	Final Document	1		25		25	25
		Total:	112	123	5	235	240

Table 8. Project breakdown

6.2. TIME SCHEDULE

Meal Planner

Project start: **Mon, 10/2/2023**

Display week: **1**

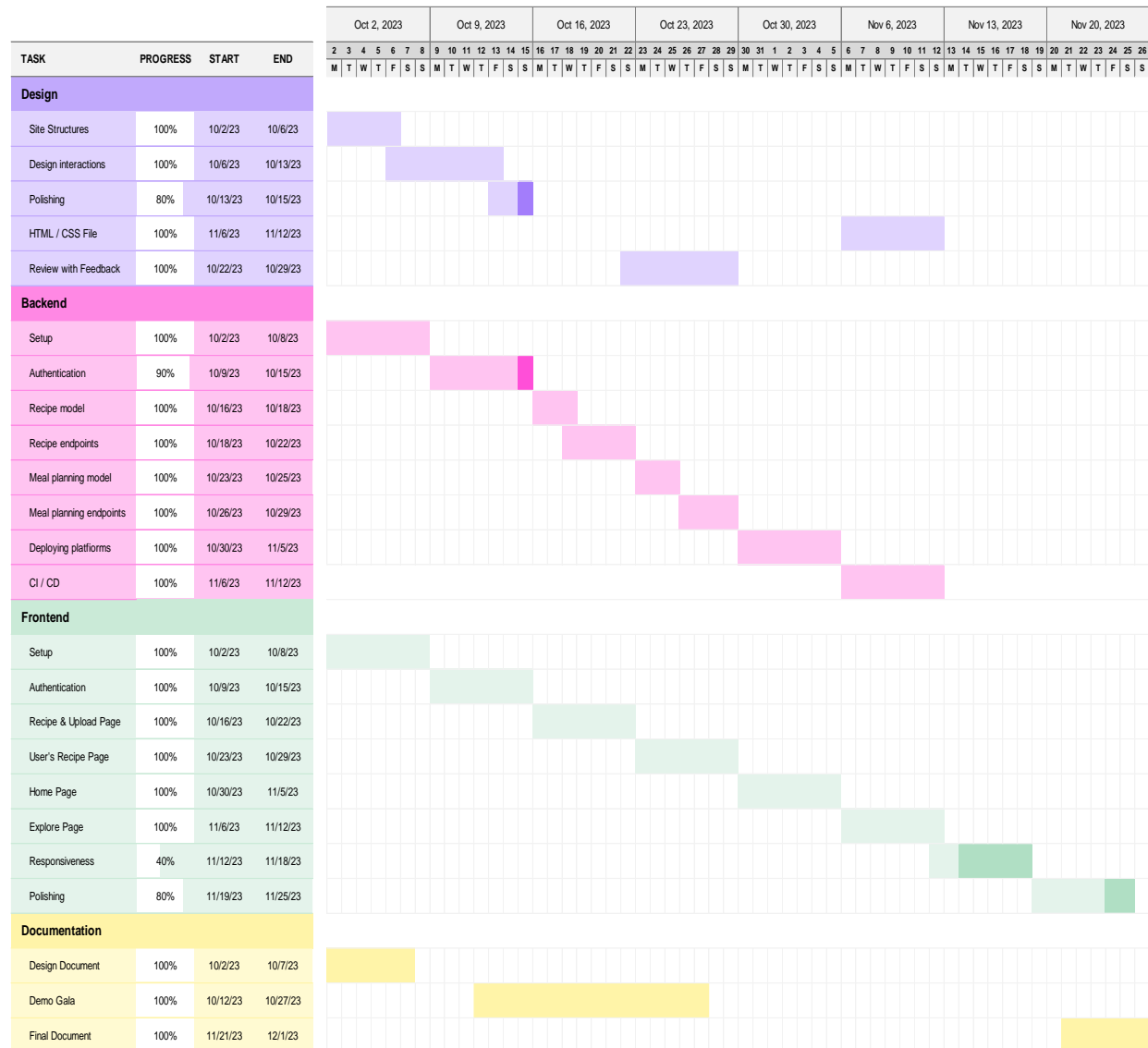


Figure 19. Time Schedule

In this section, we updated our work hours and time schedule. Notably, we did not deviate significantly from our original schedule. However, one of our teammates has unfortunately dropped from the course and did not contribute equally towards this project.

7. REFLECTION

This section discusses our reflection on the usability of our service, our project evaluation and lessons.

7.1. USABILITY EVALUATION

Our service achieves most of our initial goals. We started the project aiming to create a handy mobile webservice that combines major functionalities for cooking applications: recipe creation and exploration, meal planning and nutritional tracking. Our current application accomplishes such a purpose by simplifying these features and unifying them via simple and intuitive interface design.

While the generalist approach of our application may not appeal to cooking enthusiasts or extremely health-conscious people, our service will be largely appreciated by casual users who need a convenient method to manage their eating habits. This perfectly fits our target audience: students who have little time and effort to spend but want better control over their daily food consumption. As students ourselves, we understand this pain point, and address it in our application.

However, certain functionalities we initially planned are not included in our application. The most noticeable change is in our summary feature, which we decided to simplify after receiving feedback from design document and demo gala. Our application now only provides daily summary rather than weekly, which certainly diminishes the overview look on budget or nutrient intakes. Nevertheless, this change allows us to also simplify our site structure and user interface design, which significantly improves ease of use.

Some other functionalities were unfortunately omitted due to lack of time. We did not have time to design and implement a landscape-viewport design for certain pages (Home Page, Recipe Page, and Edit Recipe Page), which makes the website not that attractive on desktop or tablet devices. We also did not facilitate the guest users' access to Explore Page and Recipe Page, nor an intuitive URL design for individual Recipe Pages. These are features that we wish to improve in the future.

7.2. PROJECT EVALUATION

The project did not progress as smoothly as we intended. One of our members did not have time to contribute to the project, and unfortunately dropped from the course. However, we did the best of our capabilities to adapt and overcome this problem by modifying our plans and prioritize the most important tasks.

The most challenging aspect of our project is the sheer number of features we initially planned. As specified in the document, many of our initial ideas were dropped in favor of more crucial features. We also underestimated the amount of work that went into the designs and course work: documentation, presentation, and demo preparation. Despite such problems, we received feedback and adjusted in time, allowing us to achieve our main goals with the application.

This is the issue we want to address should we restart our project. We should have a better judgement of our views, goals, and main features in accordance with the time and resources available. Due to the initial misvaluation, we have little room for adjustment in terms of schedule when unexpected events occur. Fortunately, midway through the project we made the decision to change and pick up the pace, regaining our momentum.

We did not encounter any project management issues. We use Telegram as our communication channel, Zoom for meetings, and Github for development. All these services work perfectly well to support us throughout the project. Fortunately, our team is small and has flexible schedule, making it simpler to arrange both regular meetings or spontaneous ones if necessary.

We are proud of overcoming the difficulties we faced in this project. Despite the adversities, we still achieved most of our goals by joint efforts and willingness to adapt. As soon as we received feedback, we immediately reviewed our previous plan and adjusted accordingly. All our members are cooperative, constantly suggesting ideas and listening to others' comments. It is also of great help that our members come from different backgrounds and have strong expertise in their respective fields, making it easier to divide the tasks efficiently and implement challenging features.

We are also proud of the overall impression of our service. The user interface is simple but intuitive, and reflective of our application theme. Both the frontend and backend were designed and implemented with attention for details, as we tested the application thoroughly for any errors or missing elements that may undermine a smooth user experience.

Throughout the project, we learned the importance of the review-revise process in development. By constantly gaining feedback, reviewing, and updating our service, we managed to adapt and deliver the most polished version of our application. Asking feedback from people with different backgrounds and potential users also gives us a better overview and assessment of our application. For instance, we asked some people in Designs or Social Sciences to give feedback on our user interface and significantly improved it, despite the lack of expertise in this field.

We also learned the importance of cooperation in teamwork. Only by the cooperative attitudes of our members that we managed to keep up with the progress when faced with unexpected problems. These problems however, could be avoided should we have a better plan which allows more flexibility in terms of time and schedule. This is another valuable lesson that we learned.

Most importantly, we learned the value of prioritizing and focusing on the most crucial features in development. Initially we planned so many features which caused both difficulty in implementation and confusion for the user. However, after re-evaluating our time and resources, as well as putting ourselves the user's mindset and identifying their needs, we decided to simplify the application and regain focus on solving the user's problems. This experience both taught us the necessity of the user-centered approach, and the advantage of a simple design: Less is more.