

**NATIONAL UNIVERSITY OF MODERN LANGUAGES**

**Software Design and Architecture Final Project**

**NAMES: M Abdul Rafay**

**Ahmed Raza**

**Zohaib Ijaz**

**Nazish Khan**

**PROGRAM:** BSSE (4th Semester)

**COURSE:** SOFTWARE DESIGN AND ARCHITECTURE

**SUBMITTED TO:** Sir Anas Bilal

**DATE: 26 May 2025 DAY: Sunday**

Table of Contents

[1. Domain Model Diagram 4](#_Toc199646233)

[2. Class Diagram 4](#_Toc199646234)

[3. Use Case Diagrams 5](#_Toc199646235)

[7](#_Toc199646236)

[8](#_Toc199646237)

[9](#_Toc199646238)

[10](#_Toc199646239)

[11](#_Toc199646240)

[12](#_Toc199646241)

[4. Sequence Diagrams 13](#_Toc199646242)

[6. State Machine Diagrams 20](#_Toc199646243)

[35](#_Toc199646244)

[36](#_Toc199646245)

[7. Component Diagram 37](#_Toc199646246)

[8. Deployment Diagram 38](#_Toc199646247)

[Use Case Descriptions 39](#_Toc199646248)

[Use Case 1: Manage Products 39](#_Toc199646249)

[Use Case 2: Manage Orders 39](#_Toc199646250)

[Use Case 3: Manage Suppliers 40](#_Toc199646251)

[Use Case 4: Manage Stock Inventory 40](#_Toc199646252)

[Use Case 5: Generate Reports 41](#_Toc199646253)

[Use Case 6: Add Customer 41](#_Toc199646254)

[Use Case 7: Update Customer 42](#_Toc199646255)

[Use Case 8: Delete Customer 42](#_Toc199646256)

[Use Case 9: View Customer Details 43](#_Toc199646257)

[Use Case 10: Search Customers 43](#_Toc199646258)

[Use Case 11: Search Products 44](#_Toc199646259)

[Use Case 12: View Product Details 44](#_Toc199646260)

[Use Case 13: Filter Products by Category 45](#_Toc199646261)

[Use Case 14: Delete Order 46](#_Toc199646262)

[Use Case 15: Search Orders 46](#_Toc199646263)

[Use Case 16: Cancel Order 47](#_Toc199646264)

[Use Case 17: Manage Vendors 47](#_Toc199646265)

[Use Case 18: Update Vendor Info 48](#_Toc199646266)

[Use Case 19: Manage Warranty Claims 48](#_Toc199646267)

[Use Case 20: Track Product Shipments 49](#_Toc199646268)

[CRC – Cards 50](#_Toc199646269)

[Activity Diagram 50](#_Toc199646270)

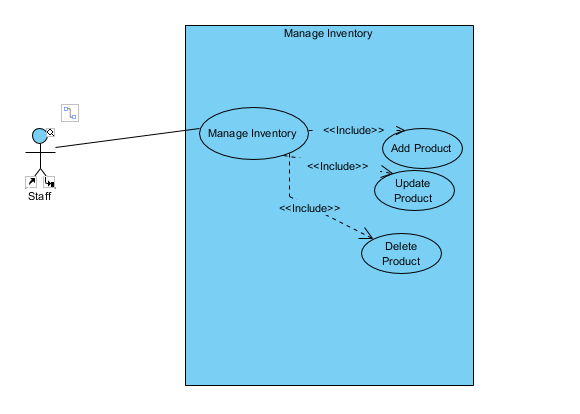
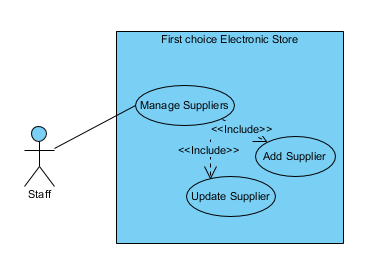
[High level Architecture : 51](#_Toc199646271)

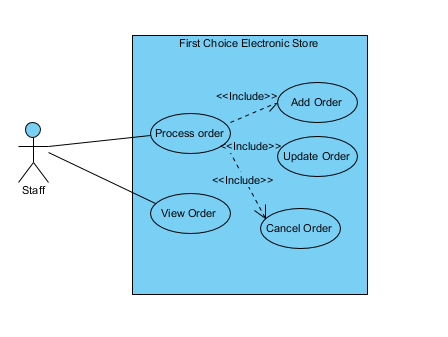
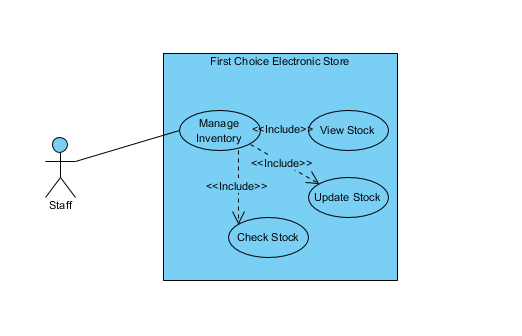
[Source Files & Resources: 52](#_Toc199646272)

# 1. Domain Model Diagram

# 2. Class Diagram

# 3. Use Case Diagrams





\

# 

# 

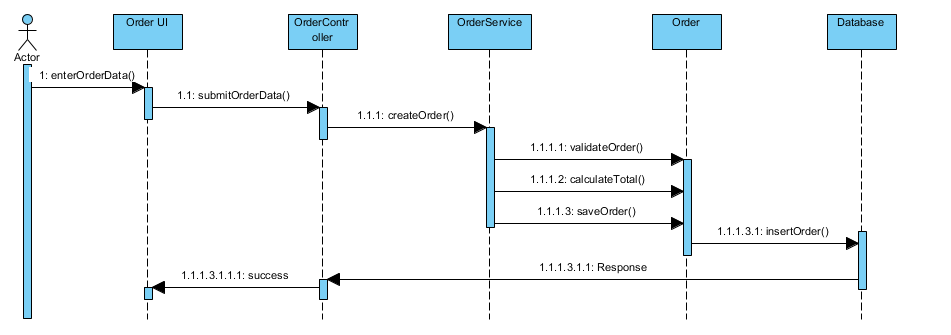
# 

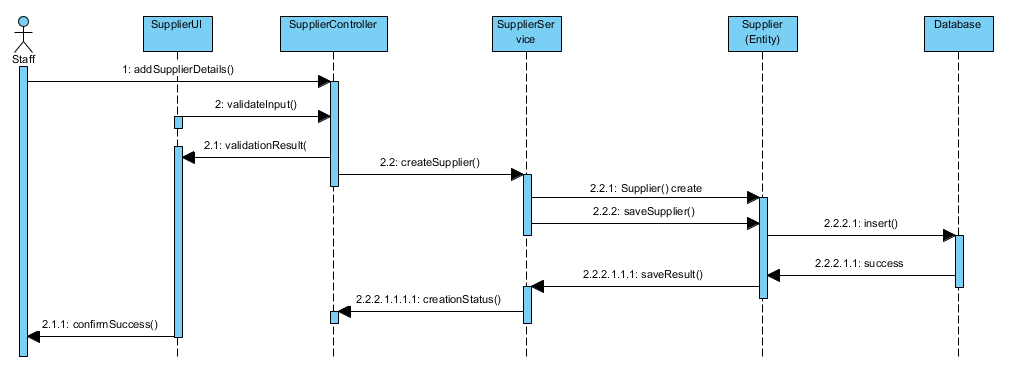
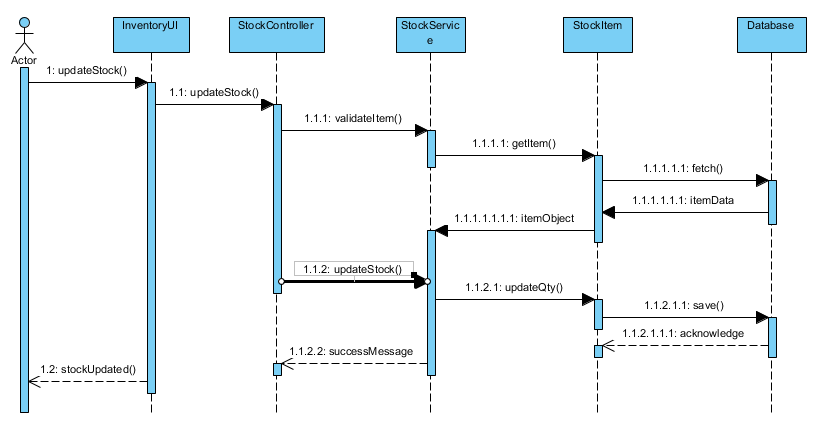
# 

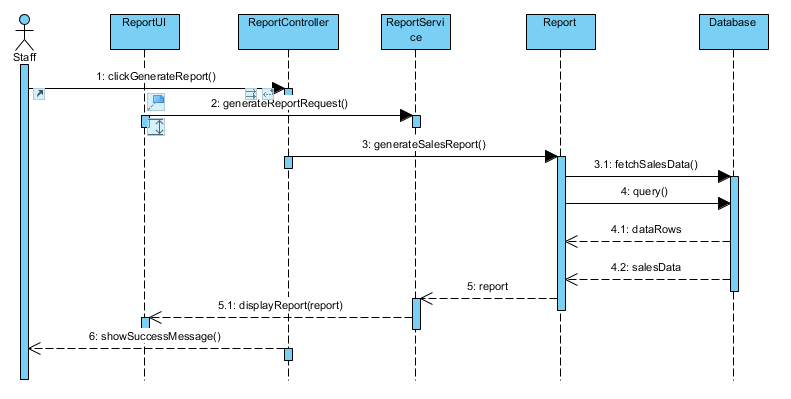
# 

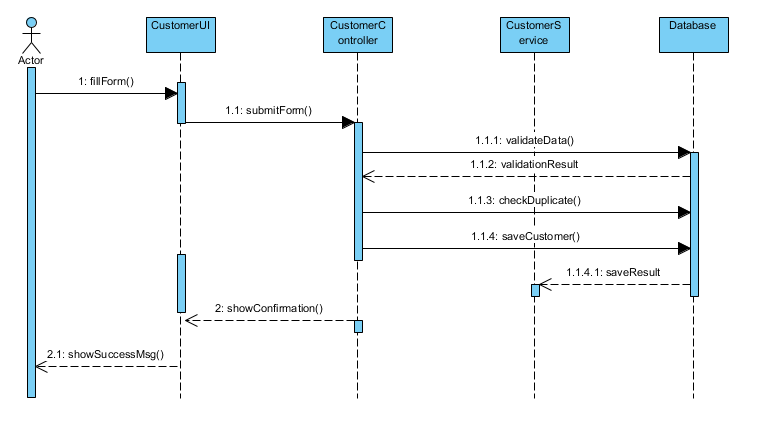
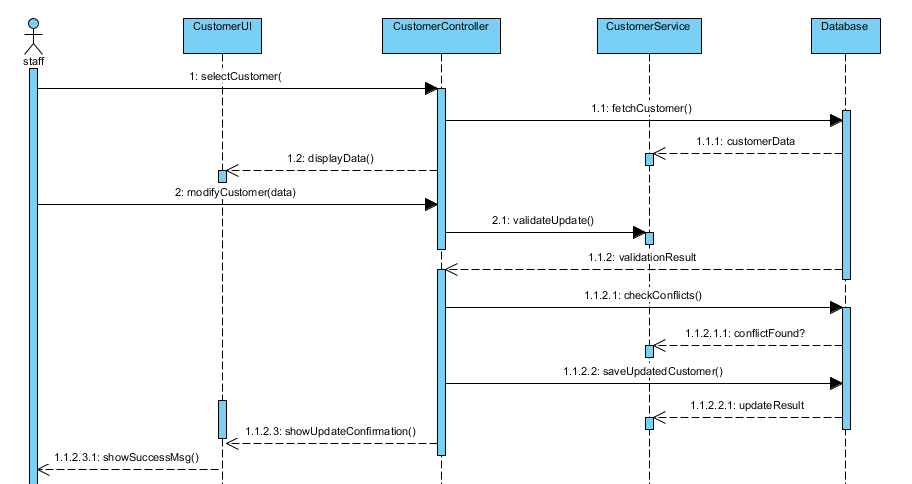
# 

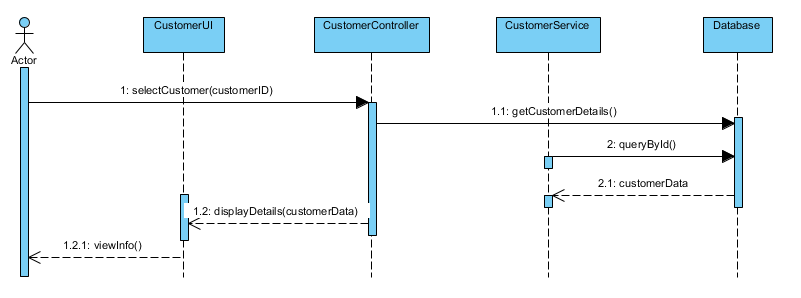
# 4. Sequence Diagrams

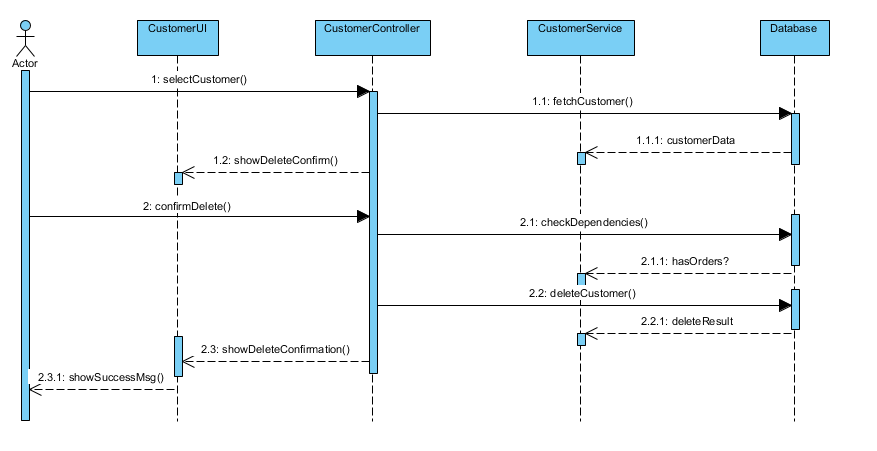


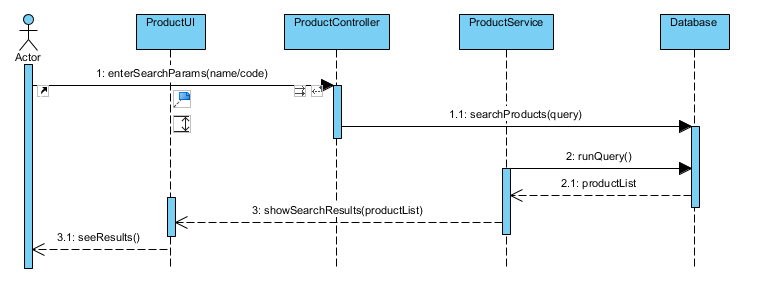


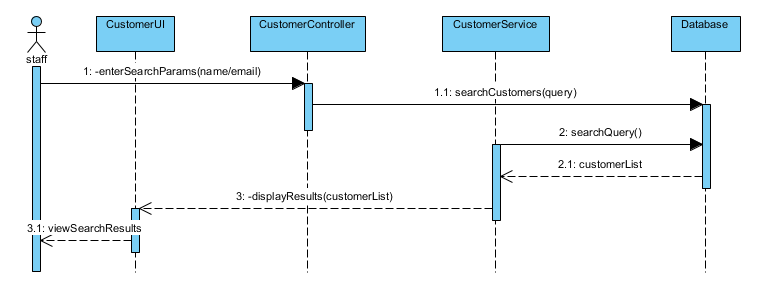


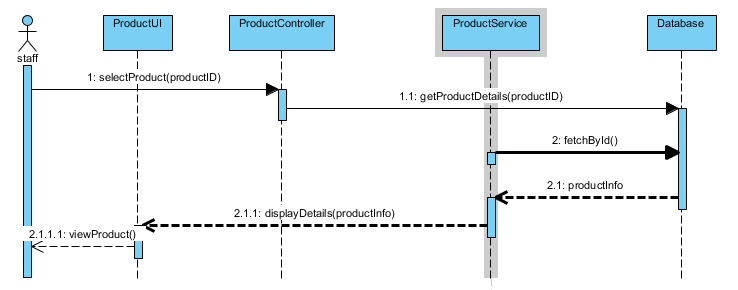
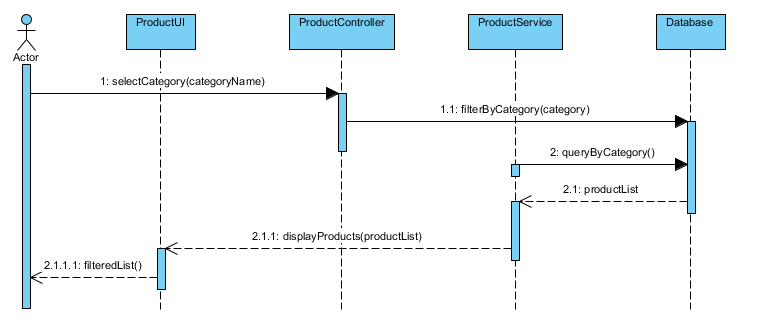


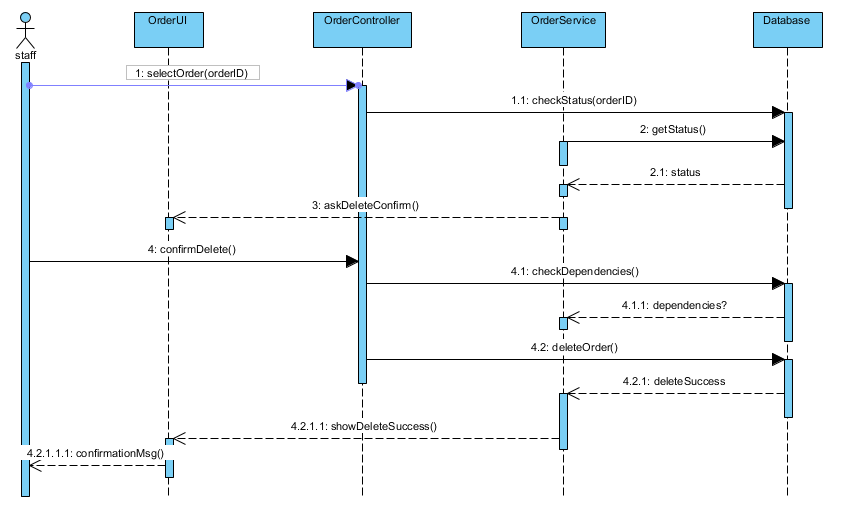


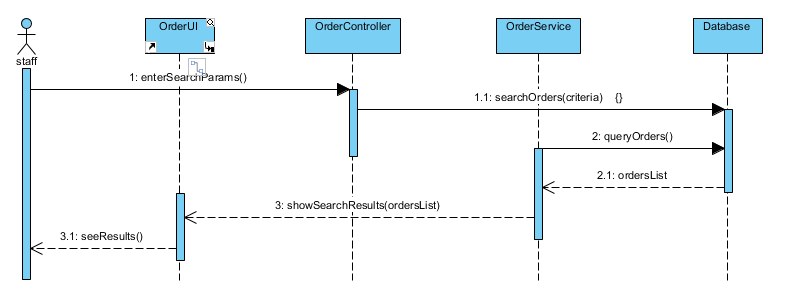


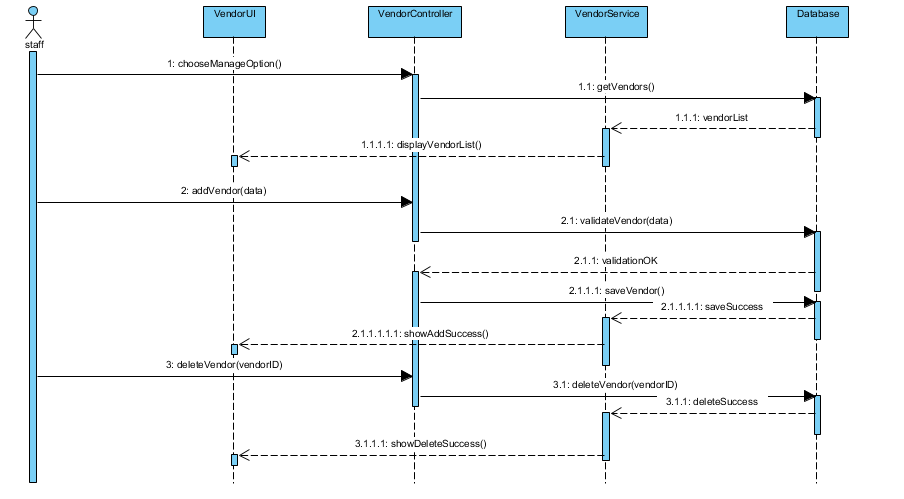


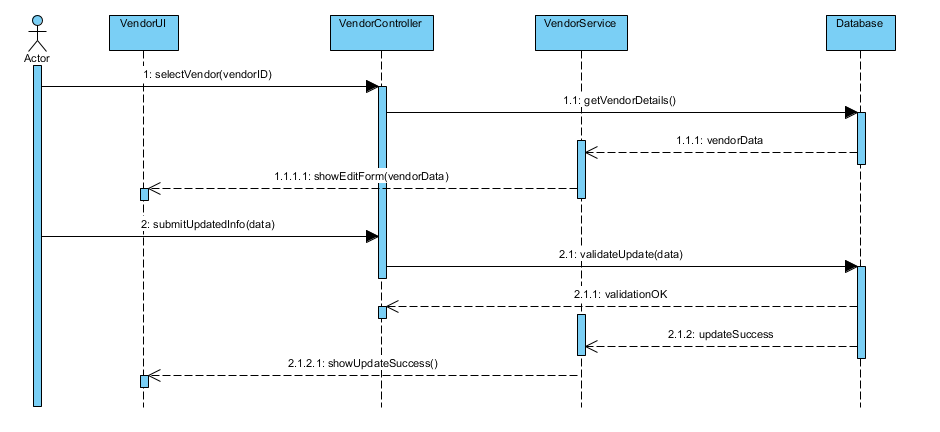


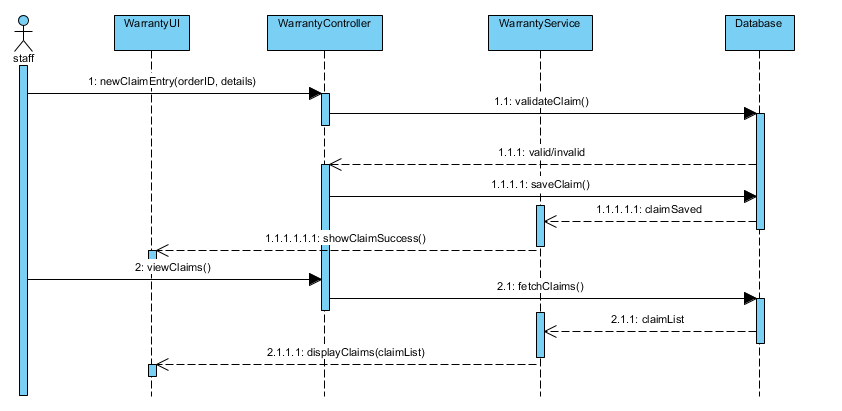


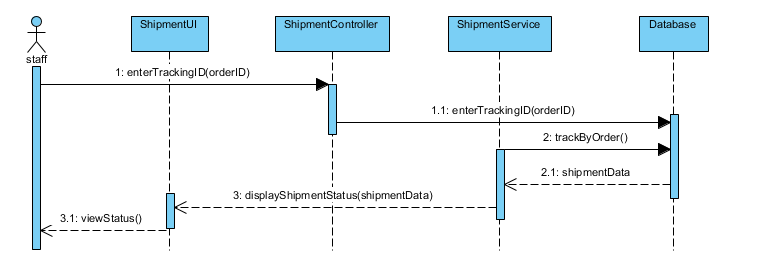


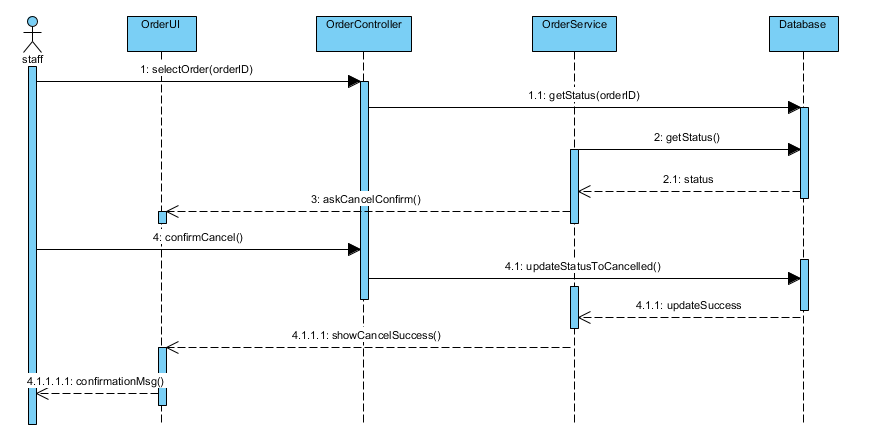






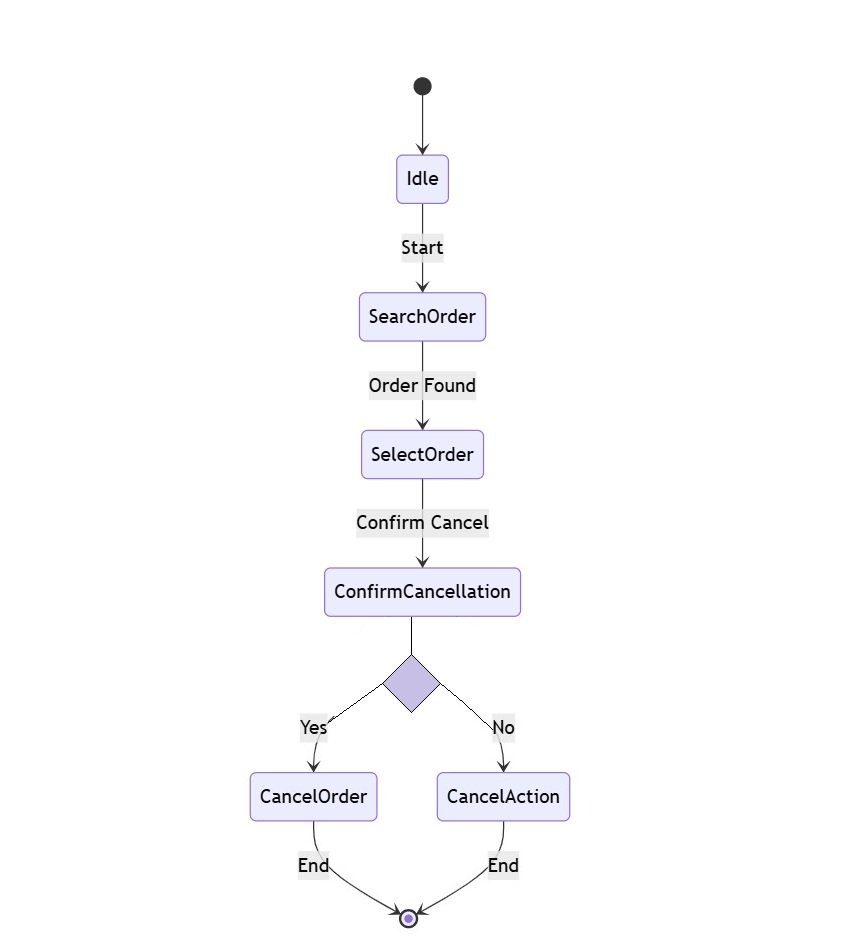


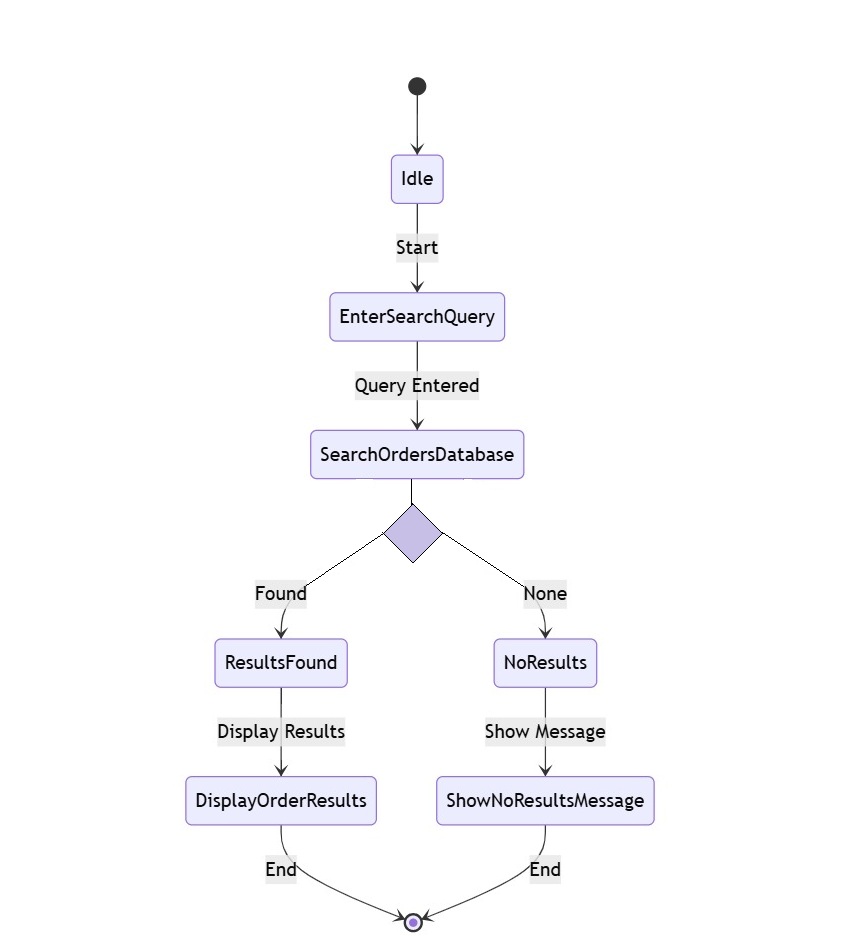


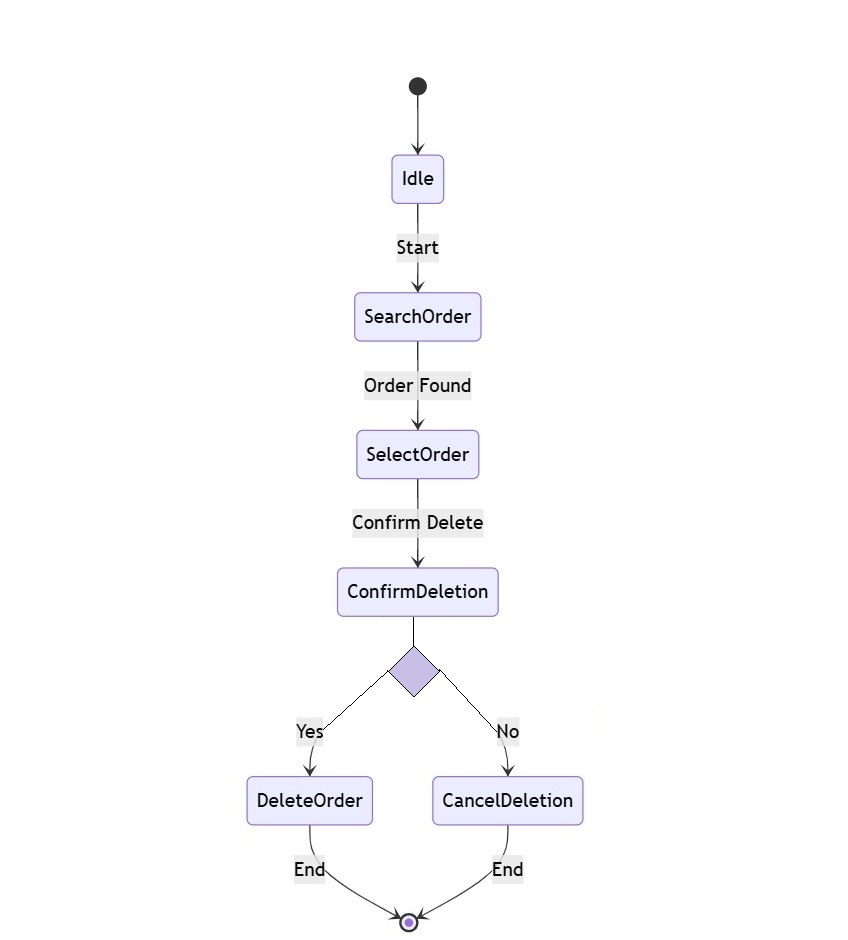


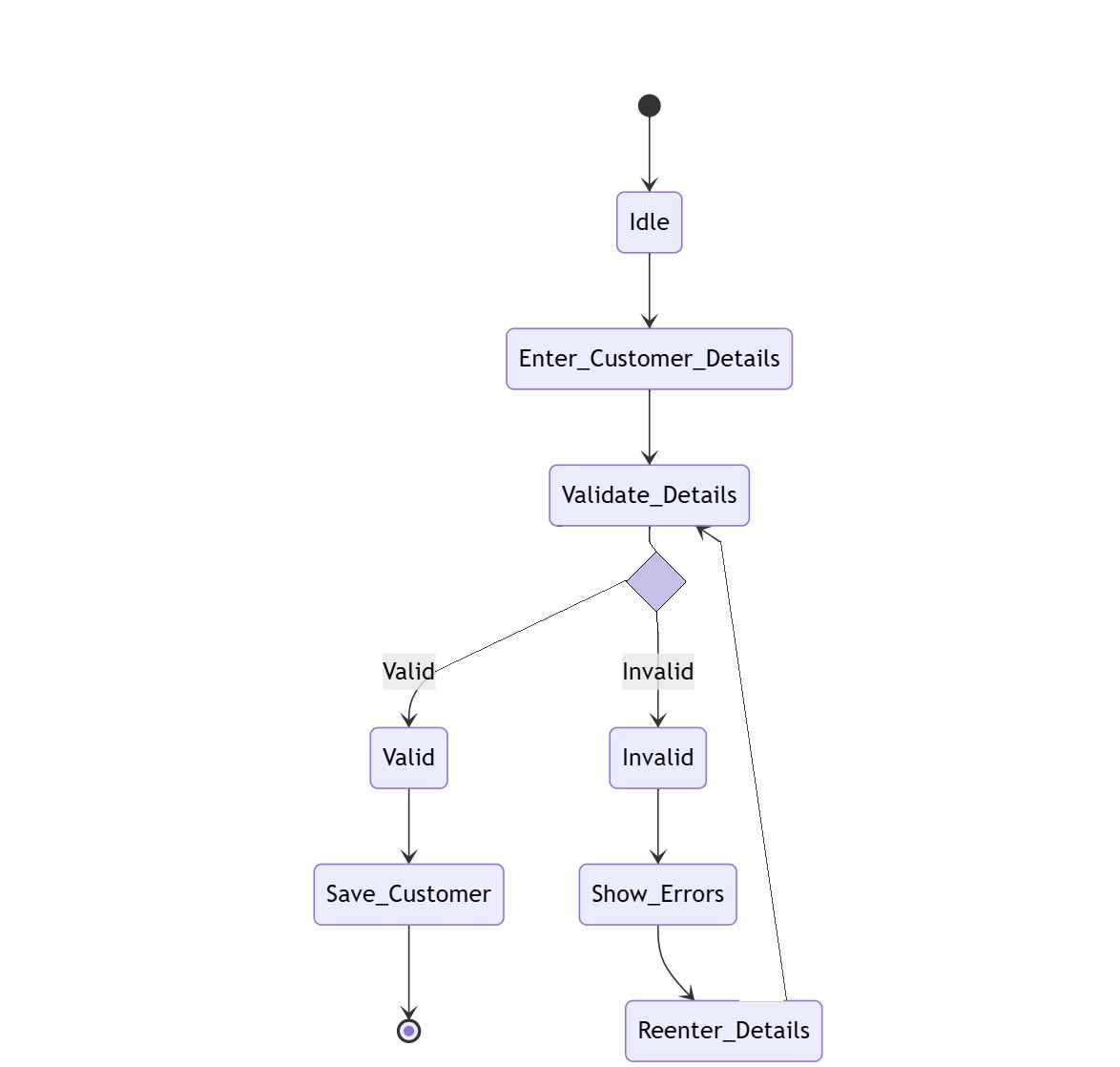
# 6. State Machine Diagrams

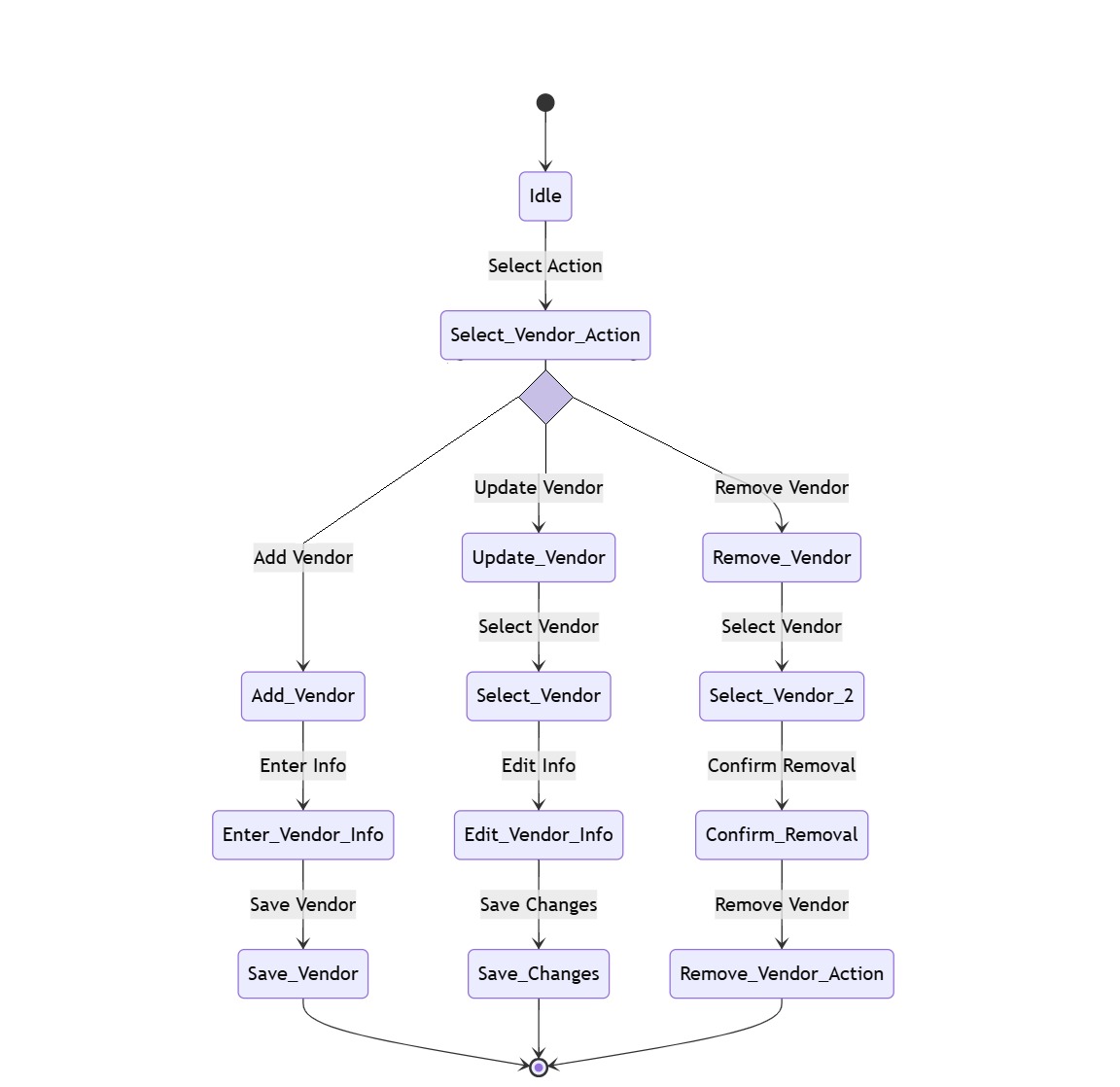
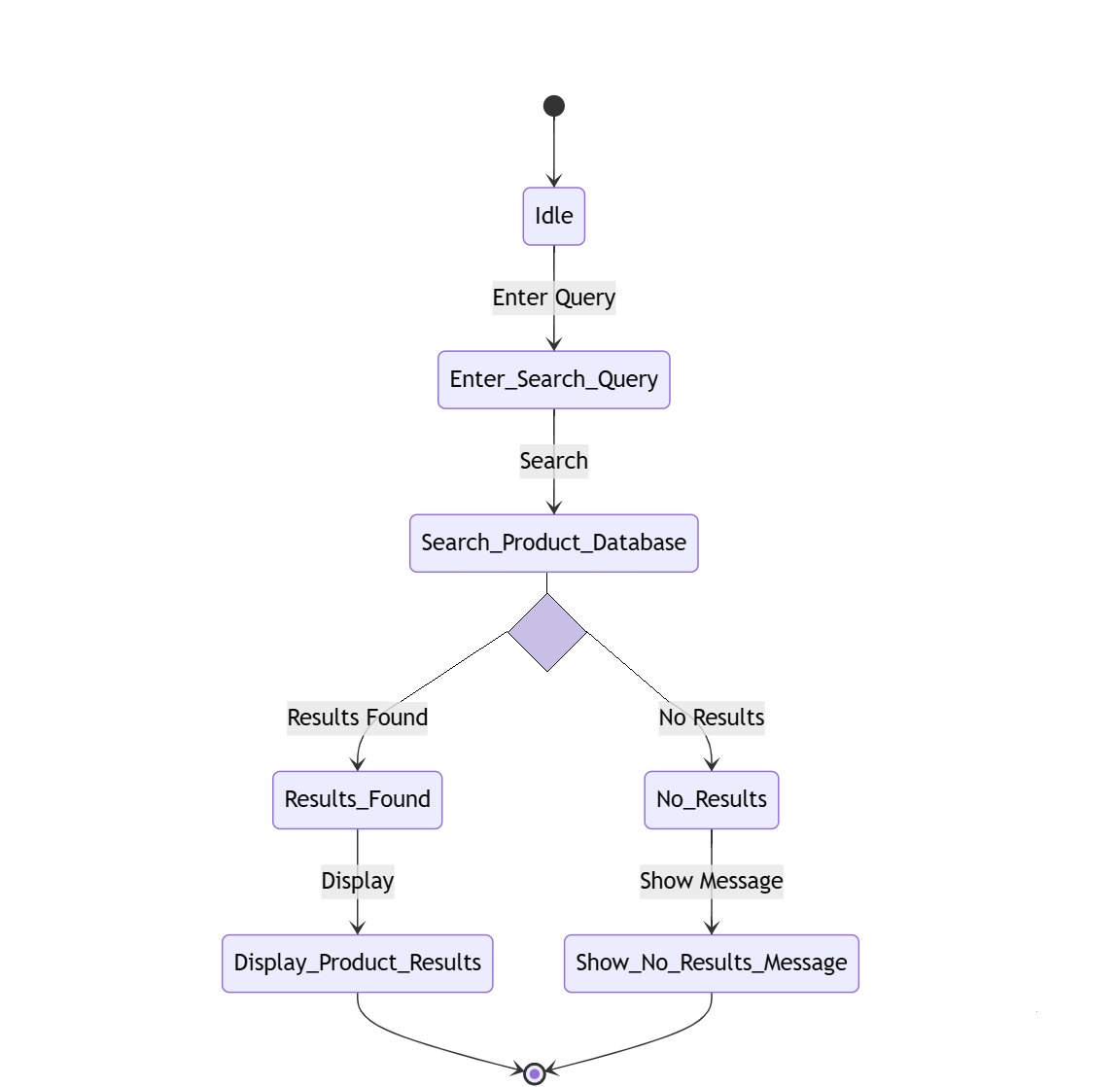
Add your screenshots or diagrams for '6. State Machine Diagrams' here.

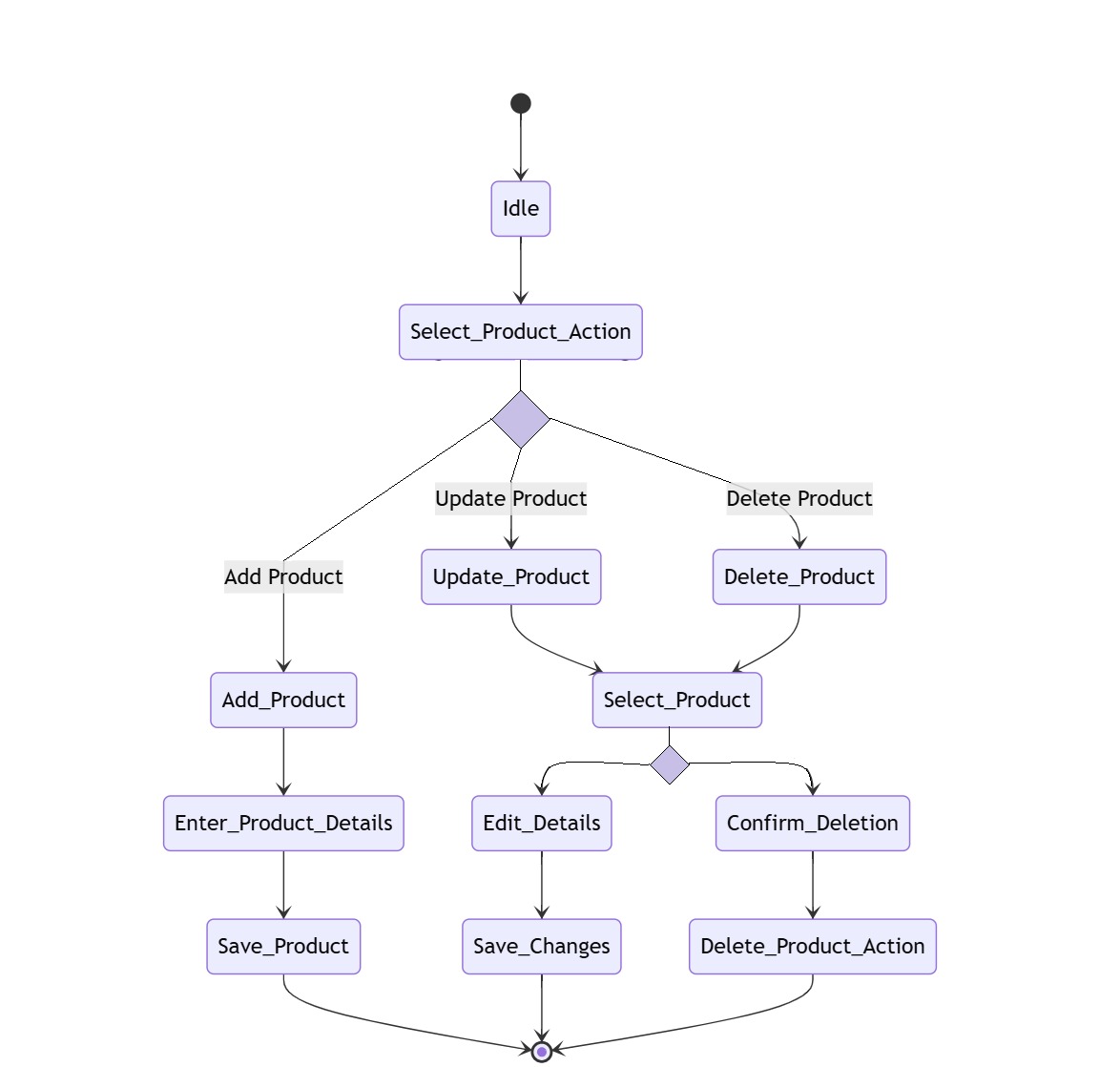


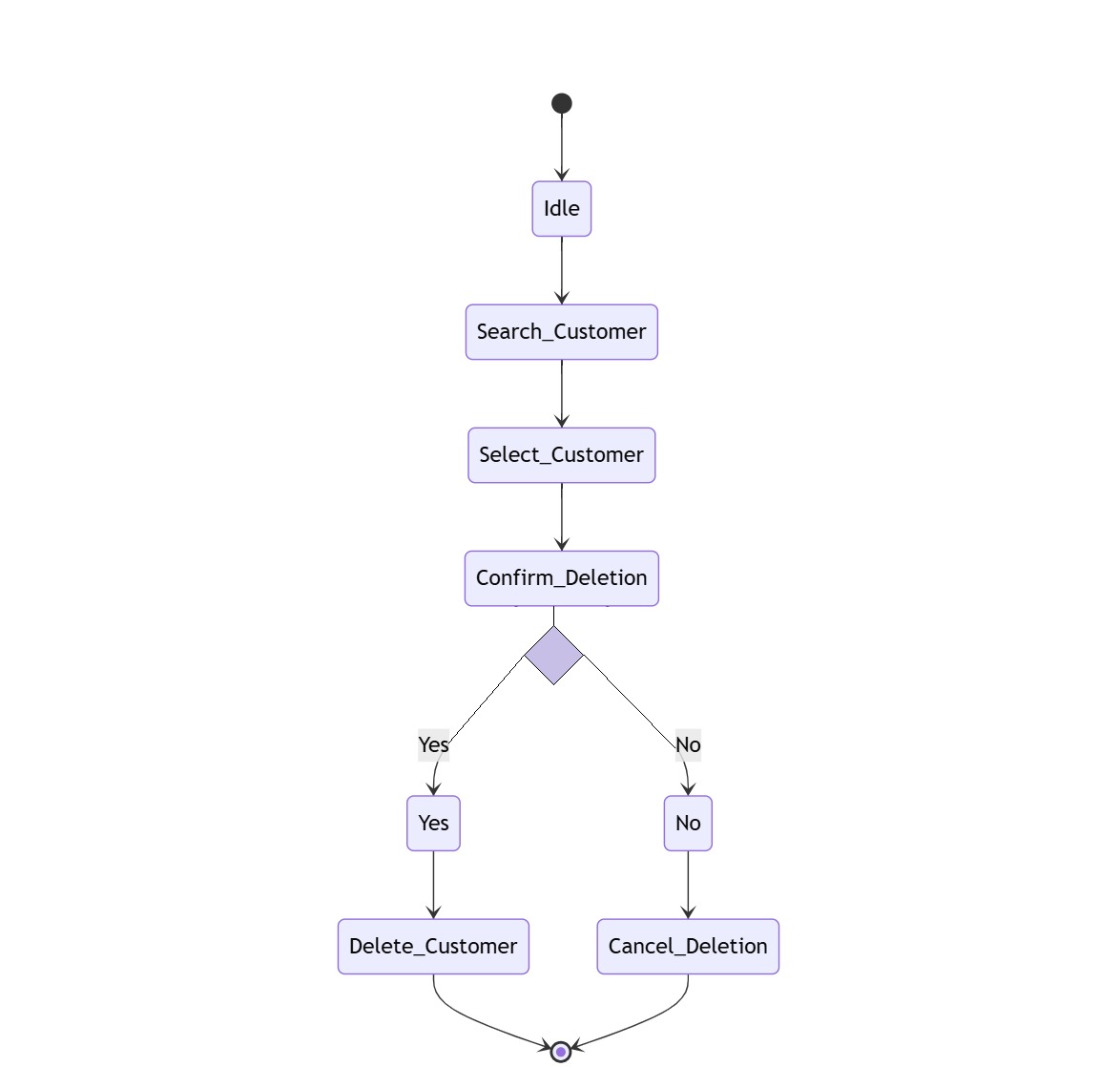
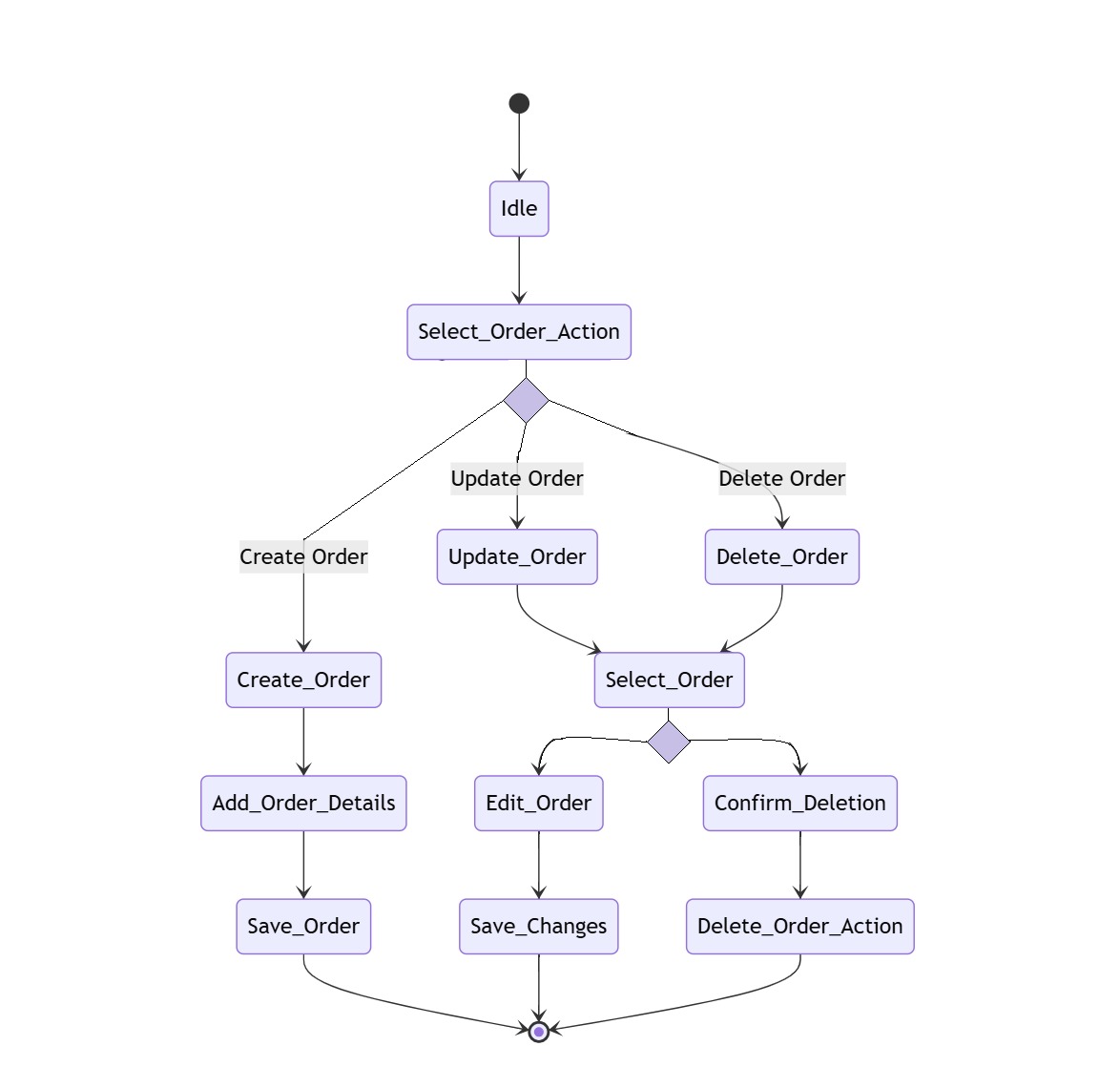


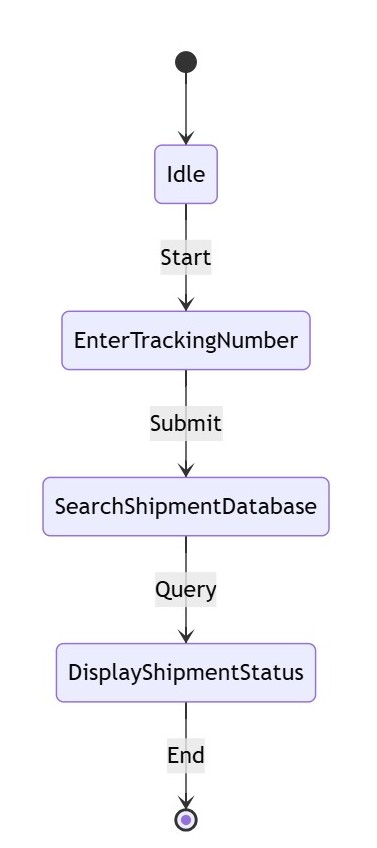


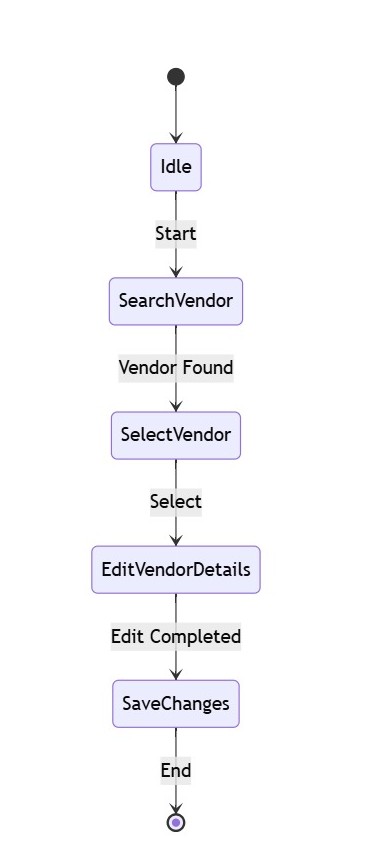


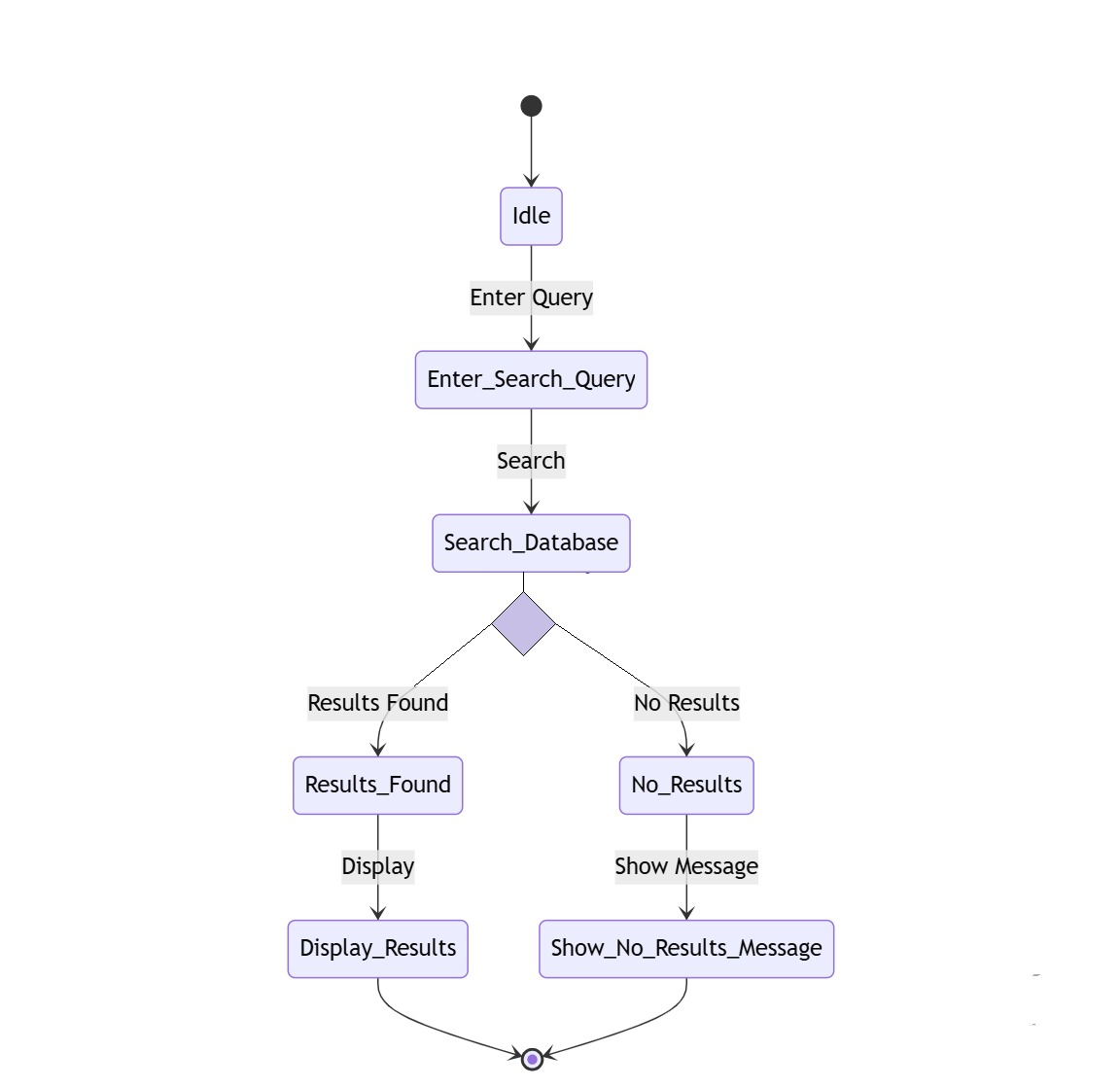


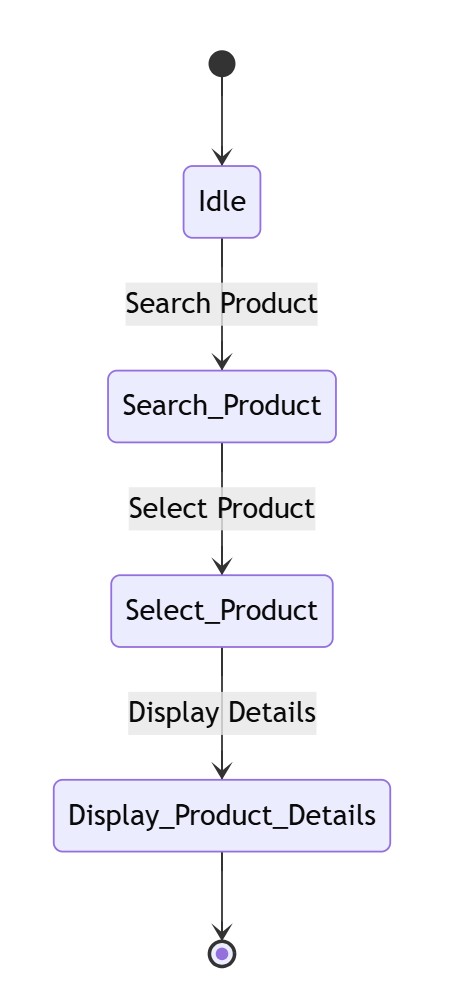


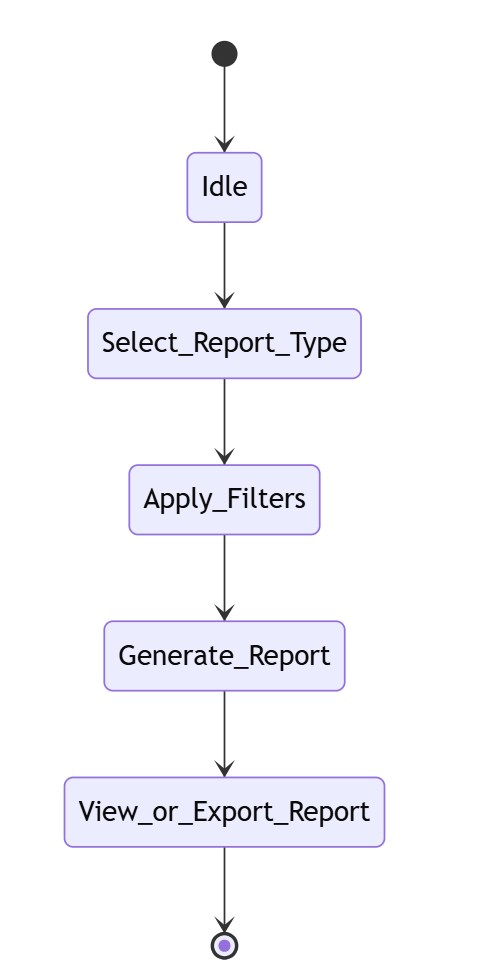


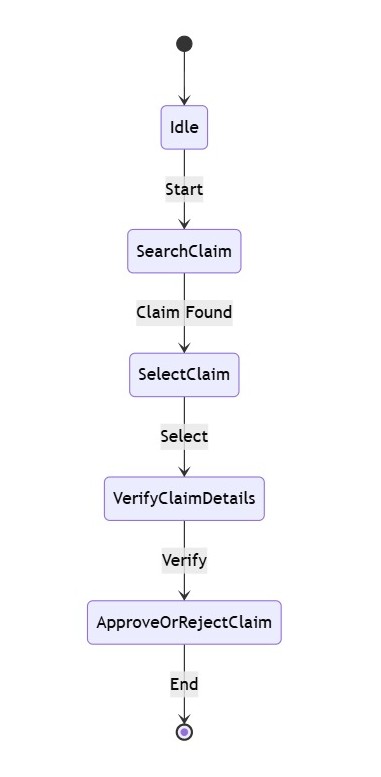


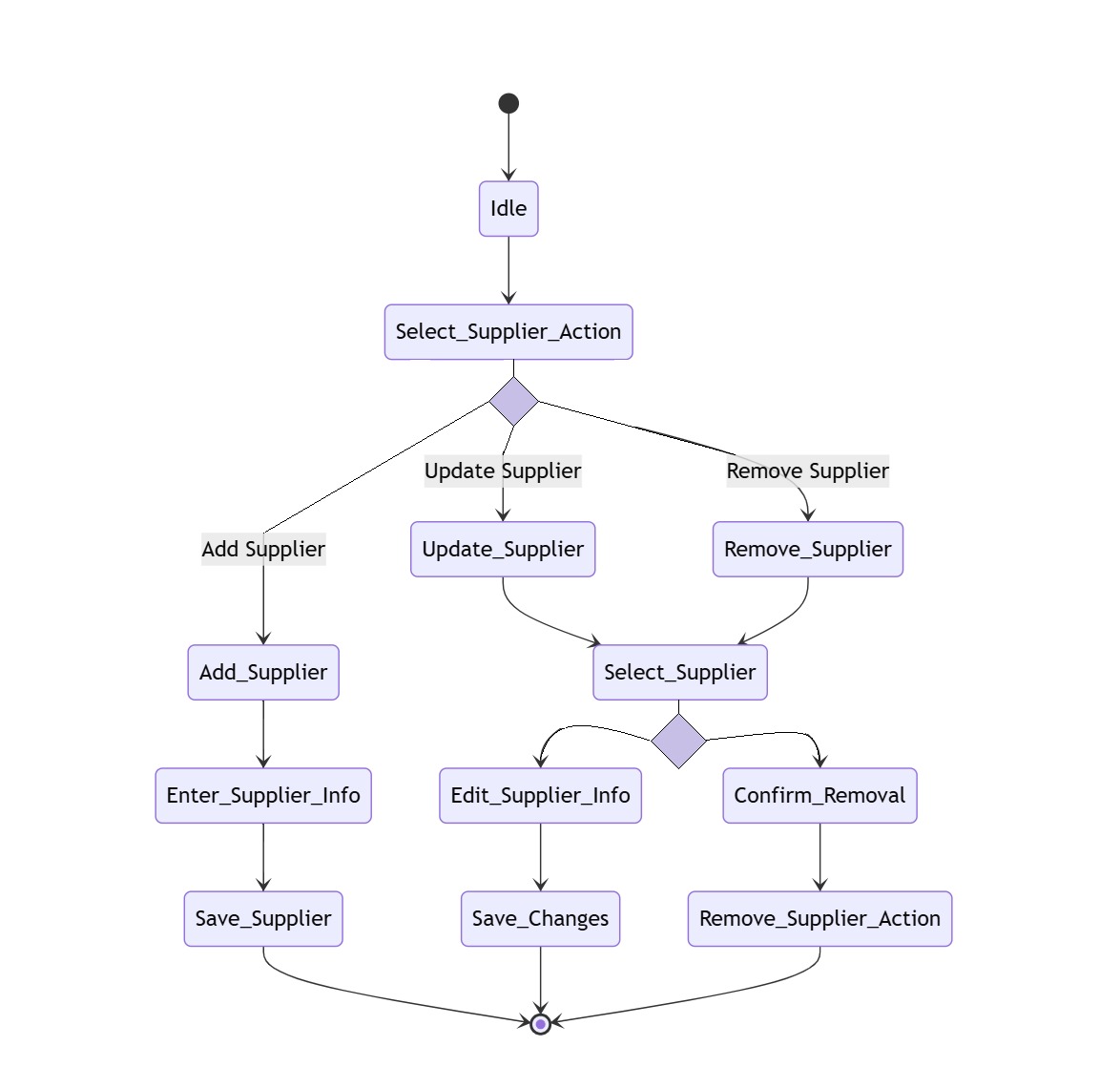


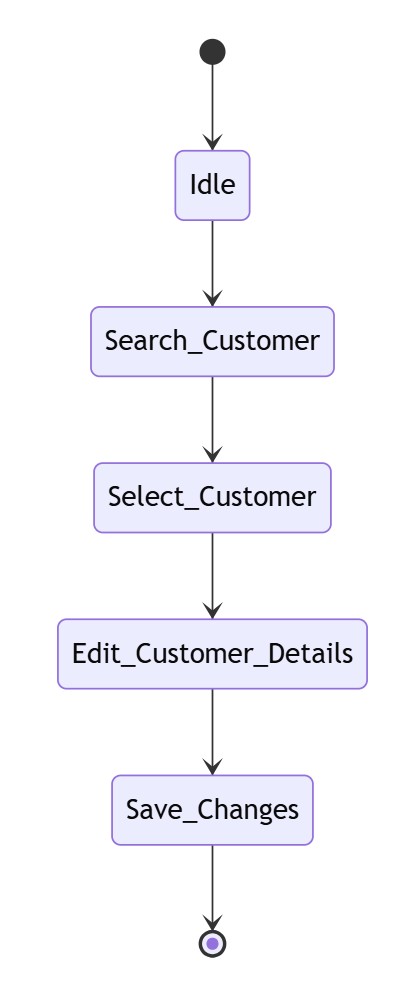


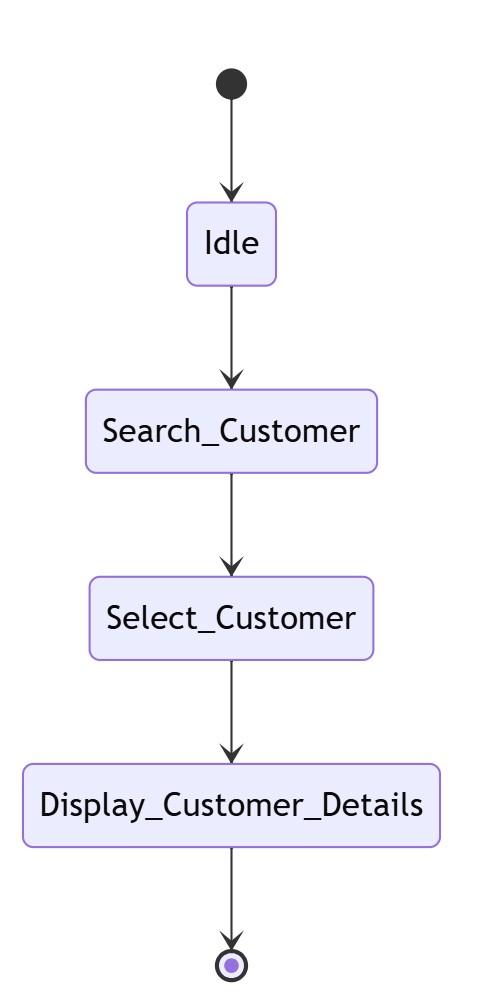








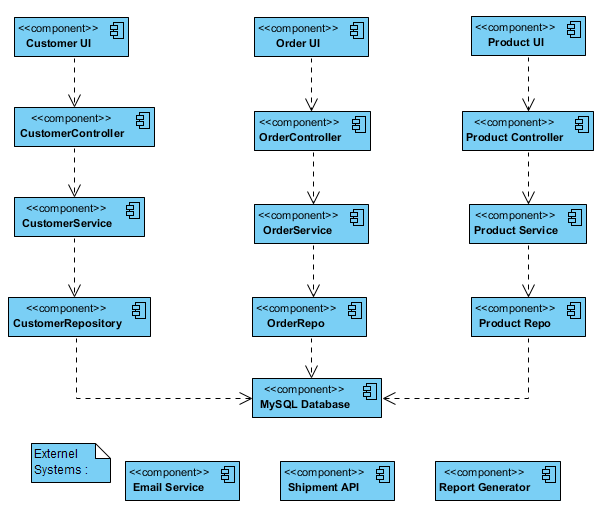




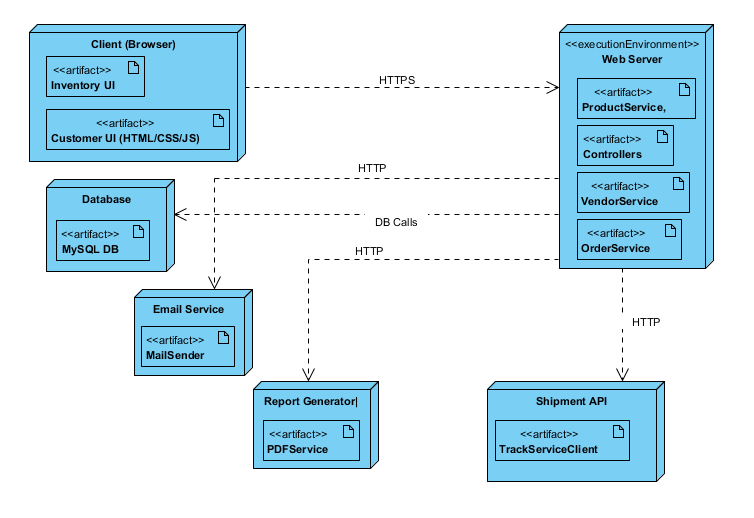
# 

# 

# 7. Component Diagram



# 8. Deployment Diagram



# Use Case Descriptions

## Use Case 1: Manage Products

Brief Description: System shall allow staff to add, update, and delete product details.

Actors: Staff, System

Preconditions: Staff must be authenticated and authorized to perform the action.

Postconditions: Action completed successfully, and changes are reflected in the system.

* Basic Flow:

1. Staff accesses the respective module via UI.

2. Staff selects 'Manage Products' functionality.

3. System displays relevant form/data.

4. Staff performs the operation (add/update/delete/search/etc.).

5. System processes the request and displays success confirmation.

* Alternative Flow:

1. If input is invalid, system shows validation error.

2. If database is unreachable, system shows connection error message.

3. If operation fails due to constraints, system logs the issue and notifies the user.

## Use Case 2: Manage Orders

Brief Description: System shall allow staff to create and update customer orders.

Actors: Staff, System

Preconditions: Staff must be authenticated and authorized to perform the action.

Postconditions: Action completed successfully, and changes are reflected in the system.

* Basic Flow:

1. Staff accesses the respective module via UI.

2. Staff selects 'Manage Orders' functionality.

3. System displays relevant form/data.

4. Staff performs the operation (add/update/delete/search/etc.).

5. System processes the request and displays success confirmation.

* Alternative Flow:

1. If input is invalid, system shows validation error.

2. If database is unreachable, system shows connection error message.

3. If operation fails due to constraints, system logs the issue and notifies the user.

## Use Case 3: Manage Suppliers

Brief Description: System shall allow staff to add and update supplier information.

Actors: Staff, System

Preconditions: Staff must be authenticated and authorized to perform the action.

Postconditions: Action completed successfully, and changes are reflected in the system.

* Basic Flow:

1. Staff accesses the respective module via UI.

2. Staff selects 'Manage Suppliers' functionality.

3. System displays relevant form/data.

4. Staff performs the operation (add/update/delete/search/etc.).

5. System processes the request and displays success confirmation.

* Alternative Flow:

1. If input is invalid, system shows validation error.

2. If database is unreachable, system shows connection error message.

3. If operation fails due to constraints, system logs the issue and notifies the user.

## Use Case 4: Manage Stock Inventory

Brief Description: System shall allow staff to view and update stock levels.

Actors: Staff, System

Preconditions: Staff must be authenticated and authorized to perform the action.

Postconditions: Action completed successfully, and changes are reflected in the system.

* Basic Flow:

1. Staff accesses the respective module via UI.

2. Staff selects 'Manage Stock Inventory' functionality.

3. System displays relevant form/data.

4. Staff performs the operation (add/update/delete/search/etc.).

5. System processes the request and displays success confirmation.

* Alternative Flow:

1. If input is invalid, system shows validation error.

2. If database is unreachable, system shows connection error message.

3. If operation fails due to constraints, system logs the issue and notifies the user.

## Use Case 5: Generate Reports

Brief Description: System shall allow staff to generate product and sales reports.

Actors: Staff, System

Preconditions: Staff must be authenticated and authorized to perform the action.

Postconditions: Action completed successfully, and changes are reflected in the system.

* Basic Flow:

1. Staff accesses the respective module via UI.

2. Staff selects 'Generate Reports' functionality.

3. System displays relevant form/data.

4. Staff performs the operation (add/update/delete/search/etc.).

5. System processes the request and displays success confirmation.

* Alternative Flow:

1. If input is invalid, system shows validation error.

2. If database is unreachable, system shows connection error message.

3. If operation fails due to constraints, system logs the issue and notifies the user.

## Use Case 6: Add Customer

Brief Description: System shall allow staff to add a new customer into the database.

Actors: Staff, System

Preconditions: Staff must be authenticated and authorized to perform the action.

Postconditions: Action completed successfully, and changes are reflected in the system.

* Basic Flow:

1. Staff accesses the respective module via UI.

2. Staff selects 'Add Customer' functionality.

3. System displays relevant form/data.

4. Staff performs the operation (add/update/delete/search/etc.).

5. System processes the request and displays success confirmation.

* Alternative Flow:

1. If input is invalid, system shows validation error.

2. If database is unreachable, system shows connection error message.

3. If operation fails due to constraints, system logs the issue and notifies the user.

## Use Case 7: Update Customer

Brief Description: System shall allow staff to update customer details.

Actors: Staff, System

Preconditions: Staff must be authenticated and authorized to perform the action.

Postconditions: Action completed successfully, and changes are reflected in the system.

* Basic Flow:

1. Staff accesses the respective module via UI.

2. Staff selects 'Update Customer' functionality.

3. System displays relevant form/data.

4. Staff performs the operation (add/update/delete/search/etc.).

5. System processes the request and displays success confirmation.

* Alternative Flow:

1. If input is invalid, system shows validation error.

2. If database is unreachable, system shows connection error message.

3. If operation fails due to constraints, system logs the issue and notifies the user.

## Use Case 8: Delete Customer

Brief Description: System shall allow staff to remove customer records.

Actors: Staff, System

Preconditions: Staff must be authenticated and authorized to perform the action.

Postconditions: Action completed successfully, and changes are reflected in the system.

* Basic Flow:

1. Staff accesses the respective module via UI.

2. Staff selects 'Delete Customer' functionality.

3. System displays relevant form/data.

4. Staff performs the operation (add/update/delete/search/etc.).

5. System processes the request and displays success confirmation.

* Alternative Flow:

1. If input is invalid, system shows validation error.

2. If database is unreachable, system shows connection error message.

3. If operation fails due to constraints, system logs the issue and notifies the user.

## Use Case 9: View Customer Details

Brief Description: System shall allow staff to view complete customer information.

Actors: Staff, System

Preconditions: Staff must be authenticated and authorized to perform the action.

Postconditions: Action completed successfully, and changes are reflected in the system.

* Basic Flow:

1. Staff accesses the respective module via UI.

2. Staff selects 'View Customer Details' functionality.

3. System displays relevant form/data.

4. Staff performs the operation (add/update/delete/search/etc.).

5. System processes the request and displays success confirmation.

* Alternative Flow:

1. If input is invalid, system shows validation error.

2. If database is unreachable, system shows connection error message.

3. If operation fails due to constraints, system logs the issue and notifies the user.

## Use Case 10: Search Customers

Brief Description: System shall allow staff to search customers using filters.

Actors: Staff, System

Preconditions: Staff must be authenticated and authorized to perform the action.

Postconditions: Action completed successfully, and changes are reflected in the system.

* Basic Flow:

1. Staff accesses the respective module via UI.

2. Staff selects 'Search Customers' functionality.

3. System displays relevant form/data.

4. Staff performs the operation (add/update/delete/search/etc.).

5. System processes the request and displays success confirmation.

* Alternative Flow:

1. If input is invalid, system shows validation error.

2. If database is unreachable, system shows connection error message.

3. If operation fails due to constraints, system logs the issue and notifies the user.

## Use Case 11: Search Products

Brief Description: System shall allow staff to search products by name or category.

Actors: Staff, System

Preconditions: Staff must be authenticated and authorized to perform the action.

Postconditions: Action completed successfully, and changes are reflected in the system.

* Basic Flow:

1. Staff accesses the respective module via UI.

2. Staff selects 'Search Products' functionality.

3. System displays relevant form/data.

4. Staff performs the operation (add/update/delete/search/etc.).

5. System processes the request and displays success confirmation.

* Alternative Flow:

1. If input is invalid, system shows validation error.

2. If database is unreachable, system shows connection error message.

3. If operation fails due to constraints, system logs the issue and notifies the user.

## Use Case 12: View Product Details

Brief Description: System shall allow staff to view product information.

Actors: Staff, System

Preconditions: Staff must be authenticated and authorized to perform the action.

Postconditions: Action completed successfully, and changes are reflected in the system.

* Basic Flow:

1. Staff accesses the respective module via UI.

2. Staff selects 'View Product Details' functionality.

3. System displays relevant form/data.

4. Staff performs the operation (add/update/delete/search/etc.).

5. System processes the request and displays success confirmation.

* Alternative Flow:

1. If input is invalid, system shows validation error.

2. If database is unreachable, system shows connection error message.

3. If operation fails due to constraints, system logs the issue and notifies the user.

## Use Case 13: Filter Products by Category

Brief Description: System shall allow staff to filter product listings by category.

Actors: Staff, System

Preconditions: Staff must be authenticated and authorized to perform the action.

Postconditions: Action completed successfully, and changes are reflected in the system.

* Basic Flow:

1. Staff accesses the respective module via UI.

2. Staff selects 'Filter Products by Category' functionality.

3. System displays relevant form/data.

4. Staff performs the operation (add/update/delete/search/etc.).

5. System processes the request and displays success confirmation.

* Alternative Flow:

1. If input is invalid, system shows validation error.

2. If database is unreachable, system shows connection error message.

3. If operation fails due to constraints, system logs the issue and notifies the user.

## Use Case 14: Delete Order

Brief Description: System shall allow staff to delete a customer order.

Actors: Staff, System

Preconditions: Staff must be authenticated and authorized to perform the action.

Postconditions: Action completed successfully, and changes are reflected in the system.

* Basic Flow:

1. Staff accesses the respective module via UI.

2. Staff selects 'Delete Order' functionality.

3. System displays relevant form/data.

4. Staff performs the operation (add/update/delete/search/etc.).

5. System processes the request and displays success confirmation.

* Alternative Flow:

1. If input is invalid, system shows validation error.

2. If database is unreachable, system shows connection error message.

3. If operation fails due to constraints, system logs the issue and notifies the user.

## Use Case 15: Search Orders

Brief Description: System shall allow staff to search and view orders.

Actors: Staff, System

Preconditions: Staff must be authenticated and authorized to perform the action.

Postconditions: Action completed successfully, and changes are reflected in the system.

* Basic Flow:

1. Staff accesses the respective module via UI.

2. Staff selects 'Search Orders' functionality.

3. System displays relevant form/data.

4. Staff performs the operation (add/update/delete/search/etc.).

5. System processes the request and displays success confirmation.

* Alternative Flow:

1. If input is invalid, system shows validation error.

2. If database is unreachable, system shows connection error message.

3. If operation fails due to constraints, system logs the issue and notifies the user.

## Use Case 16: Cancel Order

Brief Description: System shall allow staff to cancel an existing order.

Actors: Staff, System

Preconditions: Staff must be authenticated and authorized to perform the action.

Postconditions: Action completed successfully, and changes are reflected in the system.

* Basic Flow:

1. Staff accesses the respective module via UI.

2. Staff selects 'Cancel Order' functionality.

3. System displays relevant form/data.

4. Staff performs the operation (add/update/delete/search/etc.).

5. System processes the request and displays success confirmation.

* Alternative Flow:

1. If input is invalid, system shows validation error.

2. If database is unreachable, system shows connection error message.

3. If operation fails due to constraints, system logs the issue and notifies the user.

## Use Case 17: Manage Vendors

Brief Description: System shall allow staff to manage vendor profiles.

Actors: Staff, System

Preconditions: Staff must be authenticated and authorized to perform the action.

Postconditions: Action completed successfully, and changes are reflected in the system.

* Basic Flow:

1. Staff accesses the respective module via UI.

2. Staff selects 'Manage Vendors' functionality.

3. System displays relevant form/data.

4. Staff performs the operation (add/update/delete/search/etc.).

5. System processes the request and displays success confirmation.

* Alternative Flow:

1. If input is invalid, system shows validation error.

2. If database is unreachable, system shows connection error message.

3. If operation fails due to constraints, system logs the issue and notifies the user.

## Use Case 18: Update Vendor Info

Brief Description: System shall allow staff to update vendor details.

Actors: Staff, System

Preconditions: Staff must be authenticated and authorized to perform the action.

Postconditions: Action completed successfully, and changes are reflected in the system.

* Basic Flow:

1. Staff accesses the respective module via UI.

2. Staff selects 'Update Vendor Info' functionality.

3. System displays relevant form/data.

4. Staff performs the operation (add/update/delete/search/etc.).

5. System processes the request and displays success confirmation.

* Alternative Flow:

1. If input is invalid, system shows validation error.

2. If database is unreachable, system shows connection error message.

3. If operation fails due to constraints, system logs the issue and notifies the user.

## Use Case 19: Manage Warranty Claims

Brief Description: System shall allow staff to handle warranty claim processes.

Actors: Staff, System

Preconditions: Staff must be authenticated and authorized to perform the action.

Postconditions: Action completed successfully, and changes are reflected in the system.

* Basic Flow:

1. Staff accesses the respective module via UI.

2. Staff selects 'Manage Warranty Claims' functionality.

3. System displays relevant form/data.

4. Staff performs the operation (add/update/delete/search/etc.).

5. System processes the request and displays success confirmation.

* Alternative Flow:

1. If input is invalid, system shows validation error.

2. If database is unreachable, system shows connection error message.

3. If operation fails due to constraints, system logs the issue and notifies the user.

## Use Case 20: Track Product Shipments

Brief Description: System shall allow staff to track shipment status of products.

Actors: Staff, System

Preconditions: Staff must be authenticated and authorized to perform the action.

Postconditions: Action completed successfully, and changes are reflected in the system.

* Basic Flow:

1. Staff accesses the respective module via UI.

2. Staff selects 'Track Product Shipments' functionality.

3. System displays relevant form/data.

4. Staff performs the operation (add/update/delete/search/etc.).

5. System processes the request and displays success confirmation.

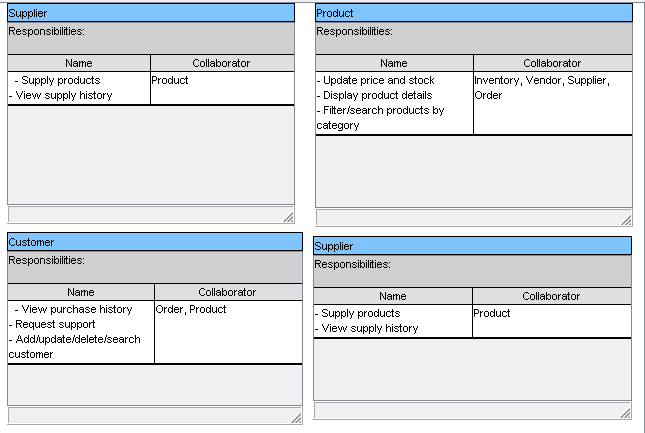
* Alternative Flow:

1. If input is invalid, system shows validation error.

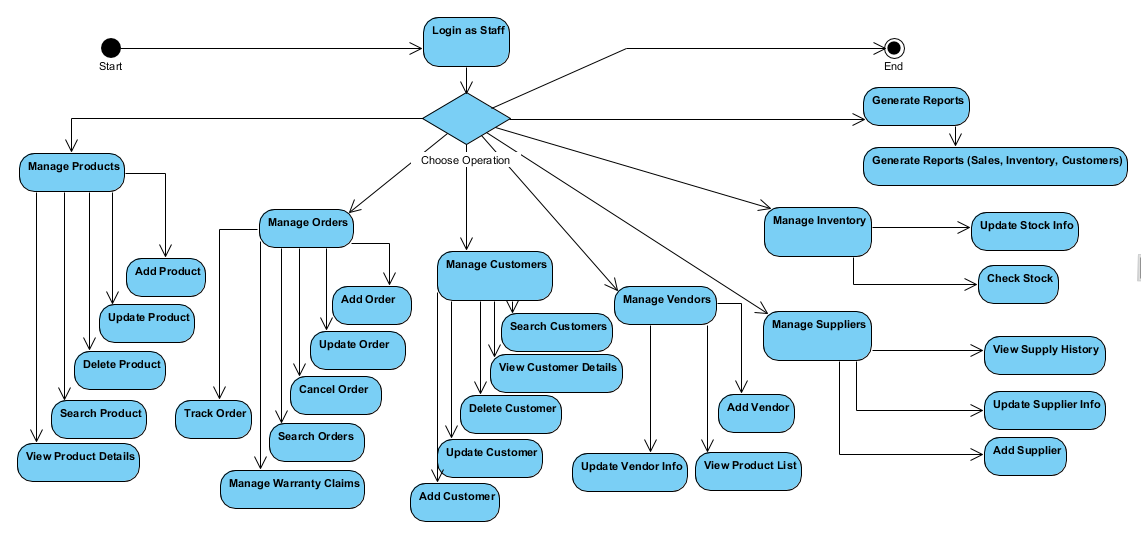
2. If database is unreachable, system shows connection error message.

3. If operation fails due to constraints, system logs the issue and notifies the user.

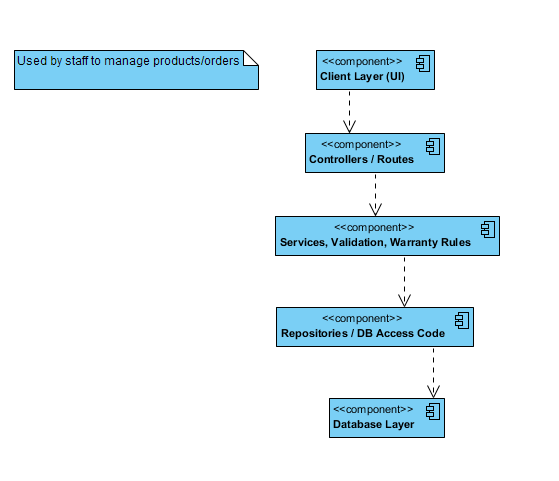
# CRC – Cards



# Activity Diagram



# High level Architecture :



Source Files & Resources:  
All source files, code, and design diagrams are available in the GitHub repository:  
🔗 <https://github.com/git-rafaykhan/SDA-Project>