VIETNAM GENERAL CONFEDERATION OF LABOR

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**FACULTY OF INFORMATION TECHNOLOGY**



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**FINAL REPORT**

**SOFTWARE ENGINEERING**

**HO CHI MINH CITY, 2025**

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**SOFTWARE ENGINEERING**

Advised by

**PhD. Nguyen Ngoc Phien**

**HO CHI MINH CITY, 2025**

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*Ho Chi Minh City, 21th April 2025.*

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**DECLARATION OF AUTHORSHIP**

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# INTRODUCTION

**Topic Name:** Flower shop management software

## Reason to choose this topic

With the developing technology nowsaday, more and more shops have begun using computers to manage their shops. If people keeps doing all the work by hands, it wouldn’t be able for them to keep up sooner or later. And if they decide to open multiple braches, it will be even harder to keep track without using computer. From the reasons above, management softwares have been developed to help shop’s owners with managing works. That not only helps reducing the possible errors made by the owner but also makes the work become easier and more enjoyable.

For all the reasons above, our group has decided to choose the “Flower shop management software” topic to help flower shops that have problems with managing stuffs in their shop. They can check the data and update, deleting them if necessary like: type of flower, flower’s stock, order, price,… The user-friendly graphic interfaces will make it easier for the owner to use.

## Engineering Requirement

### Functional Requirement

Admin: Customer consultation, Order management, Product management, User information management, Delivery management.

Customer: Access the website, View and Buy product, Manage personal ìnormation.

### Non-Functional Requrement

* Performance:

+ Data is uploaded, updated quickly with complete consistency and accuracy.

+ Easy to use, not too complicated user interface, cross-platform interface, fast response speed.

+ Capable of serving many devices at the same time.

* Safety:

+ Capable of storing data, backing up and restoring data in case the software encounters problems likes: connection problems, hardware problems,…

* Confidentiality:

+ Manage user rights through functions and data. Independently designed View, Add, Edit, Delete functions give customers more flexibility in organizing multiple users and controlling data.

* Quality attributes:

+ Built on web platform and compatible with many browsers for user’s preference.

+ Easy to maintain, upgrade, develop software after deployed.

+ The ability to reuse the software for a number of other information management purposes.

## Bussiness Process

Customers can order products online through the website. They can view and search for product’s information without having to log in, but if they want to buy the product, the customer will be required to log in with their accounts or create an account if they haven’t had one yet. To make a complete purchase, the customer are required to choose available product(s) and haven’t run out of stock yet into their cart. Next, they must choose a payment method likes: pay online via bank cart, e-waleet or pay on receiving the product. After making a complete purchase, the system will receive and process the order and the payment, then send the information to the shop’s owner. Customers can also view the progress of their orders on the web through the order viewing function.

## Fact Survey

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Interviewer | Interviewees | Interviewee's Role | Interview Question | Answer |
| Nguyễn Cao Hậu | Bùi Trọng Khang | User | Hello, in your opinion, what is the most outstanding thing about an online flower shop? | Hi, according to my years of experience ordering flowers online, the most outstanding thing is the convenience and speed of ordering and delivery. What physical flower shops can't always provide. |
| Nguyễn Cao Hậu | Trần Đức Huy | User | Hello, can you tell me what are the disadvantages of these online flower shops? | Hi, as far as I know from my experience using one or two online flower shops, one of the biggest disadvantages is the need for a stable Internet connection. If one day you don’t have 4G or Wifi and you want to order flowers online, it’s impossible. |
| Nguyễn Cao Hậu | Nguyễn Đức Anh | Developer | Hi, can you tell me what is difficult when launching an online flower shop? | As I see it, the risk of data loss is one of the major difficulties. All order and customer data is stored on the company’s server along with that of hundreds of other clients. A virus can easily attack and crash the whole system. At that point, the business will almost lose all data — customer info, orders, revenue, everything — and recovery is difficult. The consequences are hard to imagine. |
| Nguyễn Cao Hậu | Phan Văn Dương | Admin | Hello, I want to know what is one of the advantages of selling flowers online? | Hi, interesting question. One advantage is that the initial setup cost is relatively low. This is a short-term benefit when starting a flower business online. For example, only about 2-3 million VND/year for the first setup. Annually, you need to pay to maintain the server and staff to ensure your data is secure. In fact, the yearly cost of running an online flower shop is just a bit lower than the fixed cost of running a physical flower store. |
| Nguyễn Cao Hậu | Đinh Quốc Cường | User | Hello, can you share with me the benefits of buying flowers online that you know? | Hi, in my opinion, the benefits of buying flowers online include fast response and payment options, enthusiastic consultants, and support for many payment methods. |

# SPECIFIC DESCRIPTION

## System Description

The “Flower shop management software” will include two objects: Customer and Owner.

- On the Customer side: Customer can view the goods on the website but if they want to buy through the website, they have to have an account by creating a new account. Only then, they can add any product they like to their cart and choose a payment method. Completing these two steps, customer can pay for the product they chose. Then, they can review the order and check the status of that order. And if the customer don’t feel like it, they can cancel the order at any time and the money will be given back to them.

- On the Owner side: The Owner can manage many things on the website like: goods’ stock, goods’ price, add or remove goods, edit goods’ information and catalog, manage accounts and information,… The Owner don’t have to process the order and payment themselves since the system will do that job and send a notification to them. They will handle the delivery though, making sure the customer receive the product.

## Target Audience

The system’s targeted audience are flower shop’s owners who want to have some advantages in their work by having a better efficiency and time management and those who plan to expand their business further.

## Project Range

The system will ensure mobility between webs and devices. It will also support multiple langagues for different users all over the world. The system will make sure to provide high security for their data and information too.

## Actor in the System

|  |  |  |
| --- | --- | --- |
| **No.** | **Actor** | **Description** |
| 1 | Admin | Admin is responsible for managing things on the system, including product, account, order and customer service. |
| 2 | Customer | Regular customers who visit the website, view products, place orders, verify identity, manage their informations on the web. |

## Use Case in the System

|  |  |  |
| --- | --- | --- |
| **Number** | **Use Case Name** | **Describe** |
| UC01 | Sign up | Customers can create an account to make purchases. |
| UC02 | Sign in | Customers can sign in to their existing accounts. |
| UC03 | View product | Customers can browse products and view product details such as price and availability. |
| UC04 | Search product | Customers can search for products based on criteria. |
| UC05 | Make order | Customers can place an order after selecting products. |
| UC06 | Manage personal information | Customers can update their personal information. |
| UC07 | Make Payment | Customers can make payments for their orders. |
| UC08 | Manage account | Admin manages the accounts of customers and updates details. |
| UC09 | Manage order | Admin manages orders (e.g., processing, shipping, etc.). |
| UC10 | Manage product | Admin manages products, including adding, deleting, and updating details. |
| UC11 | Manage customer service | Admin handles customer inquiries and service requests. |

## System Function

|  |  |  |
| --- | --- | --- |
| **Number** | **Function** | **Describe** |
| 1 | Register | Allow customers to register for an account to place orders and manage their orders. |
| 2 | Login | Allow owner, staff, and customers to log in to the system. |
| 3 | Personal information management | Allow customers and staff to view and edit their personal information. |
| 4 | Payment processing | Allow customers to pay for orders through an integrated payment system. |
| 5 | View product information | Allow customers to view details about flowers, including price, availability, and promotions. |
| 6 | Product Management | Allow owner and staff to add, delete, or edit flower/product information. |
| 7 | View orders | Allow customers to view the status of their current and past orders. |
| 8 | Inventory Management | Allow staff to track and update the stock of flowers/products in the system. |
| 9 | Price Management | Allow the owner to update and set the price of flowers/products. |
| 10 | Customer support | Allow customers to contact support via online chat or hotline for inquiries and issues. |

# DETAILED DESIGN

## General Use Case Diagram

1. General Use Case

## Use Case Diagram and Specification

### Sign up/Sign in

1. Use Case Sign Up / Sign In

|  |  |
| --- | --- |
| **Use case name** | Sign Up/Sign In |
| **Scenario** | Customer want the use the website to make purchase |
| **Triggering event** | Customer who want to have an account and use the website |
| **Brief description** | Allow users to log in to the site to make purchase and view product |
| **Actors** | Customer, Admin |
| **Related use case** | Must have |
| **Stakeholders** | Admin |
| **Preconditions** | - Customer successfully entered the site  - Customer need to have internet |
| **Post conditions** | - Customer successfully registered  - Customer successfully logged in |
| **Flow of activities ( Actor)** | 1. Customer select “Login”   1.2 Enter your username or email address  1.3 Enter password .  1.4 Enter account  1.5 Click the “Login ” button |
| **Flow of activities (System)** | 1. Display the” Login “ interface 2. Show login successful and go to home page |
| **Exception conditions** | 1.If you enter an incorrect or invalid username , you will be asked to re-enter it.  2.If you confirm the password incorrect you will be asked to re-enter it.  3. If you enter the wrong account or password, you will be asked re-enter it. |

### View Product

1. Use Case View Product

|  |  |
| --- | --- |
| **Use case name** | View Product |
| **Scenario** | Customer can view product information from any source. |
| **Trigger event** | Use want to know the quality and origin of the product. |
| **Brief description** | Allow customer to know the quality and process of the product, the origin of the product. |
| **Actors** | Customer |
| **Related use case** | Must have |
| **Stakeholders** | Admin |
| **Precondition** | - Customer successfully entered the website  - Customer must have internet connection |
| **Post conditions** | - Customer successfully logged in  - Customer must select product to view |
| **Flow of activities (Actor)** | 1.1 Customer select the product to view  1.2 Customer choose to know product information  1.3 If the customer chooses to view, the customer will continue to view image, name, price of the product. |
| **Flow of activities (System)** | 1.1 Display product interface will include product information  1.2 Display view Product appear  1.3 If the customer choose to view, then switch to image, name, price.  1.4 If the customer choose to cancel display, return the View Product interface |
| **Exception condition** | 1.3.1 To choose product to the View, if the customer is not logged in , they will have to log in |

### Search Product

1. Use Case Search Product

|  |  |
| --- | --- |
| **Use case name** | Search Product |
| **Scenario** | Customer wants to search for a product to view or purchase. |
| **Trigger event** | Customer selects the search function on the website. |
| **Brief description** | Allows customers to search for products using name, supplier, price, or popularity criteria. |
| **Actors** | Customer |
| **Related use case** | Must have |
| **Stakeholders** | Admin |
| **Precondition** | - Customer successfully entered the website  - Customer must have internet connection |
| **Post conditions** | - Customer successfully logged in  - Search results are displayed successfully based on user input |
| **Flow of activities (Actor)** | 1.1 Customer selects the search option.  1.2 Customer enters search criteria (e.g., name, supplier, price range, popularity).  1.3 Customer clicks the “Search” button. |
| **Flow of activities (System)** | 1.1 System includes basic search by name.  1.2 System optionally extends to filter by supplier, price, or popularity if customer inputs these criteria.  1.3 System displays matching products in a list. |
| **Exception condition** | 1.1 If no products match the search criteria, a “No results found” message is shown  1.2 If search input is empty, user is prompted to enter valid input  1.3 If system encounters an error (e.g., network issue), user is notified |

### Make Order

1. Use Case Make Order

|  |  |
| --- | --- |
| **Use case name** | Make Order |
| **Scenario** | A customer selects products and quantities to place an order and optionally proceeds to payment. |
| **Triggering event** | Customer decides to make a purchase and accesses the ordering function. |
| **Brief description** | The customer places an order by selecting one or more products and specifying the quantity. The customer can then proceed to make a payment. |
| **Actor** | Customer |
| **Related use case case** | Choose Product, Choose Quantity, Make Payment |
| **Stakeholders** | Customer, Staff, Admin |
| **Preconditions** | An order is created with selected products and quantities. Payment may be completed. |
| **Post conditions** | An order is created with selected products and quantities. Payment may be completed. |
| **Flow of activities(Actor)** | 1. Customer accesses the ordering system. 2. Customer chooses a product. 3. Customer selects the quantity. 4. Order is created. 5. (Optional) Customer proceeds to make payment. |
| **Flow of activities(System)** | 1. System displays product catalog. 2. System records selected product and quantity. 3. System creates a new order in the database. 4. (If payment selected) System initiates and processes payment. 5. System confirms order placement or payment result. |
| **Exception conditions** | Product out of stock Quantity exceeds limit  Network failure during order or payment  Invalid payment method  Session timeout before confirming the order |

### Manage Personal Information

1. Use Case Manage Personal Information

|  |  |
| --- | --- |
| **Use case name** | Manage Personal Information |
| **Scenario** | A customer manages their personal information on the website. |
| **Triggering event** | |  | | --- | |  |  |  | | --- | |  |   Customer navigates to their account settings and chooses to update personal info. |
| **Brief description** | |  | | --- | |  |  |  | | --- | |  |   The customer can manage their personal data, including editing their name, email, location, and password, or deleting their account. This allows customers to keep their profile accurate and secure. |
| **Actor** | Customer |
| **Related use case case** | Edit Name, Edit Email, Edit Location, Edit Password, Delete Account |
| **Stakeholders** | |  | | --- | | Customer, Admin |  |  | | --- | |  | |
| **Preconditions** | |  | | --- | |  |  |  | | --- | |  |   The customer is logged into their account. |
| **Post conditions** | |  | | --- | |  |  |  | | --- | |  | |  |  |  | | --- | | The customer’s personal information is updated or the account is deleted. | |
| **Flow of activities(Actor)** | 1. Customer accesses the account settings. 2. Customer selects a specific information field to update or delete the account. 3. Customer provides new information or confirms deletion. 4. System updates the changes or deletes the account. |
| **Flow of activities(System)** | 1. System verifies user authentication. 2. System retrieves and displays personal info. 3. System validates new input data. 4. System updates or deletes information in the database. 5. System confirms success or returns error message. |
| **Exception conditions** | Invalid input format (e.g., email not in correct format) Database error during update Unauthorized access attempt Deletion request cannot be processed due to system constraints |

### Make Payment

1. Use Case Make Payment

|  |  |
| --- | --- |
| **Use case name** | Make Payment |
| **Scenario** | Customer wants to complete the purchase by making a payment. |
| **Trigger event** | Customer proceeds to checkout after adding items to the cart and selecting which items to pay. |
| **Brief description** | Allows the customer to finalize an order by selecting products to pay, choosing payment methods, and entering a shipping address. |
| **Actors** | Customer |
| **Related use case** | Must have |
| **Stakeholders** | Admin |
| **Precondition** | - Customer has logged in successfully  - Customer has items in the shopping cart  - Customer selected items in the cart |
| **Post conditions** | - Payment is completed successfully  - Order is recorded and processed |

|  |  |
| --- | --- |
| **Flow of activities (Actor)** | 1.1 Customer initiates the checkout process  1.2 Customer chooses products to pay  1.3 Customer optionally changes quantity of items  1.4 Customer inputs shipping address  1.5 Customer selects a payment method  1.6 Customer confirms and submits the payment |
| **Flow of activities (System)** | 1.1 System displays list of items selected for purchase  1.2 System allows modification of item quantity if requested  1.3 System validates shipping information  1.4 System presents available payment options  1.5 System processes the payment and generates order confirmation |
| **Exception condition** | 1.1 If no payment method is selected, user is prompted to choose one  1.2 If payment fails (e.g., insufficient funds), system displays an error and allows retry  1.3 If customer modifies quantity to an unavailable stock level, system shows a warning |

### Manage Account

1. Use Case Manage Account

|  |  |
| --- | --- |
| **Use case name** | Manage Account |
| **Scenario** | Admin wants to manage user accounts in the system. |
| **Trigger event** | Admin accesses the account management interface. |
| **Brief description** | Allows the admin to create, update, view, or delete user accounts, as well as view account information and status. |
| **Actors** | Admin |
| **Related use case** | Must have |
| **Stakeholders** | Admin, Customer |
| **Precondition** | - Admin has logged in successfully  - Admin has appropriate access rights |
| **Post conditions** | - Account information is updated, created, deleted, or reviewed successfully |

|  |  |
| --- | --- |
| **Flow of activities (Actor)** | 1.1 Admin selects “Manage Account” from admin panel  1.2 Admin chooses an operation: create, update, delete, or view account  1.3 If viewing, admin may choose to view status or information  1.4 Admin confirms and submits the selected operation |
| **Flow of activities (System)** | 1.1 System displays account management options  1.2 System collects and validates input for the selected operation  1.3 System performs the action (e.g., save new account, update details, remove record)  1.4 System confirms action success or shows error |
| **Exception condition** | 1.1 If admin provides incomplete or invalid data, system shows validation errors  1.2 If system fails to retrieve account details, an error message is displayed  1.3 If admin lacks permission for the action, access is denied |

### Manage Order

1. Use Case Manage Order

|  |  |
| --- | --- |
| **Use case name** | Manage Order |
| **Scenario** | Admin manages customer orders, including accepting or denying them. |
| **Trigger event** | Admin receives a new or pending order in the system. |
| **Brief description** | This use case allows the admin to either accept or deny a customer order. Upon acceptance, the admin updates the shipping status. If denied, the admin may process a refund. Notifications are sent to customers in both cases. |
| **Actors** | Admin |
| **Related use case** | Must have |
| **Stakeholders** | Admin, Customer |
| **Precondition** | - Admin is authenticated  - Order exists and is in a valid state to manage |
| **Post conditions** | - Order is either accepted and shipping is updated, or denied and refunded  - Customer is notified of the decision |
| **Flow of activities (Actor)** | 1.1 Admin opens the order management dashboard  1.2 Admin reviews the order details  1.3 Admin selects to either Accept or Deny the order  1.4 Admin confirms the action |
| **Flow of activities (System)** | 1.1 System displays order options (accept or deny)  1.2 If accepted:  1.2.1 System updates shipping state  1.2.2 System sends notification to customer  1.3 If denied:  1.3.1 System processes refund (if applicable)  1.3.2 System sends notification to customer |
| **Exception condition** | 1.1 If order is already processed, system prevents re-processing  1.2 If shipping update fails, notify admin and roll back  1.3 If refund process fails, notify admin to resolve manually  1.4 If customer notification fails, log error for retry |

### Manage Product

1. Use Case Manage Product

|  |  |
| --- | --- |
| **Use case name** | Manage Product |
| **Scenario** | Admin manages the product catalog by creating, editing, viewing, or deleting products. |
| **Trigger event** | Admin chooses to access the product management module. |
| **Brief description** | This use case enables the admin to maintain product information by performing operations such as creating new products, updating existing ones, deleting outdated entries, or simply viewing product data. |
| **Actors** | Admin |
| **Related use case** | Must have |
| **Stakeholders** | Admin, Customer |
| **Precondition** | - Admin is authenticated and authorized  - Product database is accessible |
| **Post conditions** | - Product data is modified (created, updated, deleted) or viewed successfully  - Any changes are reflected in the product catalog for users |
| **Flow of activities (Actor)** | 1.1 Admin accesses the product management interface  1.2 Admin selects a desired action:  1.2.1 Create a new product  1.2.2 Edit an existing product  1.2.3 Delete a product  1.2.4 View product list/details  1.3 Admin performs the selected operation and submits the changes |
| **Flow of activities (System)** | 1.1 System displays product management options  1.2 System processes the selected operation:  1.2.1 For create/edit: Validates and saves product data  1.2.2 For delete: Removes the selected product from database  1.2.3 For view: Fetches and displays product information  1.3 System confirms success or returns appropriate error messages |
| **Exception condition** | 1.1 Missing or incorrectly formatted product data during creation or editing. The system will display an error message and prompt the user to re-enter the data.  1.2 Product not found when attempting to edit or delete. The system will notify the user that the product does not exist.  1.3Attempt to delete a product that is linked to existing orders. The system will prevent deletion and notify the user due to data constraints.  1.4 Database connection failure. The system will display a technical error message and log the issue for further investigation.  1.5 Unauthorized access. If the account does not have permission to manage products, the system will block the action and show an access denied message |

### Manage Customer Service

1. Use Case Manage Customer Service

|  |  |
| --- | --- |
| **Use case name** | Manage customer services |
| **Scenario** | Customer needs assistance or feedback management. |
| **Triggering event** | Customer submits feedback or a problem has relative with shop. |
| **Brief description** | Enables staff to view, respond, delete feedback and solve customer’s problem. |
| **Actor** | Staff, Owner |
| **Related use case case** | Must have. Includes: view feedback, respond feedback, delete feedback, solve customer’s issue |
| **Stakeholders** | Owner, staff, customer |
| **Preconditions** | Staff logged into customer management system and customer give a problem has relative shop. |
| **Post conditions** | Feedback is successfully managed and customer’s issue is solved. |
| **Flow of activities(Actor)** | 1. Staff selects “Manage customer services” 2. Staff views, respond or delete feedback. 3. Staff solves customer issues through chat online or hotline. |
| **Flow of activities(System)** | * 1. Display feedback or customer issue details.   2. Enable options for response or deletion.   3. Provide access to online chat or hotline call features. |
| **Exception conditions** | 1.2.1 If deletion or response fails, notify the staff.  1.3.1 If online chat or hotline call fails, inform staff and suggest retry. |

## Activity Diagram

### Sign up/Sign in

1. Sign Up / Sign In Activity Diagram

### View Product

1. View Product Activity Diagram

### Search Product

1. Search Product Activity Diagram

### Make Order

1. Make Order Activity Diagram

### Manage Personal Information

1. Manage Personal Information Activity Diagram

### Make Payment

1. Make Payment Activity Diagram

### Manage Account

1. Manage Account Activity Diagram

### Manage Order

1. Manage Order Activity Diagram

### Manage Product

1. Manage Product Activity Diagram

### Manage Customer Service

1. Manage Customer Service Activity Diagram

## Sequence Diagram

### Sign up/Sign in

1. Sign Up / Sign In Sequence Diagram

### View Product

1. View Product Sequence Diagram

### Search Product

1. Search Product Sequence Diagram

### Make Order

1. Make Order Sequence Diagram

### Manage Personal Information

1. Manage Personal Information Sequence Diagram

### Make Payment

1. Make Payment Sequence Diagram

### Manage Account

1. Manage Account Sequence Diagram

### Manage Order

1. Manage Order Sequence Diagram

### Manage Product

1. Manage Product Sequence Diagram

### Manage Customer Service

1. Manage Customer Service Sequence Diagram

## Class Diagram

1. Class Diagram

## Entity Relationship Diagram

1. Entity Relationship Diagram

## Relation Data Model

1. Relation Data Model

# ACTUAL PROCESS

## Software development life cycle model

### Introduction to the waterfall model

The waterfall model is a sequential model that divides software development into predefined phases. The development process is like a flow, with phases performed in strict sequence and without rollbacks or phase jumps: analysis, design, build, test, implementation and maintenance.The model was introduced by Winston Royce in 1970. The waterfall modelis the earliest model in the Software Development Life Cycle. Stages of development in the model:

* Requirements Analysis:

Stage of collecting and analyzing system requirements and documenting requirements specification.

* System Design:

Software system analysis and design phase.

Determine the overall architecture of the system.

Discuss hardware and software requirements.

* Building the system (Implementation):

The system is developed in units and integrated in the next phase.

Each unit (unit) developed and tested by programmer is called Unit Test.

* System Testing:

All units developed during the build phase are integrated into the system after unit testing has been completed. After integration, the whole system is checked and debugged.

* System Deployment:

After the testing steps are completed, the product is deployed to the customer and released to the market.

* System Maintenance:

Maintain the system when there is any change from the client side.

### Advantages

* Is a simple model, easy to apply, sequential process step by step.
* Easy to manage because it is fixed in each step.
* Stages are explicitly processed and completed at the same time.
* Process and results are fully documented.
* Suitable for small projects with clearly defined requirements.

### Defects

* The flexibility is not high, when a stage is in the process of being executed and an error is discovered, it will have to stop altogether and return to the first stage to update the document and start again from that stage…
* High risk, uncertain.
* Not suitable for projects with high complexity, many changes in requirements during the development life cycle.
* Difficult to measure development progress of each stage.

### Reasons for choosing model

* Waterfall model is a simple model, easy to understand, easy to use.
* Suitable for disseminating and assigning work.
* The model has each specific phase, easy to apply and implement.
* The model is suitable for the implementation of the final project because the project has little change in requirements and the requirements are defined at the outset, fully and clearly.

## Programming Language

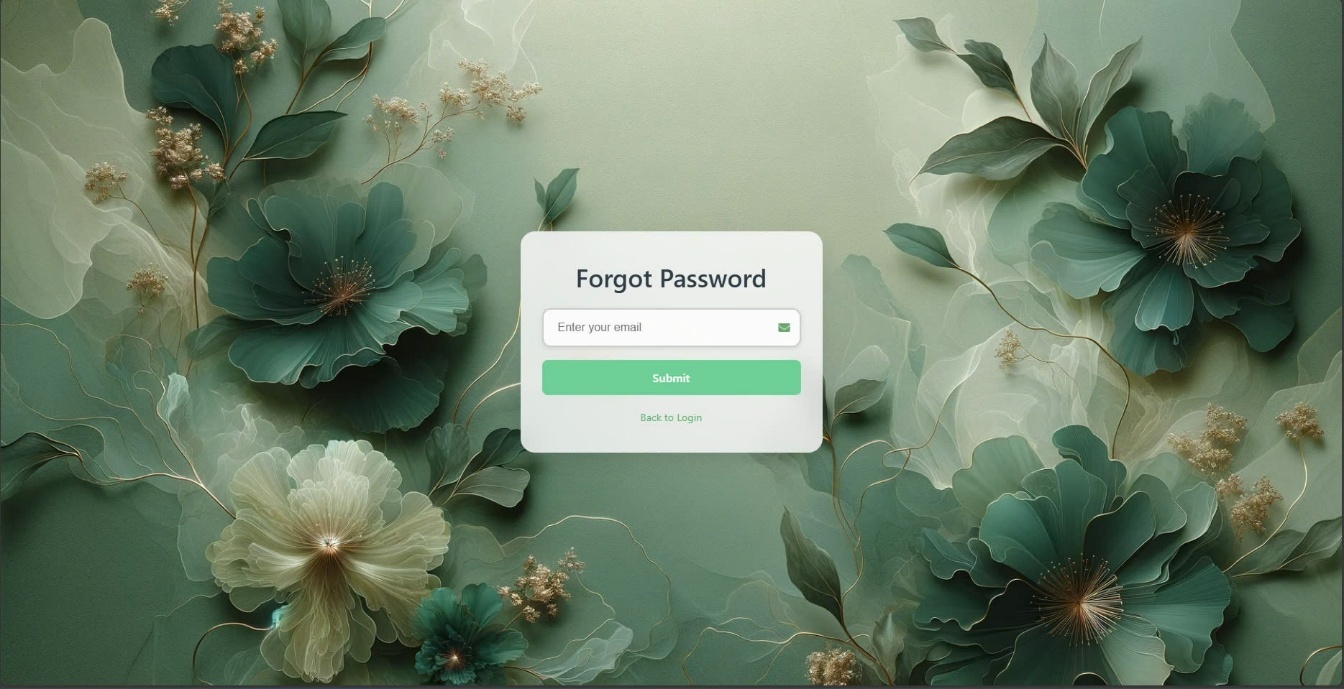
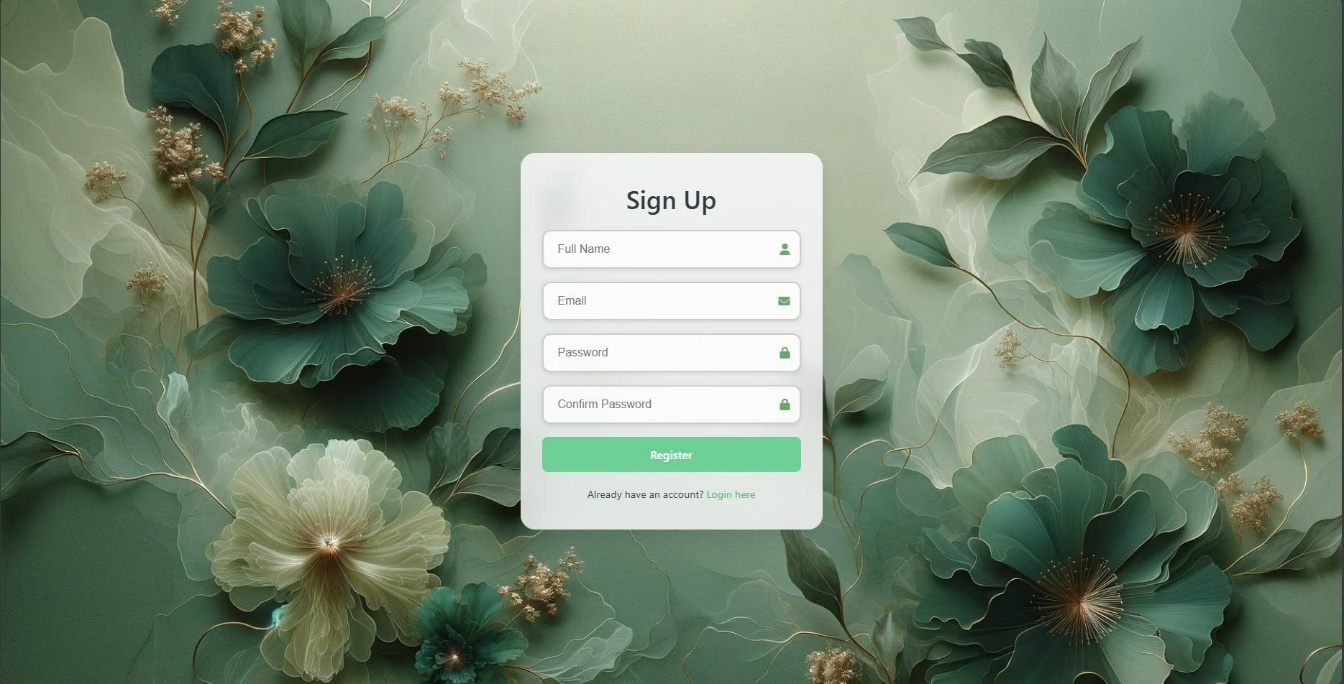
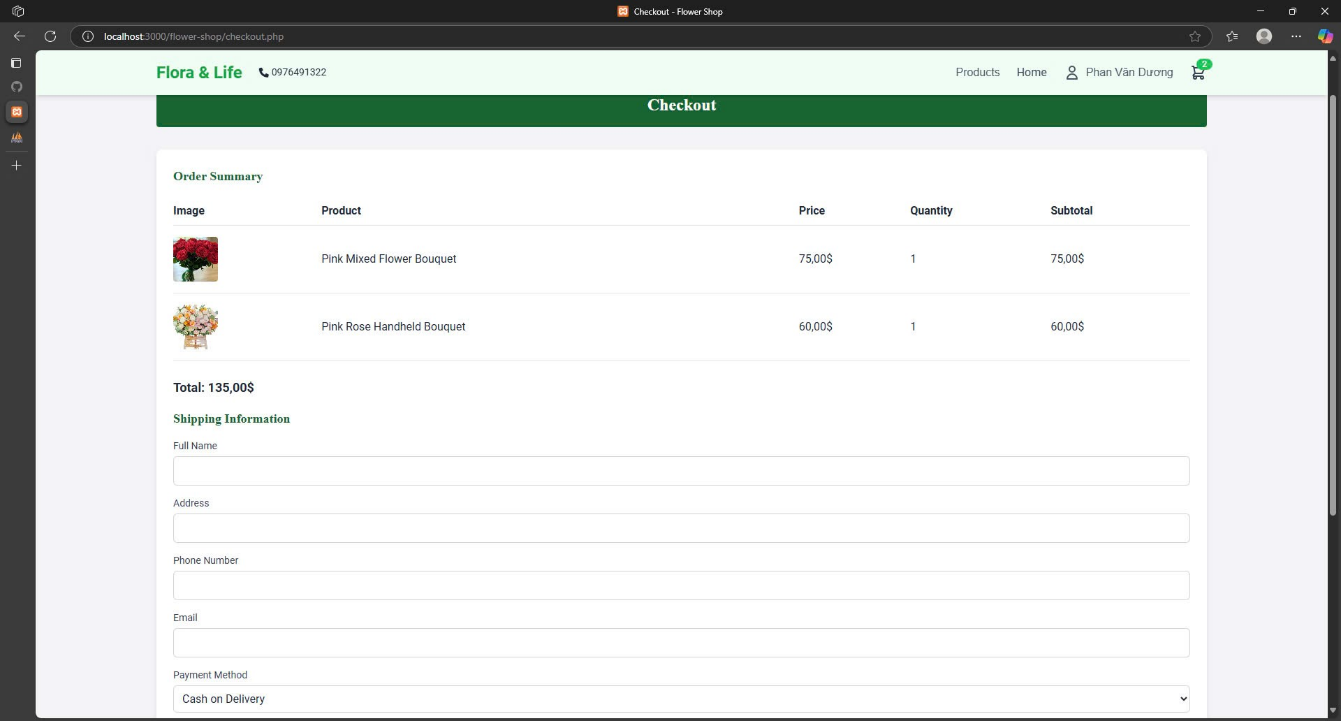
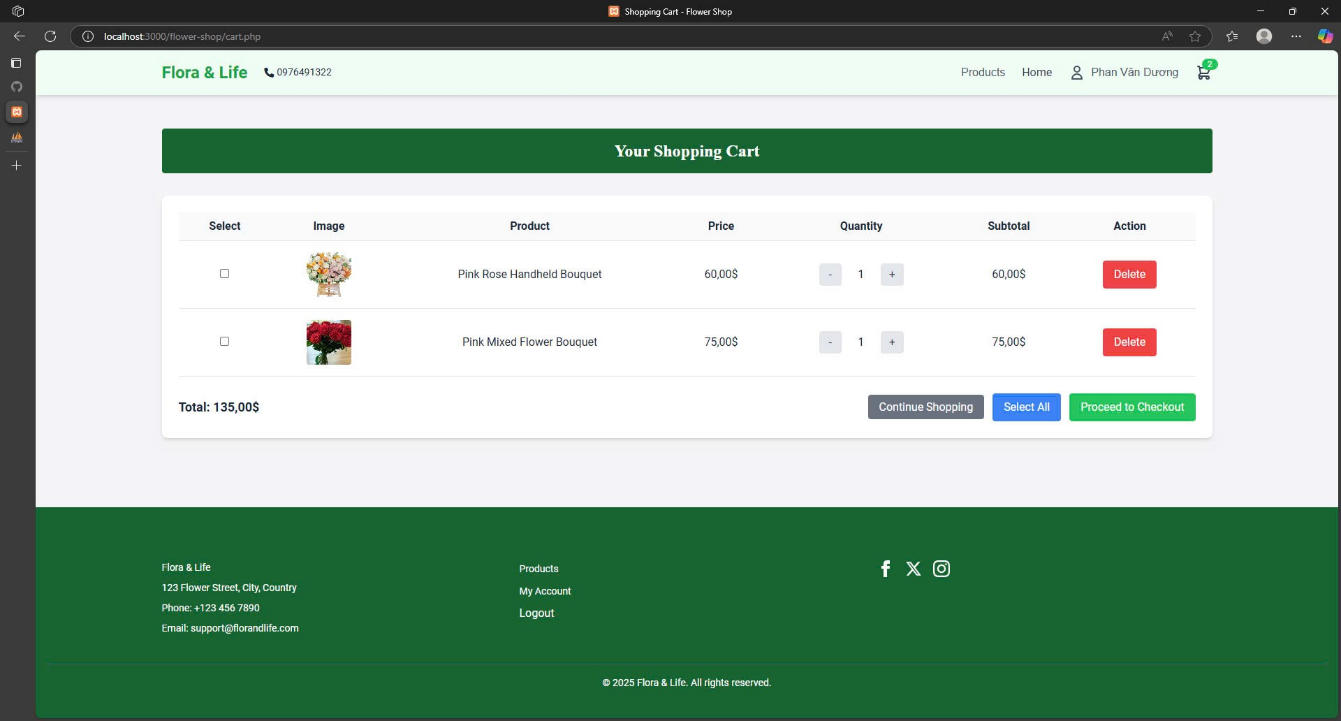
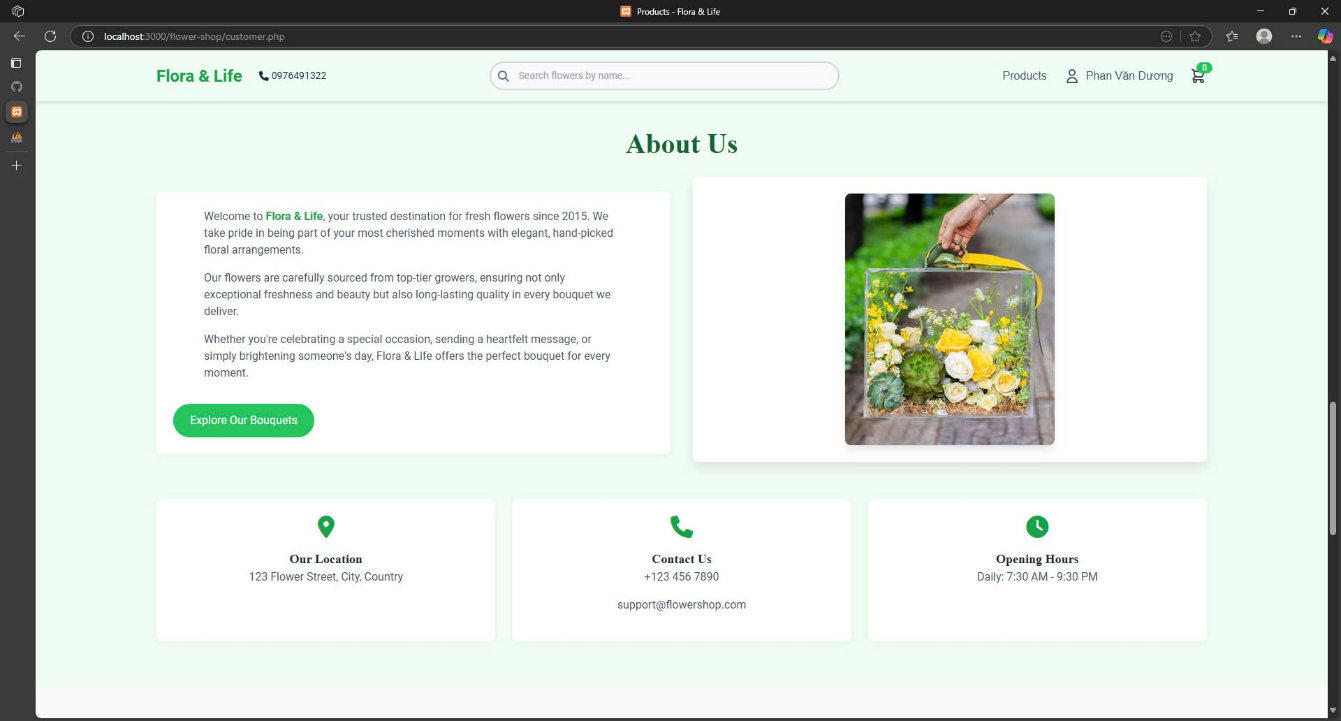
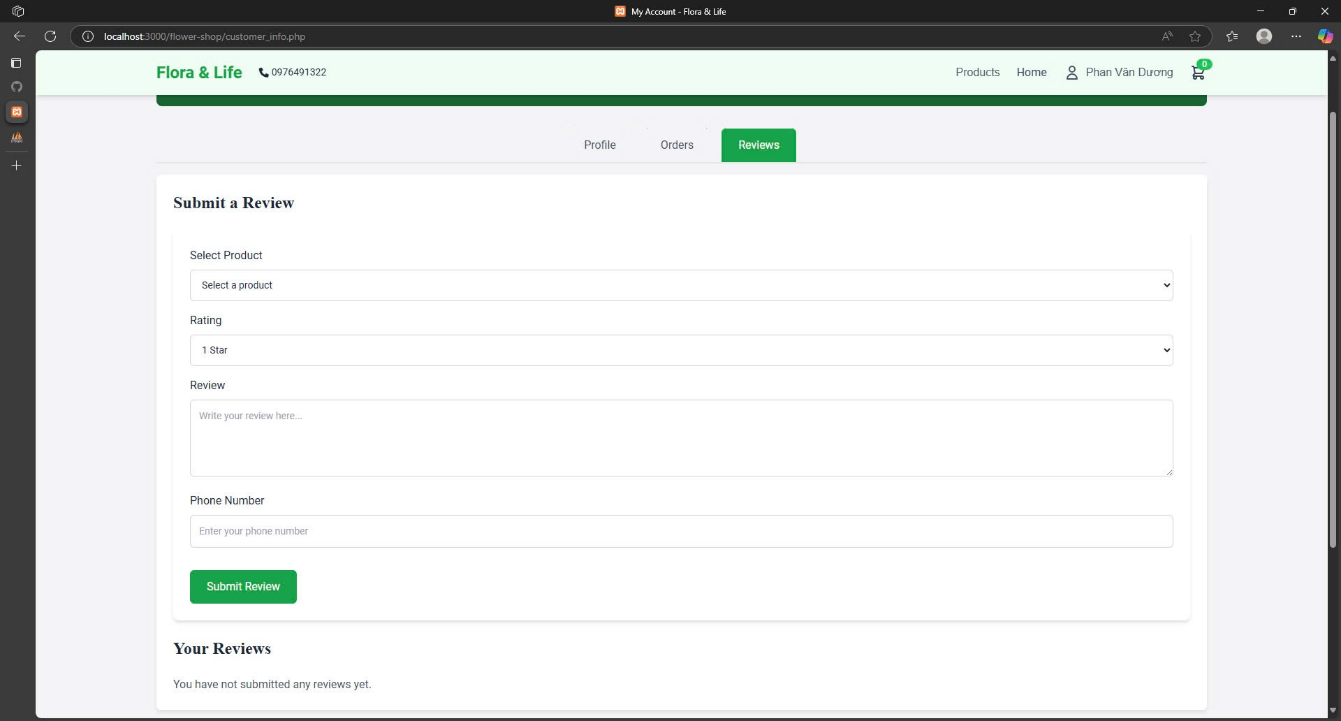
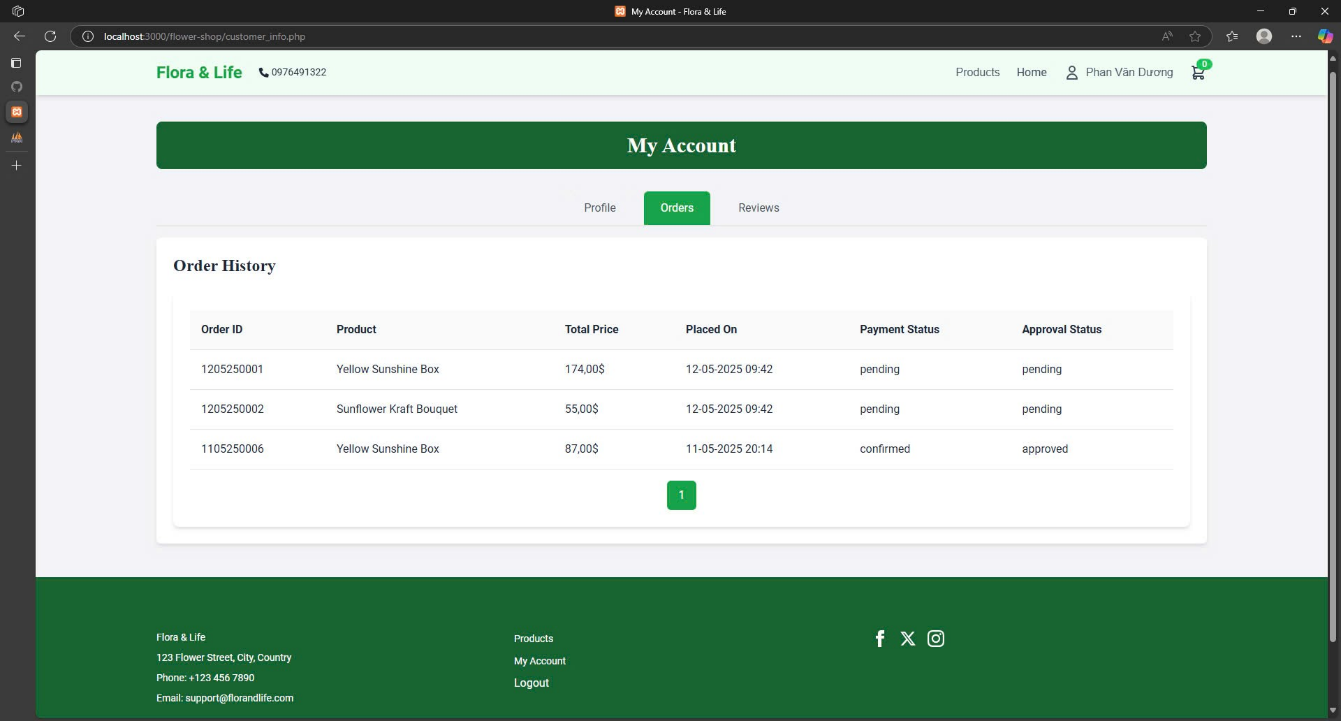
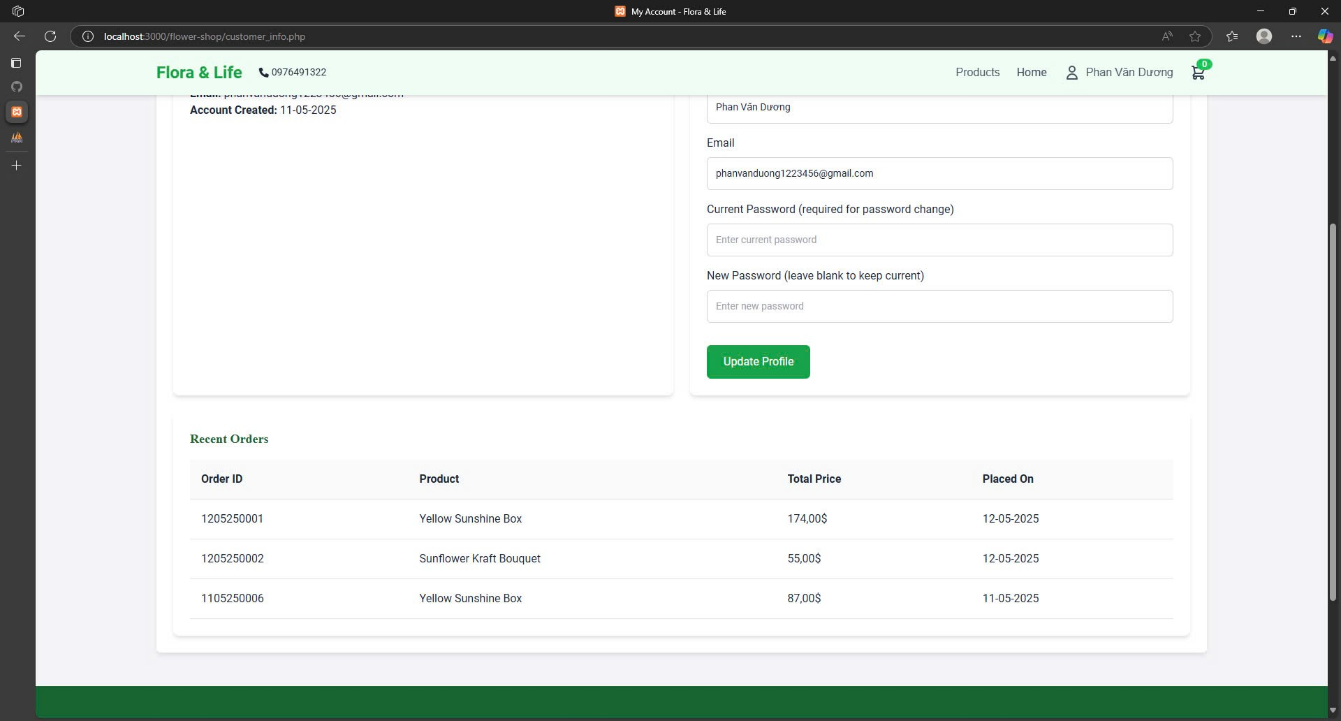
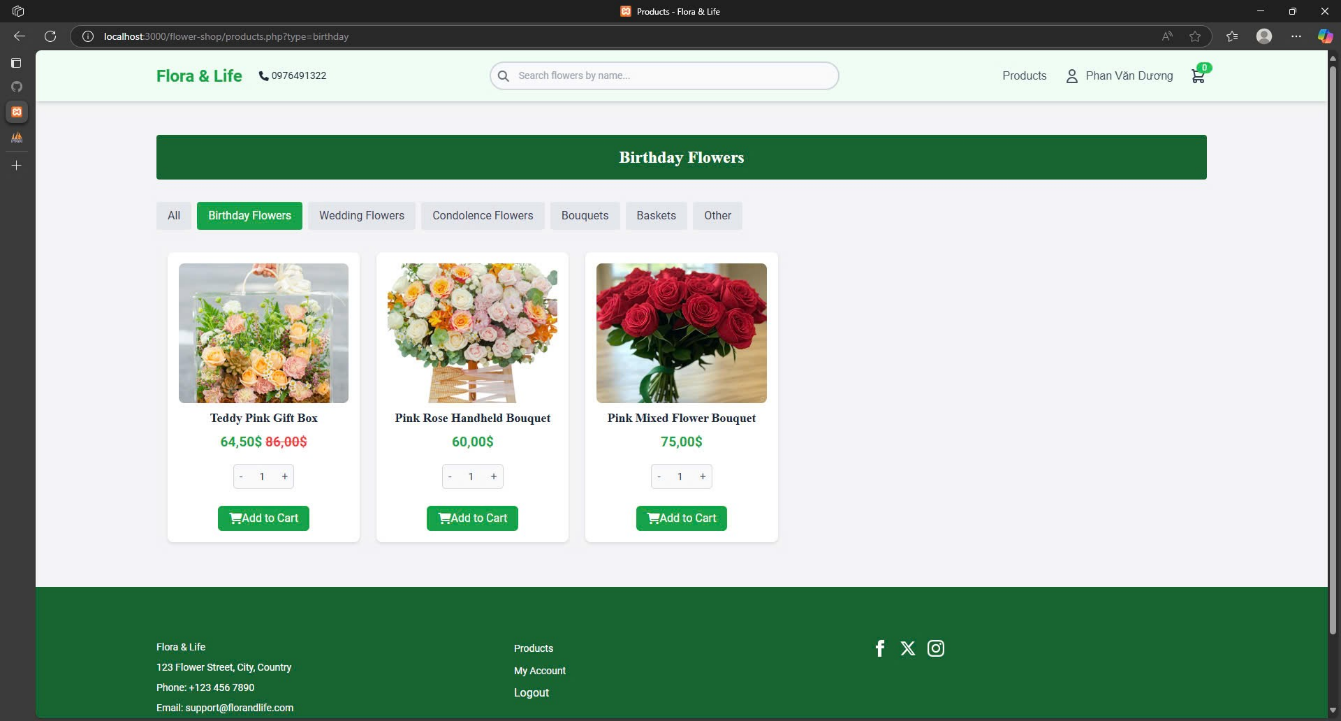
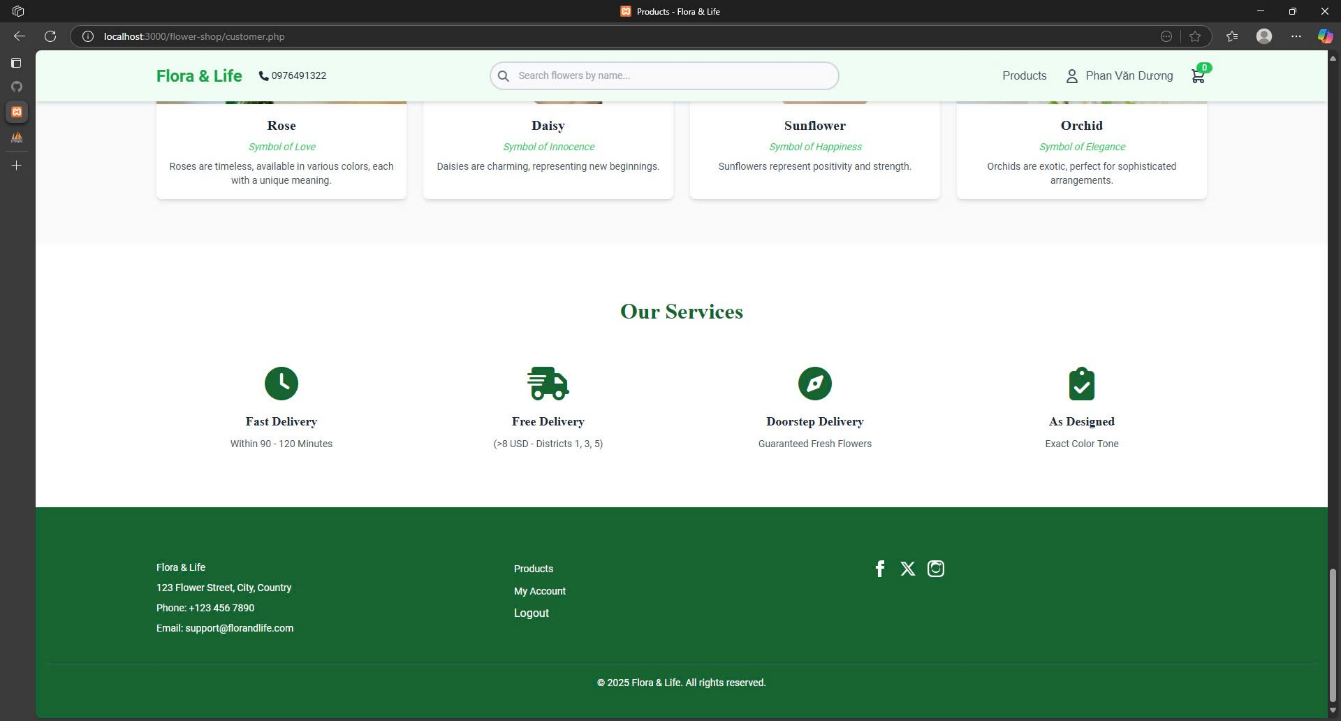
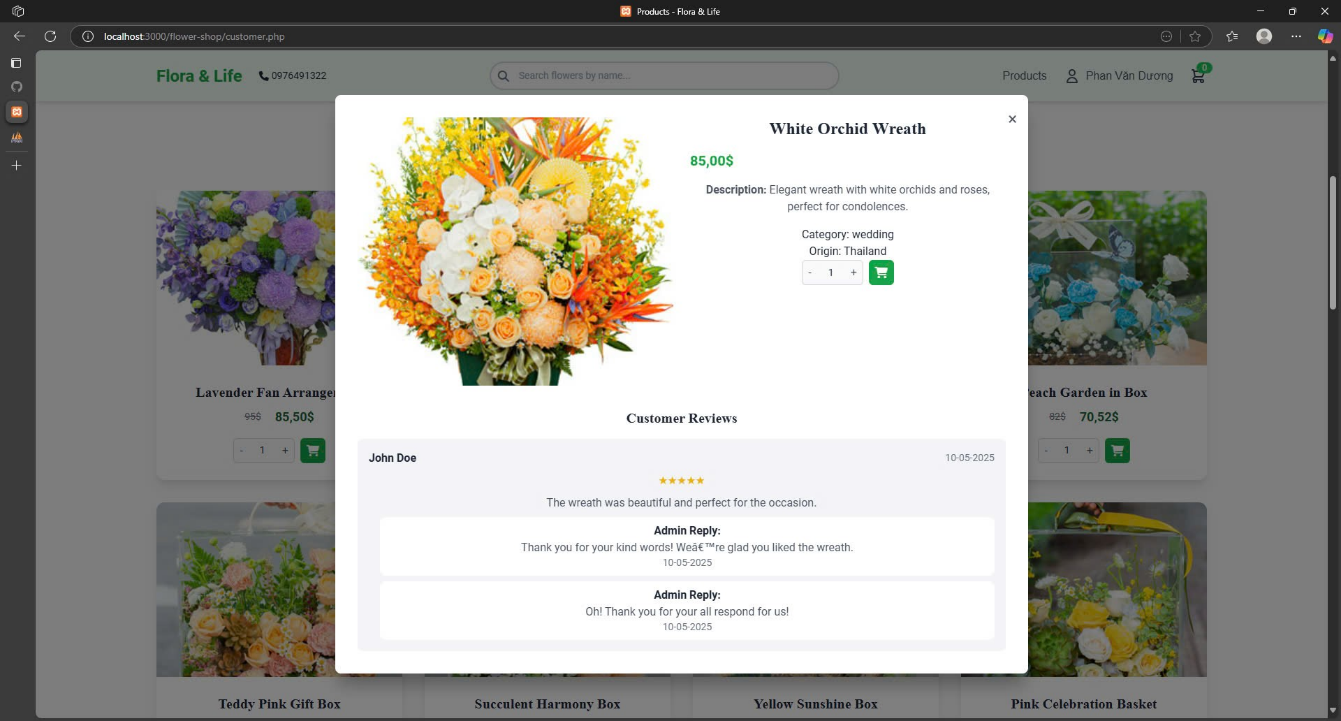
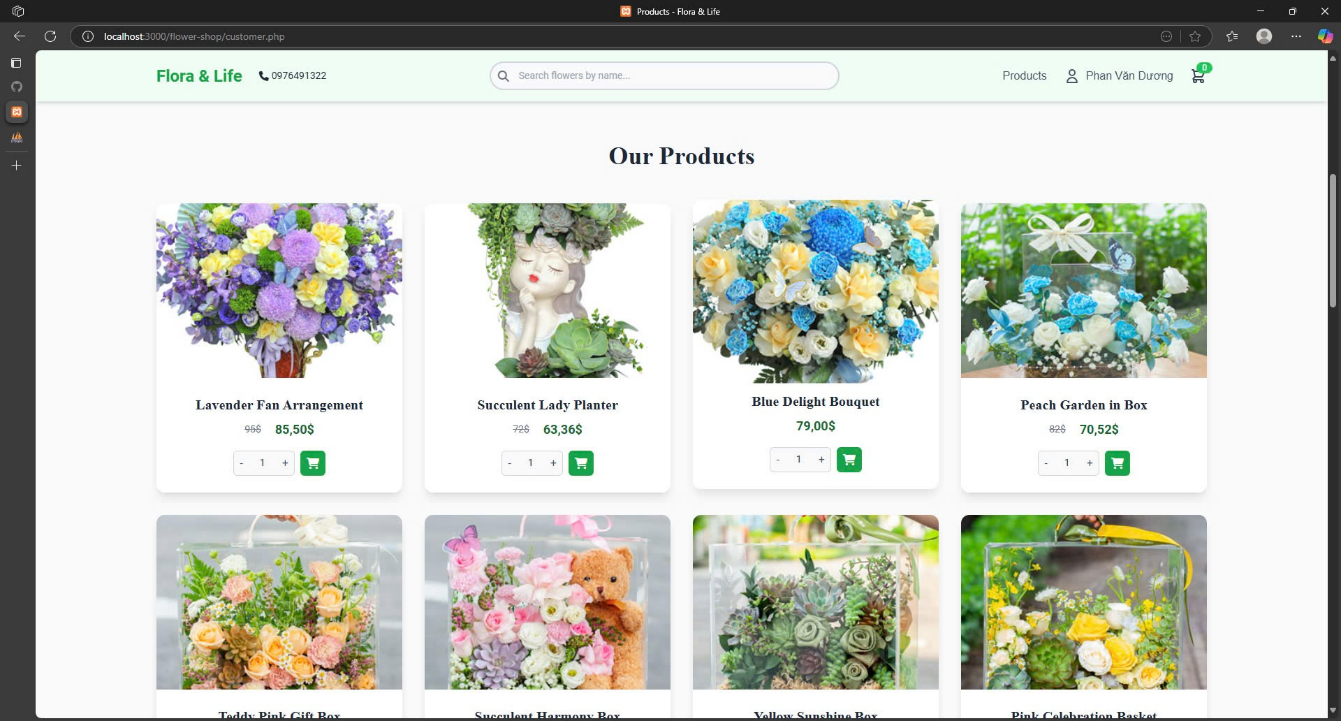
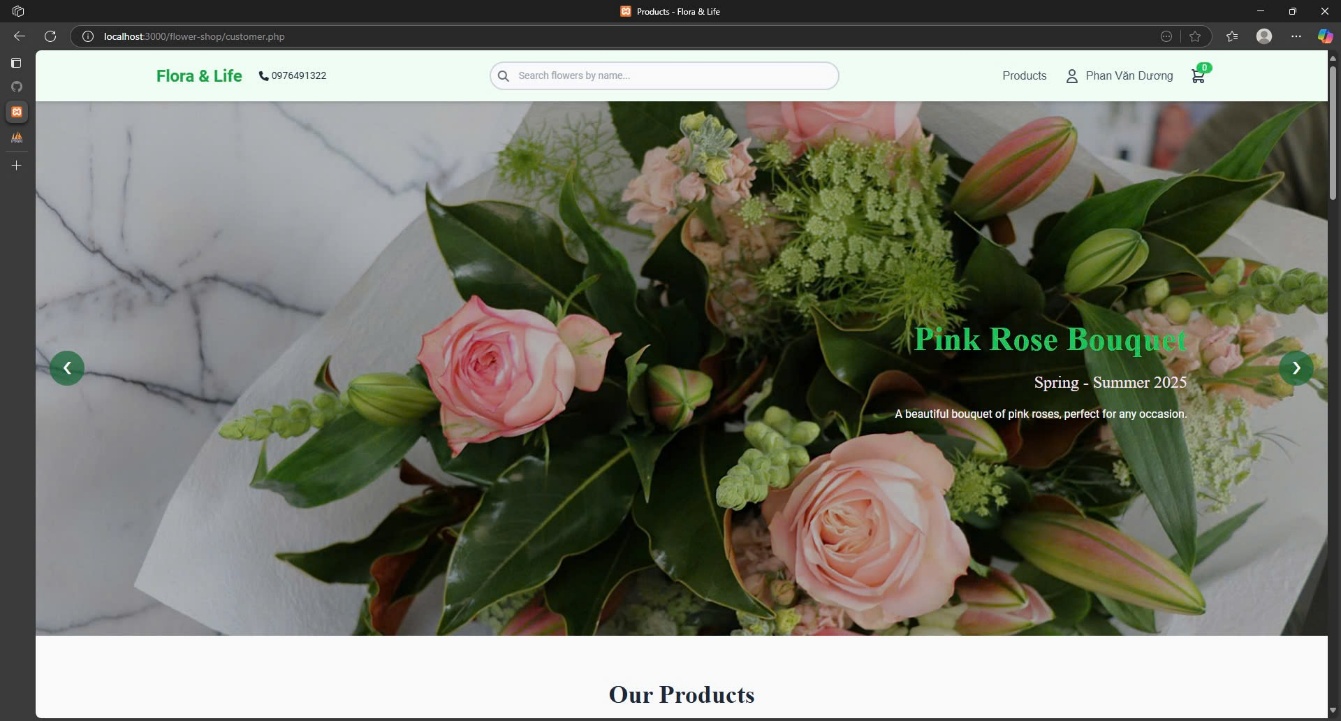
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| --- | --- |
| **Programming languague used** | **Library used** |
| HTML, CSS, PHP, Javascript | Bootstrap, Font Awesome |

# DEMO CODE

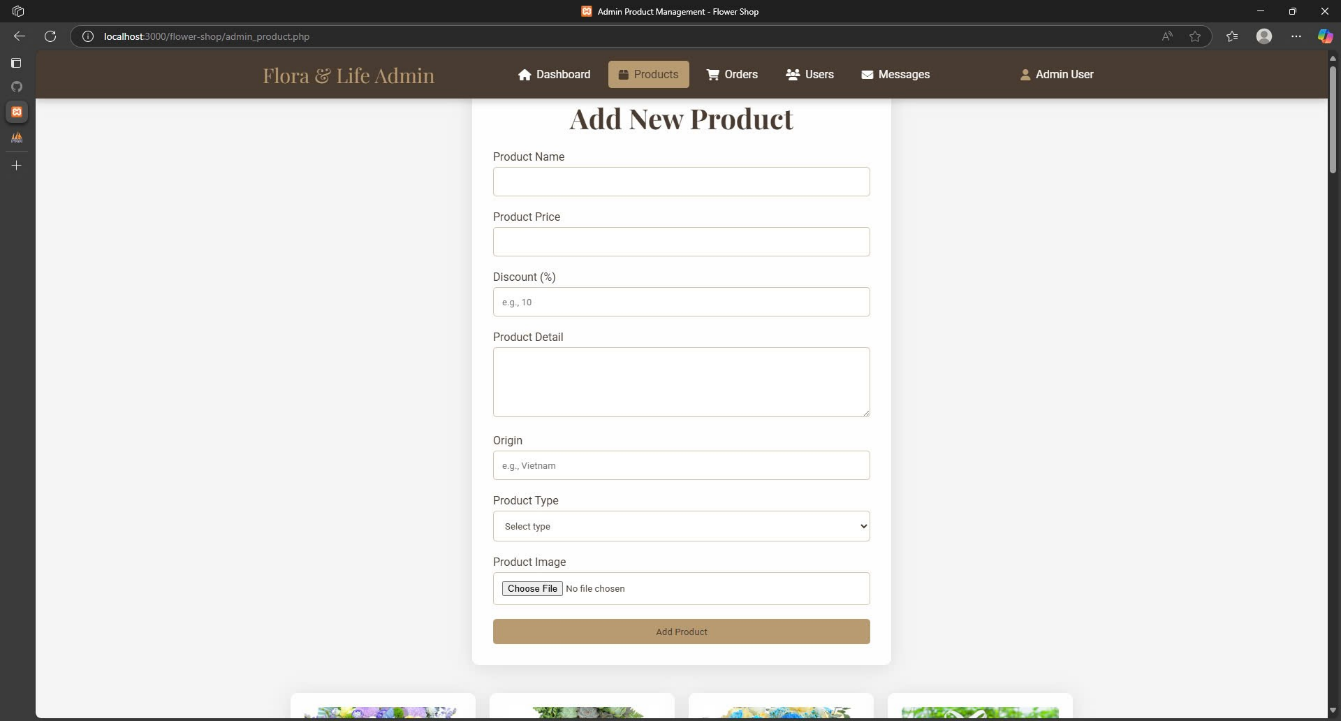
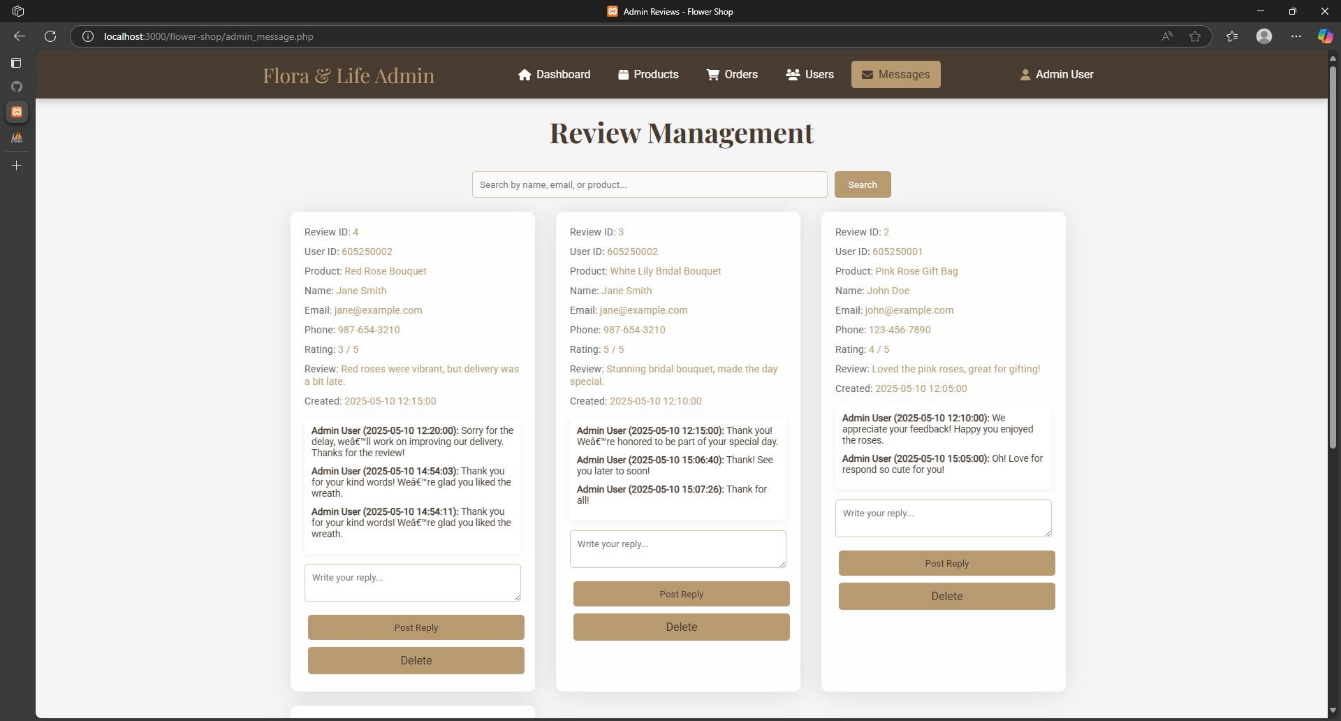
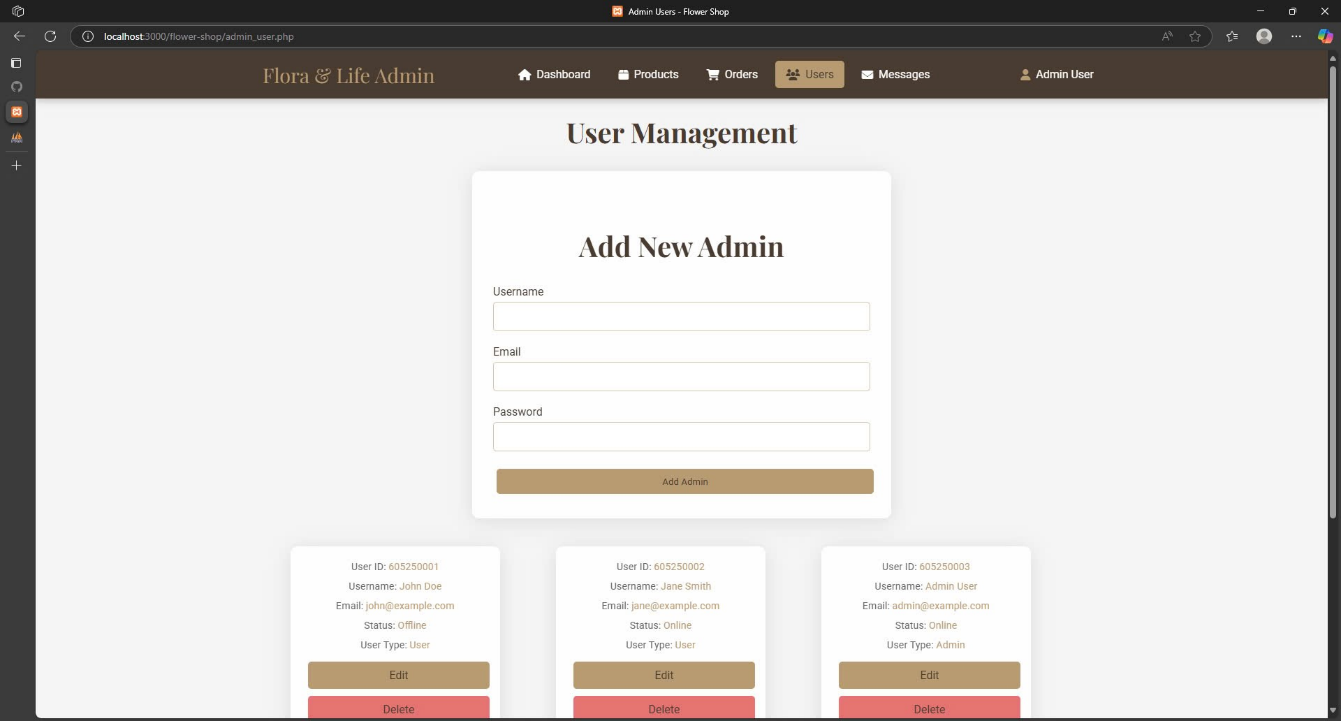
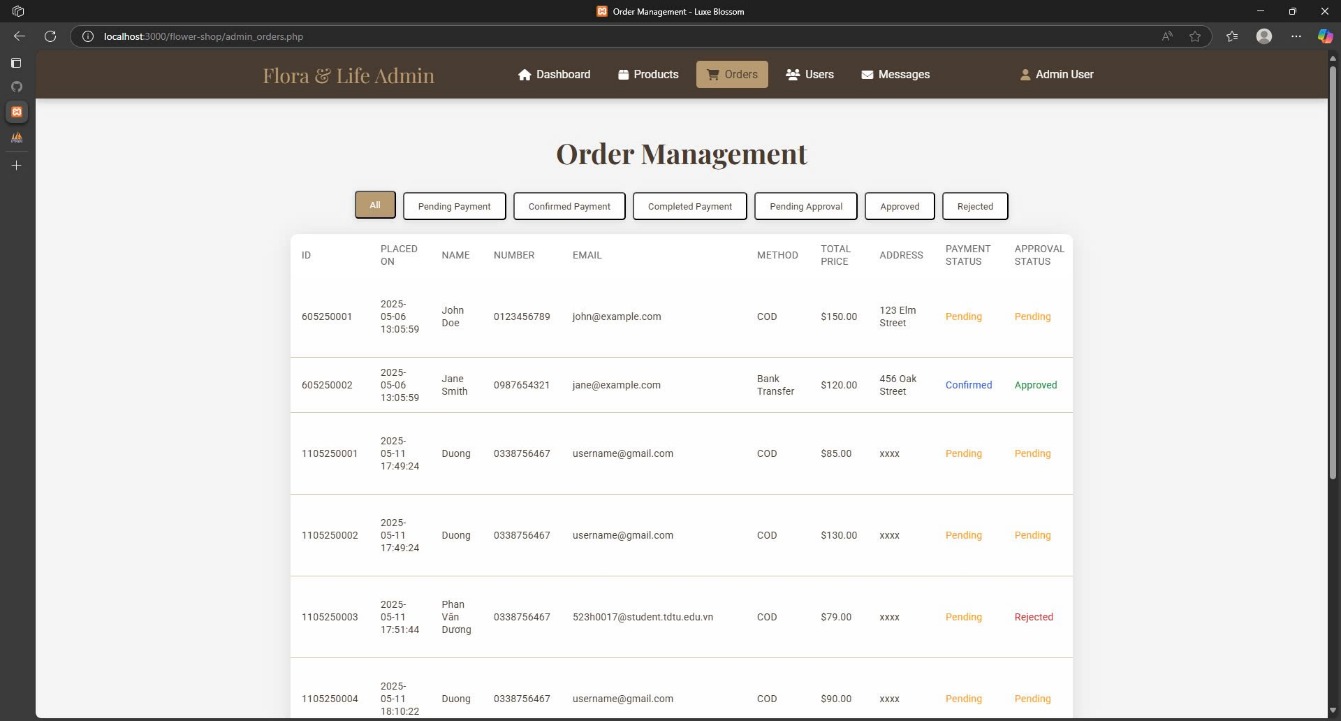
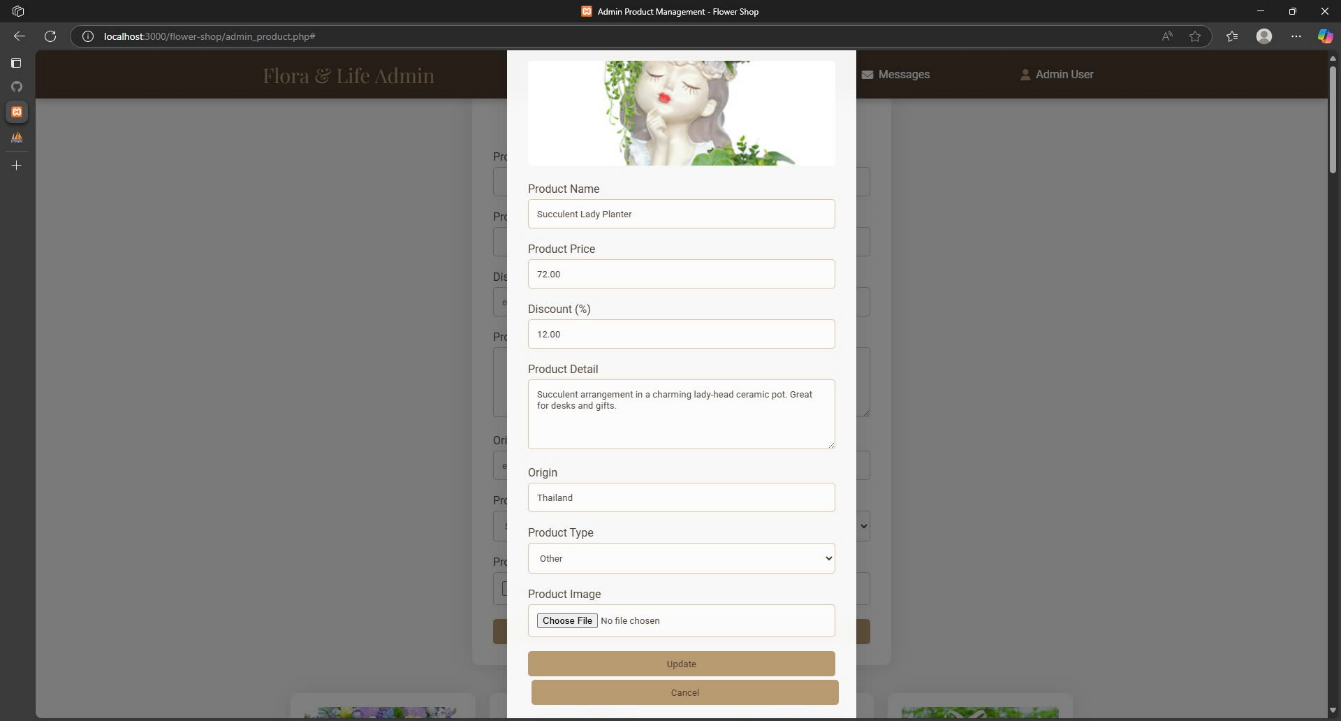
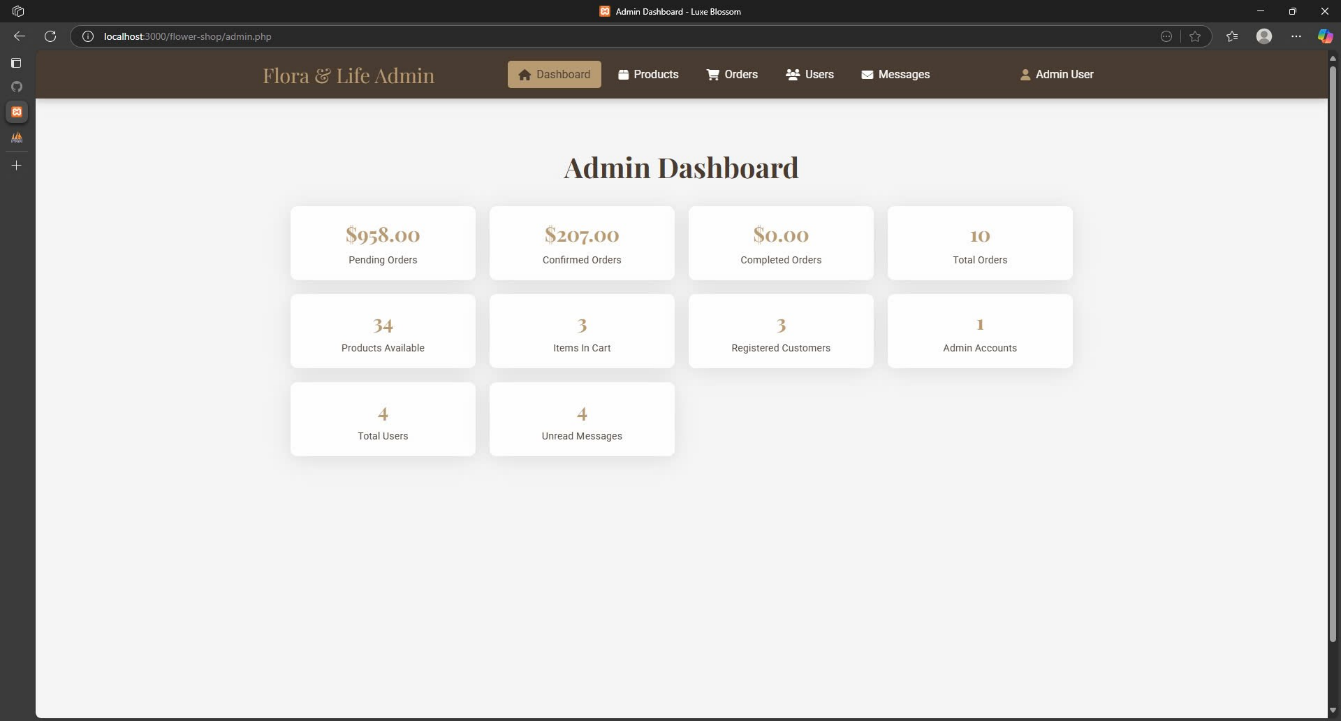
## Database

1. Database

## Customer Interfaces

1. Customer Login Page
2. Customer Forgot Password Page
3. Customer Sign Up Page
4. Customer Payment Page
5. Customer Cart page
6. Customer About Us Page
7. Customer Review Page
8. Customer Order History Page
9. Customer Information Page
10. Customer Search Product Page
11. Customer Service
12. Customer View Detailed Product
13. Customer View Product Page
14. Customer Main Page

## Admin Interfaces

1. Admin Product Management Page
2. Admin Add Product Page
3. Admin Review Management Page
4. Admin Account Management Page
5. Admin Order Management Page
6. Admin Product Editing
7. Admin Dashbord Page

# TEST CASE AND UNIT TEST

## Requirements/Specifications-Based System Level Test Cases

The following test cases are designed to validate the system at a system level, ensuring all major functionalities and non-functional requirements are met. Each test case includes a test ID, description, preconditions, input, expected output, and actual outcome (to be filled during execution).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Test ID** | **Description** | **Preconditions** | **Input** | **Expected Output** | **Actual Outcome** |
| TC001 | Test successful customer sign-up | No existing user with the same username | Username: "phanvanduong1223456@gmail.com", Password: "Demo@123" | User is created, success message returned | User register successfully and connect to Index |
| TC002 | Test view product with valid ID | Product with ID 1 exists in the database | POST /admin\_product.php  Product ID: 1 | Product details: {ID: 1, Name: "Test Product", Price: 100} | Appear on the board and know the results |
| TC003 | Test make order with valid data | User ID 1 exists, Product ID 1 has stock >= 2 | POST cart.php  User ID: 1, Product ID: 1, Quantity: 2 | Order created with ID, payment status: "completed", balance deducted: 200 | Notice the message and warning to the admin |
| TC004 | Test manage product by admin | Admin logged in, Product ID 1 exists | Product ID: 1, Updated Name: "New Product" | Product updated, success message: "Product updated successfully" | Notice the message successful and insert in database |
| TC005 | Test manage customer service | Customer request ID 1 exists, status: "open" | Request ID: 1, Response: "Issue resolved" | Request status updated to "resolved", response logged | Send the request from user and feedback again |
| TC006 | Test sign-up with existing username | User "phanvanduong1223456@gmail.com" already exists | Username: "phanvanduong1223456@gmail.com", Password: "pass123 | Error: "Username already exists" | Notice the message existed and return login |
| TC007 | Test sign-in with wrong password | User "john@example.com" exists with password "pass123" | Username: "john@example.com", Password: "wrongPass" | Error: "Invalid credentials" | Notice the message warning and return login |
| TC008 | Test manage personal information | User ID 1 logged in | User ID: 1, New Email: "john@example.com" | Email updated, success message: "Information updated successfully" | Notice the message succes |
| TC009 | Test manage personal info with invalid email | User ID 1 logged in | User ID: 1, New Email: "invalid-email" | Error: "Invalid email format" | Request to email of user and authentic |
| TC010 | Test manage order (cancel order) | Test manage order (cancel order) | Order ID: 1, Action: "cancel" | Order status updated to "canceled", success message returned | Notice the message cancel request from user |
| TC011 | Test manage order (invalid order ID) | Order ID 999 does not exist | Order ID: 999, Action: "cancel" | Error: "Order not found" | Notice the message Order not found |
| TC012 | Test manage account (update password) | Admin logged in, User ID 1 exists | User ID: 1, New Password: "newPass123" | Password updated, success message: "Account updated successfully" | Notice the message success to user |
| TC013 | Test manage account with weak password | Admin logged in, User ID 1 exists | User ID: 1, New Password: "123" | Error: "Password must be at least 8 characters" | Notice the message “Please verify again” |

## Traceability of Test Cases to Use Cases

The test cases are directly traceable to the use cases, ensuring all specified functionalities are validated. The traceability matrix maps each test case to its corresponding use case.

|  |  |  |  |
| --- | --- | --- | --- |
| ID | Usecase | Dercription | Requirement Convered |
| TC001 | Sign Up | Test successful customer sign-up | Ability to register a new user |
| TC002 | Sign Up | Test sign-up with existing username | Error handling for duplicate usernames |
| TC003 | View Product | Test view product with valid ID | Retrieve product details for a valid ID |
| TC004 | Make Order | Test make order with valid data | Create order and process payment |
| TC005 | Manage Product | Test manage product by admin | Update product details by admin |
| TC006 | Manage Customer Service | Test manage customer service | Handle and resolve customer service requests |
| TC007 | Sign In | Test successful sign-in | Authenticate user with valid credentials |
| TC008 | Sign In | Test sign-in with wrong password | Error handling for invalid credentials |
| TC009 | Payment | Test payment with sufficient balance | Process payment when balance is sufficient |
| TC010 | Payment | Test payment with insufficient balance | Error handling for insufficient balance |
| TC011 | Manage Personal Information | Test manage personal information | Update user personal information |
| TC012 | Manage Personal Information | Test manage personal info with invalid email | Error handling for invalid email format |
| TC013 | Manage Order | Test manage order (cancel order) | Cancel a pending order |
| TC014 | Manage Order | Test manage order (invalid order ID) | Error handling for non-existent order ID |
| TC015 | Manage Account | Test manage account (update password) | Update user account password by admin |
| TC016 | Manage Account | Test manage account with weak password | Error handling for weak password |

## Techniques Used for Test Generation

The test cases were generated using the following techniques to ensure comprehensive coverage and alignment with the system’s requirements:

* **Equivalence Partitioning:**
* **Description:** This technique divides input data into partitions that are expected to exhibit similar behavior, reducing the number of test cases while ensuring coverage of all valid and invalid scenarios.
* **Application:**

+ For "Sign Up" (TC01, TC02): Inputs were partitioned into valid (unique username, valid password) and invalid (duplicate username) cases to test registration success and error handling.

+ For "Payment" (TC09, TC10): Balance amounts were partitioned into sufficient (≥ order amount) and insufficient (< order amount) to validate payment processing and error conditions.

+ For "Manage Personal Information" (TC11, TC12): Email inputs were partitioned into valid (e.g., "john@example.com") and invalid (e.g., "invalid-email") formats to test updates and error handling.

* **Benefit:** Ensures that representative cases from each partition are tested, optimizing test effort.
* **Boundary Value Analysis:**
* **Description:** This technique focuses on testing the boundaries of input ranges to identify defects at the edges, which are often prone to errors.
* **Application:**

+ For "Make Order" (TC04): Tested the boundary of quantity (e.g., 2 units) against the precondition of available stock (≥ 2), ensuring the system handles order limits correctly.

+ For "Manage Account" (TC15, TC16): Tested password length boundaries (e.g., "newPass123" ≥ 8 characters vs. "123" < 8 characters) to validate password policy enforcement.

+ For "Search Product" (TC17, TC18): Tested boundaries of search results (e.g., matching products vs. no matches) to ensure proper handling of result sets.

* **Benefit:** Identifies issues at the edges of input domains that might be missed by equivalence partitioning alone.
* **Use Case-Based Testing:**
* **Description:** This technique derives test cases directly from the use cases defined in the UML diagram, ensuring that all specified functionalities are validated.
* **Application:**

+ Each use case (e.g., Sign In, View Product, Manage Order) was mapped to at least one test case (e.g., TC07 for Sign In, TC03 for View Product, TC13 for Manage Order), covering both success and failure paths.

+ The traceability matrix links test cases to use cases, ensuring complete coverage (e.g., TC17 and TC18 added for Search Product).

* **Benefit:** Guarantees that the system meets the functional requirements outlined in the use case model.
* **Error Guessing:**
* **Description:** This technique relies on the tester’s experience to predict potential error-prone areas and design test cases to uncover them.
* **Application:**

+ For "Sign In" (TC08): Guessed that an incorrect password might fail authentication, testing error handling.

+ For "Manage Order" (TC14): Anticipated that an invalid order ID (e.g., 999) might cause an error, validating system robustness.

+ For "Payment" (TC10): Hypothesized insufficient balance as a likely failure scenario, testing payment rejection.

* **Benefit:** Uncovers defects that might not be caught by systematic techniques, leveraging tester intuition.
* **State Transition Testing:**
* **Description:** This technique tests the system’s behavior as it transitions between states, ensuring correct handling of state changes.
* **Application:**

+ For "Manage Order" (TC13): Tested the transition from "pending" to "canceled" state when canceling an order.

+ For "Manage Customer Service" (TC06): Validated the transition from "open" to "resolved" state for a customer request.

* **Benefit:** Ensures the system correctly manages state-dependent behavior, critical for order and service workflows.

## Assessment of the Goodness of Your Test Suite

The effectiveness of the test suite was assessed using the following metrics to ensure it adequately validates the system:

* **Test Coverage:**
* **Metric:** Measures the percentage of use cases, requirements, or code paths covered by the test suite to ensure all specified functionalities are validated.
* **Assessment:**
* **Use Case Coverage:** All use cases from the UML diagram (Sign Up, View Product, Search Product, Sign In, Manage Personal Information, Make Order, Payment, Manage Order, Manage Account, Manage Customer Service, Manage Product) are covered by at least one test case (TC01-TC18), achieving 100% use case coverage. The addition of TC17 and TC18 for Search Product closed a previous gap.
* **Requirement Coverage:** Assuming each use case maps to a requirement, the traceability matrix confirms full alignment, resulting in 100% requirement coverage.
* **Code Coverage:** Without access to the codebase, this cannot be precisely measured. However, the diversity of test cases (success, failure, edge cases) suggests good functional coverage, likely exceeding 80% if measured with a tool like JaCoCo.
* Minor gaps may exist if untested code paths (e.g., exception handling deep within logic) are present, but the use case-based approach minimizes this risk.
* **Result:** Excellent coverage with 100% use case and requirement coverage. Code coverage should be verified post-implementation to ensure no untested paths remain. Overall, the test suite is highly representative of the system’s intended functionality.
* **Defect Detection Rate:**
* **Metric:** Evaluates the ability of the test suite to identify defects by comparing the number of defects found during testing to the total defects present in the system.
* **Assessment:**
* The test suite includes error guessing and edge cases targeting common failure points (e.g., TC02 for duplicate usernames, TC08 for invalid credentials, TC10 for insufficient balance, TC14 for invalid order ID, TC16 for weak passwords).
* State transition testing (e.g., TC06 for request resolution, TC13 for order cancellation) ensures defects in state changes are caught.
* The variety of failure scenarios (approximately 40% of test cases are error-focused) suggests a high potential for defect detection, estimated at 70-90% based on similar test suites.
* Without execution data, the exact rate is unknown. The effectiveness depends on the system’s complexity and the accuracy of anticipated failure modes.
* **Result:** Strong potential for defect detection due to diverse error scenarios, but the actual rate requires execution and defect logging to confirm. Estimated effectiveness is high (70-90%), pending validation.
* **Test Execution Time:**
* **Metric:** Assesses the time required to execute the test suite, impacting efficiency and feasibility in continuous integration or regression testing.
* **Assessment:**
* With 18 test cases, each targeting a specific scenario (e.g., TC01 for sign-up, TC04 for order creation), the suite is moderately sized.
* Manual execution time is estimated at 5-10 minutes total, assuming each test takes 15-30 seconds (including setup and verification), depending on the system’s response time and tester experience.
* Factors like database setup (e.g., mocking users, products) and payment gateway simulation could extend this if not pre-configured.
* Without automation, execution time may increase with system complexity or frequent regression testing. Automation could reduce this to 1-2 minutes.
* **Result:** Moderate execution time (5-10 minutes manually), suitable for initial validation. Automation is recommended to improve efficiency, especially for repeated runs, targeting 1-2 minutes.
* **Fault Tolerance:**
* **Metric:** Measures the test suite’s ability to validate the system’s robustness against errors, exceptions, and unexpected inputs.
* **Assessment:**
* The suite includes tests for invalid inputs and error conditions (e.g., TC02, TC08, TC10, TC12, TC14, TC16), covering scenarios like duplicate usernames, wrong passwords, insufficient balance, invalid emails, and non-existent order IDs.
* Boundary value analysis (e.g., TC04 with quantity limits, TC16 with password length) and state transition testing (e.g., TC06, TC13) ensure the system handles edge cases and state changes gracefully.
* Approximately 50% of test cases focus on fault tolerance, indicating a strong emphasis on robustness.
* Untested fault scenarios (e.g., network failures, concurrent access) may exist, limiting coverage of rare edge cases.
* **Result:** High fault tolerance due to extensive error and edge case testing (50% of cases). Additional tests for network failures or concurrency could further enhance robustness.
* **Automation Potential:**
* **Metric:** Evaluates the feasibility and benefits of automating the test suite to improve repeatability, scalability, and maintenance.
* **Assessment:**
* The structured format (preconditions, inputs, expected outputs) and clear traceability to use cases make the suite highly amenable to automation using frameworks like JUnit (for unit tests), Selenium (for UI), or Postman (for API).
* Test cases with specific inputs (e.g., TC09: Amount: 200) and measurable outputs (e.g., TC04: Payment status: "completed") are easily scriptable.
* Lack of current automation requires manual effort, which could hinder scalability for large systems or frequent regression testing.
* Estimated automation effort is moderate (20-30 hours to script TC01-TC18), with high long-term benefits (e.g., 80% reduction in execution time).
* **Result:** High automation potential due to clear structure and measurable outcomes. Implementing automation could reduce execution time by 80% and enhance maintainability, requiring an initial investment of 20-30 hours.
* **Overall Summary:**
* **Test Coverage:** 100% use case/requirement coverage, with potential >80% code coverage (pending verification).
* **Defect Detection Rate:** Estimated 70-90% effectiveness, pending execution data.
* **Test Execution Time:** 5-10 minutes manually, reducible to 1-2 minutes with automation.
* **Fault Tolerance:** High (50% error-focused cases), with room for rare fault scenarios.
* **Automation Potential:** High, with significant efficiency gains (80% time reduction) after initial setup.
* **Recommendations:**
* **Test Coverage:** Verify code coverage with a tool post-implementation.
* **Defect Detection Rate:** Execute tests and log defects to refine the estimate.
* **Test Execution Time:** Prioritize automation to meet efficiency goals.
* **Fault Tolerance:** Add tests for network failures or concurrency.
* **Automation Potential:** Invest in scripting (e.g., JUnit) to realize long-term benefits.

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[5] Alan Dennis, Barbara Haley Wixom, Roberta M. Roth, [2012], Systems Analysis and Design, 5th Edition, John Wiley & Sons, New Jersey.