|  |  |
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|  | **MINISTRY OF**  **EDUCATION AND TRAINING** |

**CAPSTONE PROJECT REPORT**

**Report 4 – Software Design Document**

- Hanoi, December 2021 -

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# Acronyms and Definitions

|  |  |  |
| --- | --- | --- |
| **#** | **Acronym** | **Definition** |
| 1 | PK | Primary Key |
| 2 | FK | Foreign Key |
| 3 | CI | Continuous Integration |
| 4 | CD | Continuous Delivery |
| 5 | VPS | Virtual Private Server |

*Acronyms and Definitions Table*

# Record of changes

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Status** | **In charge** | **Change description** |
| 11/20/2021 | A | VietNH | Add all heading for report |
| 12/10/2021 | M | VietNH | Complete System Architechture Design |
| 12/13/2021 | M | VietNH | Complete Database Design, Detail Design |

A – Added, M – Modified, D – deleted

# 

# Report IV. Software Design Description

## 1. System Architecture Design

### 1.1. Overall Architecture

Figure 1.1. 4HTN Overall Architecture

### 1.2. System Architecture

#### 1.2.1. Front-end Components

##### 1.2.1.1. ReactJS

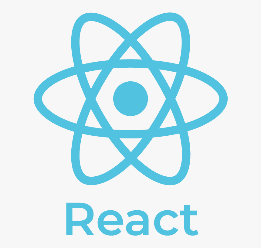


Figure 1.2.1.1. “ReactJS” Logo

The React.js framework is an open-source JavaScript framework and library developed by Facebook. It's used for building interactive user interfaces and web applications quickly and efficiently with significantly less code than you would with vanilla JavaScript.

##### 1.2.1.2. NodeJS

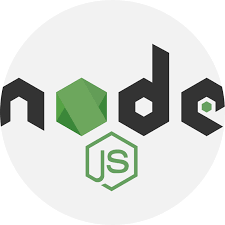


Figure 1.2.1.2. “NodeJS” Logo

Node.js is an open-source, cross-platform JavaScript runtime environment and library for running web applications outside the client's browser. Ryan Dahl developed it in 2009, and its latest iteration, [version 15.14,](https://nodejs.org/en/blog/release/v15.14.0/) was released in April 2021. Developers use Node.js to create server-side web applications, and it is perfect for data-intensive applications since it uses an asynchronous, event-driven model.

##### 1.2.1.3. Ant Design

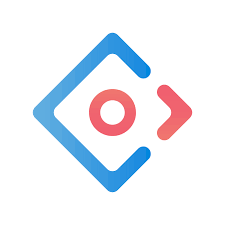


Figure 1.2.1.3. “Ant Design” Logo

**Ant Design** is a **React UI library** that contains easy-to-use components that are useful for building interactive user interfaces. It is very easy to use as well as integrate. It is one of the smart options to design web applications using react. It provides us with high-quality components which can be used with ease.

##### 1.2.1.4.

Figure 1.2.1.4.

##### 1.2.1.5.

Figure 1.2.1.5.” Logo

#### 1.2.2. Back-end Components

##### 1.2.2.1. Spring Boot[[1]](#footnote-1)

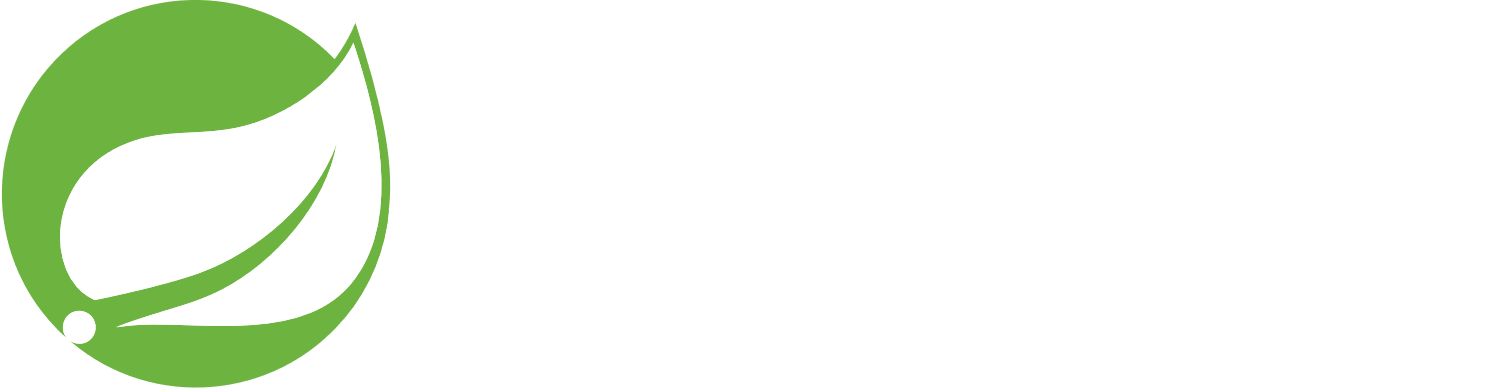


Figure 1.2.2.1. “Spring Boot” Logo

Spring Boot is an open-source Java-based framework used to create a micro-service. It is developed by Pivotal Team and is used to build stand-alone and production ready spring applications.

##### 1.2.2.2. Json Web Tokens[[2]](#footnote-2)

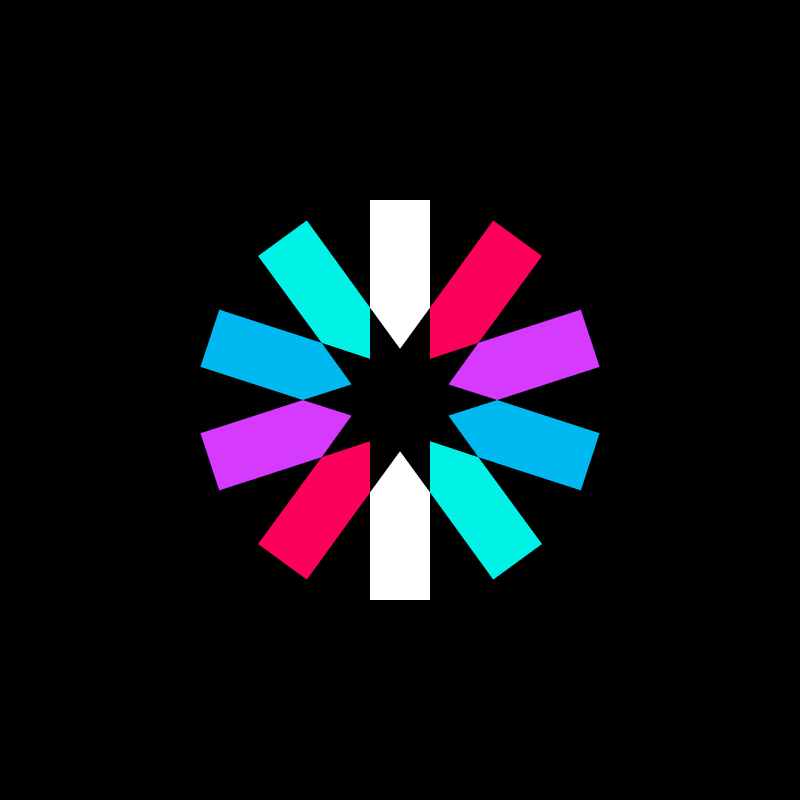


Figure 1.2.2.2. “JWT” Logo

JSON Web Token is a proposed Internet standard for creating data with optional signature and/or optional encryption whose payload holds JSON that asserts some number of claims. The tokens are signed either using a private secret or a public/private key.

##### 1.2.2.3.

Figure 1.2.2.3.

##### 1.2.2.4.

Figure 1.2.2.4.

#### 1.2.3. Database



Figure 1.2.3. MySQL Workbench

MySQL Workbench is a unified visual tool for database architects, developers, and DBAs. MySQL Workbench provides data modeling, SQL development, and comprehensive administration tools for server configuration, user administration, backup, and much more. MySQL Workbench is available on Windows, Linux and Mac OS X.

#### 1.2.4. Deployment & Hosting

##### 1.2.4.1. GitLab



Figure 1.2.4.1. “GitLab” Logo

GitLab is one of America's fastest-growing private software companies, posting[huge gains in 2021](https://www.reuters.com/technology/coding-platform-gitlab-valued-1348-bln-shares-climb-debut-2021-10-14/). The company provides a central server that manages Git repositories and is used to simplify the administration tasks of many corporations worldwide. According to Wikipedia, GitLab has over 100,000 users and is used by large, well-known organizations such as IBM, Sony, Goldman Sachs, and NASA.

##### 1.2.4.2. Github Actions[[3]](#footnote-3)

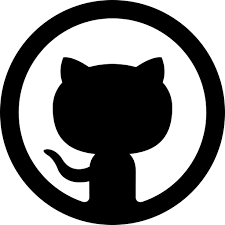


Figure 1.2.4.2. “Github Actions” Logo

GitHub is a for-profit company that offers a cloud-based Git repository hosting service. Essentially, it makes it a lot easier for individuals and teams to use Git for version control and collaboration.

### 1.3. Package Diagrams

#### 1.3.1. Frontend

Figure 1.3.1. Frontend Package Diagram

|  |  |  |
| --- | --- | --- |
| **No** | **Package** | **Description** |
| 1 | navigations | House navigation stacks and navigation functions to move between multiple screens. |
| 2 | pages | House screens of the application |
| 3 | view - components | House reusable components for the screens. |
| 4 | assets | House images and logos of the application. |
| 5 | utilities | House helper functions for lightweight logic and creates HTTP requests and stores. |
| 6 | config | House theme configuration. |
| 7 | constants | House constant variables (strings, numbers, default values) are used across the application. |
| 8 | models | House models of the store. Contains all states and actions to communicate with API. |

Table 1.3.1. Frontend package details

#### 1.3.2. Backend

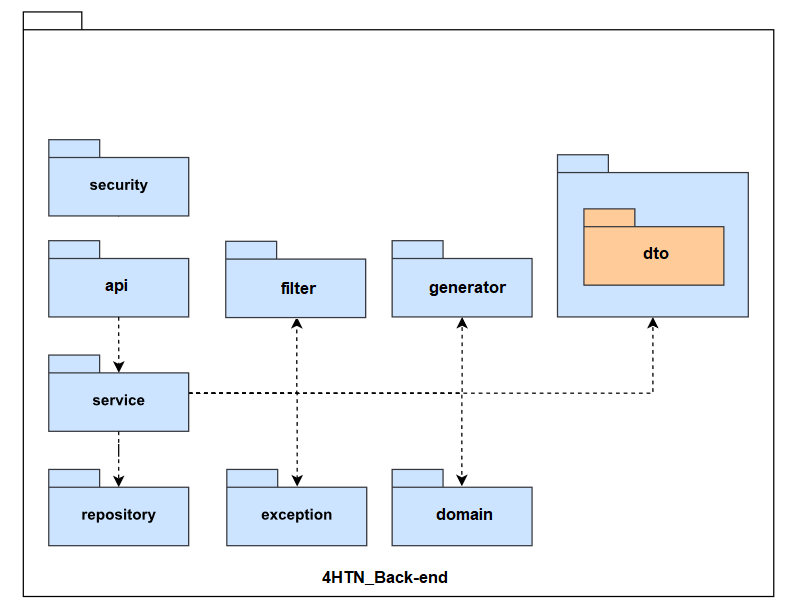


Figure 1.3.2. Backend Package Diagram

|  |  |  |
| --- | --- | --- |
| **No** | **Package** | **Description** |
| 1 | security | Contains classes used for configuration |
| 2 | api | Contains classes which handle incoming requests |
| 3 | service | Contains classes which are used to perform business logic. These classes communicate with data tier, process data then return to controller classes |
| 4 | repository | Contains interfaces which communicate with the database and return them to service classes |
| 5 | filter | Used for authentication and authorization |
| 6 | dto | Contains objects used to transfer data between controller and service |
| 7 | exception | Contains custom exceptions and exceptions handler |
| 8 | domain | Contains classes represent real entities which can be persisted in database and some additional helper classes |
| 9 | generator | Contains objects used to handling combinatorial division algorithm |

Table 1.3.2. Backend package details

## 2. Database Design

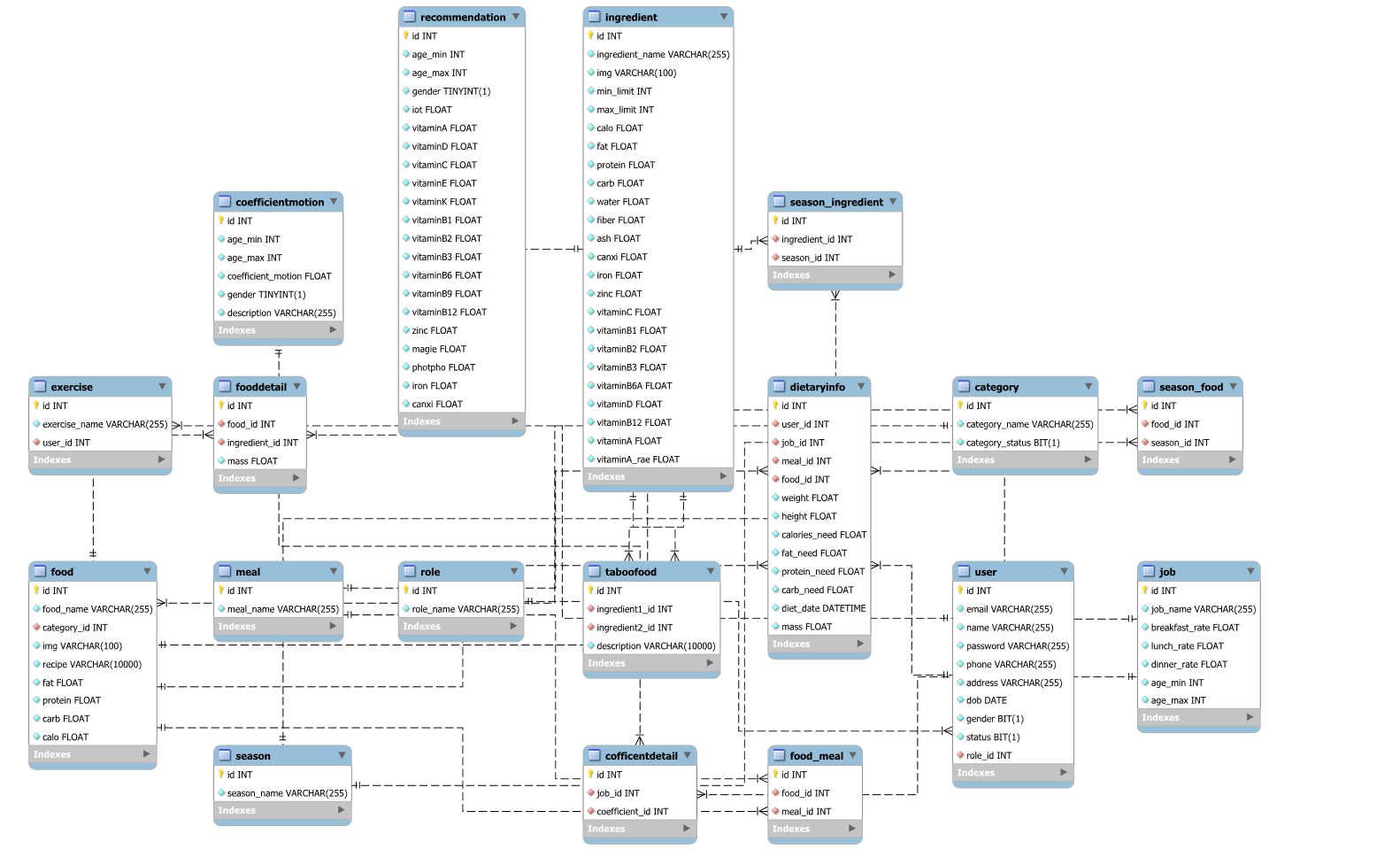


Figure 2. 4HTN Database design

### 2.1. Table “user”

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **#** | **Field name** | **Type** | **Size** | **Unique** | **Not Null** | **PK/FK** | **Notes** |
| 1 | id | int |  | x | x | PK |  |
| 2 | email | varchar | 255 |  | x |  |  |
| 3 | name | varchar | 255 |  | x |  |  |
| 4 | password | varchar | 255 |  | x |  |  |
| 5 | phone | varchar | 255 |  | x |  |  |
| 6 | address | date |  |  | x |  |  |
| 7 | gender | bit | 1 |  | x |  |  |
| 8 | status | status | 1 |  | x |  |  |
| 9 | role\_id | int |  |  | x |  |  |

Table 2.1. Table”user”

### 2.2. Table “dietaryinfo”

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **#** | **Field name** | **Type** | **Size** | **Unique** | **Not Null** | **PK/FK** | **Notes** |
| 1 | id | int |  | x | x | PK |  |
| 2 | user\_id | int |  |  | x | FK |  |
| 3 | job\_id | int |  |  | x | FK |  |
| 4 | meal\_id | int |  |  | x | FK |  |
| 5 | food\_id | int |  |  | x | FK |  |
| 6 | weight | float |  |  | x |  |  |
| 7 | height | float |  |  | x |  |  |
| 8 | calories\_need | float |  |  | x |  |  |
| 9 | fat\_need | float |  |  | x |  |  |
| 10 | protein\_need | float |  |  | x |  |  |
| 11 | carb\_need | float |  |  | x |  |  |
| 12 | diet\_date | datetime |  |  | x |  |  |
| 13 | mass | float |  |  | x |  |  |

Table 2.2. Table”dietaryinfo”

### 2.3. Table “Job”

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **#** | **Field name** | **Type** | **Size** | **Unique** | **Not Null** | **PK/FK** | **Notes** |
| 1 | id | int |  | x | x | PK |  |
| 2 | job\_name | varchar | 255 |  | x |  |  |
| 3 | breakfast\_rate | float |  |  | x |  |  |
| 4 | lunch\_rate | float |  |  | x |  |  |
| 5 | dinner\_rate | float |  |  | x |  |  |
| 6 | age\_min | int |  |  | x |  |  |
| 7 | age\_max | int |  |  | x |  |  |

Table 2.3. Table\_Job

### 2.4. Table “Food”

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **#** | **Field name** | **Type** | **Size** | **Unique** | **Not Null** | **PK/FK** | **Notes** |
| 1 | id | int |  | x | x | PK |  |
| 2 | food\_name | varchar | 255 |  | x |  |  |
| 3 | img | varchar | 100 |  | x |  |  |
| 4 | category\_id | int |  |  | x | FK |  |
| 5 | recipe | varchar | 10000 |  | x |  |  |
| 6 | fat | float |  |  | x |  |  |
| 7 | protein | float |  |  | x |  |  |
| 8 | carb | float |  |  | x |  |  |
| 9 | calo | float |  |  | x |  |  |

Table 2.4. Table\_Food

### 2.5. Table “Category”

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **#** | **Field name** | **Type** | **Size** | **Unique** | **Not Null** | **PK/FK** | **Notes** |
| 1 | id | int |  | x | x | PK |  |
| 2 | category\_name | varchar | 255 |  | x |  |  |
| 3 | category\_status | bit | 1 |  | x |  |  |

Table 2.5. Table Category

### 2.6. Table “Season”

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **#** | **Field name** | **Type** | **Size** | **Unique** | **Not Null** | **PK/FK** | **Notes** |
| 1 | id | int |  | x | x | PK |  |
| 2 | season\_name | varchar | 255 |  | x |  |  |

Table 2.6. Table Season

### 2.7. Table “CoefficentMotion”

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **#** | **Field name** | **Type** | **Size** | **Unique** | **Not Null** | **PK/FK** | **Notes** |
| 1 | id | int |  | x | x | PK |  |
| 2 | age\_min | int |  |  | x |  |  |
| 3 | age\_max | int |  |  | x |  |  |
| 4 | coefficient\_motion | float |  |  | x |  |  |
| 5 | gender | tinyint | 1 |  | x |  |  |
| 6 | description | varchar | 255 |  | x |  |  |

Table 2.7. Table “CoefficentMotion”

### 2.8. Table “Recommendation”

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **#** | **Field name** | **Type** | **Size** | **Unique** | **Not Null** | **PK/FK** | **Notes** |
| 1 | id |  |  | x | x | PK |  |
| 2 | min\_age | int |  |  | x |  |  |
| 3 | max\_age | int |  |  | x |  |  |
| 4 | gender | tinyint |  |  | x |  |  |
| 5 | iot | float |  |  | x |  |  |
| 6 | maggie | float |  |  | x |  |  |
| 7 | photpho | float |  |  | x |  |  |
| 8 | vitaminB9 | float |  |  | x |  |  |
| 9 | vitaminE | float |  |  | x |  |  |
| 10 | fiber | float |  |  | x |  |  |
| 11 | ash | float |  |  | x |  |  |
| 12 | canxi | float |  |  | x |  |  |
| 13 | iron | float |  |  | x |  |  |
| 14 | zinc | float |  |  | x |  |  |
| 15 | vitaminC | float |  |  | x |  |  |
| 16 | vitaminB1 | float |  |  | x |  |  |
| 17 | vitaminB2 | float |  |  | x |  |  |
| 18 | vitaminB3 | float |  |  | x |  |  |
| 19 | vitaminB6A | float |  |  | x |  |  |
| 20 | vitaminB12 | float |  |  | x |  |  |
| 21 | vitaminD | float |  |  | x |  |  |
| 22 | vitaminA | float |  |  | x |  |  |

Table 2.8. Table”Remommendation”

### 2.9. Table “Ingredient”

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **#** | **Field name** | **Type** | **Size** | **Unique** | **Not Null** | **PK/FK** | **Notes** |
| 1 | id | bigserial |  | x | x | PK |  |
| 2 | ingredient\_name | varchar | 255 |  | x |  |  |
| 3 | img | varchar | 100 |  | x |  |  |
| 4 | min\_limit | int |  |  | x |  |  |
| 5 | max\_limit | int |  |  | x |  |  |
| 6 | calo | float |  |  | x |  |  |
| 7 | carb | float |  |  | x |  |  |
| 8 | protein | float |  |  | x |  |  |
| 9 | fat | float |  |  | x |  |  |
| 10 | water | float |  |  | x |  |  |
| 11 | fiber | float |  |  | x |  |  |
| 12 | ash | float |  |  | x |  |  |
| 13 | canxi | float |  |  | x |  |  |
| 14 | iron | float |  |  | x |  |  |
| 15 | zinc | float |  |  | x |  |  |
| 16 | vitaminC | float |  |  |  |  |  |
| 17 | vitaminB1 | float |  |  | x | FK |  |
| 18 | vitaminB2 | float |  |  | x | FK |  |
| 19 | vitaminB3 | float |  |  | x |  |  |
| 20 | vitaminB6A | float |  |  | x |  |  |
| 21 | vitaminB12 | float |  |  | x |  |  |
| 22 | vitaminD | float |  |  |  |  |  |
| 23 | vitaminA | float |  |  |  |  |  |
| 24 | vitaminArae | float |  |  |  |  |  |

Table 2.9. Table “Ingredient”

### 2.10. Table “Season\_Ingredient”

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **#** | **Field name** | **Type** | **Size** | **Unique** | **Not Null** | **PK/FK** | **Notes** |
| 1 | id |  |  | x | x | PK |  |
| 2 | season\_id | int |  |  | x |  |  |
| 3 | ingredient\_id | int |  |  | x |  |  |

Table 2.10. Season\_Ingredient

### 2.11. Table “FoodDetail”

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **#** | **Field name** | **Type** | **Size** | **Unique** | **Not Null** | **PK/FK** | **Notes** |
| 1 | id | int |  | x | x | PK |  |
| 2 | food\_id | int |  |  | x | FK |  |
| 3 | ingredient\_id | int |  |  | x | FK |  |
| 4 | mass | int |  |  | x |  |  |

Table 2.11. Table “Food\_Detail”

### 2.12. Table “Meal”

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **#** | **Field name** | **Type** | **Size** | **Unique** | **Not Null** | **PK/FK** | **Notes** |
| 1 | meal\_id | int |  |  | x | PK |  |
| 2 | meal\_name | varchar | 255 |  | x |  |  |

Table 2.12. Table “Meal”

### 2.13. Table “Food\_meal”

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **#** | **Field name** | **Type** | **Size** | **Unique** | **Not Null** | **PK/FK** | **Notes** |
| 1 | id | int |  | x | x | PK |  |
| 2 | food\_id | int |  |  | x | FK |  |
| 3 | meal\_id | int |  |  | x | FK |  |

Table 2.13. Table “Food\_Meal”

### 2.14. Table “Taboo\_Food”

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **#** | **Field name** | **Type** | **Size** | **Unique** | **Not Null** | **PK/FK** | **Notes** |
| 1 | id | int |  | x | x | PK |  |
| 2 | Ingredient1\_id | int |  |  | x |  |  |
| 3 | Ingredient2\_id | int |  |  | x |  |  |
| 4 | description | varchar | 255 |  | x |  |  |

Table 2.14. Table”Tabbo\_Food”

### 2.15. Table “Role”

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **#** | **Field name** | **Type** | **Size** | **Unique** | **Not Null** | **PK/FK** | **Notes** |
| 1 | id | int | 8 | x | x | PK |  |
| 2 | role\_name | varchar | 255 |  | x |  |  |

Table 2.15. tbl\_province

### 2.16. Table “Season\_Food”

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **#** | **Field name** | **Type** | **Size** | **Unique** | **Not Null** | **PK/FK** | **Notes** |
| 1 | id |  |  | x | x | PK |  |
| 2 | food\_id | int |  |  | x | FK |  |
| 3 | Season\_id | int |  |  | x | FK |  |

Table 2.16. Season\_Food

### 2.17. Table “Exercise”

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **#** | **Field name** | **Type** | **Size** | **Unique** | **Not Null** | **PK/FK** | **Notes** |
| 1 | id | int |  | x | x | PK |  |
| 2 | user\_id | int |  |  | x | FK |  |
| 3 | exercise\_name | varchar | 255 |  | x |  |  |

Table 2.17. Table”Exercise”

## 3. Detail Design

### 3.1. Feature “Login and Register”

#### 3.1.1. Class Diagram

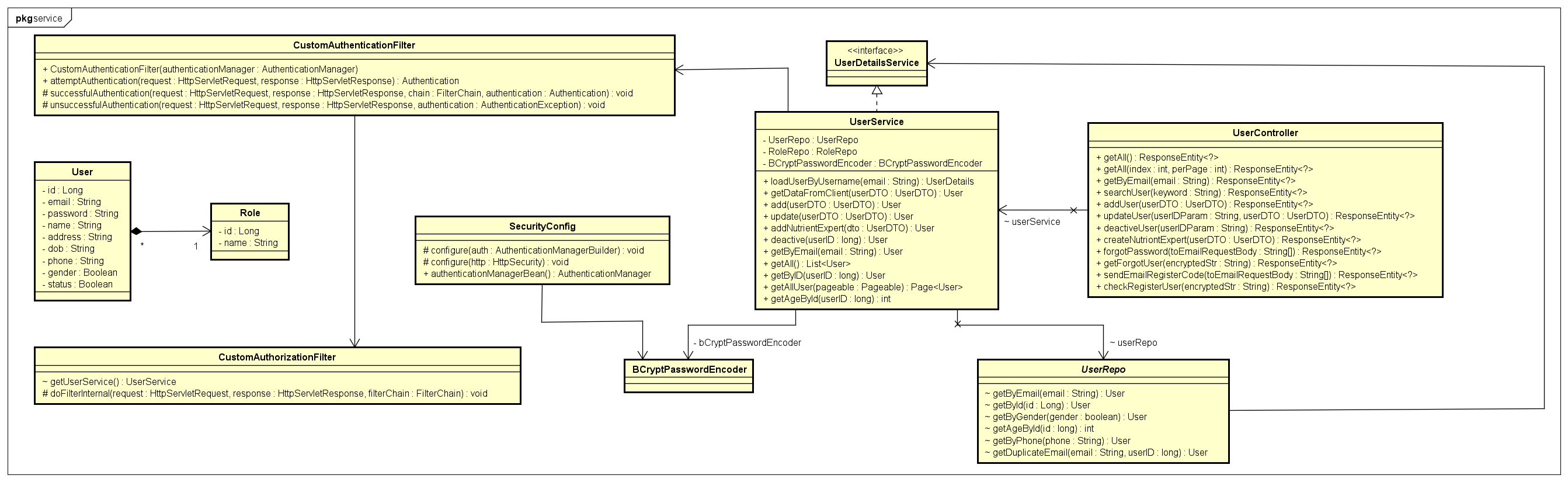


Figure 3.1. “Login and Register” Class Digram

#### 3.1.2. Sequence Diagram(s)

##### 3.1.2.1. Login

Figure 3.1.2.1. “Login” Sequence Diagram

##### 3.1.2.2. Register

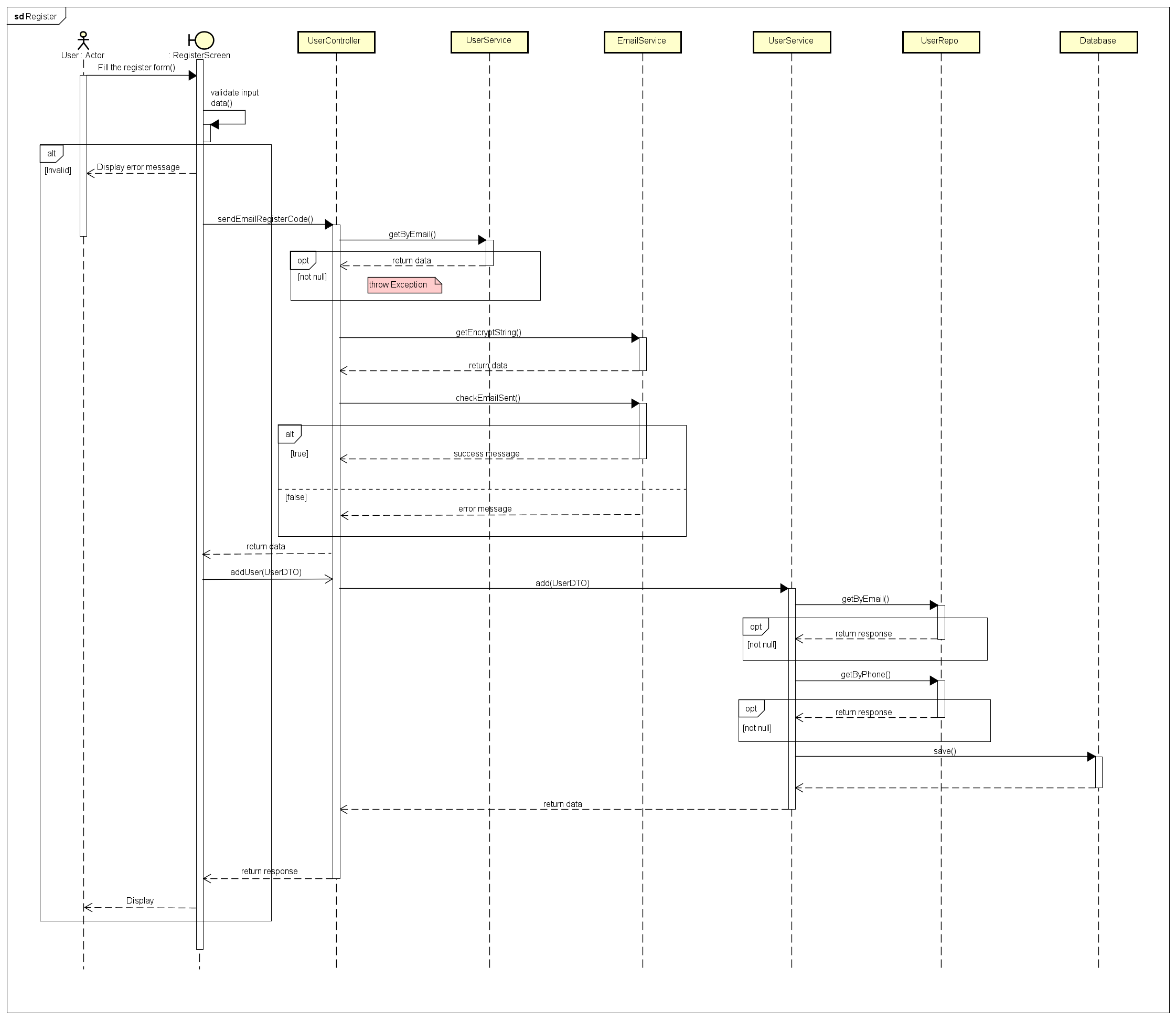


Figure 3.1.2.2. “Register” Sequence Diagram

##### 3.1.2.3. Forgot password

Figure 3.1.2.3. “Forgot password” Sequence Diagram

### 3.2. Feature “Manage personal profile”

#### 3.2.1. Class Diagram

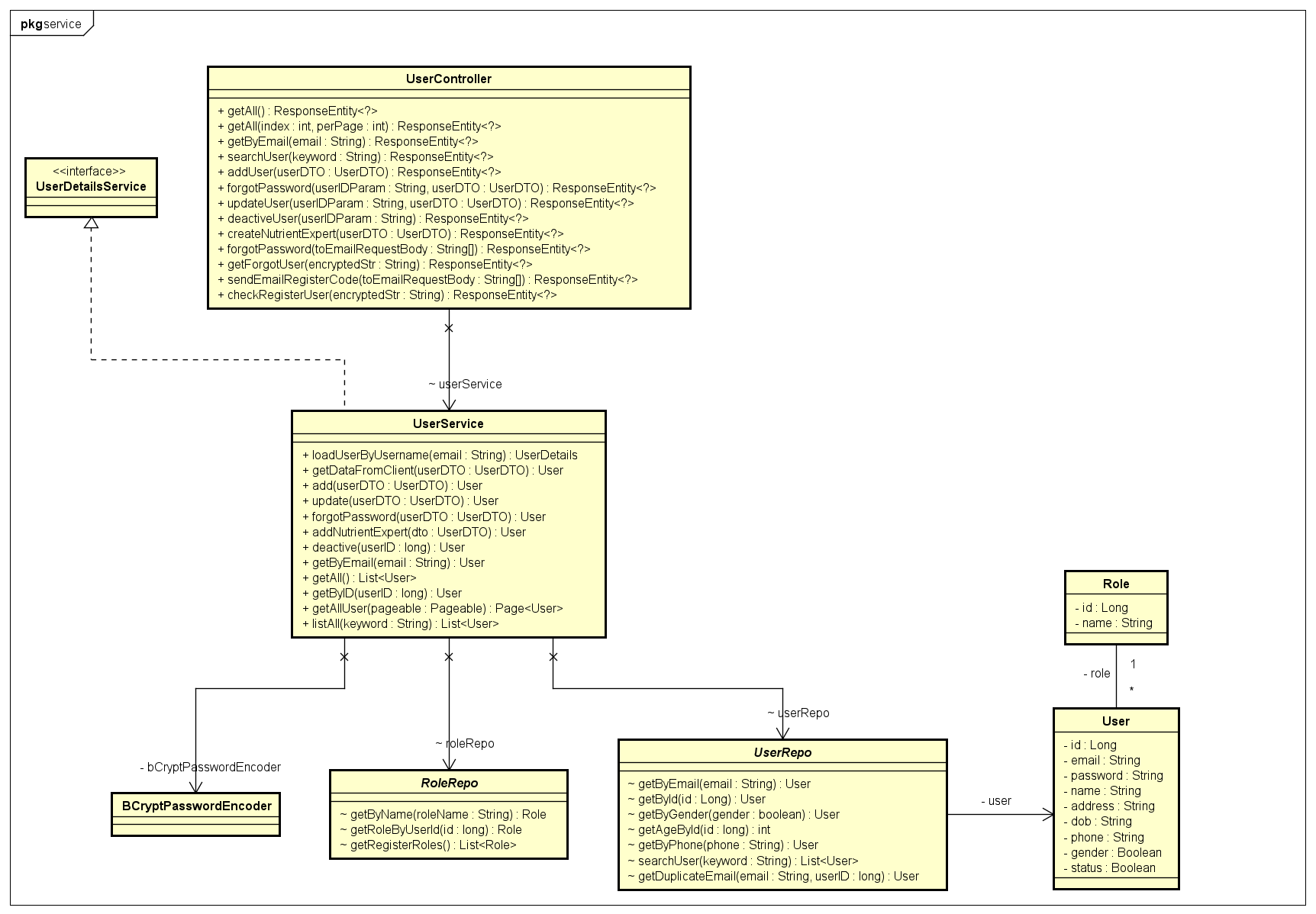


Figure 3.2. “Manage personal profile” Class Diagram

#### 3.2.2. Sequence Diagram(s)

##### 3.2.2.1. View personal profile

Figure 3.2.2.1. “View personal profile” Sequence Diagram

##### 3.2.2.2. Edit personal profile

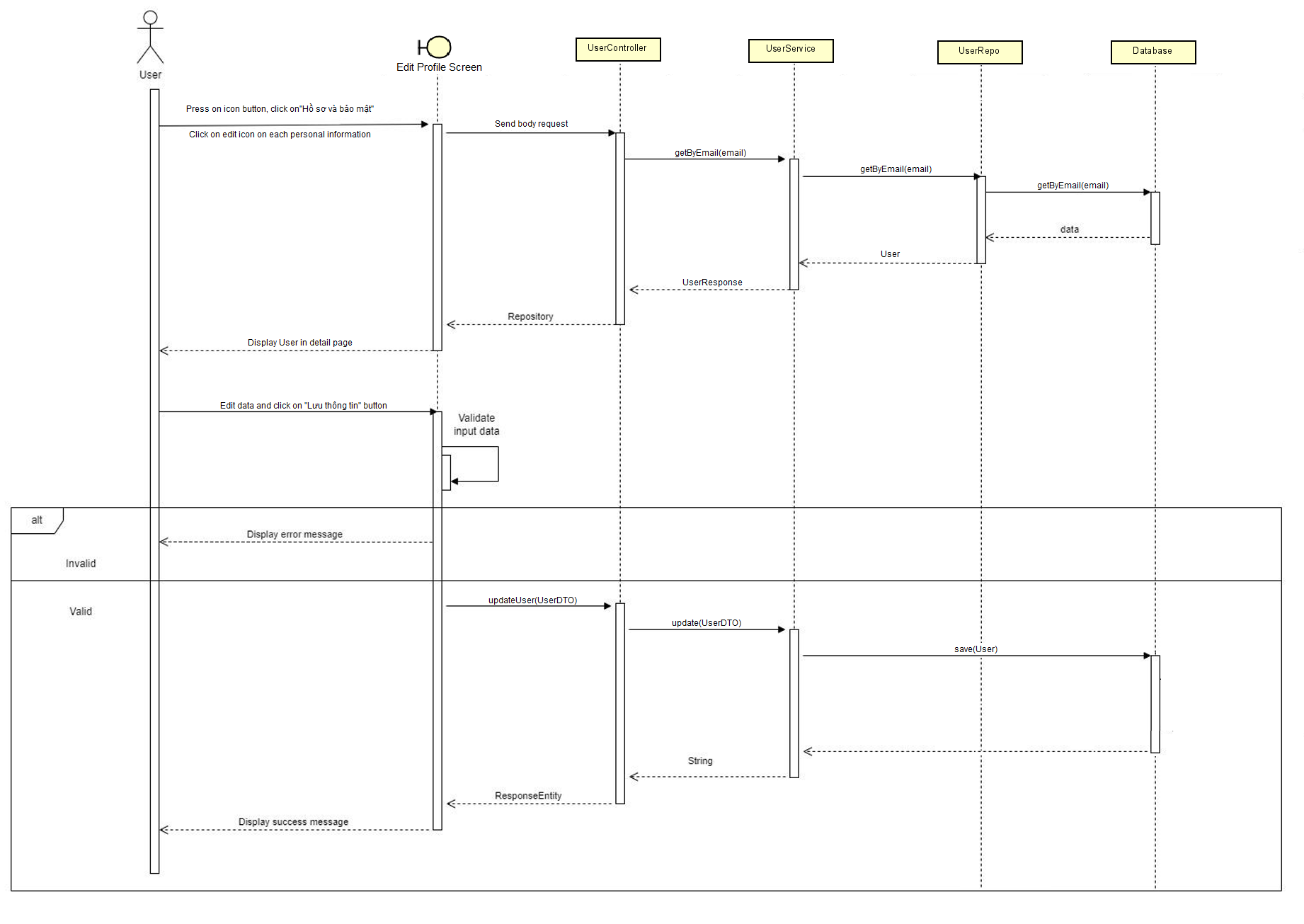


Figure 3.2.2.2. “Edit personal profile” Sequence Diagram

##### 3.2.2.3. Change password

Figure 3.2.2.3. “Change password” Sequence Diagram

##### 3.2.2.4.

Figure 3.2.2.4. “Change password” Sequence Diagram

##### 3.2.2.5. Send email

Figure 3.2.2.5. “Send Email” Sequence Diagram

##### 3.2.2.6. Validate email

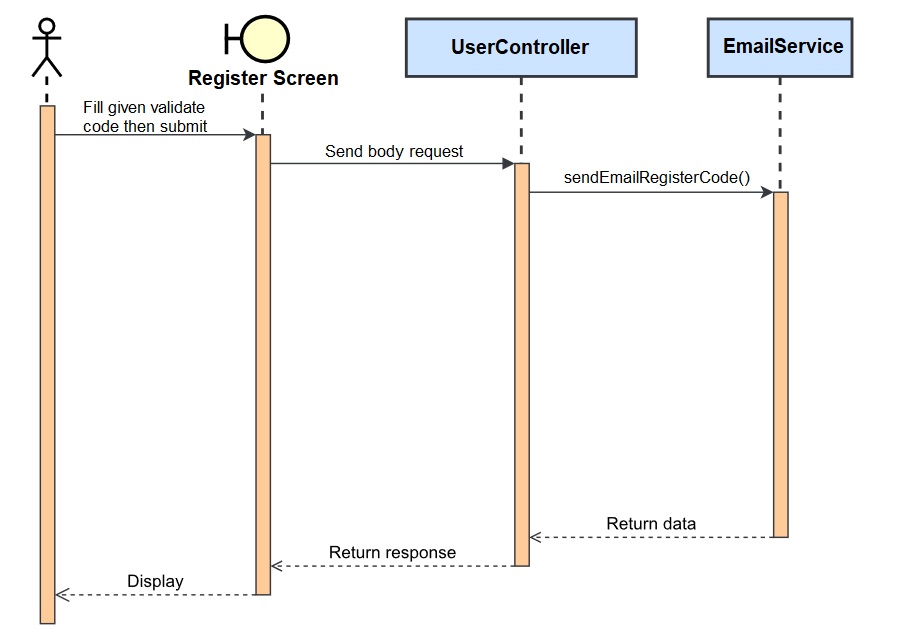


Figure 3.2.2.5. “Validate email” Sequence Diagram

### 

### 3.3. Feature “Manage system accounts”

#### 3.3.1. Class Diagram

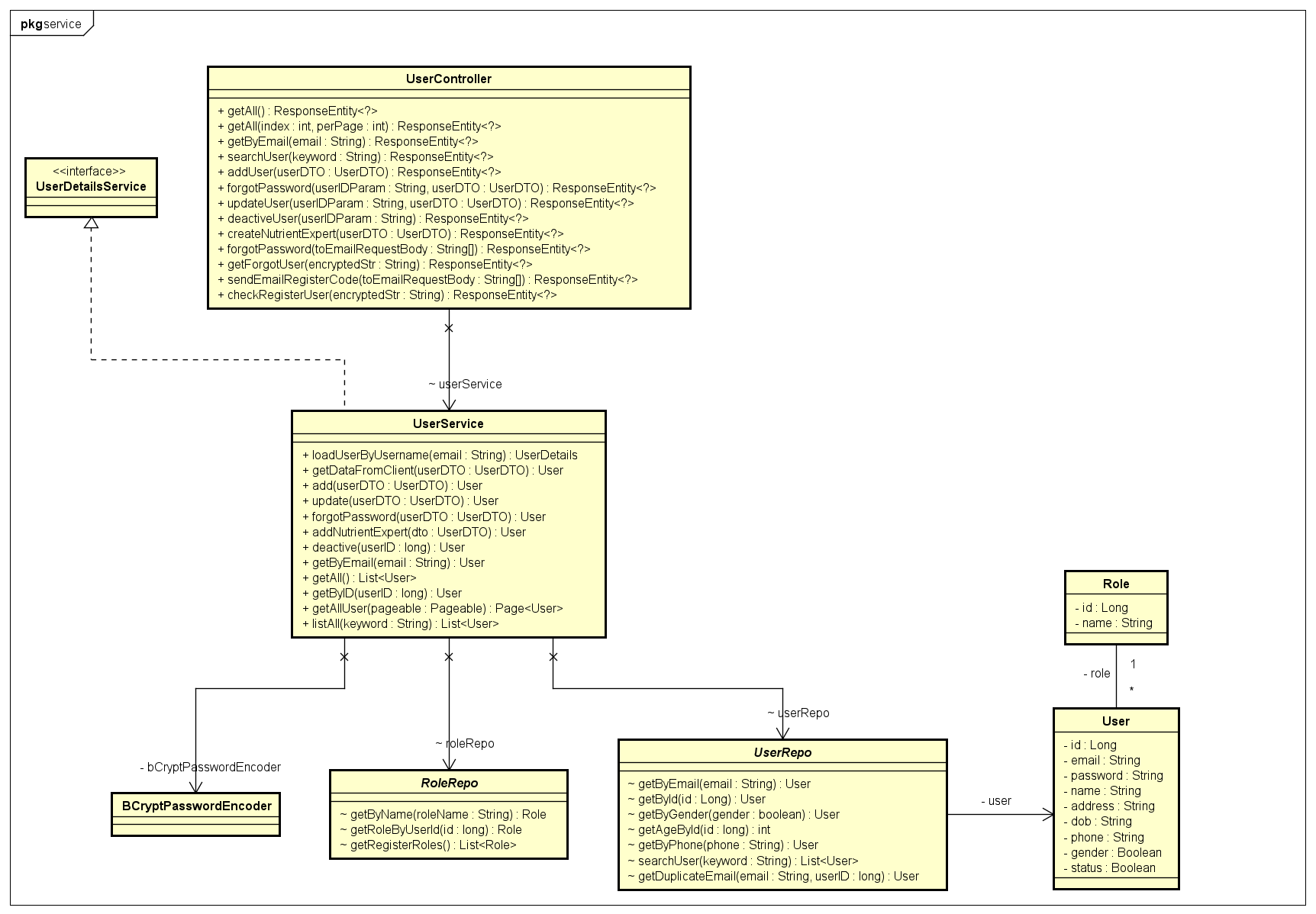


Figure 3.3.1. “Manage system accounts” Class Diagram

#### 3.3.2. Sequence Diagram(s)

##### 3.3.2.1. View system account list

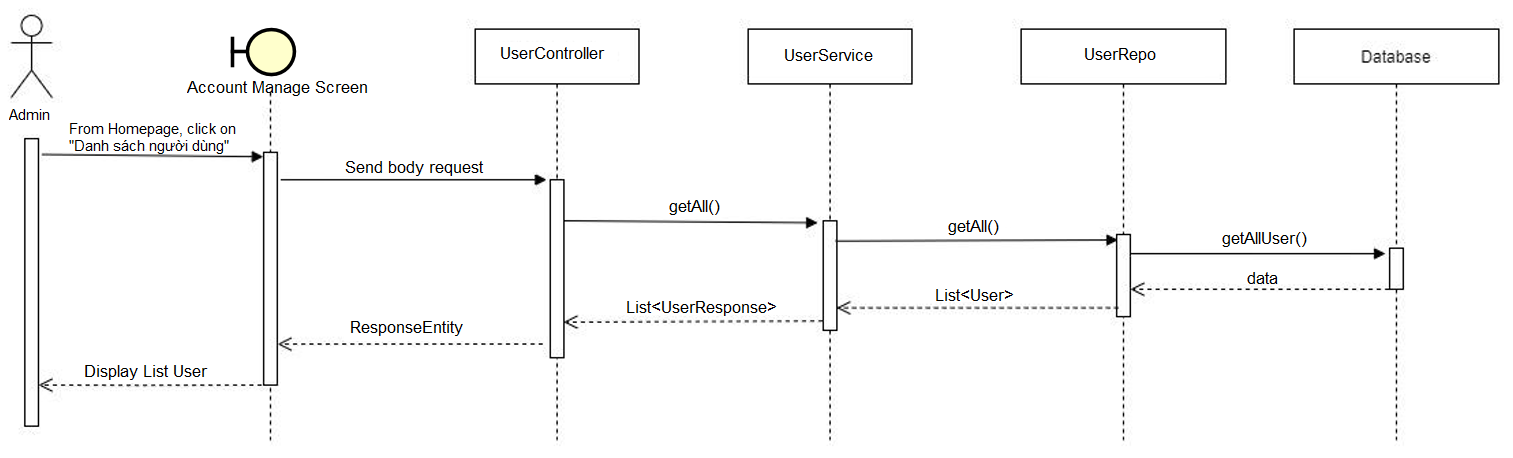


Figure 3.3.2.1. “View system account list” Sequence Diagram

##### 3.3.2.2. View account details

Figure 3.3.2.2. “View account details” Sequence Diagram

### 3.4. Feature “Manage Food”

#### 3.4.1. Class Diagram

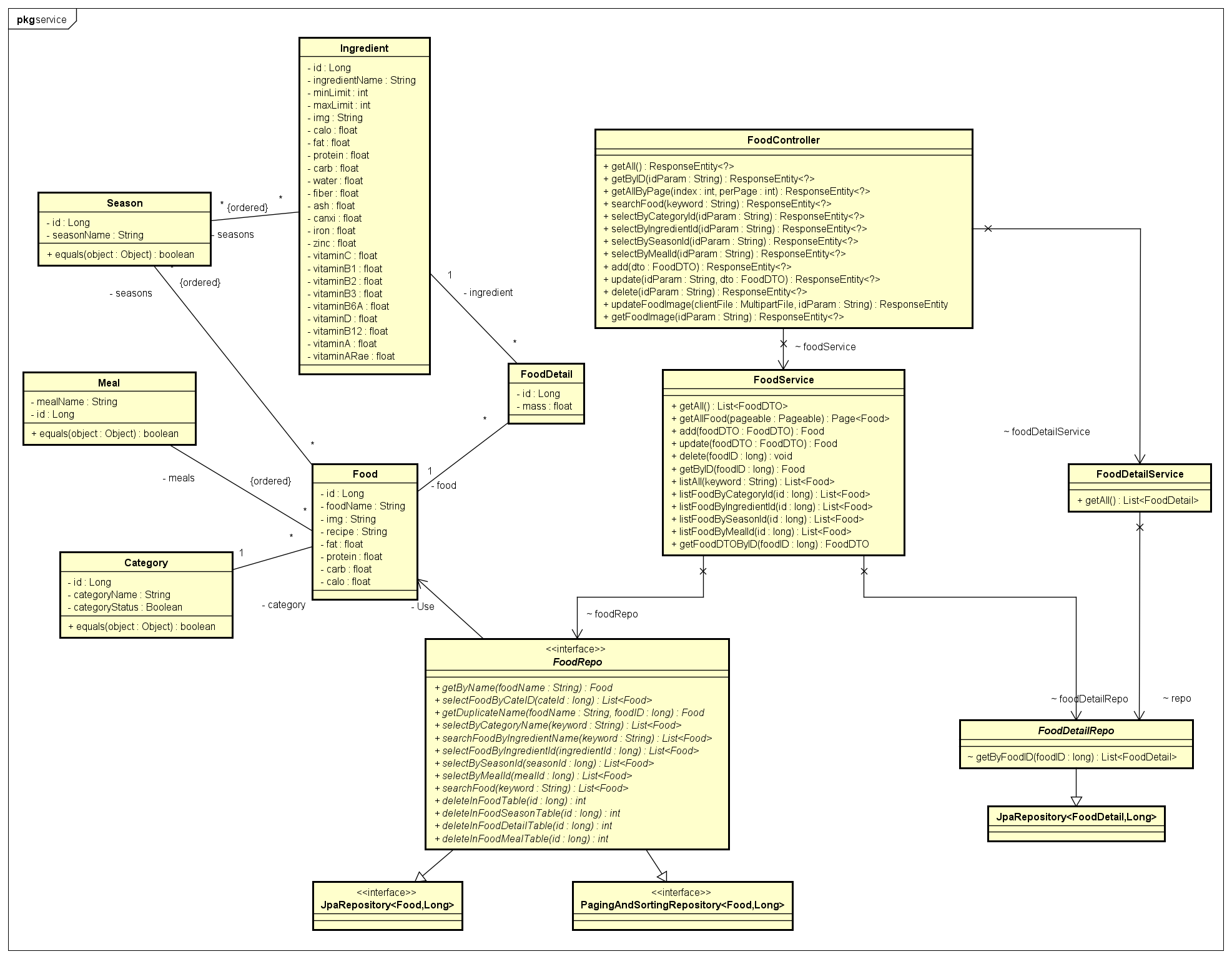


Figure 3.4.1. “Manage Food” Class Diagram

#### 3.4.2. Sequence Diagram(s)

##### 3.4.2.1. Add Food

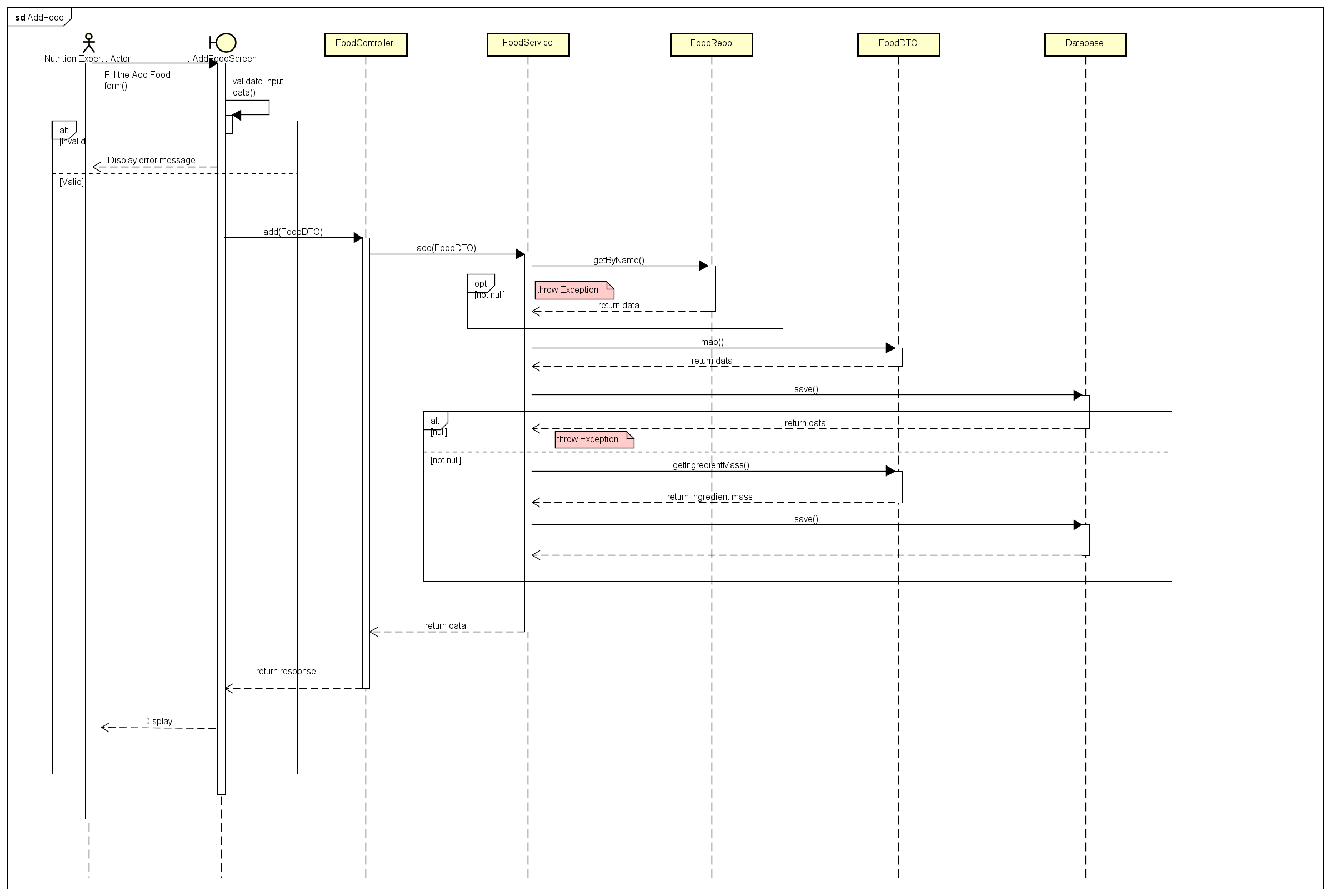


Figure 3.4.2.1. “Add Food” Sequence Diagram

##### 3.4.2.3. Edit Ingredient

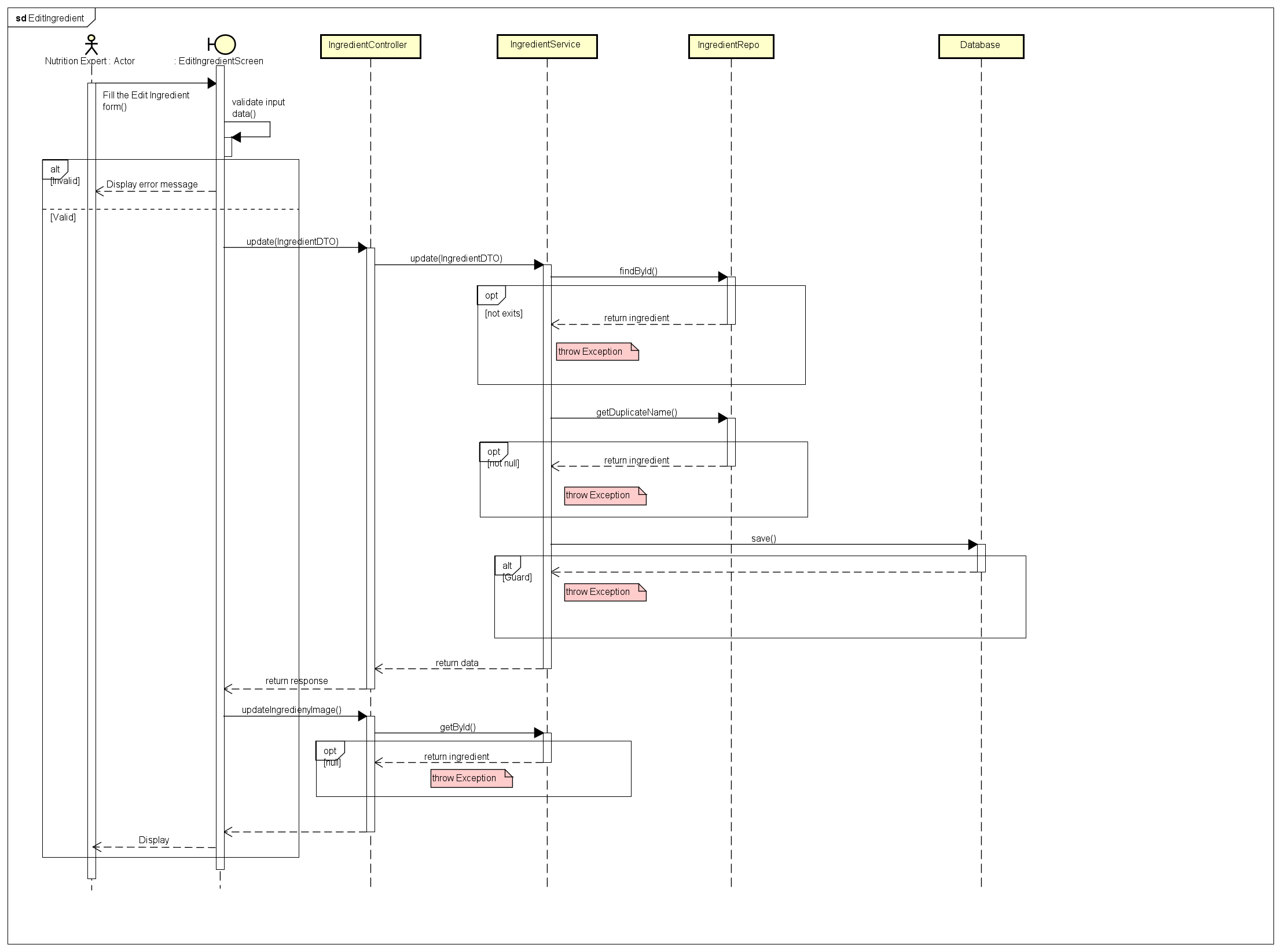


Figure 3.4.2.3. “Edit Ingredient” Sequence Diagram

##### 3.4.2.4. Delete Food

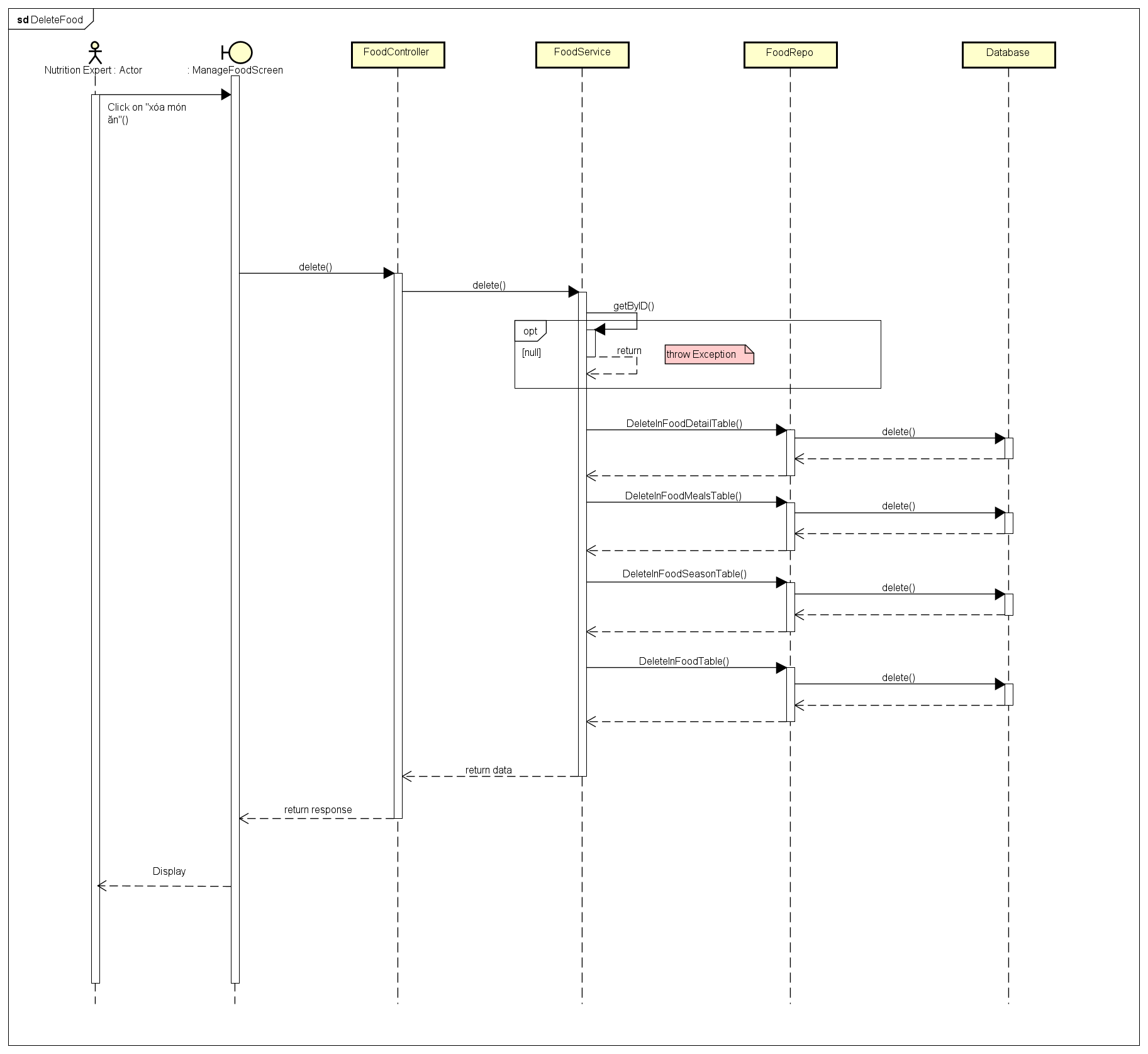


Figure 3.4.2.4. “Delete Food” Sequence Diagram

##### 3.4.2.5. Edit Food

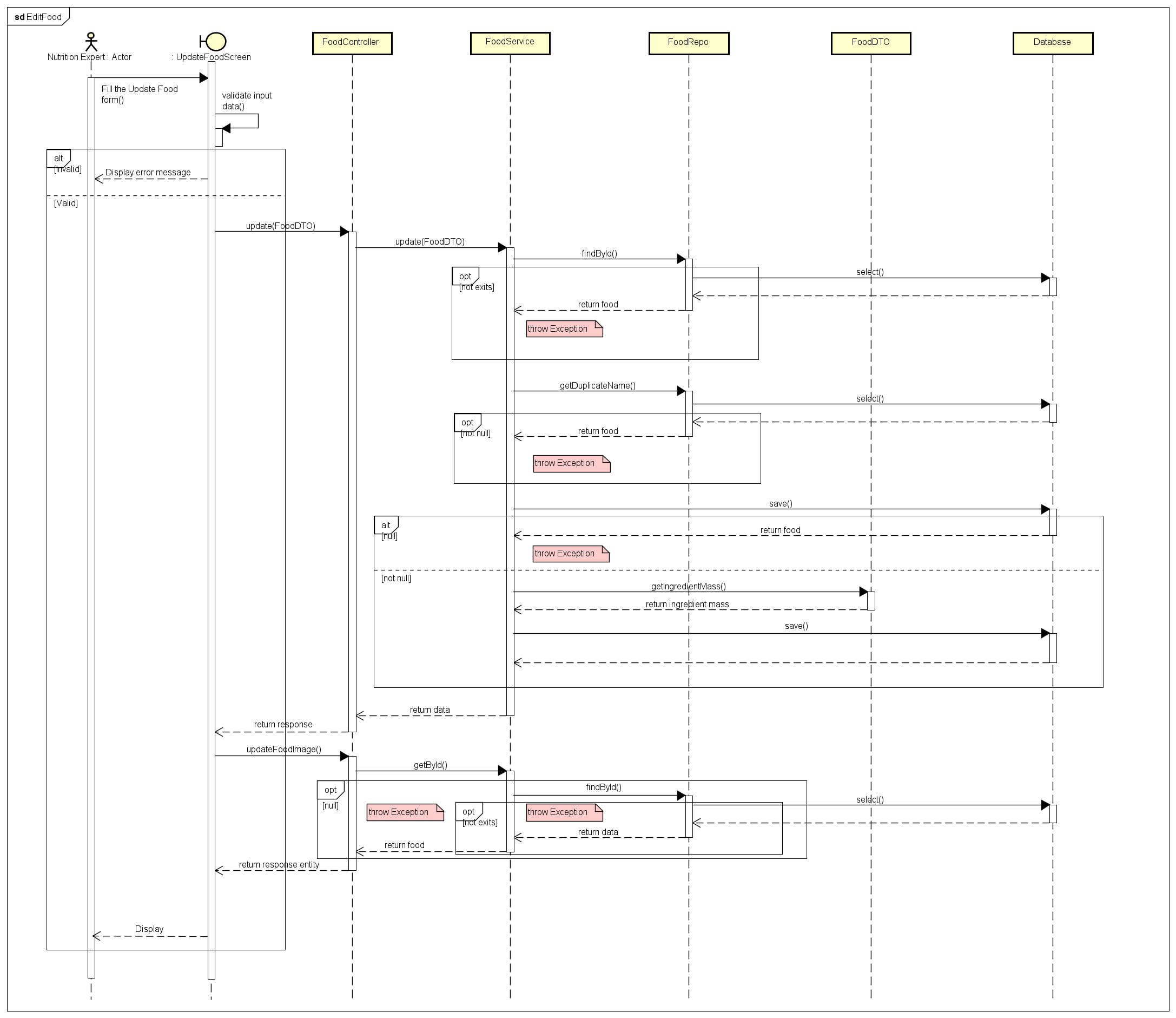


Figure 3.4.2.5. “Edit Food” Sequence Diagram

##### 3.4.2.6. Delete Ingredient

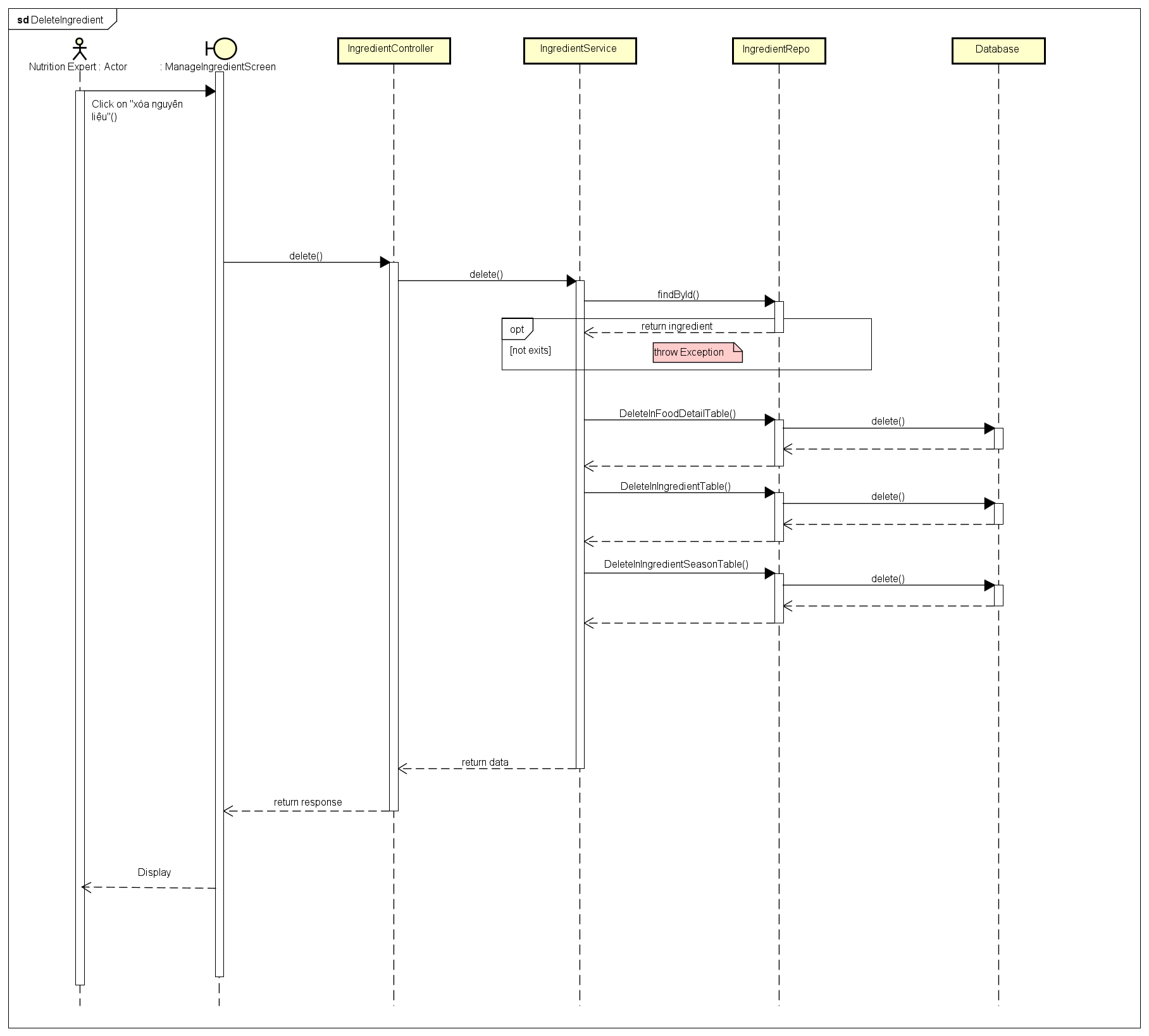


Figure 3.4.2.6. “Delete Ingredient” Sequence Diagram

##### 3.4.2.7. Add Ingredient

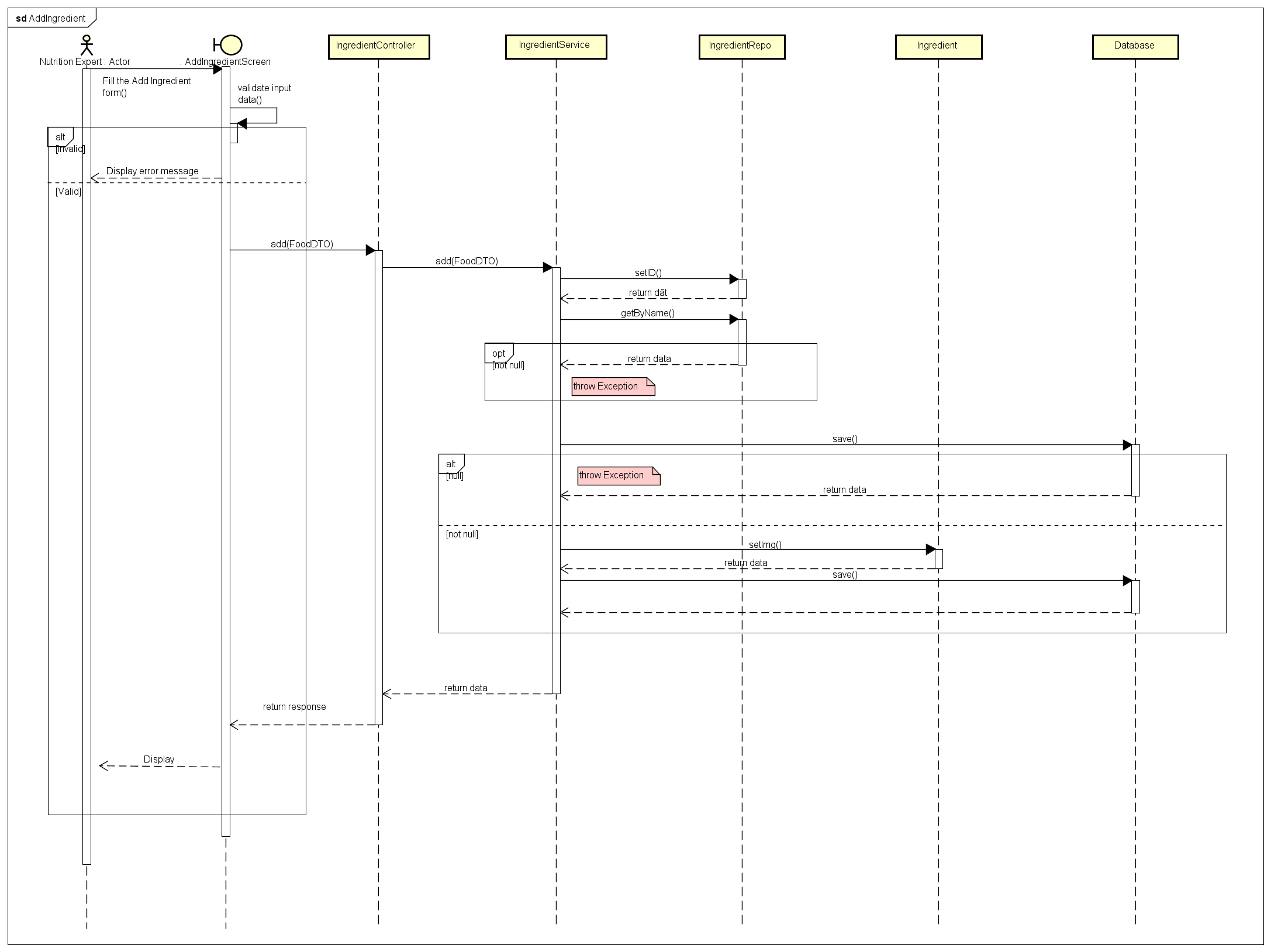


Figure 3.4.2.7. “Add Ingredient” Sequence Diagram

### 3.5. Feature “Search Food and Ingredient”

#### 3.5.1. Class Diagram

Figure 3.5.1. “Manage fishing location’s reviews” Class Diagram

#### 3.5.2. Sequence Diagram(s)

##### 3.5.2.1. Search Food by Name

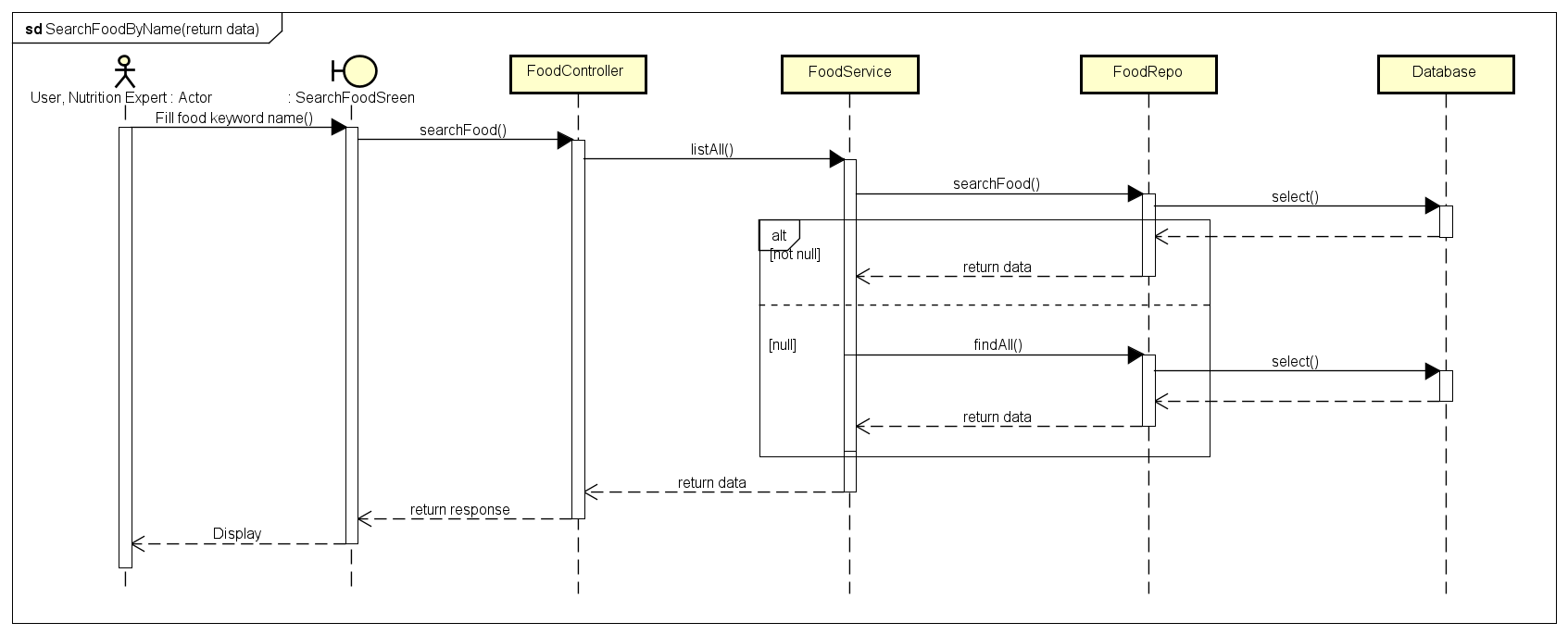


Figure 3.5.2.1. “” Sequence Diagram

##### 3.5.2.2. Search Ingredient by Name

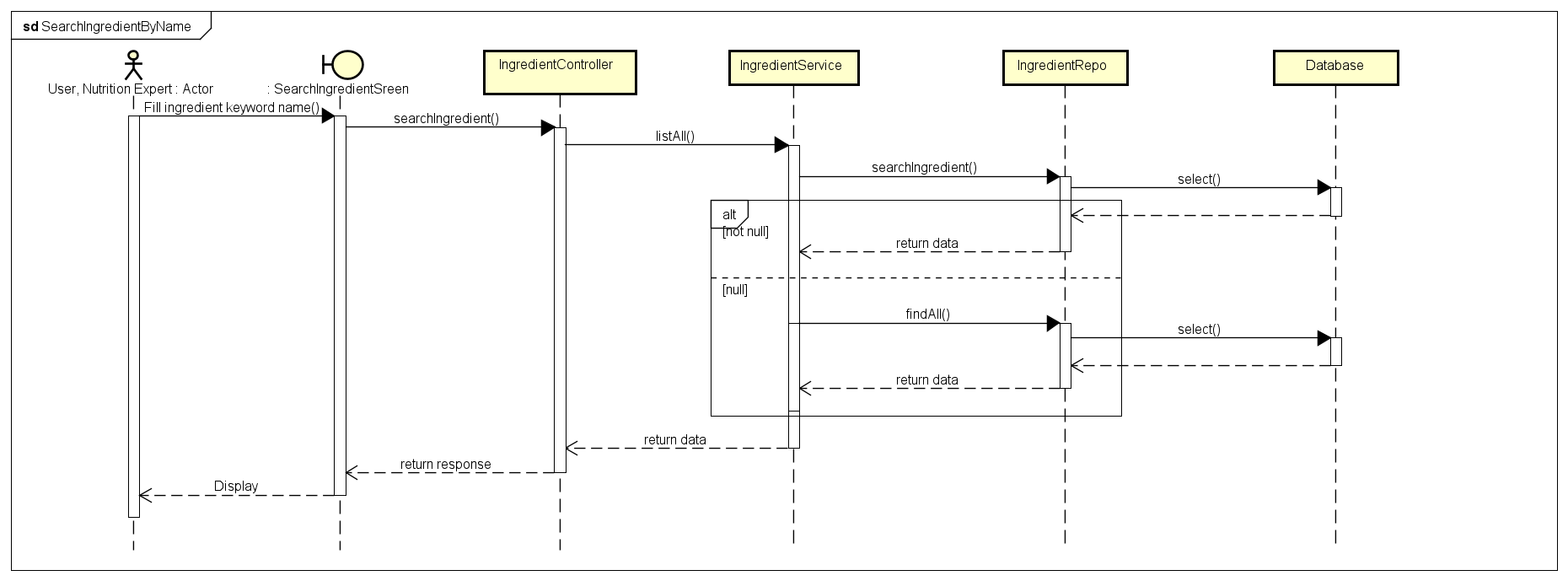


Figure 3.5.2.2. “” Sequence Diagram

##### 3.5.2.3. Filter Food

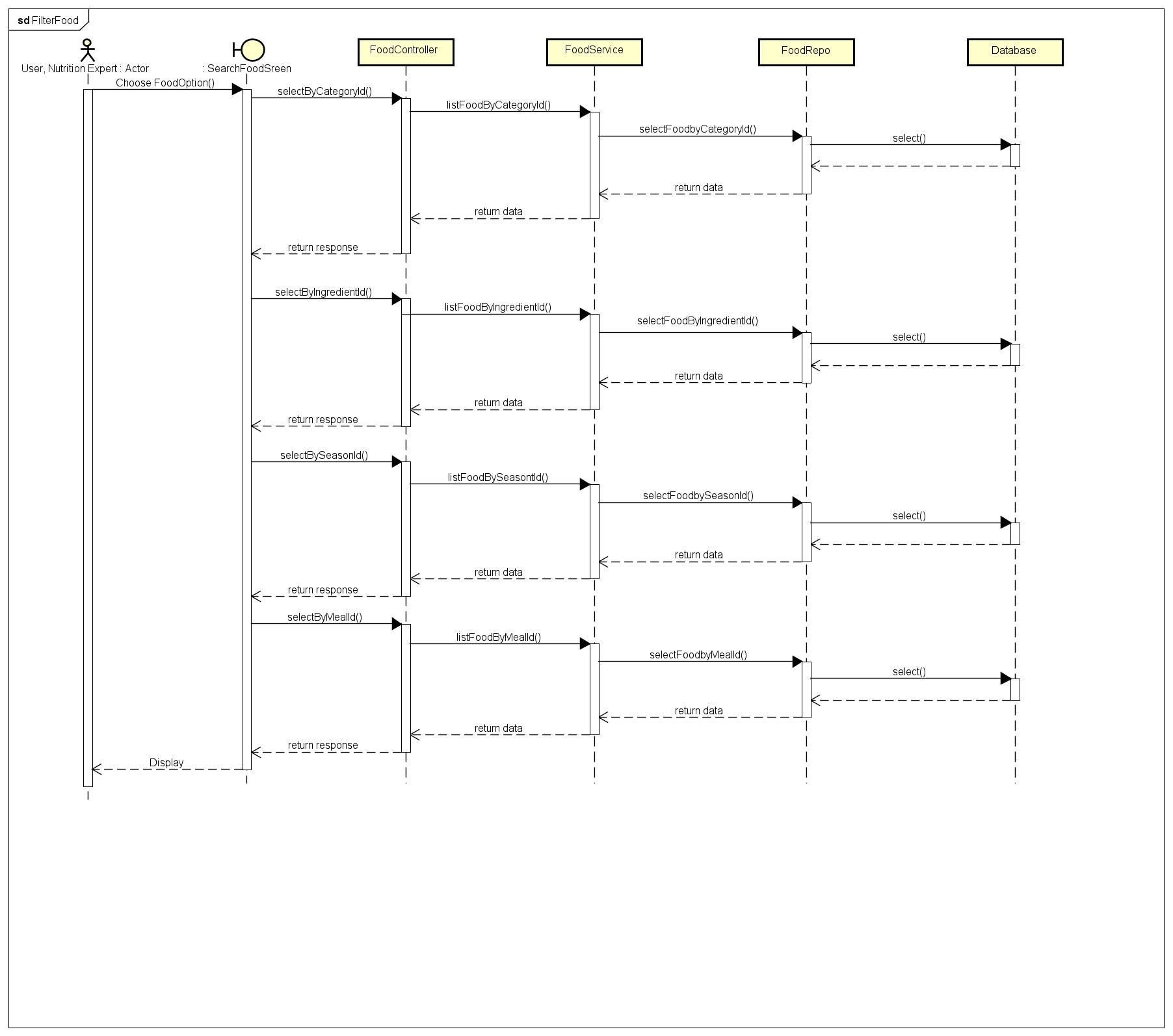


Figure 3.5.2.3. “” Sequence Diagram

##### 3.5.2.4. Filter Ingredient

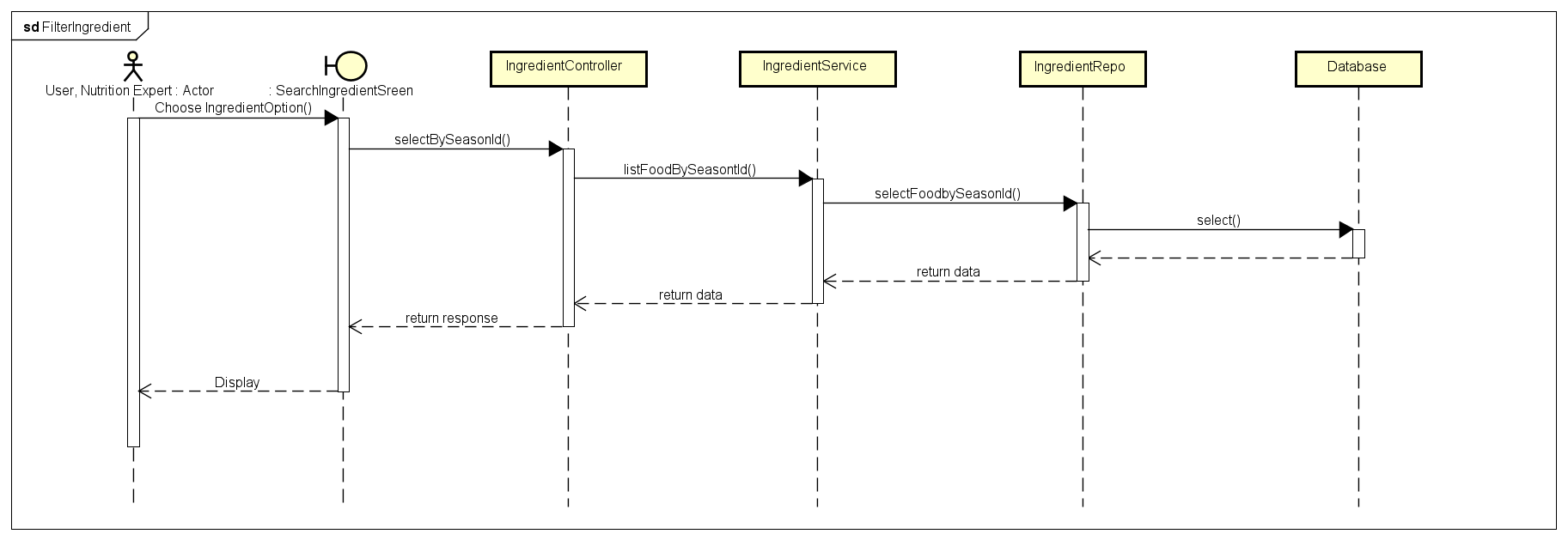


Figure 3.5.2.4. “Delete personal review” Sequence Diagram

##### 3.5.2.5. View Food Detail

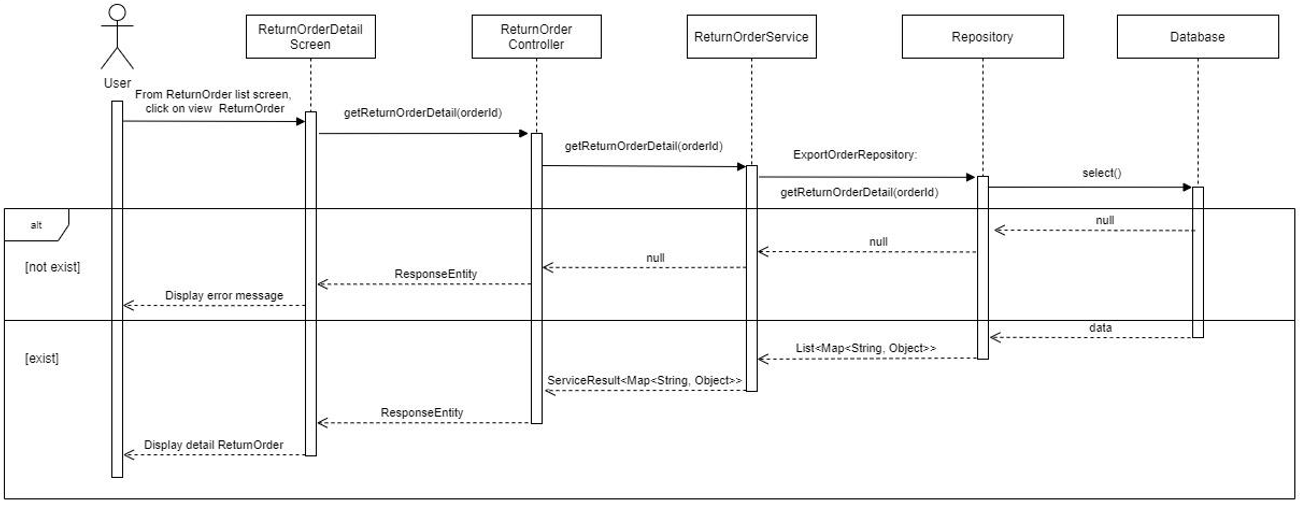


Figure 3.5.2.5. “View Food Detail” Sequence Diagram

### 3.6. Feature “Manage Diet”

#### 3.6.1. Class Diagram

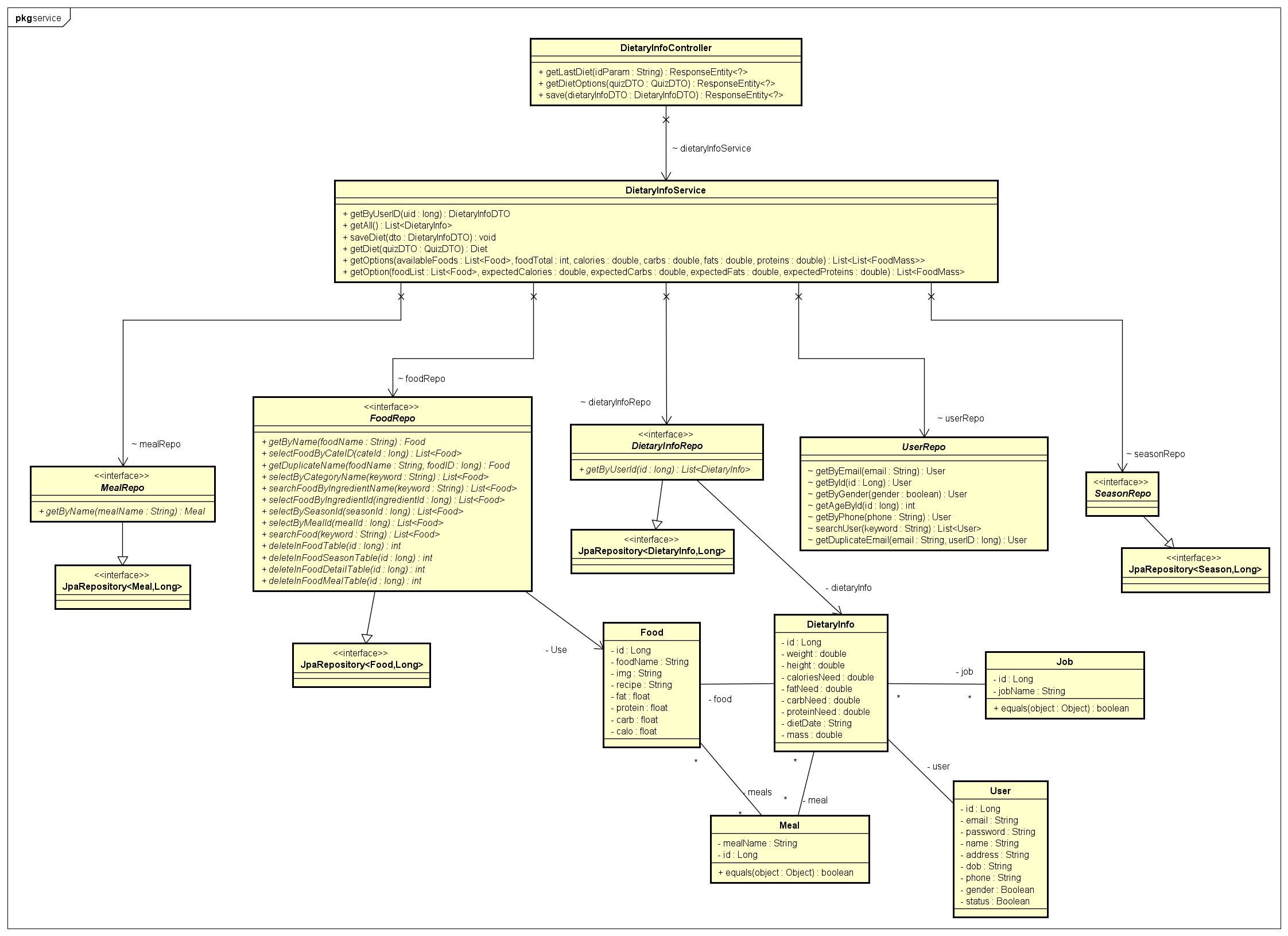


Figure 3.6.1. “Manage check-in” Class Diagram

#### 3.6.2. Sequence Diagram(s)

##### 3.6.2.1. Receive Diet

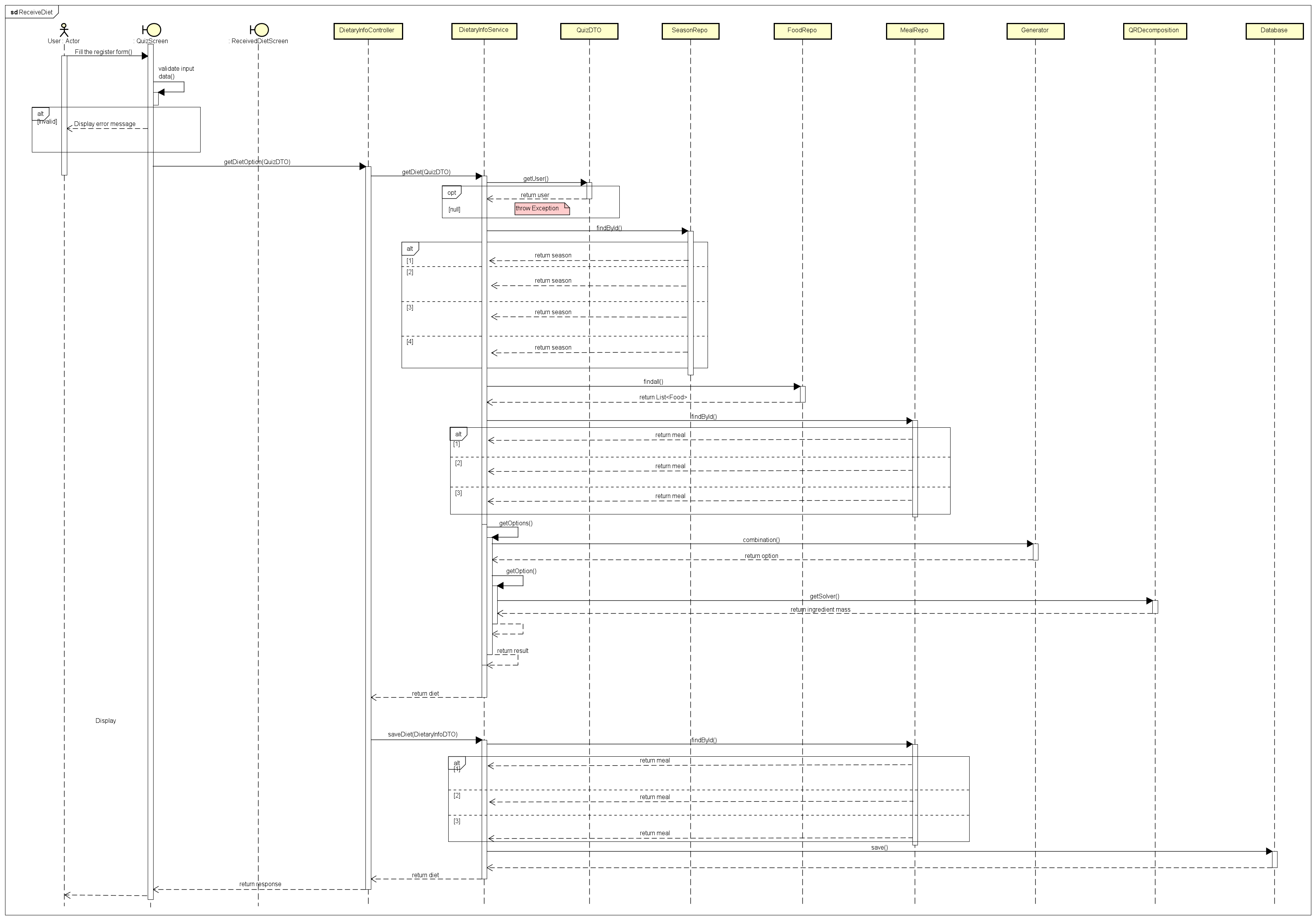


Figure 3.6.2.1. “” Sequence Diagram

##### 3.6.2.2. View Schedule

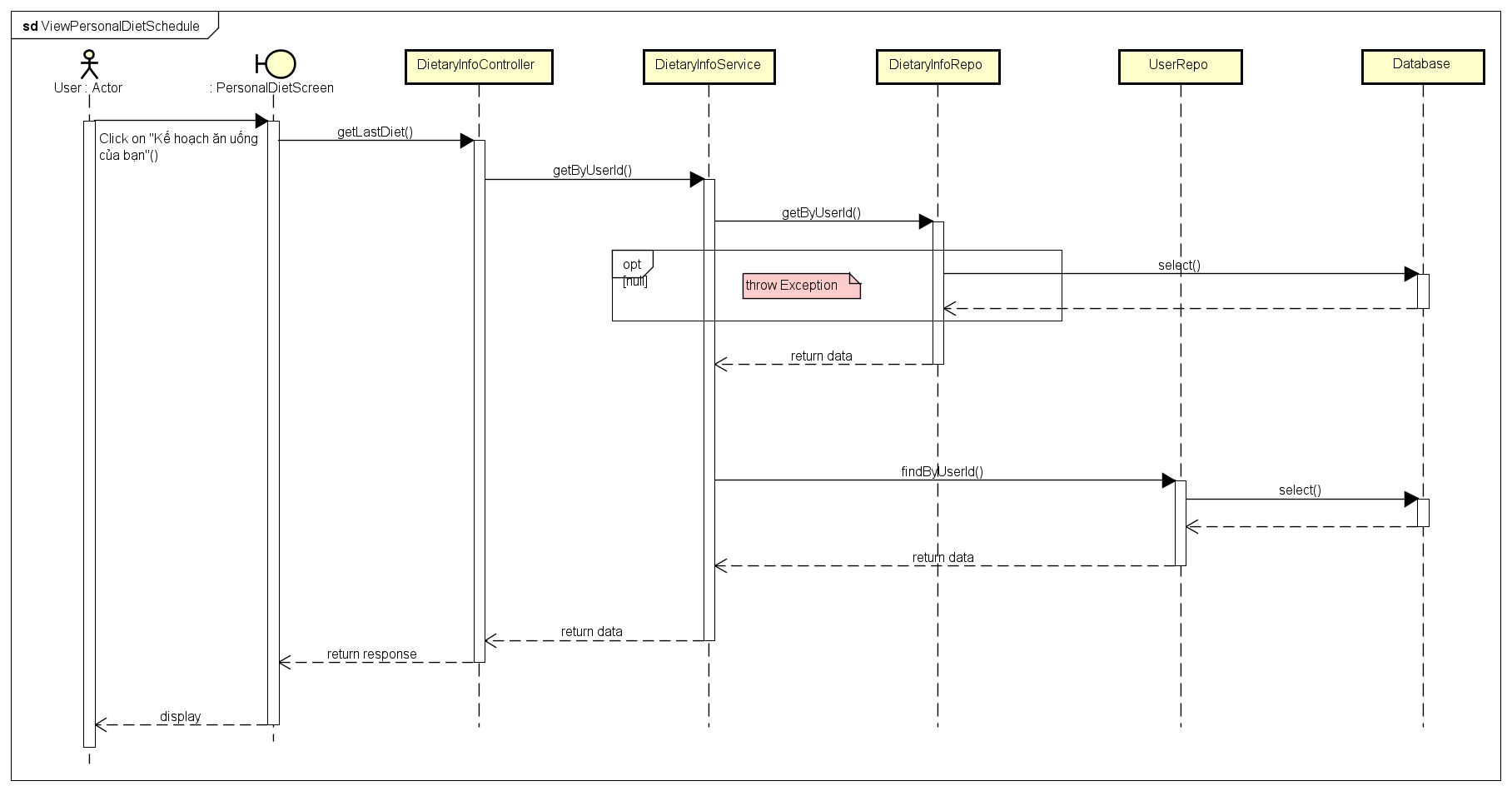


Figure 3.6.2.2. “View personal Schedule” Sequence Diagram

##### 3.6.2.3. Change Diet

Figure 3.6.2.3. “” Sequence Diagram

### 3.7. Feature “”

#### 3.7.1. Class Diagram

Figure 3.7.1. “Manage catch reports” Class Diagram

#### 3.7.2. Sequence Diagram(s)

##### 3.7.2.1.

Figure 3.7.2.1. “” Sequence Diagram

##### 3.7.2.2.

Figure 3.7.2.2. “” Sequence Diagram

##### 3.7.2.3.

Figure 3.7.2.3. “” Sequence Diagram

##### 3.7.2.4.

Figure 3.7.2.4. “” Sequence Diagram

##### 3.7.2.5.

Figure 3.7.2.5. “” Sequence Diagram

### 3.8. Feature “”

#### 3.17.1. Class Diagram

Figure 3.17.1. “” Class Diagram

#### 3.17.2. Sequence Diagram(s)

##### 3.17.2.1.

Figure 3.17.2.1. “” Sequence Diagram

##### 3.17.2.2.

Figure 3.17.2.2. “” Sequence Diagram

##### 3.17.2.3.

Figure 3.17.2.3. “” Sequence Diagram

1. [Spring Boot](https://spring.io/projects/spring-boot) [↑](#footnote-ref-1)
2. [JSON Web Tokens](https://jwt.io/) [↑](#footnote-ref-2)
3. [GitHub Actions](https://github.com/features/actions) [↑](#footnote-ref-3)