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Flora Artistry: JavaFX Project Documentation

This document explains the structure, design patterns, and components of the **Flora Artistry** project. The project is organized into several packages, each serving a distinct purpose, and adheres to clean code principles like **MVC**, **DAO**, and **Singleton**.

Project Structure

The project is organized into the following packages:

1. **controller**: Contains classes for managing user interactions and updating the view/model.
2. **dao**: Encapsulates database operations using the **DAO pattern**.
3. **database**: Manages the connection to the database with a singleton class.
4. **main**: Contains the entry point of the application.
5. **model**: Defines the data structure of entities.
6. **resources**: Stores resources.
7. **view**: Contains the UI components and logic for rendering pages.
8. **view.partials**: Contains reusable components like navigation menus and custom alerts.

Package Details

1. `controller`

Manages interactions between the view and the model.

- **Abstract Class: `Controller`**
  - A generic class that holds a reference to a specific DAO and the `MainController`.
  - Provides shared functionality for all controllers.
- **Concrete Controllers**:

    - **`CartController`**: Manages cart-related actions (e.g., adding/removing items).
    - **`FlowerController`**: Handles flower-related operations like fetching flower data.
    - **`LoginController`**: Manages user authentication logic.
    - **`RegisterController`**: Handles new user registration.
    - **`PageController`**: Responsible for navigating between views (e.g., `showLoginView`).
    - **`TransactionController`**: Manages transactions (header and detail operations).
    - **`MainController`**:
        - Singleton class that holds all other controllers as single instances.
        - Provides **getter methods** to access specific controllers.

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2. `dao`

Encapsulates database operations using the **DAO Design Pattern** for abstraction and reusability.

- **Abstract Class: `DAO`**
    - Superclass that provides shared logic for DAOs.
    - Contains a reference to `Connect` instance for connecting to the database.
- **Concrete DAOs**:
    - **`CartDAO`**: Handles CRUD operations for the `Cart` model.
    - **`FlowerDAO`**: Manages `Flower` data.
    - **`TransactionDAO`**: Operates on `TransactionHeader` and `TransactionDetail` models.
    - **`UserDAO`**: Manages user data for authentication and registration.

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3. `database`

Handles database connectivity.

- **Class: `Connect`**
    - Implements the **Singleton Design Pattern** to ensure a single database connection.

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4. `main`

Contains the application entry point.

- **Class: `Main`**
  - Starts the application and initializes the `MainController`.
  - Displays the `LoginView` using `PageController`.

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5. `model`

Defines the application's data entities.

- **Classes**:
  - `Cart` → `userId`, `flowerId`, `quantity`.
  - `User` → `userId`, `username`, `email`, `password`, `address`, `phoneNumber`, `role`.
  - `Flower` → `flowerId`, `name`, `type`, `price`.
  - `TransactionHeader` → `transactionId`, `userId`.
  - `TransactionDetail` → `transactionId`, `flowerId`, `quantity`.
  - `Role` → Enum for user roles (`CUSTOMER`, `ADMIN`).

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6. `resources`

Contains external resources for the application.

- **File: `styles.css`**
  - Used for styling the JavaFX UI components.

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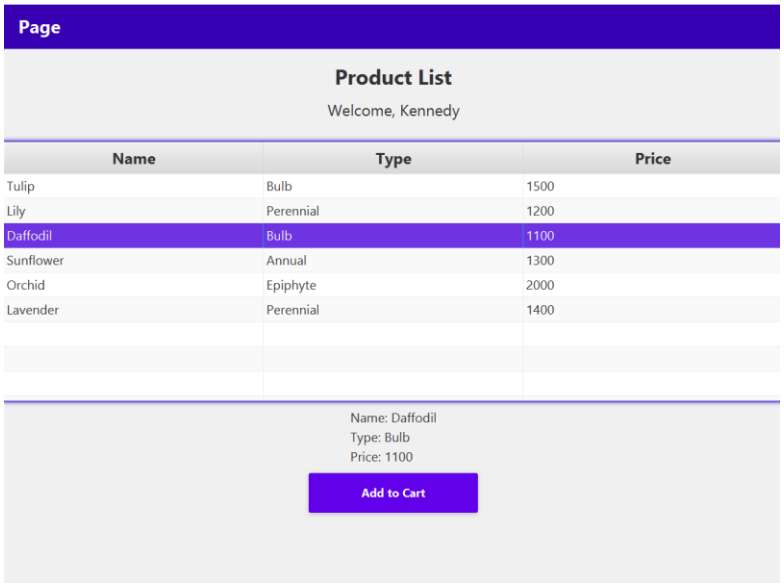
7. `view`

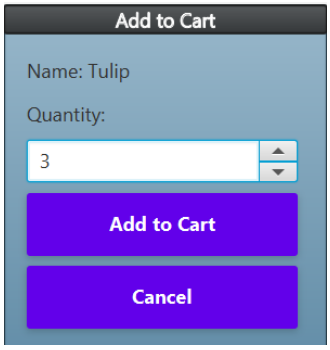
Defines the UI structure of the application.

- **Abstract Class: `View`**
  - Superclass for all views.

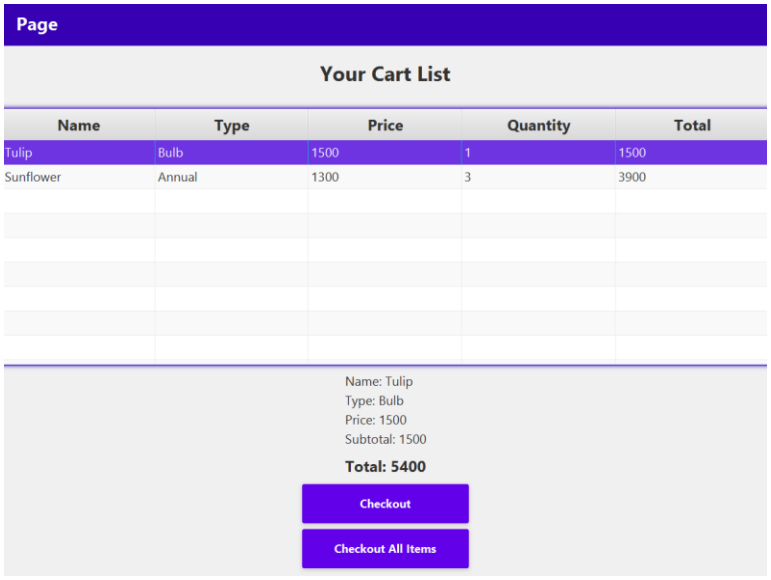
Holds the `MainController` and defines the abstract method to get the Pane.

- **Concrete Views**:
  - `BuyFlowerView` → Displays flowers available for purchase.



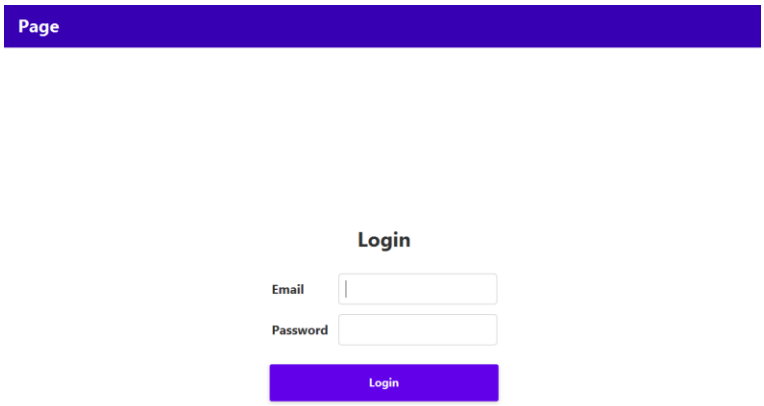


    - Label: product list, greeting, product detail, product name, quantity.
    - TableView: product table.
    - Spinner: quantity.
    - Button: add to cart, add to cart popup, cancel.
    - Window (jfxtras): add to cart popup
  - `CartView` → Shows the cart and allows management of items.



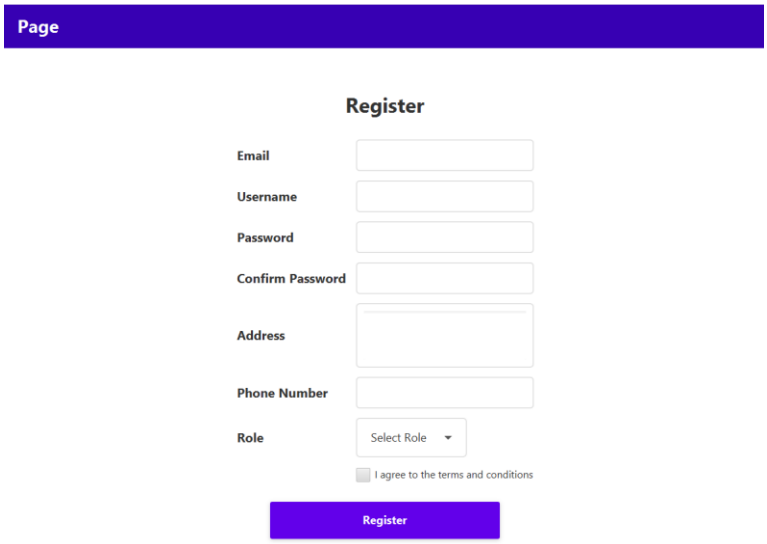
- Label: cart, item detail, total.
- TableView: cart table.
- Button: checkout, checkout all items.

○ `LoginView` → Provides a login form.



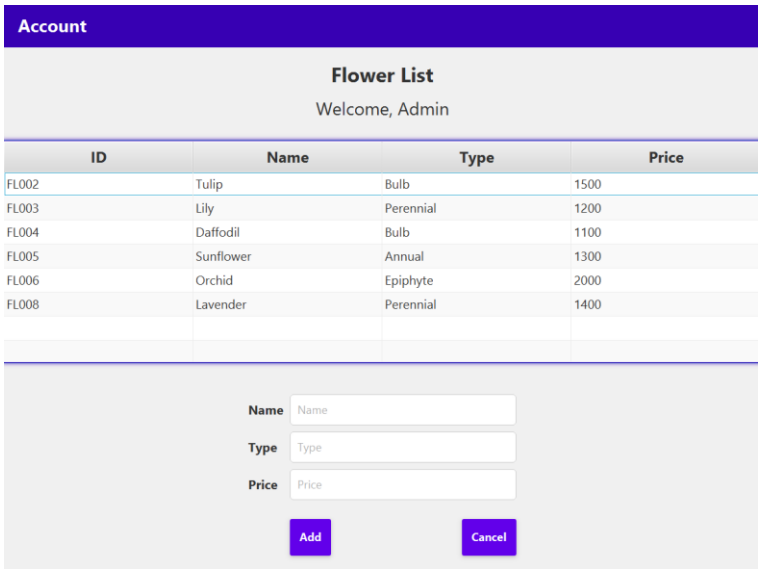
- Label: login, email, password.
- TextField: email.
- PasswordField: password.
- Button: login.

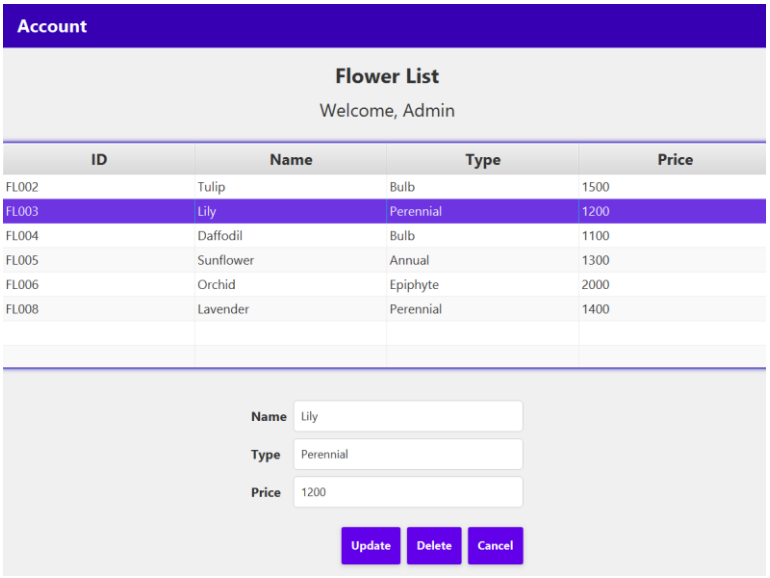
○ `RegisterView` → Contains a registration form for new users.



- Label: register, email, username, password, confirm password, address, phone number, role.
- TextField: email, username, phone number.
- PasswordField: password, confirm password.
- TextArea: address.
- ComboBox: role.
- CheckBox: terms and conditions.
- Button: register.

○ `ManageFlowerView` → Allows admins to add or manage flowers.





- Label: flower list, greeting, name, type, price.
- TableView: flower table.
- TextField: flower name, flower type, flower price.
- Button: add, update, delete, cancel.

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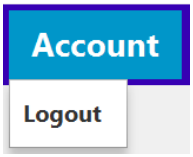
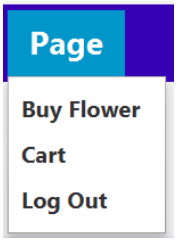
8. `view.partials`

Reusable UI components and utility classes.

- **Classes**:
  - **`AdminNavigation`**:

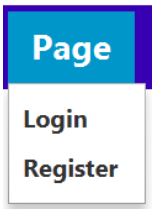
    

    - Navigation menu for admins.
    - Options: Logout.
  - **`CustomerNavigation`**:

    - Navigation menu for customers.
    - Options: Buy Flowers, Cart, Logout.

- **`AuthNavigation`**:



    - Navigation for the login and registration page (switch between them).
- **`CustomAlert`**:
    - Utility class for creating JavaFX alert dialogs without instantiating new objects repeatedly.
- **Abstract Class: `Navigation`**
    - Superclass for all navigation components.
    - Holds the `MainController` and defines the abstract method to get the MenuBar.

Architecture and Design Patterns Used

1. **MVC**: Separates the application into Model, View, and Controller layers for modularity and scalability.
2. **DAO**: Encapsulates database operations, making them reusable and maintainable.
3. **Singleton**: Ensures a single instance of the database connection using the `Connect` class.

Conclusion

The **Flora Artistry** project is designed for clarity, modularity, and maintainability. By leveraging **MVC**, **DAO**, and **Singleton**, the project ensures separation of concerns and a clean codebase. The use of partial views, abstract superclasses, and dynamic navigation menus enhances reusability and flexibility across the application.