CS 5200 - DATABASE MANAGEMENT SYSTEMS PROJECT FINAL REPORT

Project Name: Recipe Book

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Members

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INTRODUCTION

The project aims to develop a Recipe Management System, an application that will provide users with a convenient platform to store, organize, and retrieve their favourite recipes. The database will provide a user-friendly interface. Overall, the project aims to enhance the user experience, increase the efficiency of searching recipes, and improve the effectiveness of the online recipe cookbook website.

Functionalities

1. Recipe Storage: Users can add, edit, and delete recipes, including details such as ingredients, cooking instructions, preparation time, and serving size.

2. Categorization: Recipes can be organized into categories (e.g., breakfast, lunch, dinner, desserts) for easy navigation and retrieval.

3. Search and Filter: Users can search for specific recipes by name, ingredients, or keywords, and apply filters based on dietary preferences (e.g., vegetarian, gluten-free).

4. Meal Planning: The application can help users plan their meals by allowing them to create meal plans for a specific period, incorporating recipes from their collection.

5. User Profiles: Users can create and manage profiles with personal preferences and dietary restrictions, enabling the system to suggest recipes tailored to their needs.

6. Rate and Review: Users can rate and leave reviews for recipes, providing feedback and recommendations to others in the community.

7. Scalability: The system can be expanded to accommodate a growing number of recipes and users. Overall, the Recipe Book DBMS project will offer a user-friendly and feature-rich platform for individuals to manage and explore their culinary interests while fostering a sense of community and collaboration among cooking enthusiasts.

Database Description

Every recipe has a unique ID, a unique name, a tagline describing a recipe, a rating, instructions describing the process of preparing a recipe, preparation time, and cooking time. Each recipe also keeps track of whether the recipe is vegan, gluten-free, vegetarian, or eggetarian. Each recipe also has a set of images. Each recipe is associated with exactly with many categories. There is exactly one image for every recipe category. Each recipe is a part of one cuisine. There is an image for each cuisine.

Every recipe is made up of some ingredients with a certain quantity. Every ingredient has a unique name and a specific type of measurement. Each ingredient also keeps track of nutritional information like calories, protein, fats, carbs, and

sugar per 100 gm. Each ingredient belongs to one category. There is one image for every ingredient category. Ingredients can be available in online stores. Each store has a unique name and website.

The meal plan comprises exactly four recipes. Each meal plan has a name.

There are two types of users- Registered User and Anonymous User. Any user can view or search for recipes and meal plans. Registered users can favorite meal plans. Registered users can like comment, and rate recipes. Recipe ratings will be updated according to the user's rating. Each user has a name, unique email address, and password. Every user can specify whether they are vegetarian, eggetarian, or non-vegetarian. Registered users can see recently liked recipes and meal plans. Anonymous users can register to become a registered user.

READ ME

Steps to build the project on your system -

- Ensure that python (version > 3.7) is installed in your system and pip is also included
- Install the requirements specified in requirements.txt by running `pip install -r requirements.txt` from terminal/command prompt.
- Import the dump file in MySQL workbench.
- Edit the file `settings.py` and change the USERNAME and PASSWORD fields to your database connection username and password. You may leave the DBNAME and HOST as it is.
- Once the required packages are installed, run the application by executing `python3 app.py` on mac/Linux or `python app.py` on windows.
- When you execute the application, a web server will start on a link (something like http://127.0.0.1:5001). Copy paste this link on a web browser to view the application website.
- In case you get errors saying the port is already in use, replace the value `port = 5001` at the end of app.py with any port on your system that is free.

TECHNICAL SPECIFICATIONS

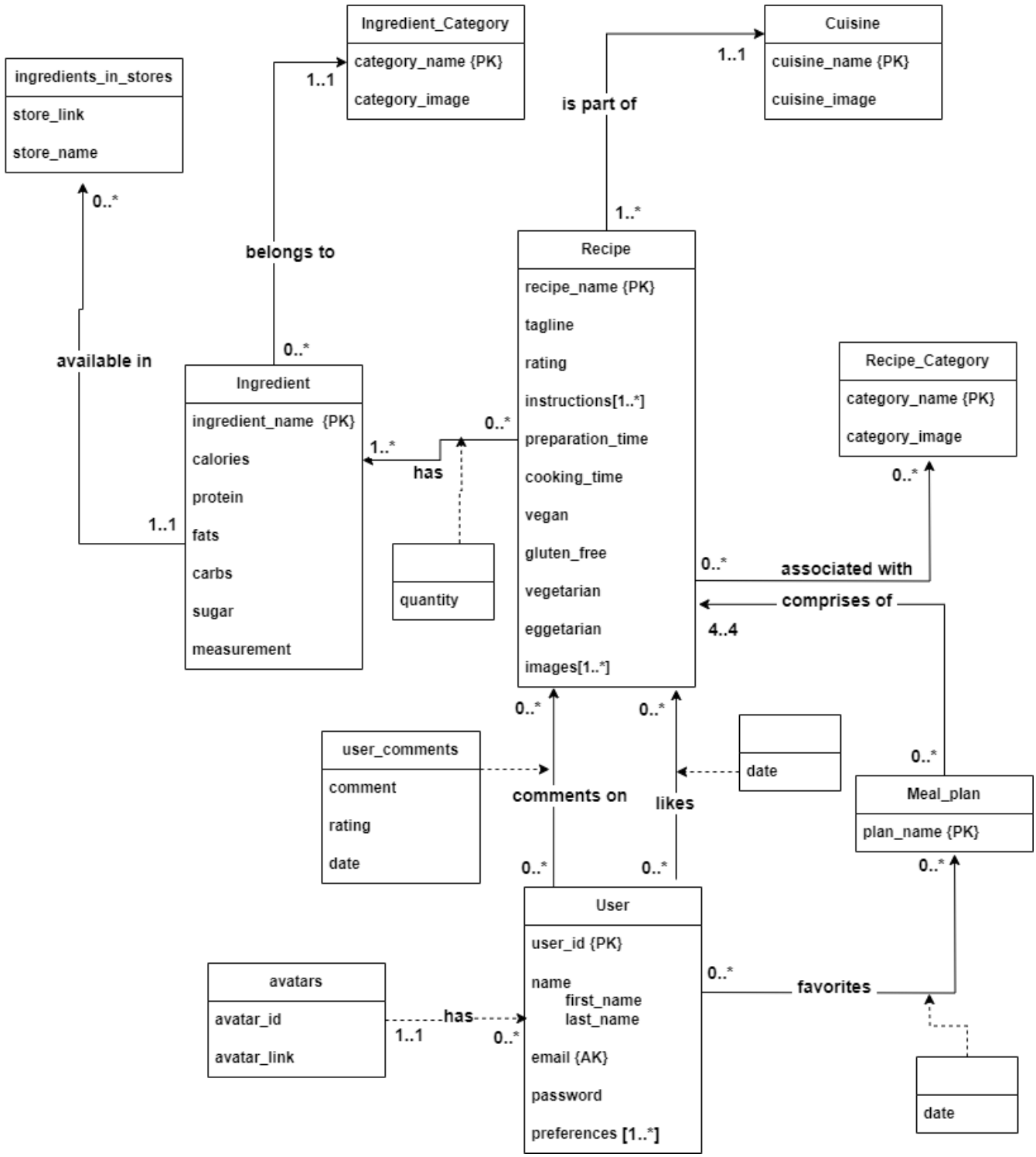
Apps, Languages and Software used:

- Apps & Software:
    1. Visual Studio Code
    2. MySQL Workbench
- Languages:
    1. Python
    2. MySQL
    3. HTML
    4. CSS
- Libraries:
    1. Numpy
    2. Matplotlib
    3. Pandas
    4. Pymysql
    5. Flask

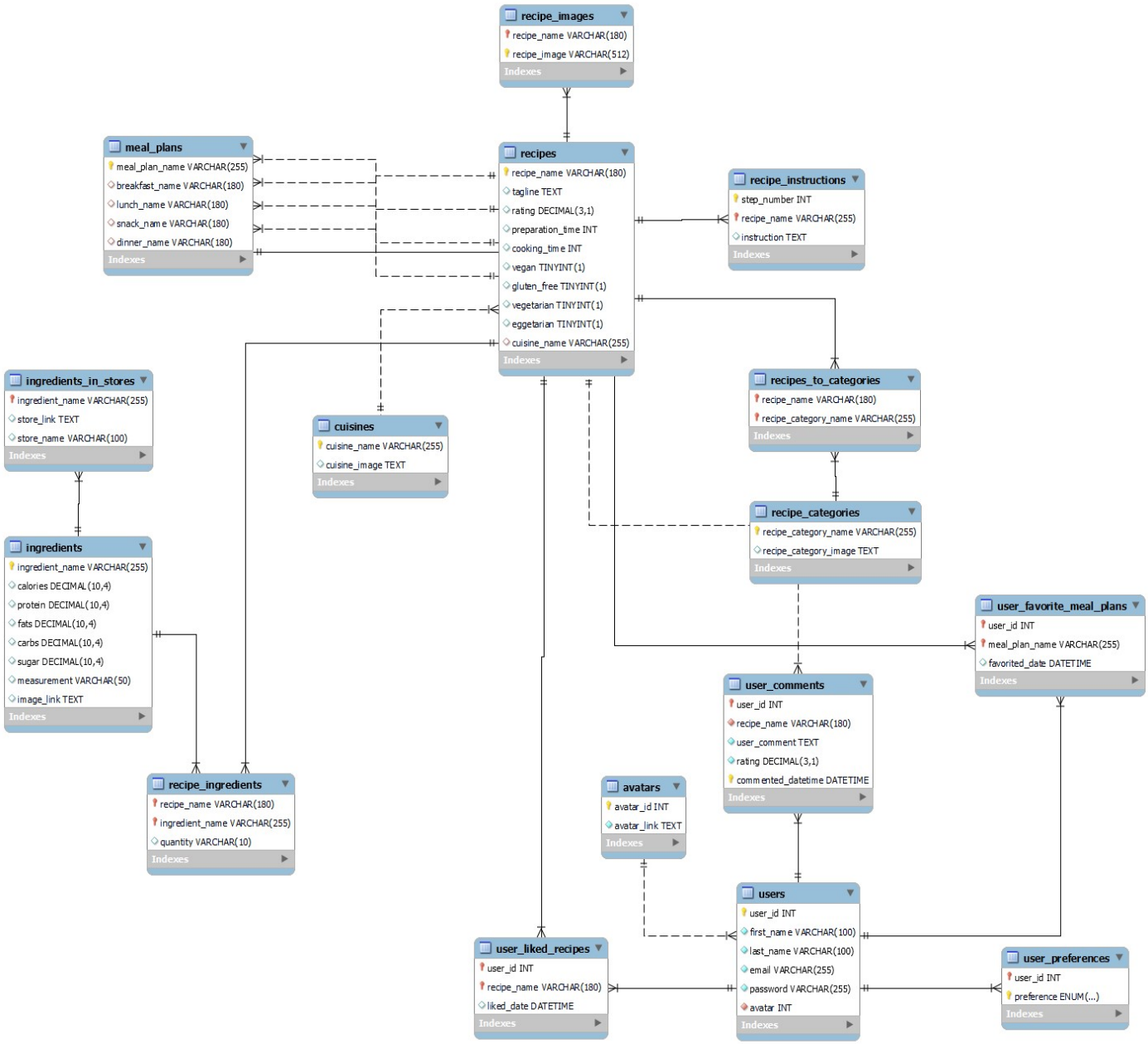
6. BeautifulSoup
7. Selenium
8. Lxml

There are no machine restrictions in the project.

CONCEPTUAL DESIGN

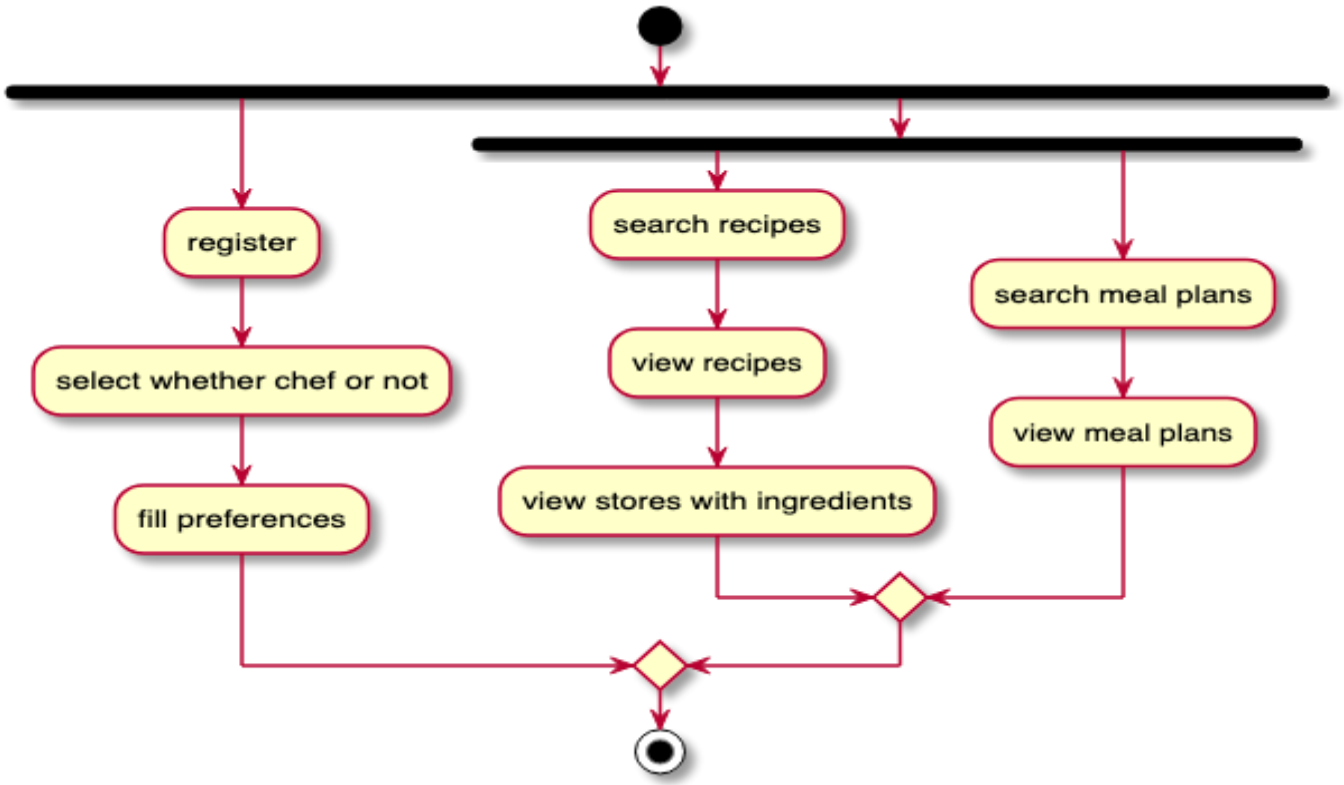


LOGICAL DESIGN

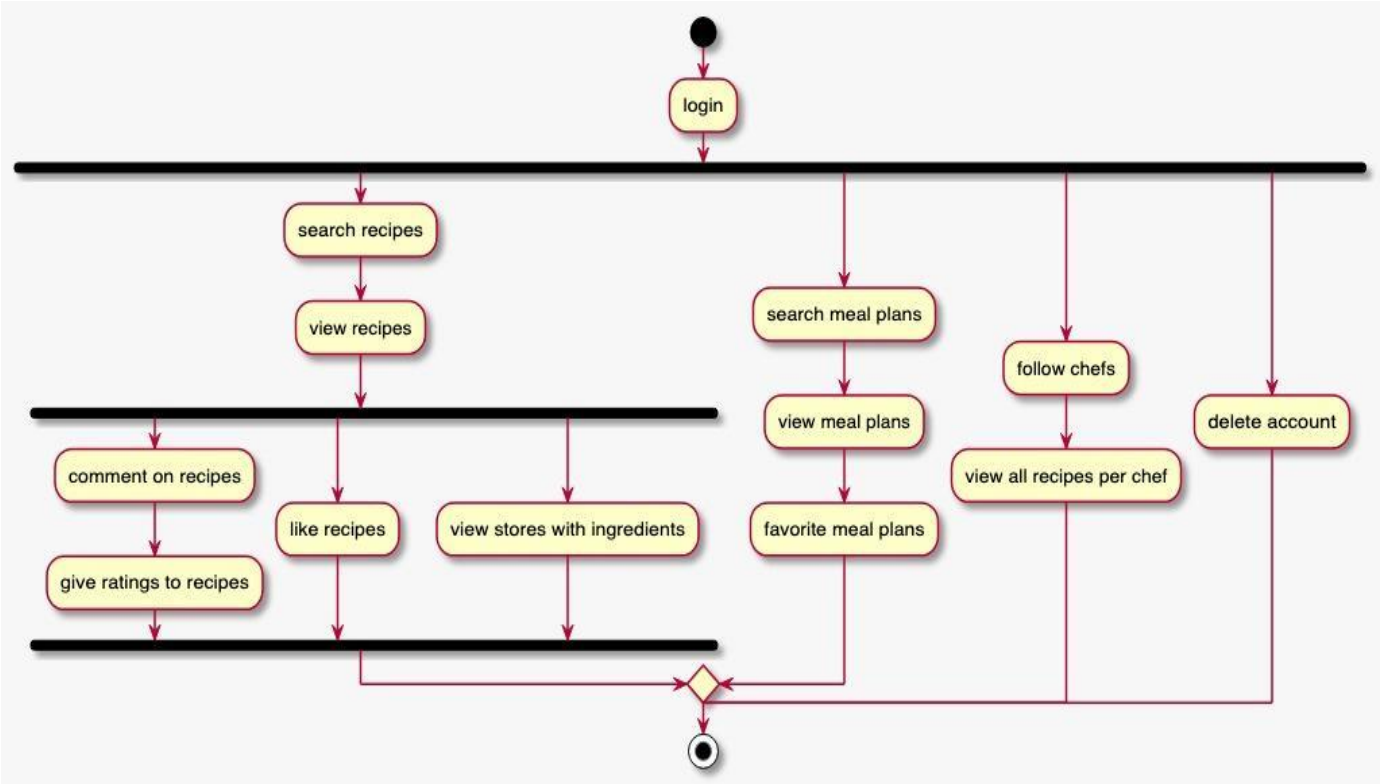


ACTIVITY DIAGRAM / USER FLOW

Anonymous User:



Registered User:



LESSONS LEARNED

By working on this project, we had developed a deeper understanding of front-end technologies like HTML and CSS, as well as back-end technologies such as Python, Flask, and MySQL. We also gained experience in full-stack development, which will prove valuable in future projects. We learnt how to create and manage relational databases, designing efficient schema, and implementing complex SQL queries.

This project has taught us the importance of effective communication and collaboration within a team, as well as task delegation and resource allocation.

We gained insights into planning and time management, learning how to set realistic goals and deadlines, and creating a project timeline to monitor progress.

An alternative approach could have been to use a different web framework, such as Django, which offers more built-in functionality and a more comprehensive admin interface. However, Flask's lightweight nature allows for more flexibility and customization. A NoSQL database, like MongoDB, could have been considered as an alternative to MySQL, offering a more flexible data model that might suit certain use cases.

FUTURE WORK

For this recipe management system, there are several potential avenues for future work and enhancements. Here are some ideas:

1. User Interactions and Recommendations:

   - Implement a recommendation system based on users' liked recipes and preferences.

   - Allow users to create and share personalized recipe collections.

2. Integration with External APIs:

   - Integrate with external APIs to fetch additional data, such as nutritional information, latest or trending recipes.

   - Implement social media sharing and authentication for a more engaging experience.

3. User Engagement and Gamification:

   - Implement a point or badge system to encourage user engagement.

   - Allow users to earn rewards or recognition for contributing recipes, leaving comments, or trying new recipes.

4. Mobile Application Development:

   - Develop a mobile application for on-the-go access to recipes and other features.

   - Ensure a responsive design for the existing web application to improve mobile usability.

BONUS WORK

Web Scraping

We have scraped recipes and ingredients data from https://www.allrecipes.com/

This website is widely used for scraping data related to recipes.

We have used BeautifulSoup, Selenium and lxml libraries to scrape the above website's data in Python. The code written for web scraping is provided along with other materials in the project directory.

User Interaction

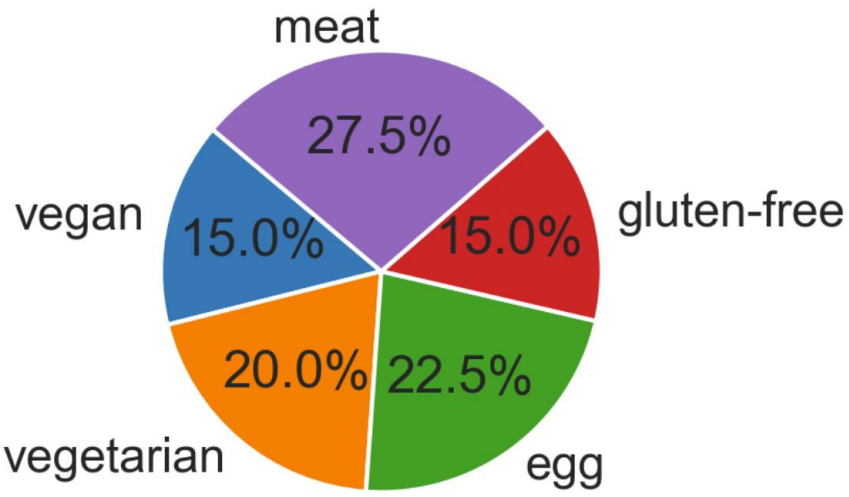
Recipe management provide an avenue for creativity and exploration. Many people enjoy experimenting with new ingredients, flavours, and cooking techniques, making it an exciting and dynamic domain. In this project, user can search for recipe's, user can like and comment on recipes. If any user wants to plan their meal for a particular day, they can opt for meal plans.

There are three roles in this project:

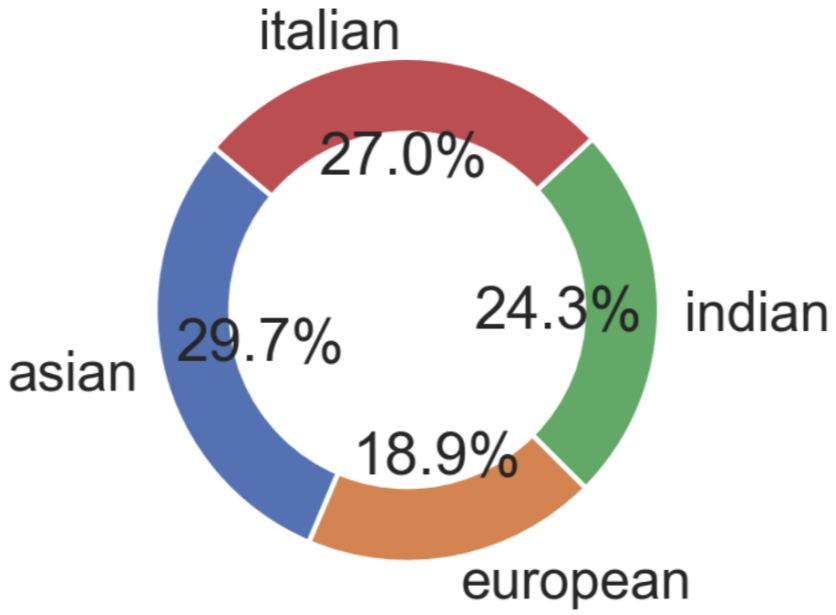
- Anonymous User: An Anonymous User is someone who can view the recipes only.
- Registered User: A registered user can view, like, comment for recipes, and add favourite meal plans.

Visualization of the data

- *Analysing User Preferences* –
  To understand the user preferences, created a pie-chart that displays the distribution of preferences (e.g., vegetarian, vegan, gluten-free) among users.



- *Most liked / Popular Cuisine* –
  To understand the trends among the cuisines based on the recipes liked, created a donut chart that shows the percentage of the recipes liked belonging to each cuisines type.



Website for the Recipe Book

We built a web application using the Flask framework. A detailed description of how to use application is provided in the video description submitted. Below is how the home page of the application looks like.