



MIDDLE EAST TECHNICAL UNIVERSITY

Department of Computer Engineering

SE560

Software Development Studio

Software Detailed Design Document

“Recipe Repository”

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1. Introduction

1.1 Problem Definition

Recipe repository system is aimed to be an online recipe bank for people. Recipes will be entered to the system by the users of the web sites. There are some cookbooks for specific kitchens like Italian meals; however they present limited tastes to the people. For the entire kitchen taste around the world there has to be many books like a library. By the recipe repository project people just look at the web site and search for the recipe they would like to have.

All recipes will be in the same format, and simple to read and understand. Users will enter their own recipes to the system easily. Users have the chance to search recipes by its full name or a part of it. And all the recipes which use one or more ingredients will be searched and listed simply.

1.2 Scope and Goals

Recipe repository is aimed to provide recipes for meals, salads, desserts, and any other food for people who seek new and different tastes all over the world. By this project all visitors of recipe repository system will get a chance to prepare their own meals and deserts from various countries and cities.

Users may add their own recipes to the system for other people to get benefit from their cooking knowledge. Also they may suggest new ingredients to the recipes already entered to the system.

Search feature of the site will be different from the ones in market already. Users may search recipes for an ingredient is used. Therefore; they will have the chance to see what kind of meals or cakes could be made by that ingredient. This feature will be an advantage over the other recipe repositories in the market.

System will only have text and image based recipes, there will not be video or sound records of how the recipe is prepared.

1.3 Design Constraints

For now, it is not supposed to have any constraints in the project.

2. Architecture

Recipe repository system will be a web application. End users of the system will access and use the application by their Internet browser like Firefox. For data storage a database will be used. And application will access this database for any data to present to end user and store to the database. This database may be in a different system from the server of the application. As database it is decided to use MS SQL Server 2005. As data access component hibernate will be used to reduce database access coding workload and for easy maintenance.

Recipe repository application is a web application therefore it will run on the IIS on windows servers since it uses .net framework technology as infrastructure. Application will be written in .net environment by using C# language. As IDE MS visual studio will be used.

The keyword describing the software architecture of Recipe Repository System is "Independency". From top to down, the architecture is constructed so that each component is unaware of the infrastructure of other components they interact with. In

order to employ this fashion of design, some *Design Patterns* are employed. Here are the patterns mentioned in the architecture of Recipe Repository.

- Model View Controller
- Facade Pattern
- Table Data Gateway

The structure of the Recipe Repository system is designed to have a Layered Architecture where each layer communicates with others in a hierarchy. In order to describe the structure mentioned, the following figure showing the architecture is given;

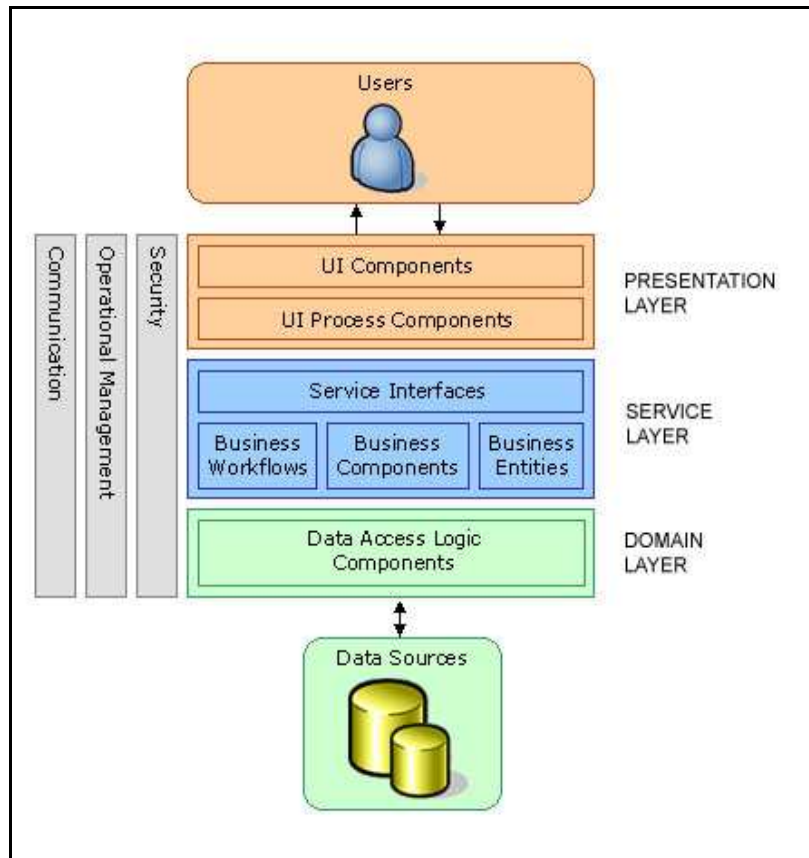


Figure 2.1 – Recipe Repository Layered Architecture

As shown in the figure, the architecture is divided into layers. The first layer consists of the Graphical User Interfaces mainly ASP.NET pages of Recipe Repository System. The UI components interact with the Service Layer.

Service Layer is the actual part where all the business logic is located. This layer follows *Interface Oriented Development* rules and its inner structure cannot be reached by other components and only the interfaces this layer provides can be used to communicate with the layer.

Domain layer is where the domain objects are located, these domain objects are used when mapping between the entity objects and database occurs. Also this layer's inner structure is invisible from external locations.

The architecture of Recipe Repository System aims *Independence and Low Coupling* in order to create a flexible system which is easy to maintain, edit and deploy.

2.1 Presentation Layer

Presentation layer is the “View” part of MVC pattern; all the html and asp.net pages (aspx) are located at this layer. The presentation layer of Recipe Repository System shows how the users view the system. What users can do, how they can interact with the system questions find their answers at this layer.

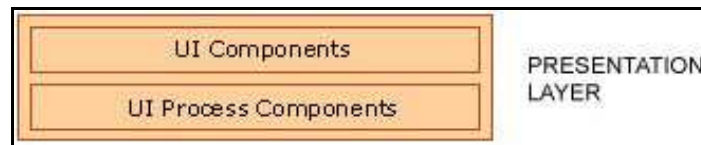


Figure 2.1.1 – Presentation Layer Representation

ASP.Net pages of Recipe Repository System are designed to have a *component-oriented structure*. There will be several **UI components** like Login, Search, View. All of these components are reusable. The idea of independency will also apply in the case of UI components by implementing these as asp.net user controls. For example there is a Login custom control which is used to login to the system. Any asp.net page in the UI layer should use this control. This control is implemented once and it will be reused by including this login web user control component.

Presentation Layer has also components called **UI Process Components** that handle the cases where the information needs to be transferred between UI components. For example, think of the process having 3 steps to upload Recipe information to the Recipe Repository System. The steps are “add ingredients”, “enter recipe details” and “add images”. Since HTML has no state, the information must be kept in the previous steps of the process in order to complete the whole. The corresponding UI Component Process will be RecipeUploadProcess that keeps track of the state of the process. Figure of what a UI Process Component does is below:

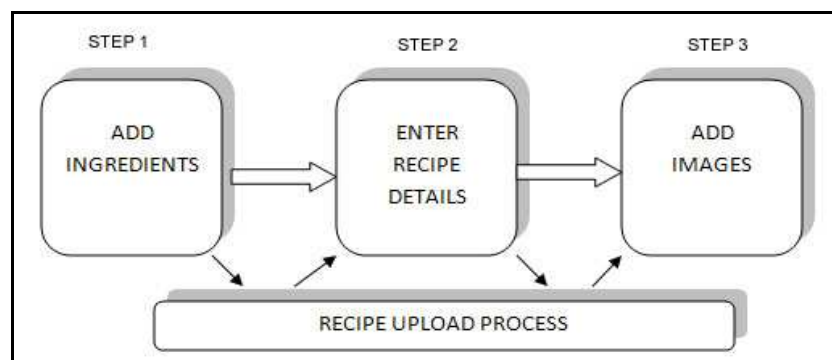


Figure 2.1.2 – Process Component Representation

2.2 Service Layer

Service Layer is where the actual business logic located. All the business and application rules and methods are defined in this layer. As mentioned in the overview, this layer is independent from the presentation layer and can work with other presentation layers without any problem. The idea behind this structure is to use an interface-oriented layer, we kept the inner structure as a secret and only show the api of the interface we provided. The only thing to do, in order to use the service layer is adding the dll file of the layer to the references and use the api.

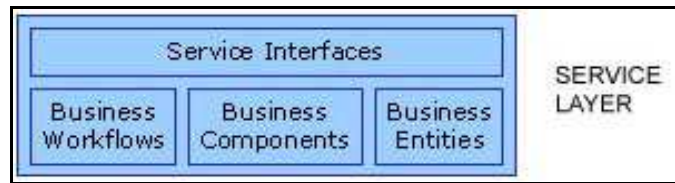


Figure 2.2.1 – Service Layer Representation

The name of the first interface is *IIngredientManager*, these interface provides several methods. A component called *IngredientManager* implements this interface and defines the business rules. Another interface is *IUserManager* which is implemented by *UserManager*. These are the components of the **service interfaces** part of the layer.

The design pattern used in our service layer is Facade, from the figure above, it should be seen that the interface in the figure corresponds to our interface, the components in the subsystem corresponds to our business components and finally the outer components that communicate with the interface express the asp.net pages.

Shortly, the Service layer is independent from other layers and can be deployed as a single dll file as mentioned. The API to use the layer will be provided by us, and the presentation layer components like asp.net pages will interact with the service layer using the wrapper functions.

2.3 Domain Layer

Domain layer is the location where all the database interaction occurs. All the entities and relations in the Recipe Repository database are mapped to the **Domain Object Models**. For example, there exist tables in database called Ingredient Table. The corresponding domain object models of these entities are the objects with the same name which are located in the domain layer. Following is the figure of the Domain Layer.

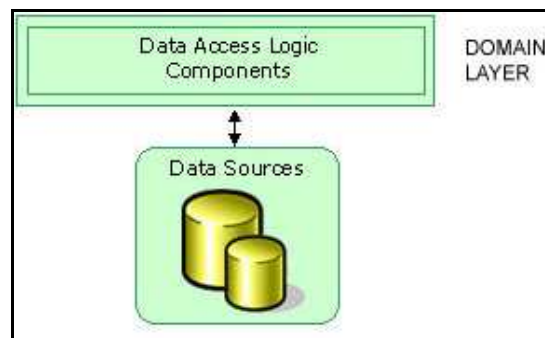


Figure 2.3.1 – Domain Layer Representation

Business Entities sent from service layer correspond to the Domain Object Models described above like Ingredient or User. The components located in domain layer are the Data Access Logic Components. These components are related to the business entities and there exists a data access logic component for each business entity. Together, the business entity and the data access logic component forms the **"Data Access Object"**. We have chosen the design pattern called **Data Table Gateway** in order to map the domain layer to the physical database model. Here is the schema representing the Data Table Gateway Pattern.

The aim is to separate the SQL code from the domain layer and centralize the SQL code. Since in our case, *IngredientDAO* and *UserDAO* objects must interact with the database, an object called **SQLHelper** will manage all the SQL code and leave the Gateways

unaware of the SQL code. For example, calling `UserDAO.find( id )` returns a `User` using SQL code embedded in the `find` method, however by using the `SQLHelper` in Domain Layer, `find` method will call the `find` method in `SQLHelper` and does not bother with the SQL itself. This makes the SQL centralized in only one place and flexible because the only thing to change the database to use will be to change only one single line of code. In our project we used `NHibernate` technology to do `SQLHelper` activities. Using this technology decreases the size of the code and effort. Also it prevents the SQL Injection problems. This is another example of the independence and flexible structure of Recipe Repository Architecture.

3. Data Design

3.1 Ingredient Table

Name	Type	Supplementary Information
id	Int32	NOT NULL
Name	Text	NOT NULL
Type	Int32	NOT NULL
Description	Text	NULL
duration	Varchar(10)	NULL
Serves	Varchar(10)	NULL
Category_id	Int32	NOT NULL

3.2 User Table

Name	Type	Supplementary Information
username	Varchar(100)	NOT NULL
Name	Varchar(100)	NOT NULL
Lastname	Varchar(100)	NOT NULL
password	Varchar(100)	NOT NULL

3.3 Recipe_Category Table

Name	Type	Supplementary Information
id	Int32	NOT NULL
Name	Varchar(100)	NOT NULL

3.4 Quantity Table

Name	Type	Supplementary Information
id	Int32	NOT NULL
Name	Varchar(100)	NOT NULL

3.5 Ingredient_Pieces Table

Name	Type	Supplementary Information
id	Int32	NOT NULL
Ingredient_id	Int32	NOT NULL
Parent_id	Int32	NOT NULL

3.6 Quantities Table

Name	Type	Supplementary Information
id	Int32	NOT NULL
Ingredient_pieces_id	Int32	NOT NULL
quantity_id	Int32	NOT NULL
Quantity_value	Varchar(10)	NOT NULL

3.7 User_ingredients Table

Name	Type	Supplementary Information
id	Int32	NOT NULL
Ingredient_pieces_id	Int32	NOT NULL
username	Varchar(100)	NOT NULL

3.8 ER Diagram

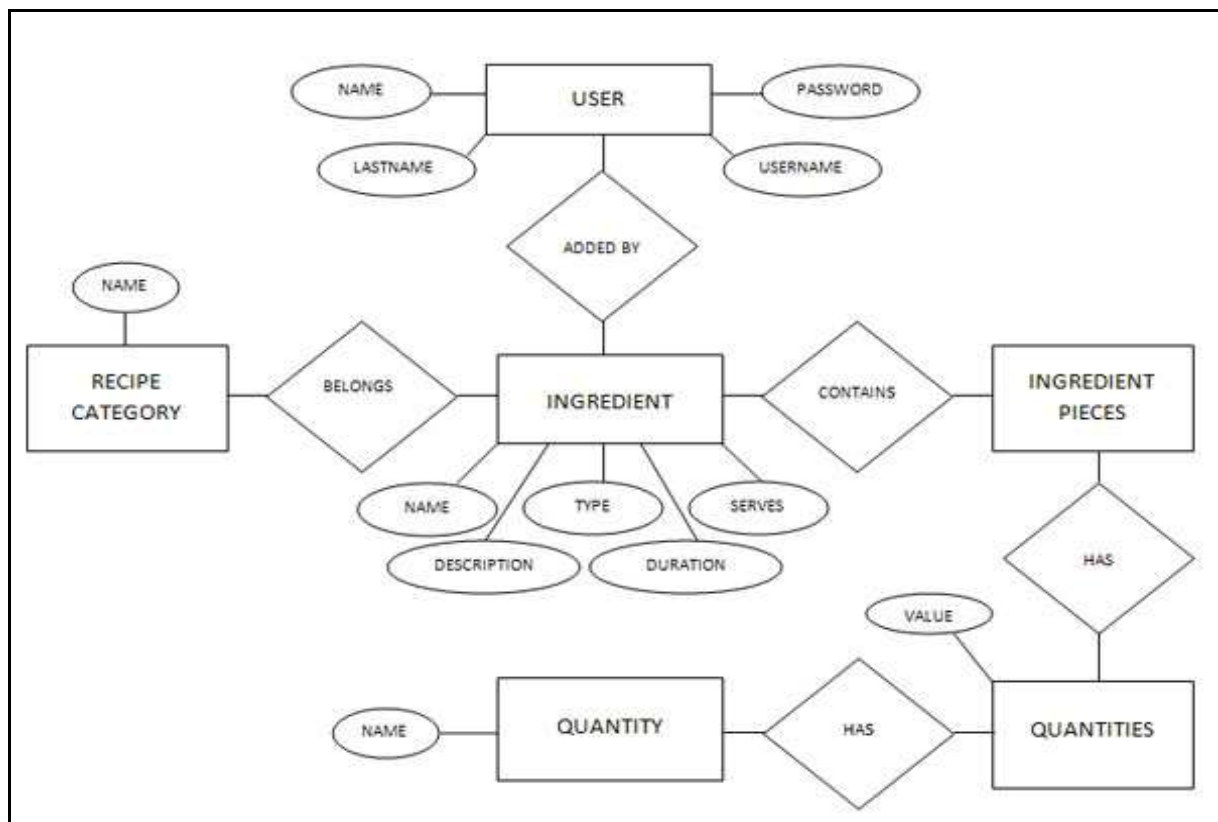


Figure 3.8.1 – ER Diagram

4. Data Dictionary

The descriptions of the fields in the database tables are as follows:

4.1 Ingredient Table

Recipe and ingredient will be hold in the same database table the type field will be used for identification.

- **Id:** is the id of the ingredient. This field is unique for each entry.
- **Name:** is the name of the ingredient.

- **Type:** is the type of the ingredient. 0- is for ingredient, 1- is for recipe, and 2- is for both.
- **Description:** is the description of the ingredient which describes the details of the entry.
- **Duration:** is the time for a recipe to be prepared.
- **Serves:** is the data for how many people this recipe is good.
- **Category_id:** is the category of the recipe i.e. Desert, meal

4.2 User Table

User table is designed to hold the user information which is the registered users of the system.

- **Username:** is the username of the user. This field is unique for each user.
- **Password:** is the password of the user. This field holds the password in md5 hash format.
- **Name:** is the name of the user.
- **Lastname:** is the lastname of the user.

4.3 Recipe_Category Table

Recipe_category table is designed to hold recipe categories like desert, and soup.

- **Id:** is the id of the recipe category. This field is unique for each entry.
- **Name:** is the name of the category.

4.4 Quantity Table

Quantity table is designed to hold quantity types like spoon, liter, and gram.

- **Id:** is the id of the quantity. This field is unique for each entry.
- **Name:** is the name of the quantity like gram, spoon, and unit.

4.5 Ingredient_Pieces Table

This table is designed to hold the pieces of an ingredient and a recipe. Since a recipe can also be an ingredient or an ingredient also has constituents, this table holds the relation between the entries in the ingredient table.

- **Id:** is the id of the recipe category. This field is unique for each entry.
- **Ingredient_id:** is the ingredient id which is used in the parent_id entry.
- **Parent_id:** the recipe or the ingredient which has the ingredients referenced in the ingredient_id field.

4.6 Quantities Table

Quantities table holds the ingredient piece quantity value with its type. For example, 100 gr. sold is added.

- **Id:** the unique number for the quantities entry.
- **Ingredient_pieces_id:** the ingredient piece id referenced by ingredient_pieces table.
- **quantity_id:** referrer the quantity type in the quantity table.
- **Quantity_value:** the value that how much this ingredient has in the recipe.

4.7 User_ingredients Table

- **Id:** the unique id for each entry.
- **Ingredient_pieces_id:** references the entry in the ingredient_pieces table.
- **Username:** the username that identifies who entered this entry. This references the user table.

5. Class Diagram

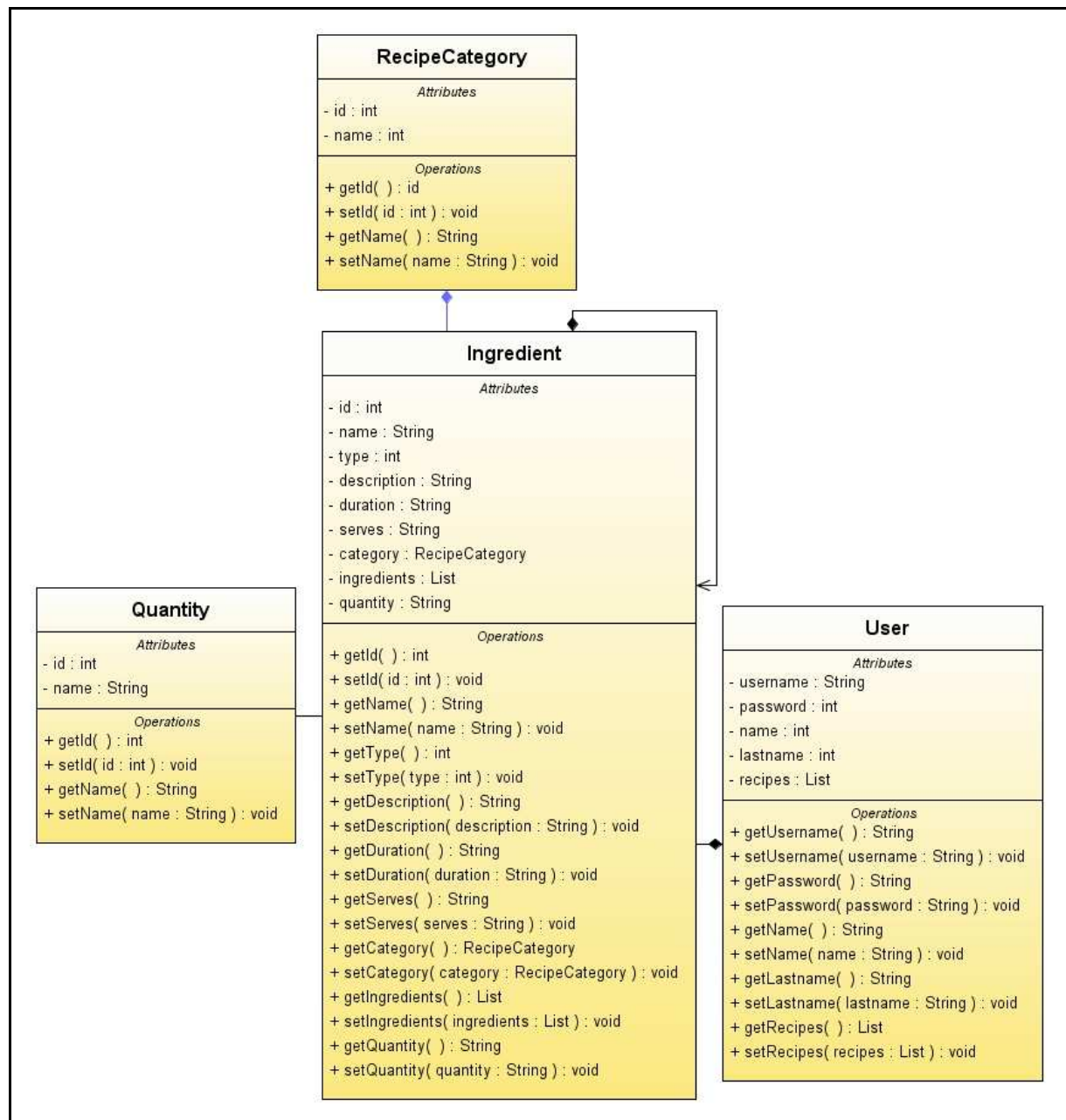


Figure 3.1 – Class Diagram of Recipe Repository System

User: is the class for user objects which are the users of the system. Users will enter their recipes and ingredients to other recipes each entry will be recorded by their username.

Ingredient: ingredient class is for ingredient and recipes objects. Since both of them have the same properties and undefined subcategory relationship, it is thought to design as shown in the figure for recipe and ingredient. By this design it is provided to include as much as ingredient and pieces for ingredient. Also each entry may be an ingredient, recipe, or both. This is classified by type property.

Quantity: is the class for quantity type. It has only id and name attributes. Each ingredient will have a quantity type and value that shows how much this ingredient is used.

RecipeCategory: is the class to hold category objects like desert or soup.

6. Activity Diagrams:

6.1 Add Recipe

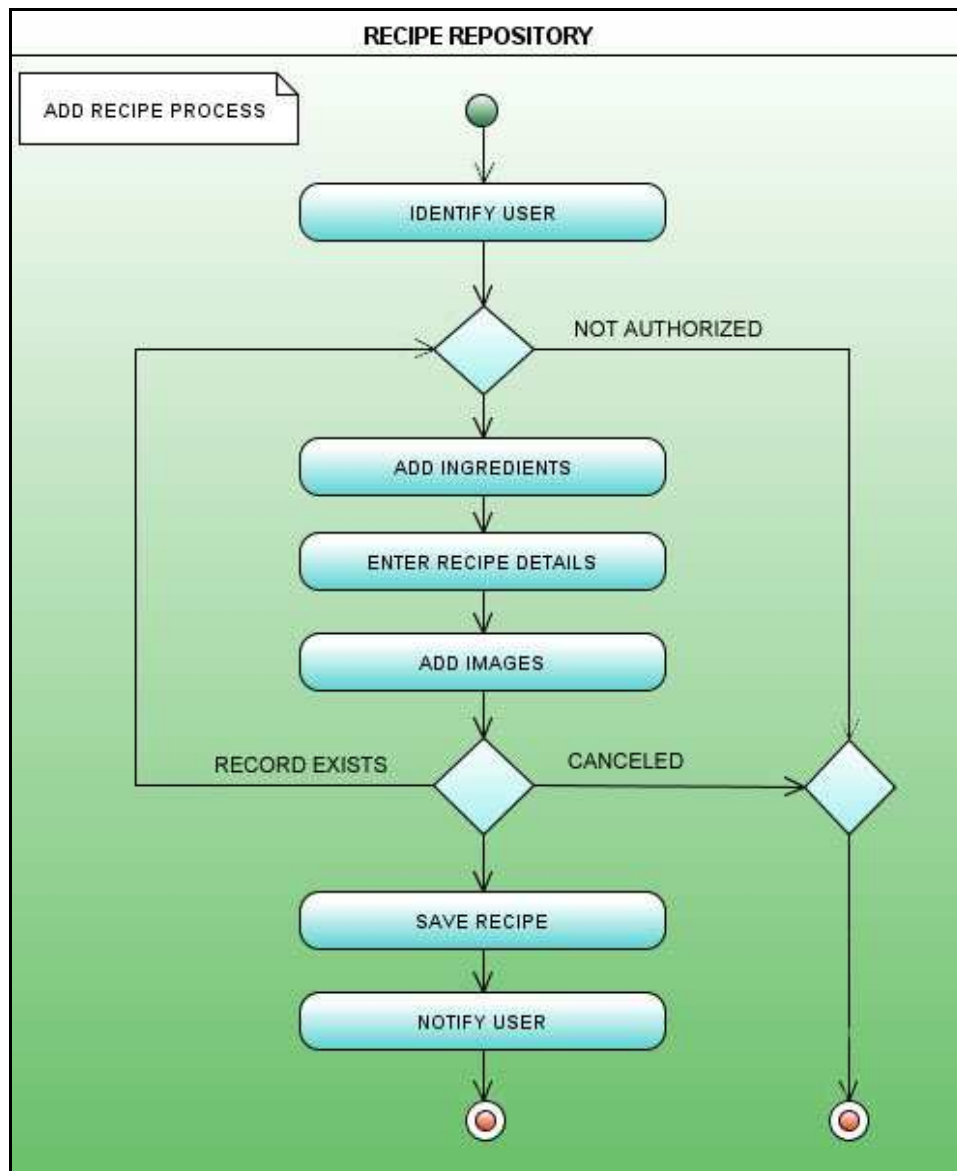


Figure 6.1.1 – Add Recipe Activity Diagram

6.2 Search For Recipe

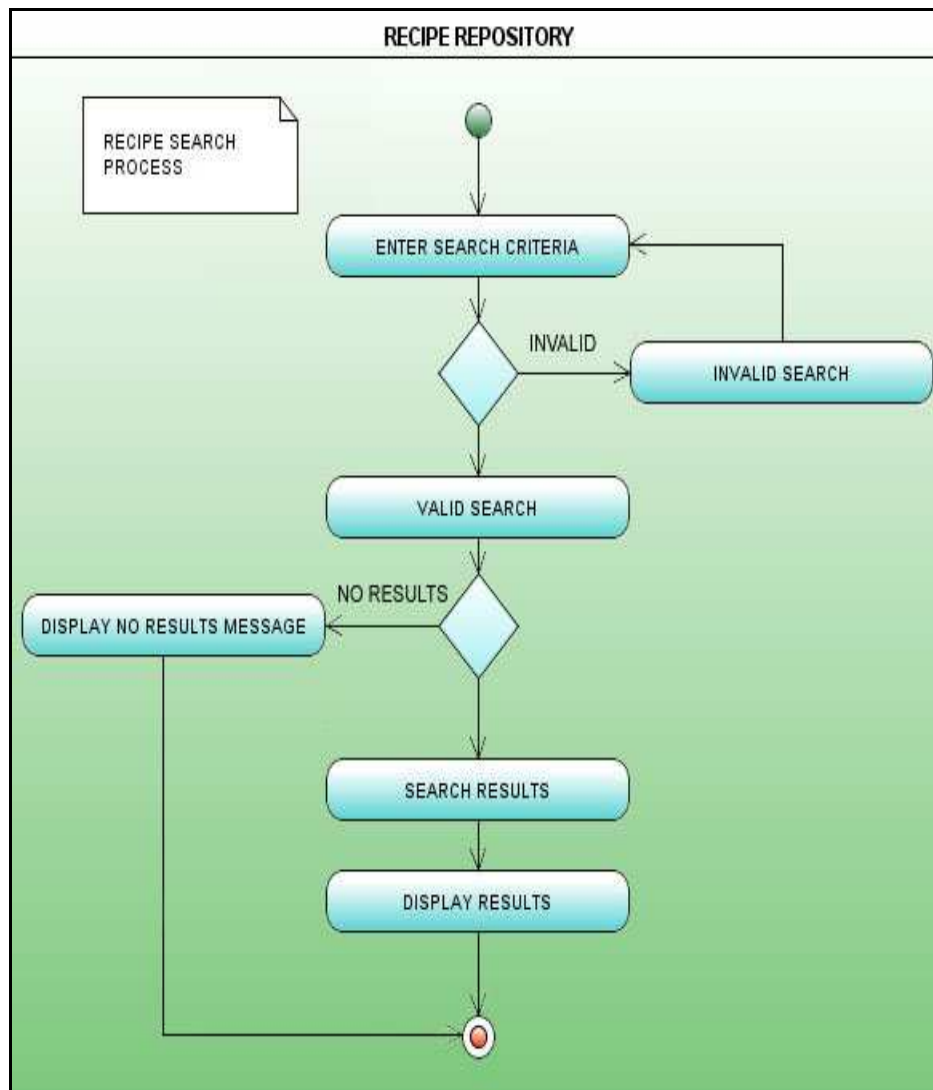


Figure 6.2.1 – Search For Recipe Activity Diagram

6.3 Add Ingredient

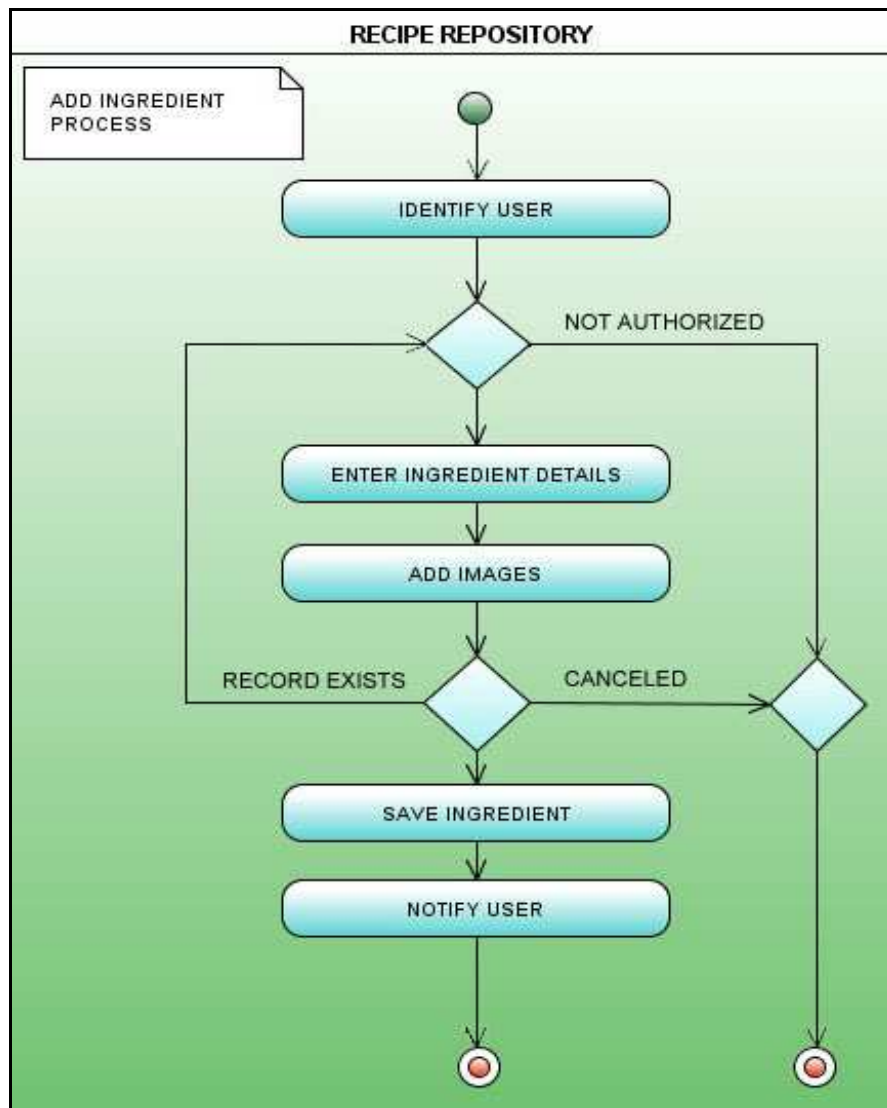


Figure 6.3.1 – Add Ingredient Activity Diagram

7. Sequence Diagrams:

7.1 Add Recipe

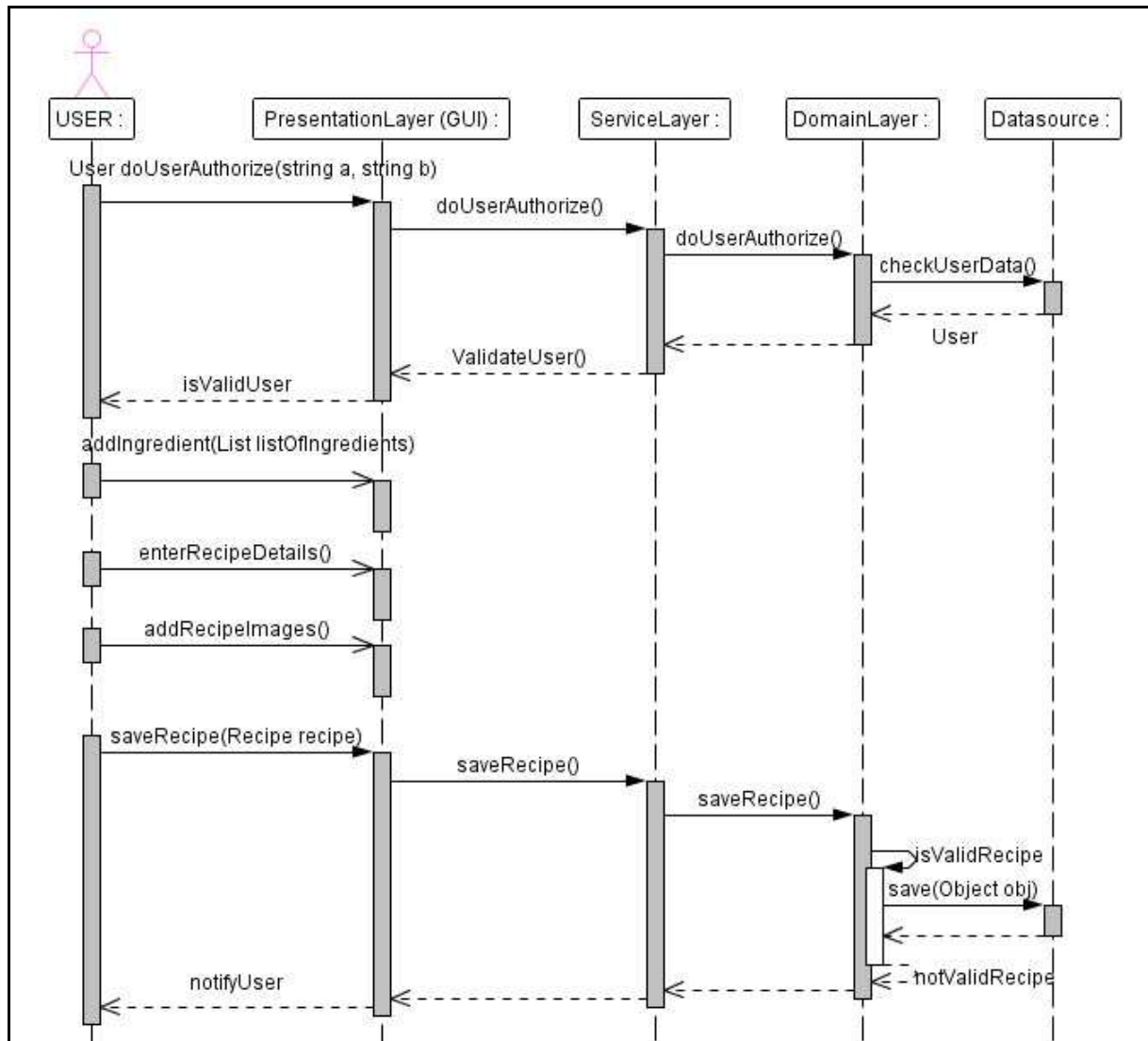


Figure 7.1.1 – Add Recipe Sequence Diagram

7.2 Search For Recipe

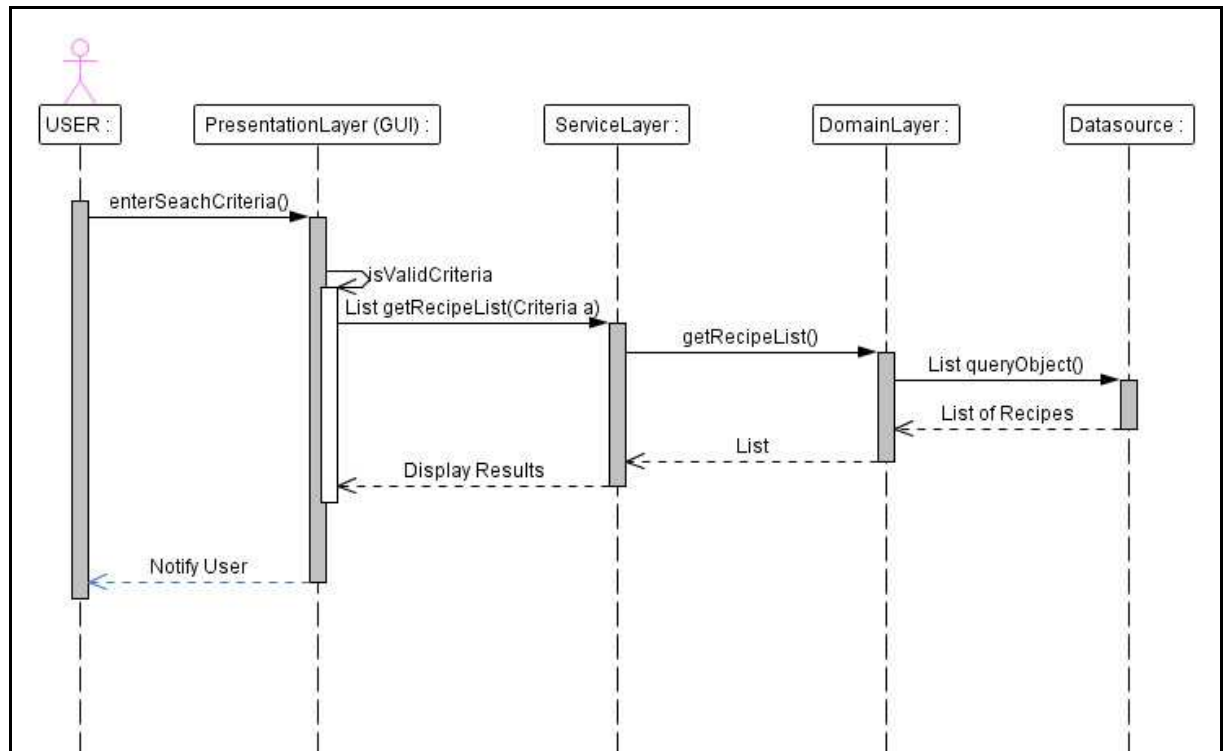


Figure 7.2.1 – Search For Recipe Sequence Diagram

7.3 Add Ingredient

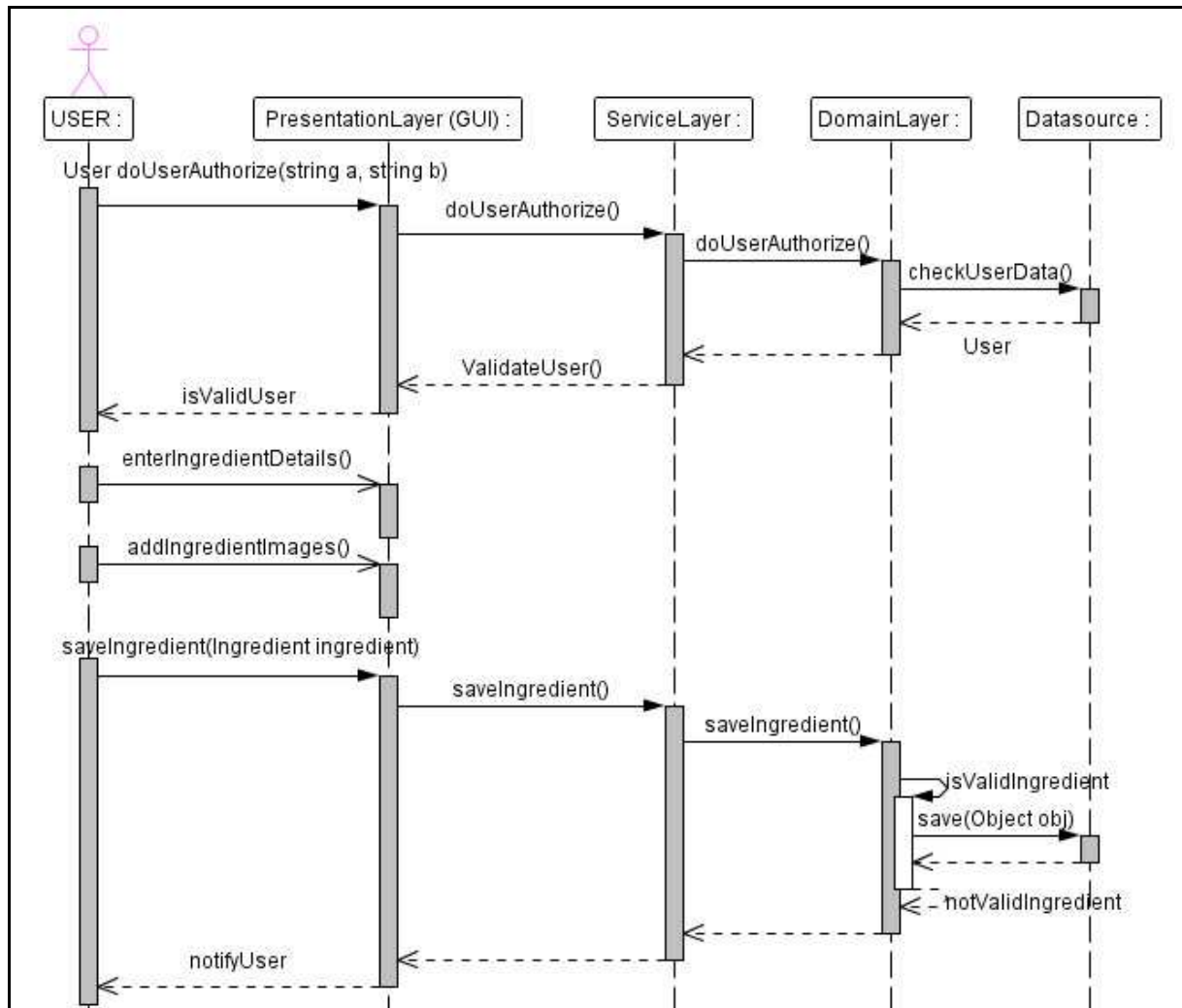


Figure 7.3.1 – Add Ingredient Sequence Diagram

8 Collaboration Diagrams:

8.1 Add Recipe

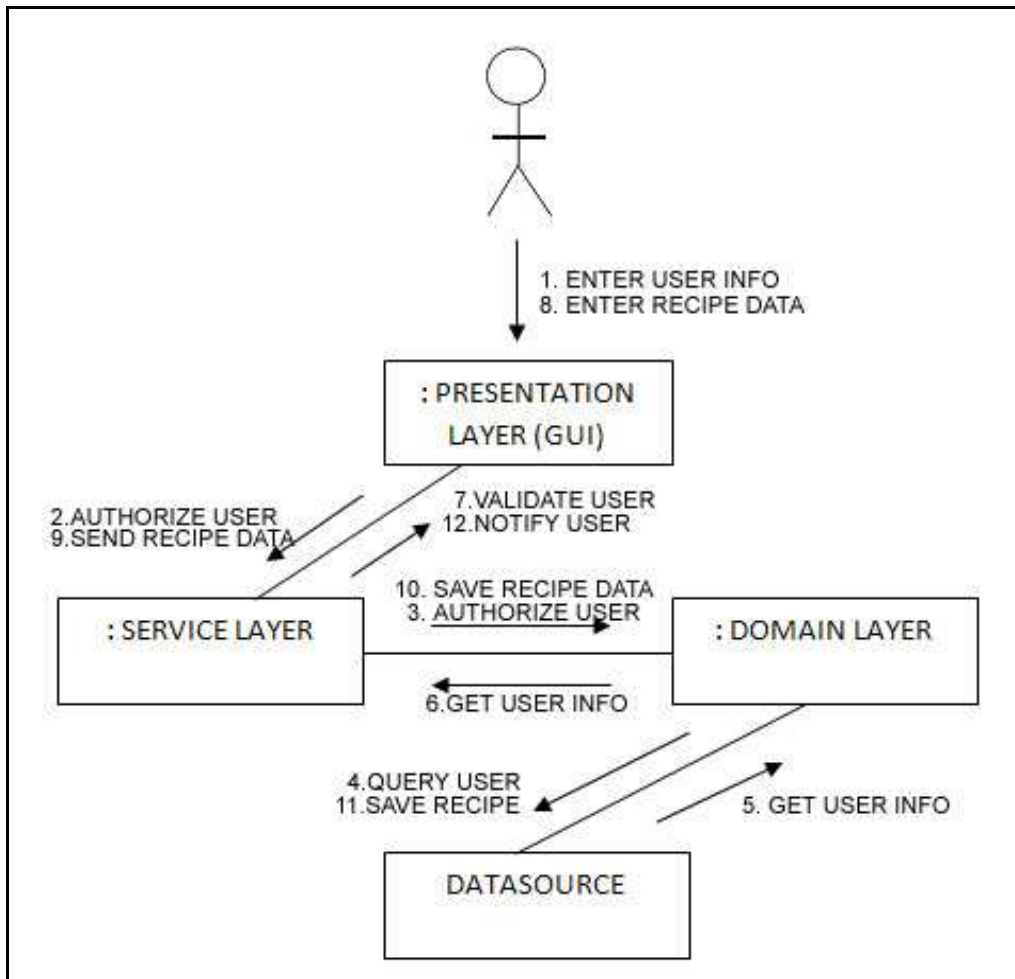


Figure 8.1.1 – Add Recipe Collaboration Diagram

8.2 Search For Recipe

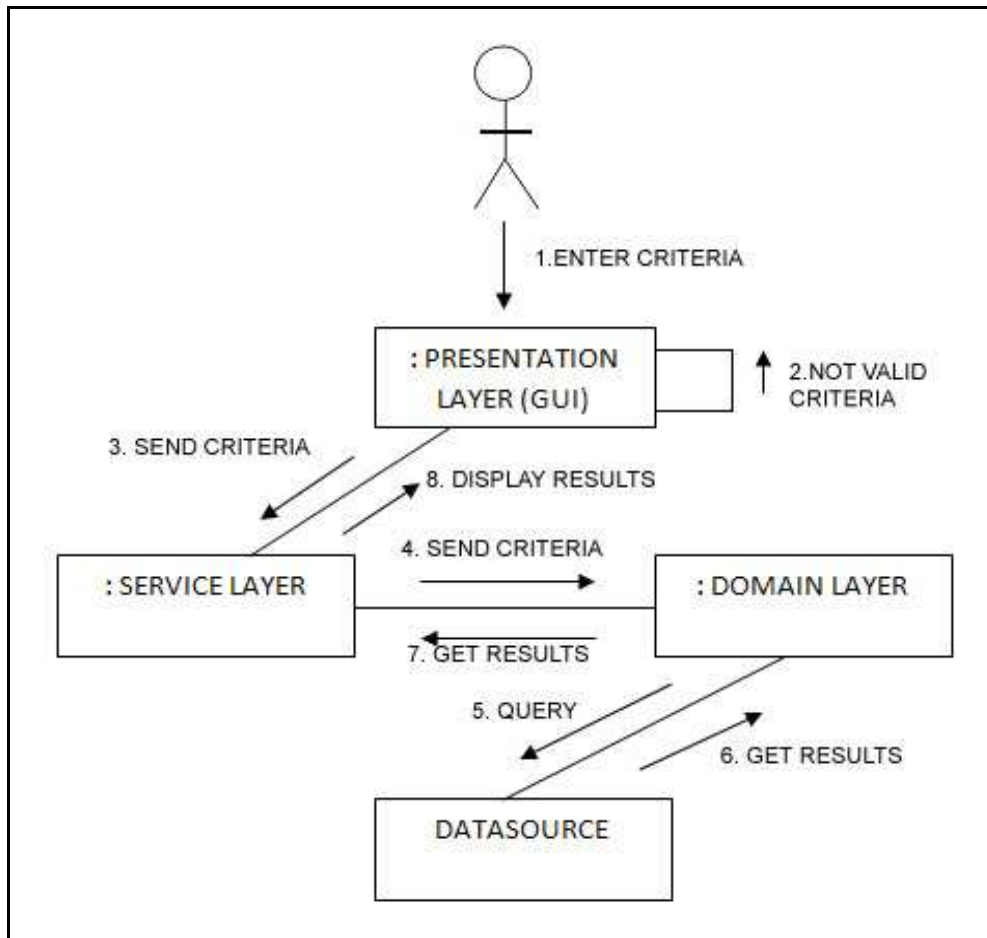


Figure 8.2.1 – Search For Recipe Collaboration Diagram

8.3 Add Ingredient

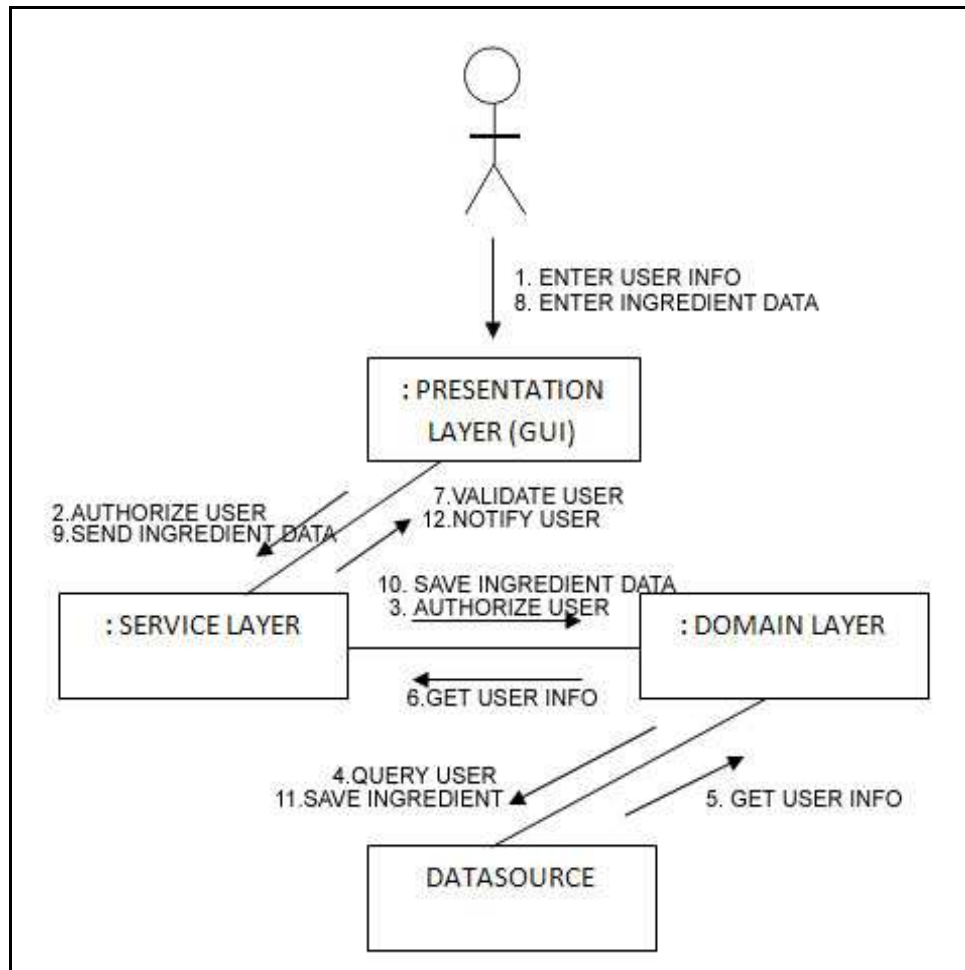


Figure 8.3.1 – Add Ingredient Collaboration Diagram

9 User Interfaces:

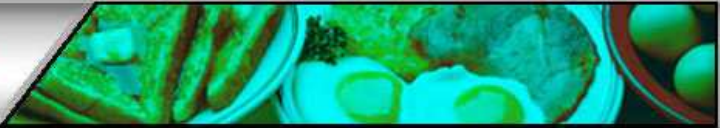
9.1 Main Page



Figure 9.1.1 – Main Page

9.2 Recipes Page

RECIPE REPOSITORY



RECIPE REPOSITORY



Recipe Repository is the most popular cooking website on net. You can find thousands of recipes with respect to your need and your materials at home. You can also add your own recipes and become one of the cooks of our site.

MARKET ONLINE



You can order ingredients from Gima Supermarket by connecting to online-ordering site of Gima. Gima supermarket is just one click away from you [READ MORE](#)

RECIPES



ALPHABETIC LIST

If you want to reach any recipe, check out here. The recipes are grouped alphabetically and waiting for you. All you have to do is to click the link below and wait:)

[VIEW ALL RECIPES](#)



SEARCH FOR RECIPES

You can search for recipes from the big archive of Recipe Repository. There are thousands of recipes and we are sure you can find something useful for your self and for any occasion. Recipes are all tested and tasted.

[SEARCH FOR RECIPES](#)



UPLOAD YOUR RECIPES

Recipe Repository is an interactive web site and we want our users to participate in it. You can upload your own recipes. Each recipe will be tested by our cooks and then they will be added to our archive to share with others.

[UPLOAD YOUR RECIPES](#)

Top 10 Recipes

1. Pumpkin Gooley Butter Cakes	6. Corn Casserole
2. Pumpkin Gingerbread Trifle	7. Mrs. Hoggle's Stuffed Cranberry Sauce
3. Southern Cornbread Stuffing	8. Apple and Onion Stuffin' Muffins
4. Herb Roasted Turkey : Breast with Pan Gravy	9. Autumn Potato Gratin
5. Fancy Green Beans	10. Oven Roasted Red Potatoes with Rosemary

WELCOME
Fatih Tuna
[LOG OUT](#)

MENU

- MAIN
- RECIPES
- INGREDIENTS
- QUANTITIES
- MARKET
- CONTACT
- LINKS

WeeklyPoll

Which is your favourite dessert?

☐ Cake

☐ Ice - Cream

☐ Pudding

☐ Tart

[VOTE](#) [VIEW RESULTS](#)

Figure 9.2.1 – Recipes Page

9.3 Recipe Search Page

RECIPE REPOSITORY



RECIPE REPOSITORY



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MARKET ONLINE



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SEARCH FOR RECIPES

SEARCH DETAILS

Name	
Type	Any v
Duration	
Serves	

NO	NAME	TYPE
1	FOOD (A)	Cool Food
2	FOOD (B)	Cool Food
3	FOOD (C)	Cool Food
4	FOOD (D)	Cool Food
5	FOOD (E)	Cool Food

1 2



SEARCH WITH INGREDIENTS

If you can not find the recipe you are looking for, you can also try searching with ingredients. This option also allows you to find what you can cook.

WELCOME
Fatih Tuna

MENU

- MAIN
- RECIPES
- INGREDIENTS
- QUANTITIES
- MARKET
- CONTACT
- LINKS

WeeklyPoll

Which is your favourite dessert?

☐ Cake

☐ Ice - Cream

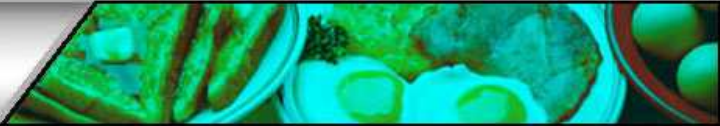
☐ Pudding

☐ Tart

Figure 9.3.1 – Recipes Search Page

9.4 Recipe Upload – Add Ingredients Page

RECIPE REPOSITORY



RECIPE REPOSITORY



Recipe Repository is the most popular cooking website on net. You can find thousands of recipes with respect to your need and your materials at home. You can also add your own recipes and become one of the cooks of our site.

MARKET ONLINE



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UPLOAD YOUR RECIPE

STEPS: **Ingredients** / Recipe Details / Images

INGREDIENTS	
Name	INGREDIENT A
Quantity	10
Q.Type	Q.TYPE A

[BACK](#) [ADD](#) [CLEAR](#) [NEXT](#)

NO	INGREDIENT
☐ 1	INGREDIENT A / 10 Q.TYPE A

[Remove](#)

WELCOME
Fatih Tuna
[LOG OUT](#)

MENU

- MAIN
- RECIPES
- INGREDIENTS
- QUANTITIES
- MARKET
- CONTACT
- LINKS

WeeklyPoll

Which is your favourite dessert?

☐ Cake

☐ Ice - Cream

☐ Pudding

☐ Tart

[VOTE](#) [VIEW RESULTS](#)

Figure 9.4.1 - Add Ingredients Page

9.5 Recipe Upload – Enter Recipe Details Page

RECIPE REPOSITORY



RECIPE REPOSITORY



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MARKET ONLINE



You can order ingredients from Gima Supermarket by connecting to online ordering site of Gima. Gima supermarket is just one click away from you [READ MORE](#)

UPLOAD YOUR RECIPE

STEPS: Ingredients/ **Recipe Details** /Images

RECIPE DETAILS	
Name	RECIPE A
Type	Sea Food
Duration	10
Serves	10
Description	RECIPE A DESCRIPTION

[BACK](#) [NEXT](#)

WELCOME
Fatih Tuna
[LOG OUT](#)

MENU

- MAIN
- RECIPES
- INGREDIENTS
- QUANTITIES
- MARKET
- CONTACT
- LINKS

WeeklyPoll

Which is your favourite dessert?

☐ Cake

☐ Ice - Cream

☐ Pudding

☐ Tart

[VOTE](#) [VIEW RESULTS](#)

Figure 9.5.1 - Enter Recipe Details Page

9.6 Recipe Upload – Add Images Page

RECIPE REPOSITORY



RECIPE REPOSITORY



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MARKET ONLINE



You can order ingredients from Gima Supermarket by connecting to online-ordering site of Gima. Gima supermarket is just one click away from you [READ MORE](#)

UPLOAD YOUR RECIPE

STEPS: [Ingredients](#) / [Recipe Details](#) / **Images**

IMAGE GALLERY



[DELETE] [SAVE]

UPLOAD IMAGES

WELCOME
Fatih Tuna

MENU

- MAIN
- RECIPES
- INGREDIENTS
- QUANTITIES
- MARKET
- CONTACT
- LINKS

WeeklyPoll

Which is your favourite dessert?

☐ Cake

☐ Ice - Cream

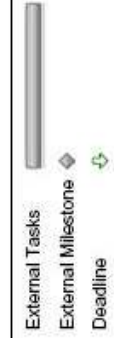
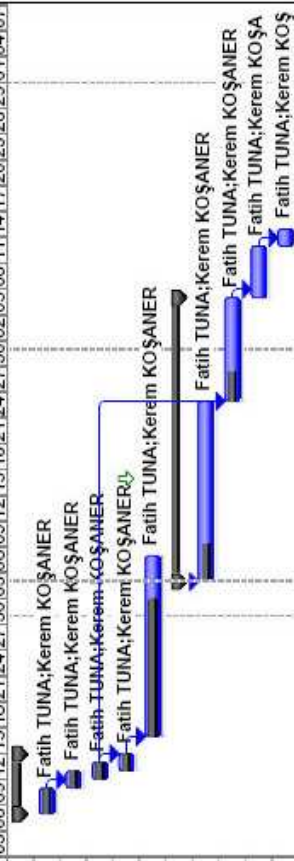
☐ Pudding

☐ Tart

Figure 9.6.1 – Add Images Page

10 Schedule:

ID	Task Name	Duration	Start	Finish	Predecessors	November 2008	December 2008	January 2009	February
1	Project Analysis	6 days	Sat 08.11.08	Fri 14.11.08		03 06 09 12 15 18 21 24 27 30 03 06 09 12 15 18 21 24 27 30 02 05 08 11 14 17 20 23 26 29 01 04 07			
2	Customer Interviews	2 days	Sat 08.11.08	Mon 10.11.08					
3	Market Research	2 days	Tue 11.11.08	Wed 12.11.08					
4	Requirement Analysis	2 days	Wed 12.11.08	Thu 13.11.08					
5	Software Requirement Analysis	2 days	Thu 13.11.08	Fri 14.11.08					
6	Project Design	15 days	Mon 17.11.08	Sun 07.12.08					
7	Project Implementation	23 days	Fri 05.12.08	Tue 06.01.09					
8	Business Services Coding	15 days	Fri 05.12.08	Thu 25.12.08					
9	GUI Development	8 days	Fri 26.12.08	Tue 06.01.09					
10	Tests	4 days	Wed 07.01.09	Mon 12.01.09					
11	Production	2 days	Tue 13.01.09	Wed 14.01.09					



Project: Project1
Date: Fri 05.12.08