DESIGN DOCUMENT

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Task Matrix

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Implementation Details	System Overwiev	Use Case Support in Design
Design Decisions	Design Decisions	Design Decisions

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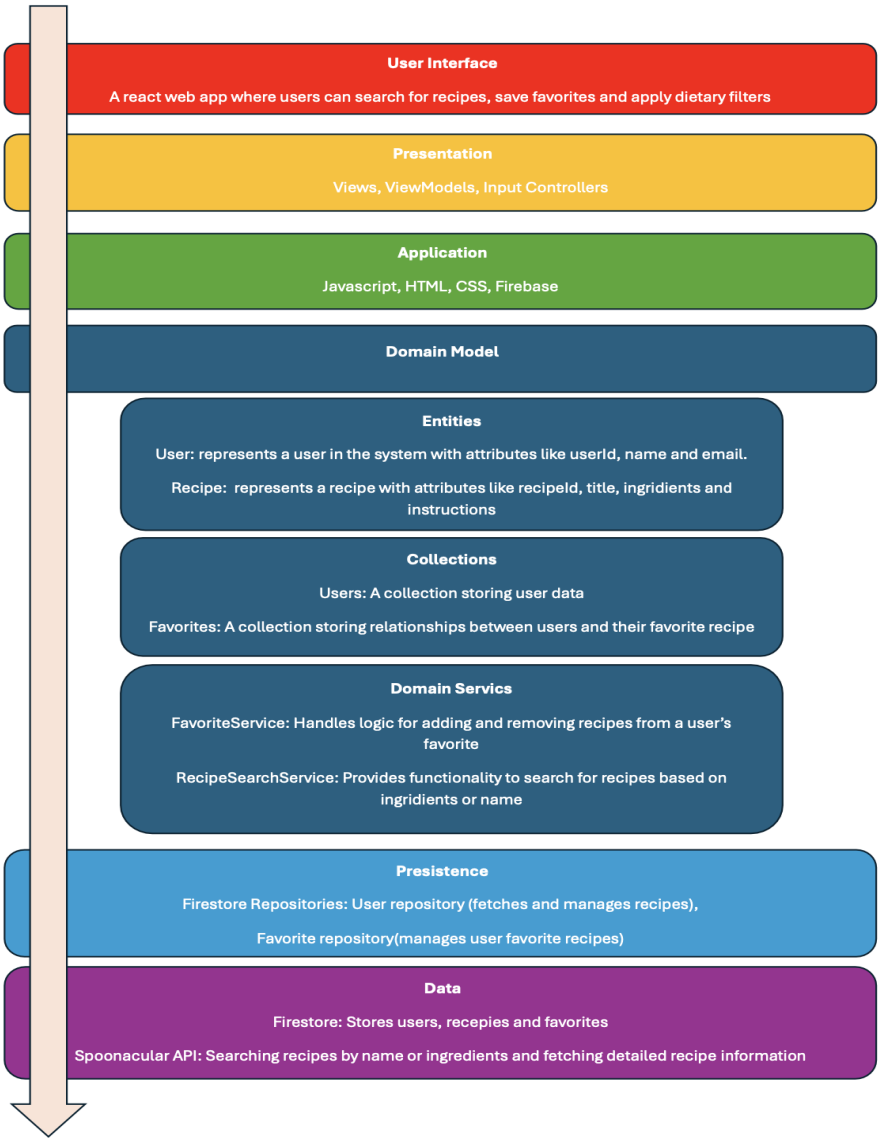
1) System Overwiev

➢ Project Description

Todayz Meal is a web application designed to help users find recipes based on the ingredients they have. Users can receive suggestions for meals they can prepare by entering their ingredients. Moreover, they can filter the meals according to preparation time and dietary preferences(vegetarian, vegan, gluten-free, lactose-free), and add recipes to their favorite section.This project aims to reduce food waste, make cooking more convenient and help people what to eat today.

➢ System Architecture



➢ Technology Stack

Frontend: HTML, CSS, React

Backend & Database: JavaScript, Firebase

APIs: Spoonacular API for recipe data

Version Control: GitHub

Communication: Slack

2) Implementation Details

➢ Codebase Structure

```
TodayzMeal/
├── ProjectOutputPackagePA1
│   ├── ProjectDefinitionDocument.pdf
│   ├── ProjectPlanDocument.pdf
│   └── ProjectRequirementsDocument.pdf
│
├── ProjectOutputPackagePA2
│   ├── DesignDocument.pdf
│   └── QualityAssurancePlan.pdf
│
├── website
│   ├── background.jpg
│   ├── index.html
│   ├── login.html
│   ├── login.js
│   ├── register.js
│   ├── script.js
│   ├── signup.html
│   ├── style.css
│   ├── style2.css
│   └── style3.css
```

➢ Key Implementations

1. **Recipe Search Module**
    a. Uses Spoonacular API to fetch recipes based on user-input ingredients and recipe names
    b. Includes error handling for API failures and alternative suggestions when no exact match is found.
2. **User Authentication**
    a. Firebase Authentication handles user sign-up, login, and session management.
    b. Secure authentication with email and password
    c. Password validation includes minimum length, uppercase letters, and numeric requirements.
3. **Favorites Feature**
    a. Users can add recipes to their favorites, which are stored in Firebase.
    b. A "most favorited" algorithm ranks popular recipes.
    c. Favorite recipes sync across devices using Firebase real-time database
4. **Filtering Mechanism**
    a. Users can filter recipes by dietary preferences (vegetarian, vegan, gluten-free, lactose-free).
    b. Sorting by preparation time allows quick meal selection.
    c. Backend logic ensures filtering occurs efficiently for large datasets.
5. **User Profile Management**
    a. Users can update personal details and dietary preferences.
    b. Profile data is stored securely in Firebase

➢ Component Interfaces

1. Authentication Components

- **Login Component**
    - **Input Fields:** Email and password input fields.
    - **Button:** Submit button for logging in.
    - **Link:** Redirects to the signup page for account creation.
    - **Functionality:** Handles user authentication and redirects to the main page upon successful login**.**
- **Signup Component**
    - **Input Fields:** Email, password, and password confirmation fields.
    - **Buttons**: Signup and cancel buttons.
    - **Functionality:** Creates a new user account and redirects to the login page upon successful registration

2. Main Application Components

- **Search Component**
    - **Input Field:** Ingredient input field for searching recipes.
    - **Checkboxes:** Vegan and vegetarian filters.
    - **Button:** Search button to trigger recipe search**.**
    - **Functionality:** Searches for recipes based on the entered ingredients and applies filters.
- **Recipe List Component**
    - **List Items:** Displays a list of found recipes.
    - **Recipe Details Button:** Button to view details for each recipe.

    - **Functionality:** Lists recipes and allows users to view detailed information.
- **Recipe Details Modal**
    - **Content:** Displays recipe title, image, preparation time, servings, ingredients, and instructions.
    - **Button:** Close button to dismiss the modal.
    - **Functionality:** Shows detailed information about the selected recipe.

3. Navigation Components

- **Logout Button**
    - **Functionality:** Logs out the user and redirects to the login page.

4. Styling Components

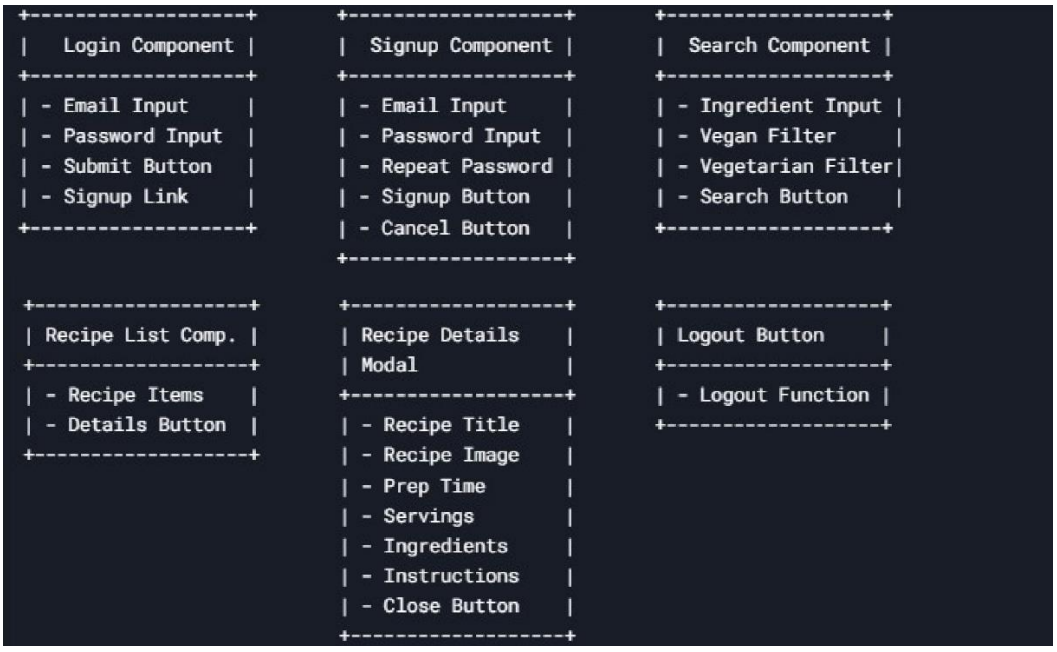
- **CSS Files**
    - **style.css:** Styles for the main page.
    - **style2.css:** Styles for the login page.
    - **style3.css:** Styles for the signup page.

5. API Integration

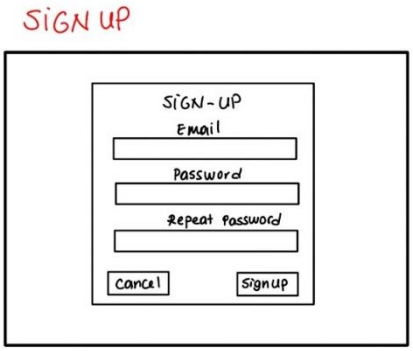
- **Spoonacular API**
    - **Functionality:** Used to fetch recipe data and details based on user input.
- **API Endpoints**
    - https://api.spoonacular.com/recipes/findByIngredients?ingredients=...&apiKey=API_KEY
    - https://api.spoonacular.com/recipes/{id}/information?apiKey=API_KEY

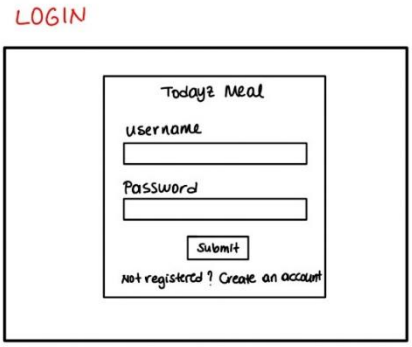
6. Firebase Integration

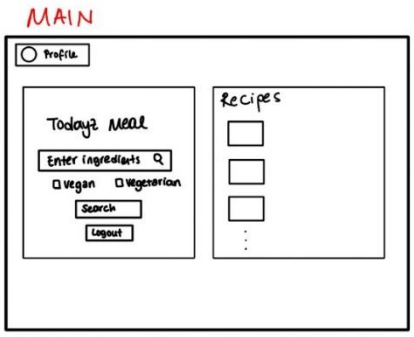
- **Authentication**
    - **Functionality:** Handles user registration and login using Firebase Authentication.

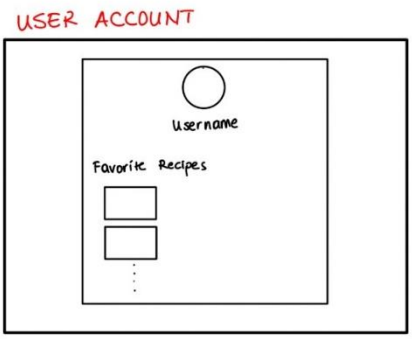


➢ Visual Interfaces









3) Use Case Support in Design

➢ Use Case Selection

1) User must be able to create an account.
2) The system must generate recipe suggestions based on input ingredients.
3) Users must be able to save favorite recipes.
4) The system must display recipe including ingredients, staps, and estimated cooking time.

➢ Requirement Mapping

Use Case	Requiement
User account creation	Users must create an account securely.
Recipe suggestion system	The system must generate recipe suggestions based on input ingredients.
Favorite recipes	Users must be able to save favorite recipes.

Recipe display	The system must display recipe including ingredients, staps, and estimated cooking time.

➢ Use Case Design

- **User Login**

Name	User login
Actors	User
Entry Condition	User is registered to the system
Event Flow	1. User connects to the website 2. Enters username and password 3. Clicks on Login 4. System checks credentials validity

- **User Account Creation**

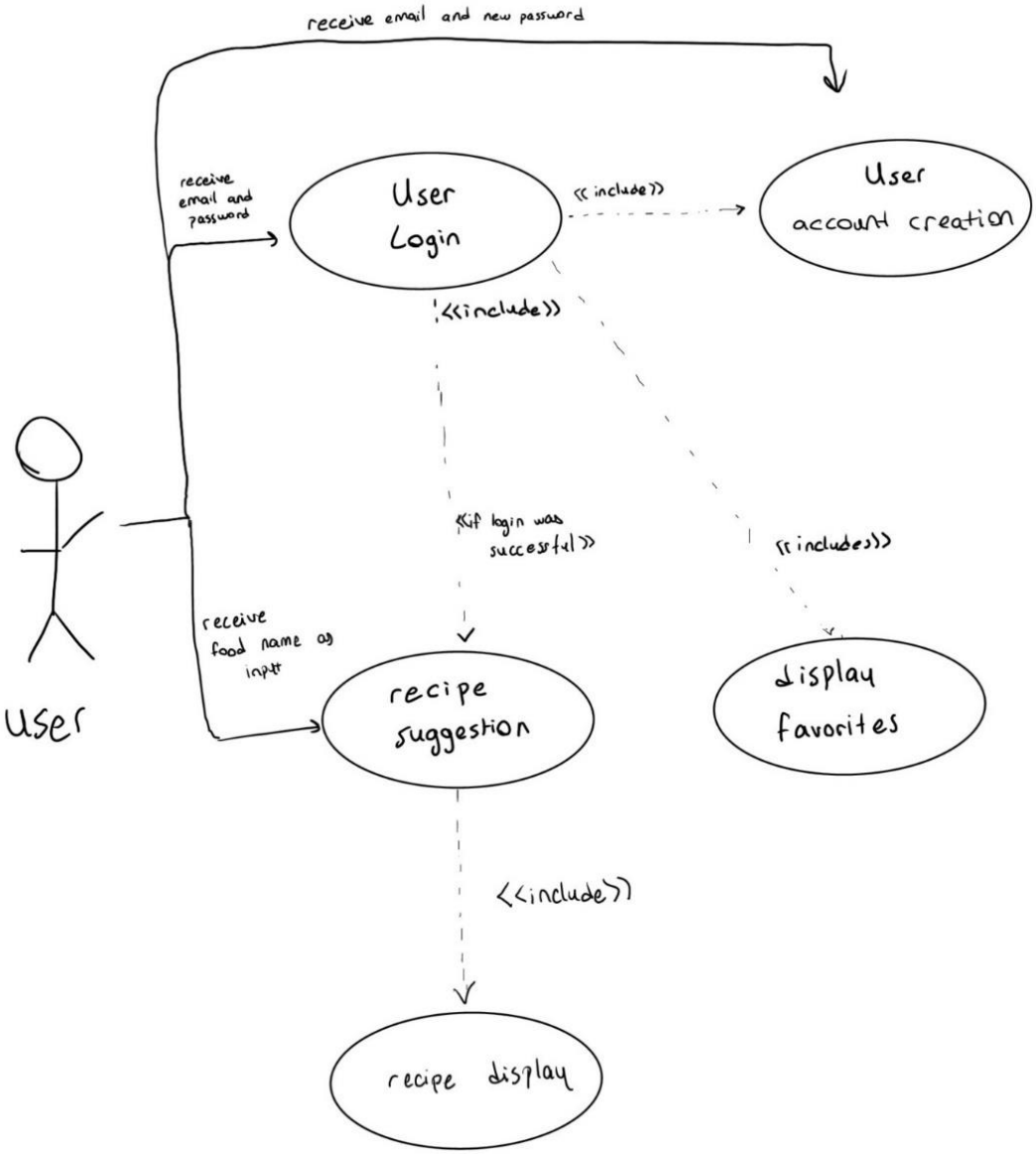
Name	User Account Creation
Actors	Guest
Entry Condition	A person has a working internet connection
Event Flow	1. Clicks on “Sing Up” 2. Inserts his data and fills mandatory fields 3. Account is registered by the system
Exit Conditions	The guest now is registered into the system and becomes a User
Exception	User is already registered Email is already associated to another account

- **Recipe Suggestion**

Name	Recipe Suggestion
Actors	User
Entry Condition	The user is logged to the website
Event Flow	1. The food ingredients to be used were entered into the search bar. 2. Vegan and vegetarian filtering options selected 3. Clicks on “Search Recipe”
Exit Condition	Clicks on “Logout”

- **Display Favorites**

Name	Display Favorites
Actors	User
Entry Condition	The user is logged to the website
Event Flow	1. Clicks on profile icon 2. Redirects to favorites page 3. Lists favorite recipes
Exit Conditions	Clicks on “Close”



4) Design Decisions

➢ Technology Comparisons

Database: Firebase vs. MySQL

Firebase: Provides real-time data syncing and easy authentication but is less suitable for complex queries.

MySQL: A widely used relational database with high performance but requires additional setup for real-time capabilities.

Decision: Firebase was chosen due to its seamless integration with authentication and real-time updates.

Frontend Framework: React vs. Angular

React: Offers component-based architecture, a strong developer community, and efficient performance.

Angular: Provides a full-fledged MVC framework but has a steeper learning curve.

Decision: React was chosen for its flexibility and widespread industry use.

Version Control System: GitHub vs. GitLab

GitHub: Industry standard for open-source projects, great integration with CI/CD tools, large community support.

GitLab: Provides built-in CI/CD pipelines, good for self-hosting but requires more setup.

Decision: GitHub was chosen due to its ease of use, team collaboration features, and widespread adoption.

➢ Decision Justification

- **Frontend (HTML, CSS, React):** React provides a reusable component-based UI structure, making frontend development modular and maintainable. HTML and CSS ensure a structured and styled user interface.
- **Backend & Database (JavaScript, Firebase):** Express.js ensures lightweight, high-performance API handling, making it ideal for a scalable backend. Firebase offers real-time syncing and seamless authentication integration.
- **APIs (Spoonacular API):** Used to fetch a wide variety of recipe data, allowing dynamic ingredient-based searches and filtering.
- **Version Control (GitHub):** Chosen for its industry-wide adoption, strong collaboration features, and seamless integration with CI/CD tools.

- **Communication (Slack):** Enables real-time team collaboration and task updates.