**MINISTRY OF EDUCATION**

**AND TRAINING**

**FPT UNIVERSITY**

Capstone Project Document

Distribution Management System in pharmaceutical

Report #4 – Software Requirement Specification

|  |  |
| --- | --- |
| Distribustion Management System in Pharmaceutial | |
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HaNoi, 11/2015

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# ARCHITECTUREDESIGN

## Choice of Architecture Design

### MVC Model overview

**CONTROLLER**

* Intercepts user input;
* Coordinates the view and model;
* Handles communication between the model and data layer.

**VIEW**

* Binds to the model;
* Renders the UIs (HTML, CSS, JavaScript);
* Allows navigating between controllers.

**MODEL**

* Communicates with data source;
* Exposes functionalities, business logics, and data validation.

Database   
Server

Application Server

1. Request

8. Response

5. Select views

7.Changes made

2. Invoke methods

6. Query states

Method invocations

Change notifications

**Figure 1-1: MVC Model**

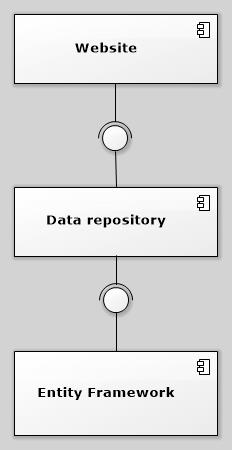
The components in MVC Model :

* **Model** is the part of the application that handles the logic for the application data. Often model objects retrieve data (and store data) from a database.
* **View** is the parts of the application that handles the display of the data. Most often the views are created from the model data.
* **Controller** is the part of the application that handles user interaction. Typically controllers read data from a view, control user input, and send input data to the model.

### Advantages and disadvantages of Layer Model

* Advantages :
* Easy to maintain the code and future improvements.
* Each object in mvc have distinct responsibilities. So change in one class doesn't need alternation in other classes.
* Clear separation between presentation logic and business logic.
* Disadvantages :
* For parallel development there is a needed multiple programmers.
* Too complex to implement and is not suitable for smaller application.

## Component Diagram



**Figure 1-2: Component Diagram**

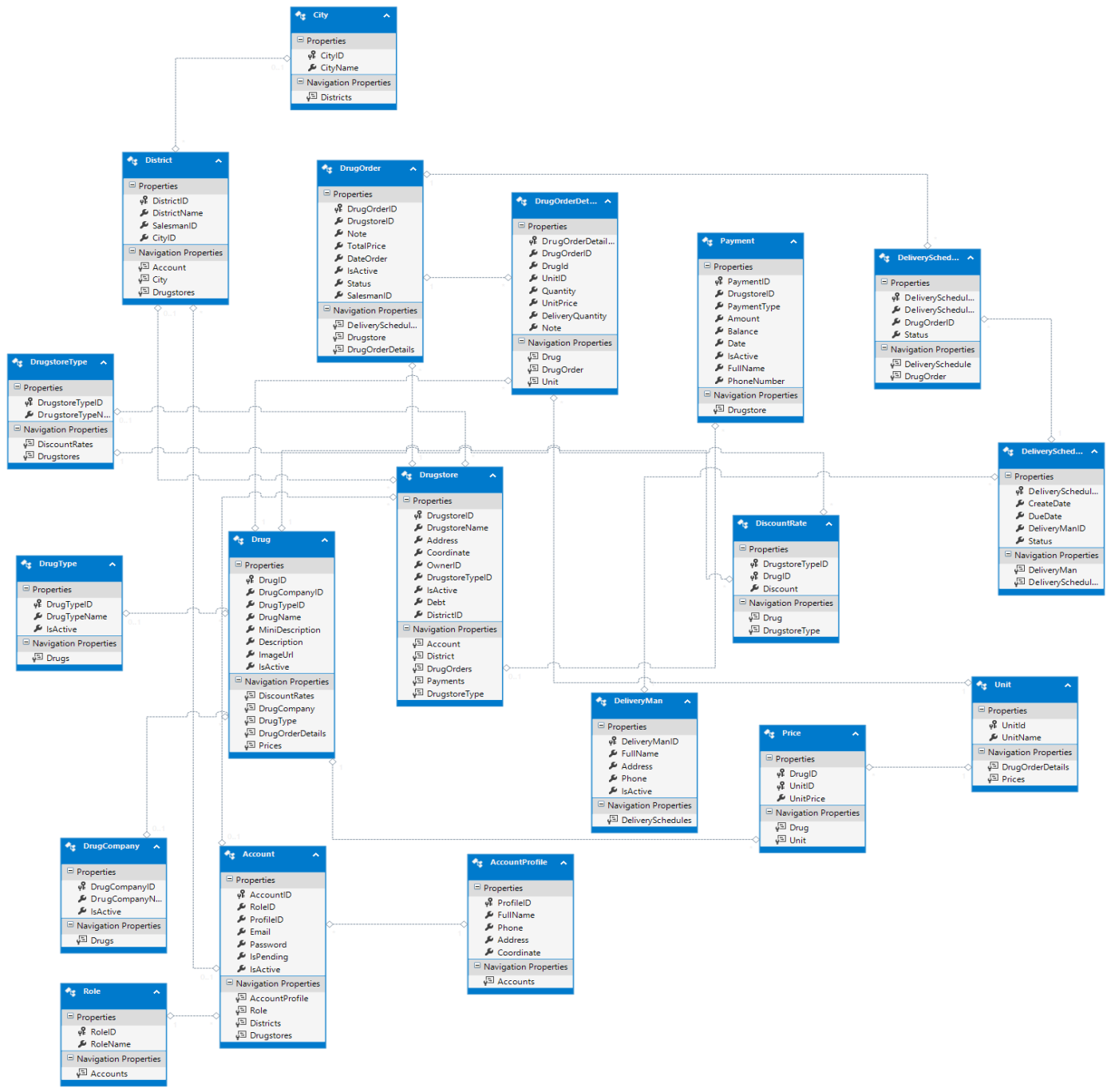
The DMS system includes the following major components:

* **Entity Framework:** An object-relational mapper that enables working with relational data persistence using domain-specific objects;
* **Data Repository:** A data store that provides data access functionality, using the Entity Framework to communicates with the database;
* **Website:** A web-application that helps exposes all the functionalities to end-users.

From the point of view of the MVC-III pattern, the components Entity Framework 5.0, Data Repository all belong to the Model part. The Controller and the View parts are wrapped in the component Website.

# Detailed Description of Components

## Entities Classes



**Figure 1-3: Class Diagram**

## Generic Repository Class



**Figure 1-4: Data Repository Class Diagram**

Properties:

|  |  |  |  |
| --- | --- | --- | --- |
| **Property name** | **Type** | **Visibility** | **Description** |
| Context | DMPEntities | internal | Database context |
| dbSet | DbSet<TEntity> | internal | The entity set that the repository is instantiated for. |

Operations:

|  |  |  |
| --- | --- | --- |
| Signature: voidDelete(objectid)  Description:Delete an entity by given id. | | |
| Parameter | **Type** | **Description** |
| *id* | object | ID of the entity to be deleted |

|  |  |  |
| --- | --- | --- |
| Signature: voidDelete(TEntity entityToDelete)  Description:Delete entity which was given | | |
| Parameter | **Type** | **Description** |
| entityToDelete | TEntity | Entity instance of the entity to be deleted |

|  |  |  |
| --- | --- | --- |
| Signature: GenericRepository(DMPEntities context)  Description:The constructor accepts a database context instance and initializes the entity set variable | | |
| Parameter | **Type** | **Description** |
| context | **DMPEntities** | Database context |

|  |  |  |
| --- | --- | --- |
| Signature: IEnumerable<TEntity> Get(  Expression<Func<TEntity, bool>> filter = null,  Func<IQueryable<TEntity>, IOrderedQueryable<TEntity>> orderBy = null,  string includeProperties = "")  Description:This method uses lambda expressions to allow the calling code to specify a filter condition and a column to order the results by, and a string parameter lets the caller provide a comma-delimited list of navigation properties for eager loading. | | |
| Parameter | **Type** | **Description** |
| filter | Expression<Func<TEntity, bool>> | The caller will provide a lambda expression based on the TEntity type, and this expression will return a Boolean value. |
| orderBy | Func<IQueryable<TEntity>, IOrderedQueryable<TEntity>> | The input to the expression is an IQueryable object for the TEntitytype. The expression will return an ordered version of that IQueryable object. |
| includeProperties | string |  |

|  |  |  |
| --- | --- | --- |
| Signature: IEnumerable<TEntity>GetAll()  Description:Get all entity. | | |
| Parameter | **Type** | **Description** |

|  |  |  |
| --- | --- | --- |
| Signature: voidGetByID(object id)  Description:Get an entity by given id. | | |
| Parameter | **Type** | **Description** |
| *id* | object | ID of the entity to be selected |

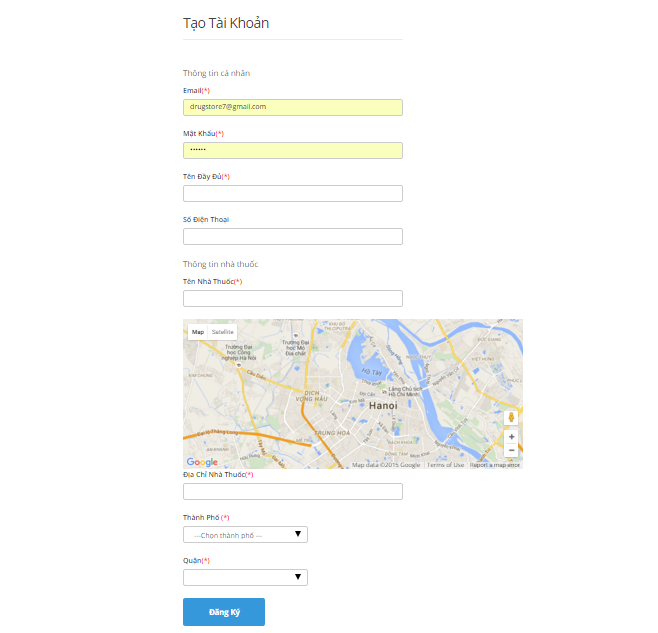
|  |  |  |
| --- | --- | --- |
| Signature: boolInsert(TEntityentity)  Description:Insert an entity by given id. | | |
| Parameter | **Type** | **Description** |
| entity | TEntity | Entity instance of the entity to be inserted |

|  |  |  |
| --- | --- | --- |
| Signature: voidSaveChanges()  Description:Save entity changes. | | |
| Parameter | **Type** | **Description** |

|  |  |  |
| --- | --- | --- |
| Signature: voidUpdate(object id)  Description: Delete an entity by given id. | | |
| Parameter | **Type** | **Description** |

## Screen Design

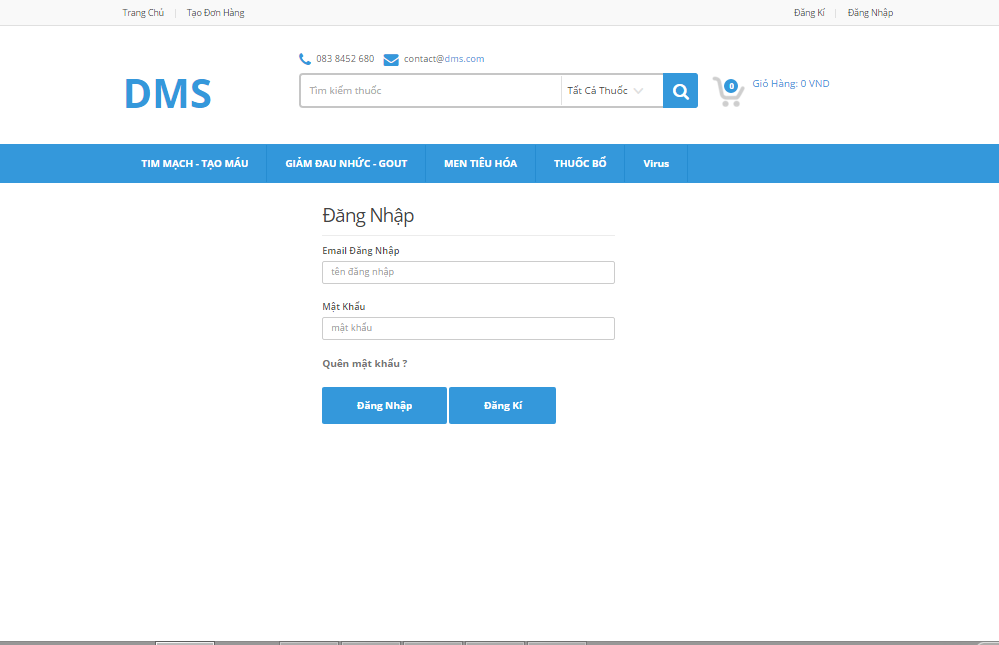
### Register



**Figure 1-5: Register Screen**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Object/Control Name | Type | Required | Description |
| 1 | Địa chỉ e-mail | Textbox | Yes | Register Email Address |
| 2 | Mật khẩu | Textbox | Yes | Password of Account |
| 3 | Tên đầy đủ | Textbox | Yes | Name of Drugsore |
| 4 | Số điện thoại | Textbox | Yes | Phone Number of Drugstore |
| 5 | Tên nhà thuốc | Textbox | Yes | Name of Drugstore |
| 6 | Đại chỉ nhà thuốc | Textbox | Yes | Drugstore’s Address |
| 7 | Thành phố | Dropdownlist | Yes | City |
| 8 | Quận | Dropdownlist | Yes | District |

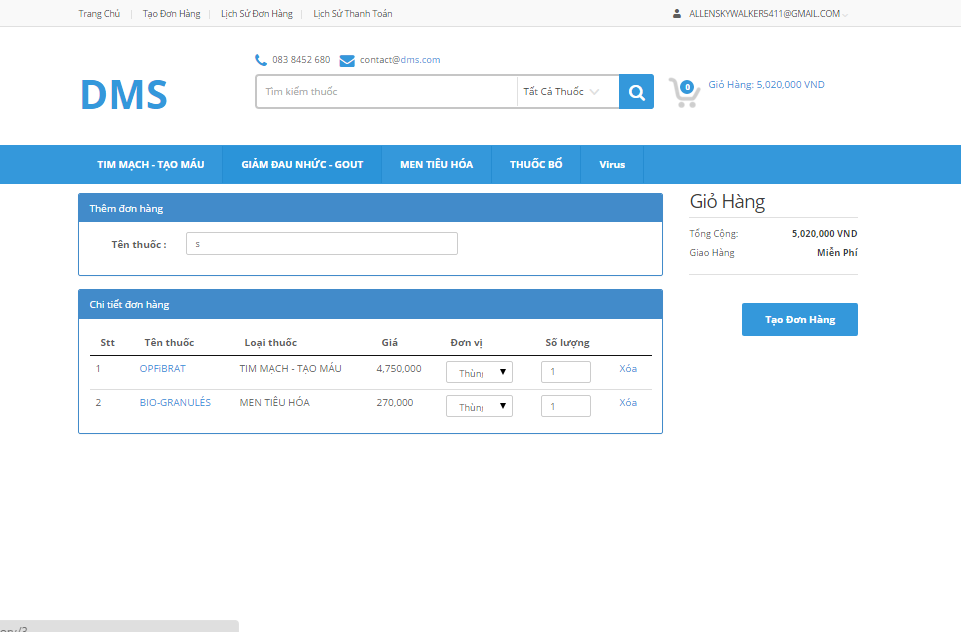
### Login



**Figure 1-6: Login Screen**

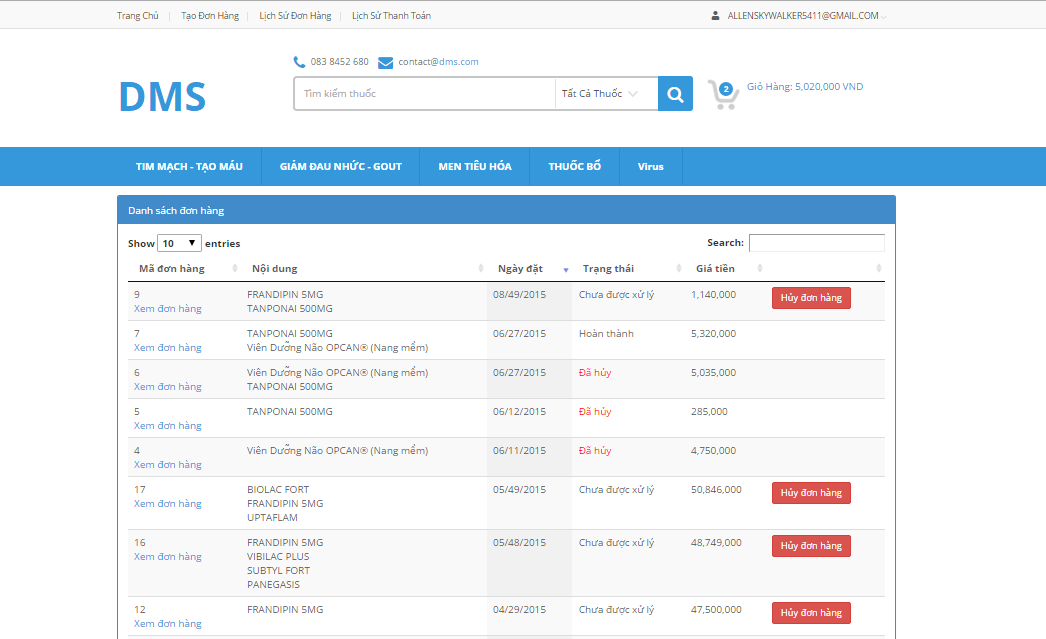
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Object/Control Name | Type | Required | Description |
| 1 | Địa chỉ e-mail | Textbox | Yes | Registed Email Address |
| 2 | Mật khẩu | Textbox | Yes | Password of account |
| 3 | Quên mật khẩu? | Hyperlink | Yes | Direct to [Quên mật khẩu] page |
| 4 | Đăng nhập | Button | Yes | Click for Login to website |
| 5 | Đăng kí | Button | Yes | Click for Register |

### Create Order



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Object/Control Name | Type | Required | Description |
| 1 | Tên thuốc | Textbox | Yes | Input Drugname to Add to Cart |
| 2 | Stt | Label | Yes | Series in Order |
| 3 | Tên thuốc | Label | Yes | Drug Name in Order |
| 4 | Giá | Label | Yes | Price |
| 5 | Đơn vị | Dropdown List | Yes | Unit |
| 6 | Số lượng | Dropdown List | Yes | Quantity |
| 7 | Tổng cộng | Label | Yes | Total price |
| 8 | Giao hang | Label | Yes | Shipping fee |

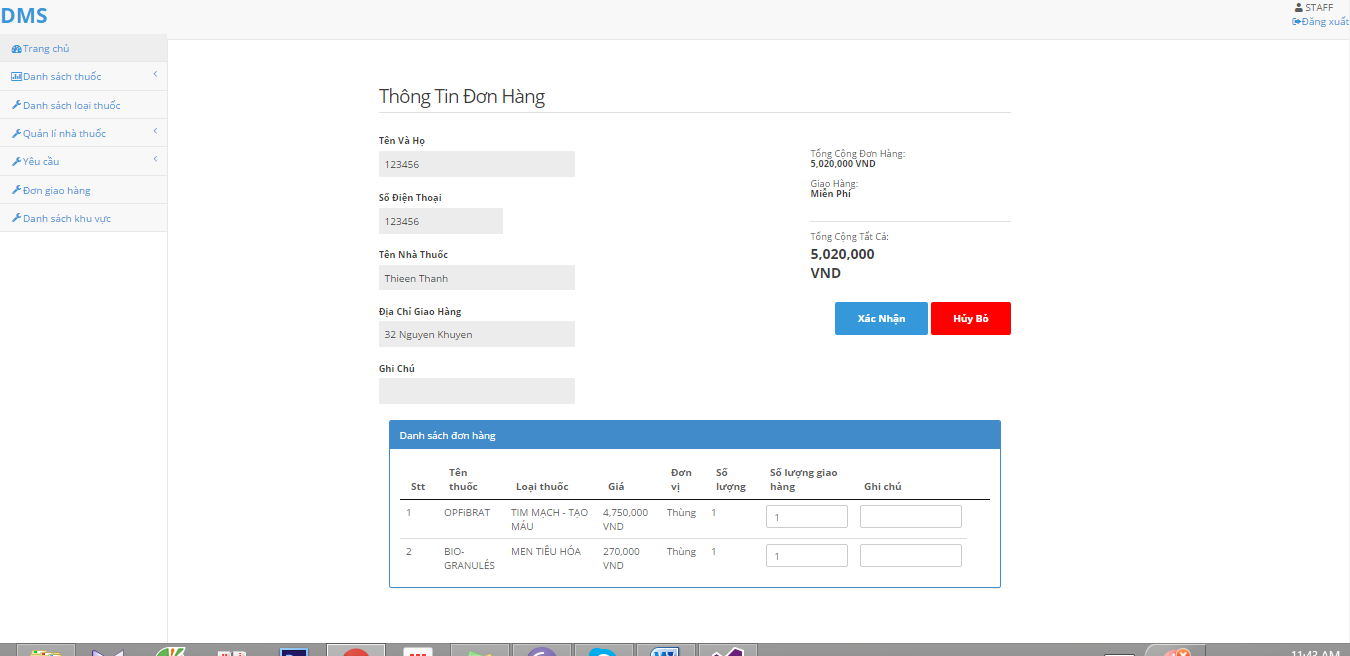
### View Order History



**Figure 1-7: View order history screen**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Object/Control Name | Type | Required | Description |
| 1 | Entries | Dropdown List | Yes | Number of Entries each page |
| 2 | Tìm kiếm | Textbox | Yes | Search Order |
| 3 | Xem đơn hang | Hyperlink | Yes | Click to view Detail |
| 4 | Nội dung | Label | Yes | Brief Order Detail |
| 5 | Ngày đặt | Date/Time | Yes | Order Date |
| 6 | Trạng thái | Label | Yes | Order Status |
| 7 | Giá tiền | Label | Yes | Price |
| 8 | Hùy đơn hang | Button | Yes | Click to cancel order |

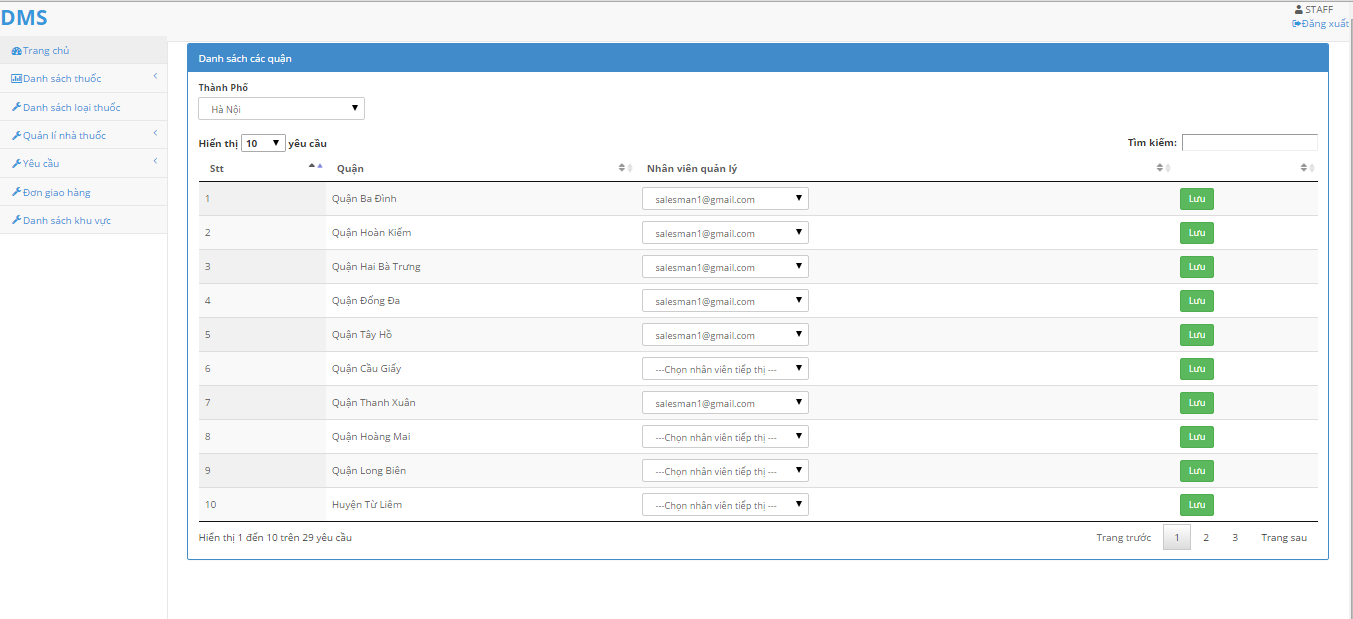
### Approve Order



**Figure 1-8: Approve Order Screen**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Object/Control Name | Type | Required | Description |
| 1 | Navigation Bar | Textbox | Yes | All feature of User function |
| 2 | Họ và Tên | Textbox | Yes | Name of User |
| 3 | Số điện thoại | Textbox | Yes | Phone Number |
| 4 | Tên nhà thuốc | Textbox | Yes | Name of Drugstore |
| 5 | Địa giao hang | Textbox | Yes | Address |
| 6 | Xác nhận | Button | Yes | Click to Approve order |
| 7 | Hủy bỏ | Button | Yes | Click to Cancel order |
| 8 | Reference to Table - | Reference to Table - | Reference to Table - | Reference to Table - |

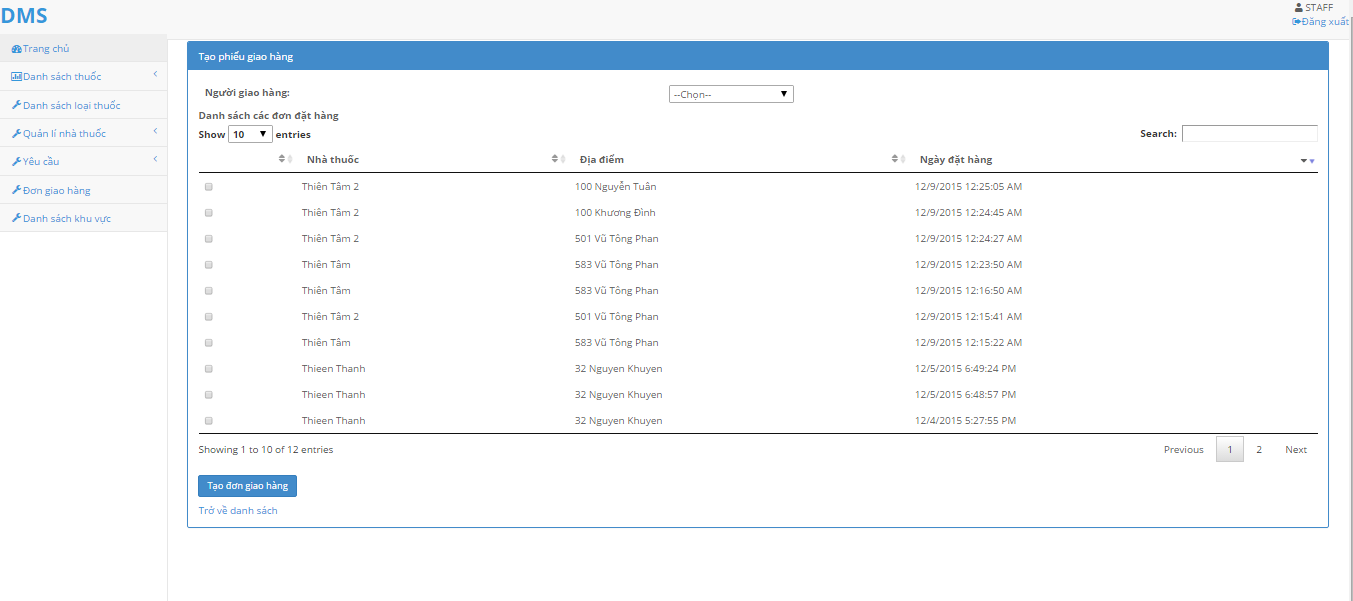
### Assign Salesman



**Figure 1-9: Assign Salesman Screen**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Object/Control Name | Type | Required | Description |
| 1 | Navigation Bar | Textbox | Yes | All feature of User function |
| 2 | Thành phố | Dropdown List | Yes | City |
| 3 | Yêu cầu | Dropdown List | Yes | Entries per page |
| 4 | Số thứ tự | Label | Yes | Series of District |
| 5 | Quận | Label | Yes | District |
| 6 | Nhân viên quản lý | Dropdown List | Yes | Salesman’s Email |
| 7 | Lưu | Button | Yes | Save |
| 8 | Trang | Hyperlink | Yes | Click to jump page |

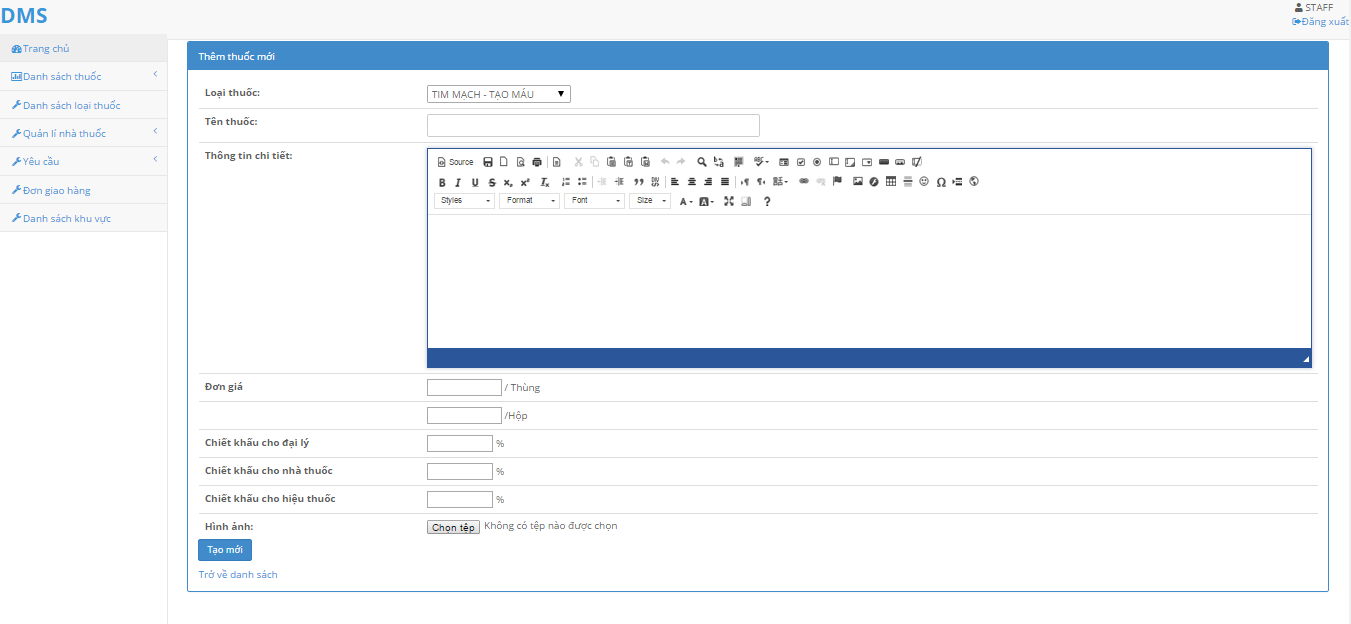
### Create delivery schedule



**Figure 1-10: Create delivery schedule screen**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Object/Control Name | Type | Required | Description |
| 1 | Navigation Bar | Textbox | Yes | All feature of User function |
| 2 | Người giao hang | Dropdown List | Yes | Name of Deliveryman |
| 3 | Entries | Dropdown List | Yes | Entries per Page |
| 4 | Tên nhà thuốc | Label | Yes | Name of Drugstore |
| 5 | Địa chỉ | Label | Yes | Address |
| 6 | Ngày đặt hang | Date/Time | Yes | Order Date |
| 7 | Tạo đơn hàng | Button | Yes | Click to Create Order |

### Add Drug

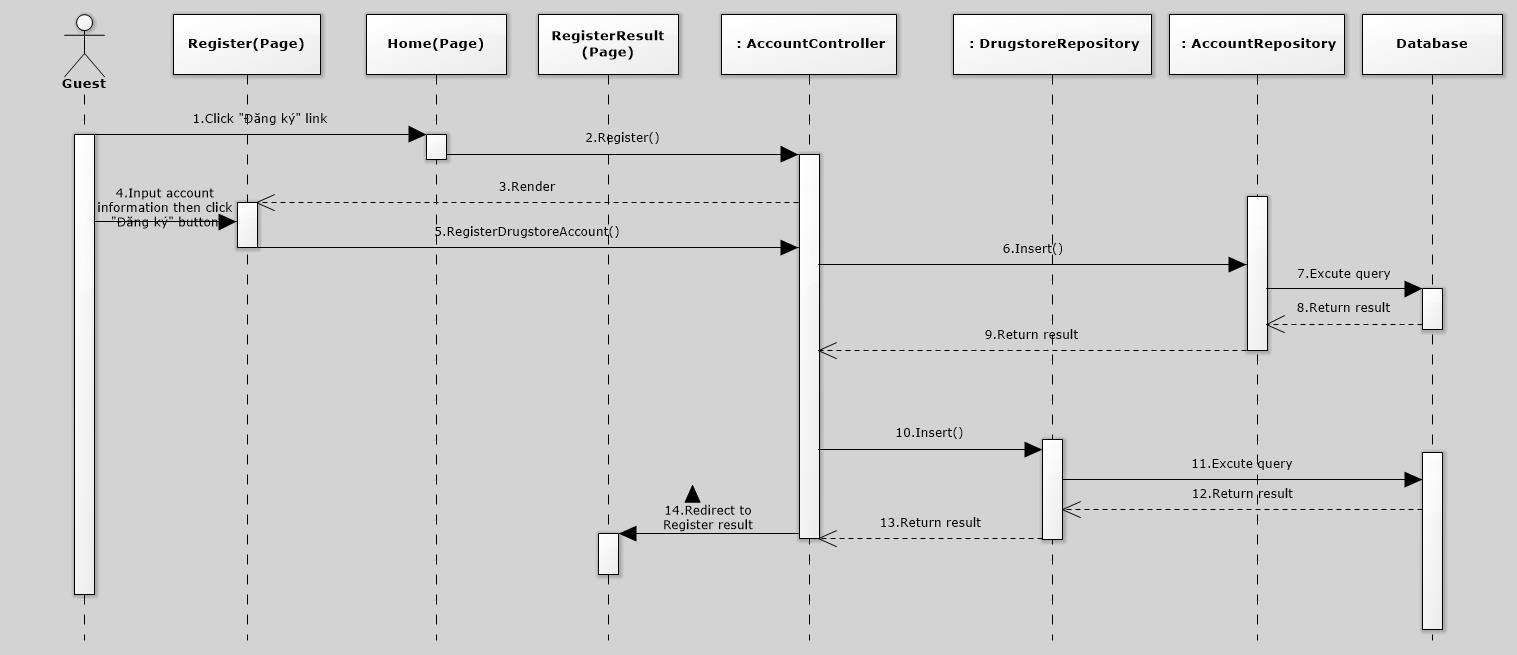


**Figure 1-11: Add Drug Screen**

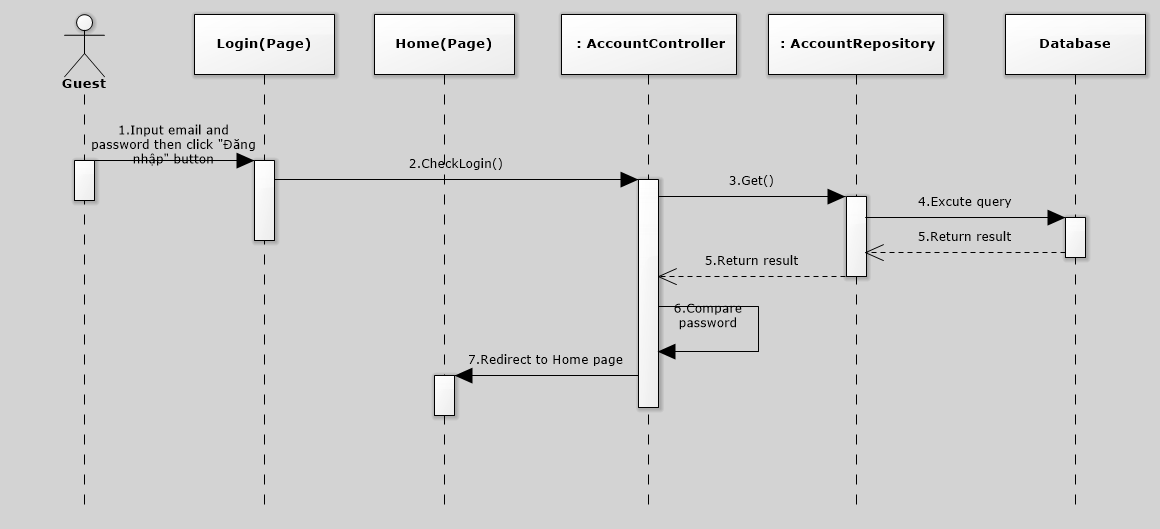
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Object/Control Name | Type | Required | Description |
| 1 | Navigation Bar | Textbox | Yes | All feature of User function |
| 2 | Loại thuốc | Dropdown List | Yes | Category |
| 3 | Tên thuốc | Textbox | Yes | Drug Name |
| 4 | Thông tin chi tiết | Editor | Yes | Input drug information |
| 5 | Đơn giá | Textbox | Yes | Price per Package |
| 6 | Đơn giá | Textbox | Yes | Price per Serving |
| 7 | Chiếu khấu đại lý | Textbox | Yes | Discount for “Đại lý” |
| 8 | Chiết khấu nhà thuốc | Textbox | Yes | Discount for “Nhà thuốc” |
| 9 | Chiết khấu hiệu thuốc | Textbox | Yes | Discount for “Hiệu thuốc” |
| 10 | Chọn tệp | Browse Button | Yes | Choose picture from local storage |
| 11 | Tạo mới | Button | Yes | Add new Drug |

## Sequence Diagram

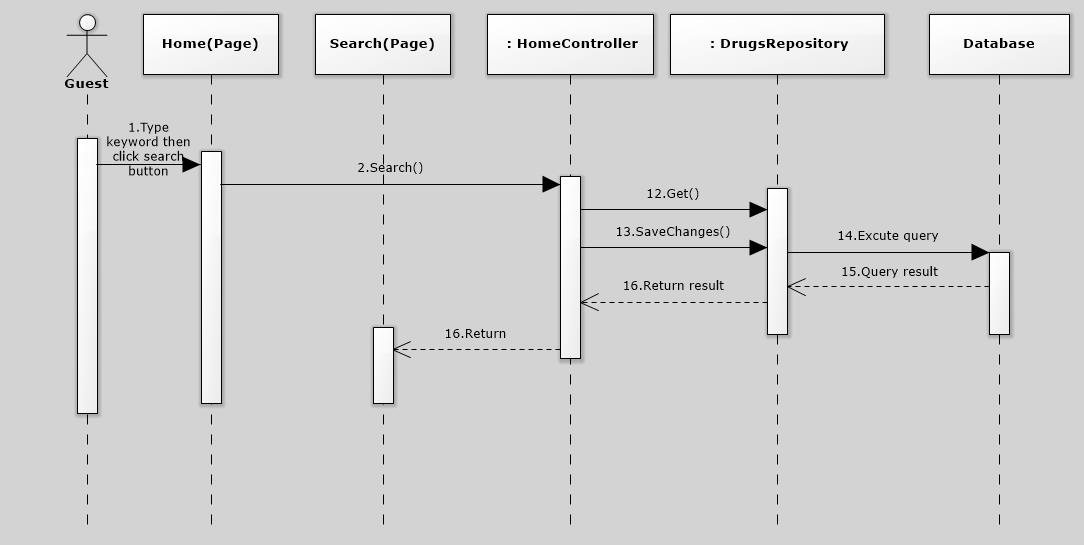
### <Guest> Register



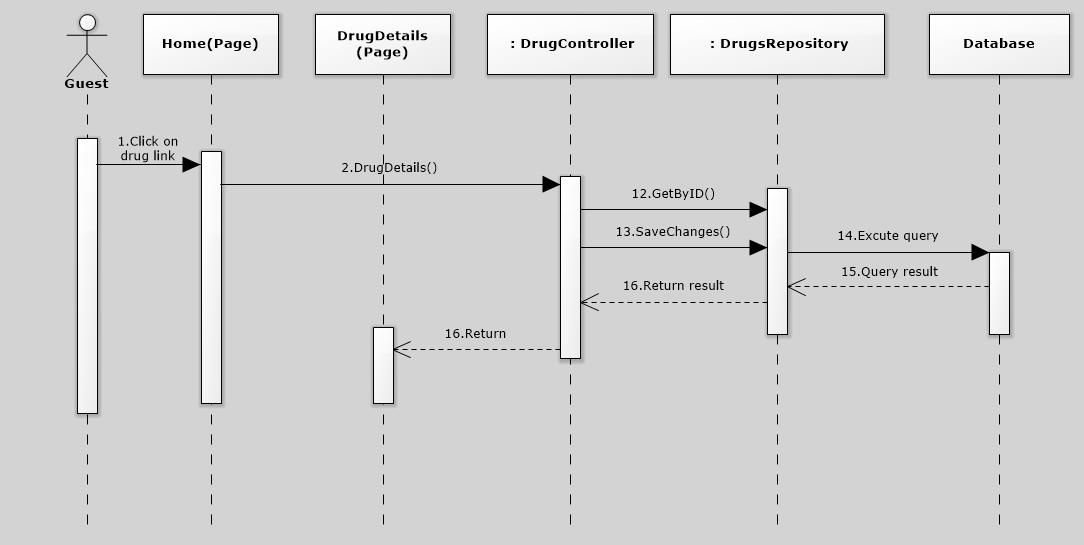
### <Guest> Login



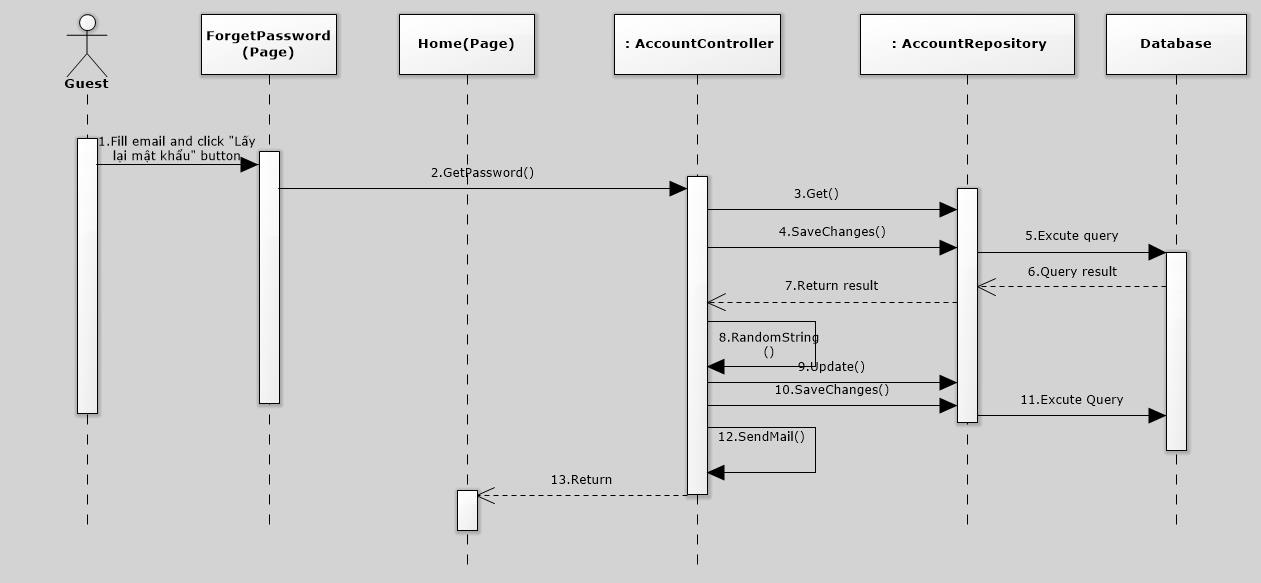
### <Guest> Search



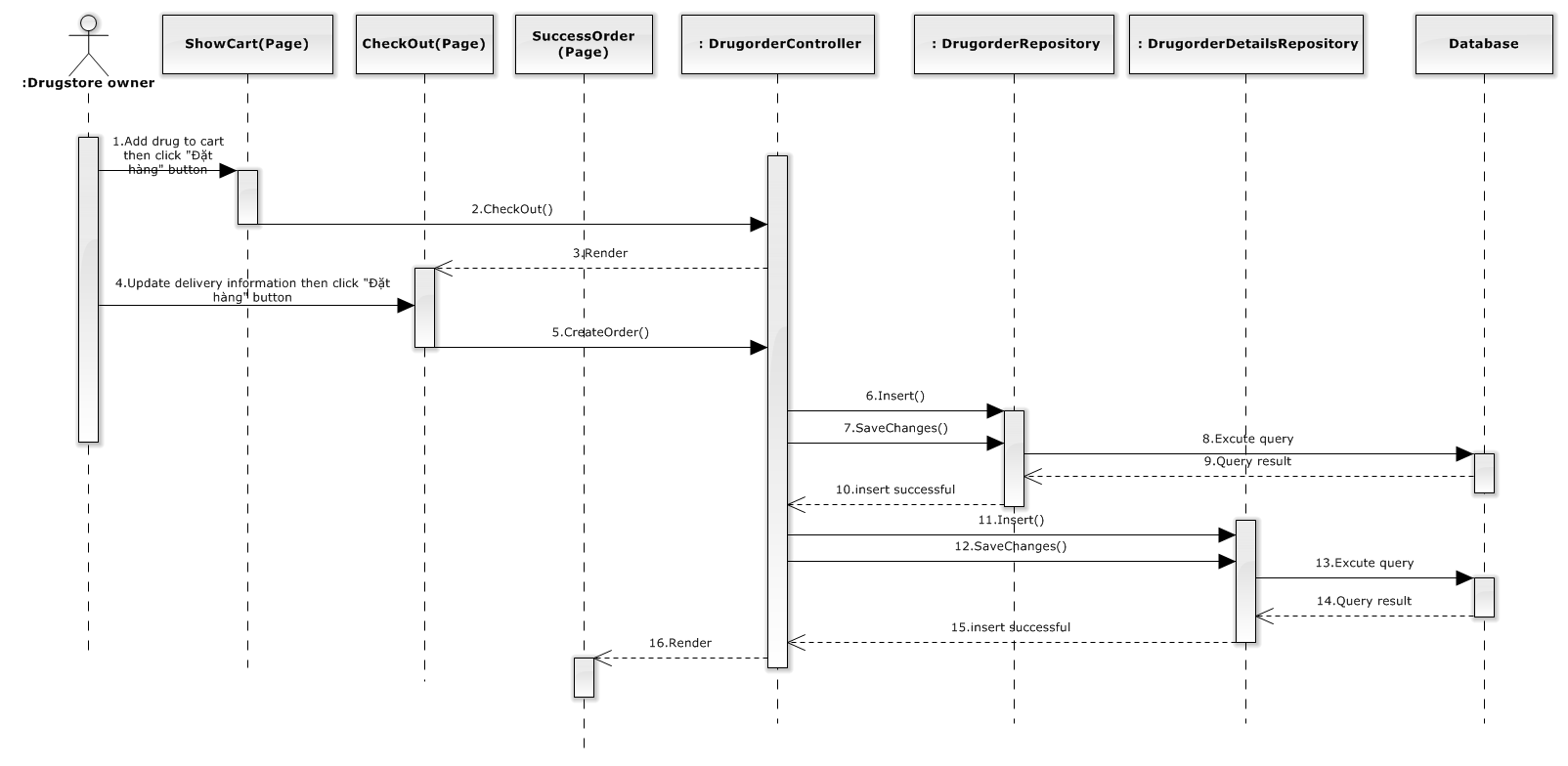
### <Guest> DrugDetails



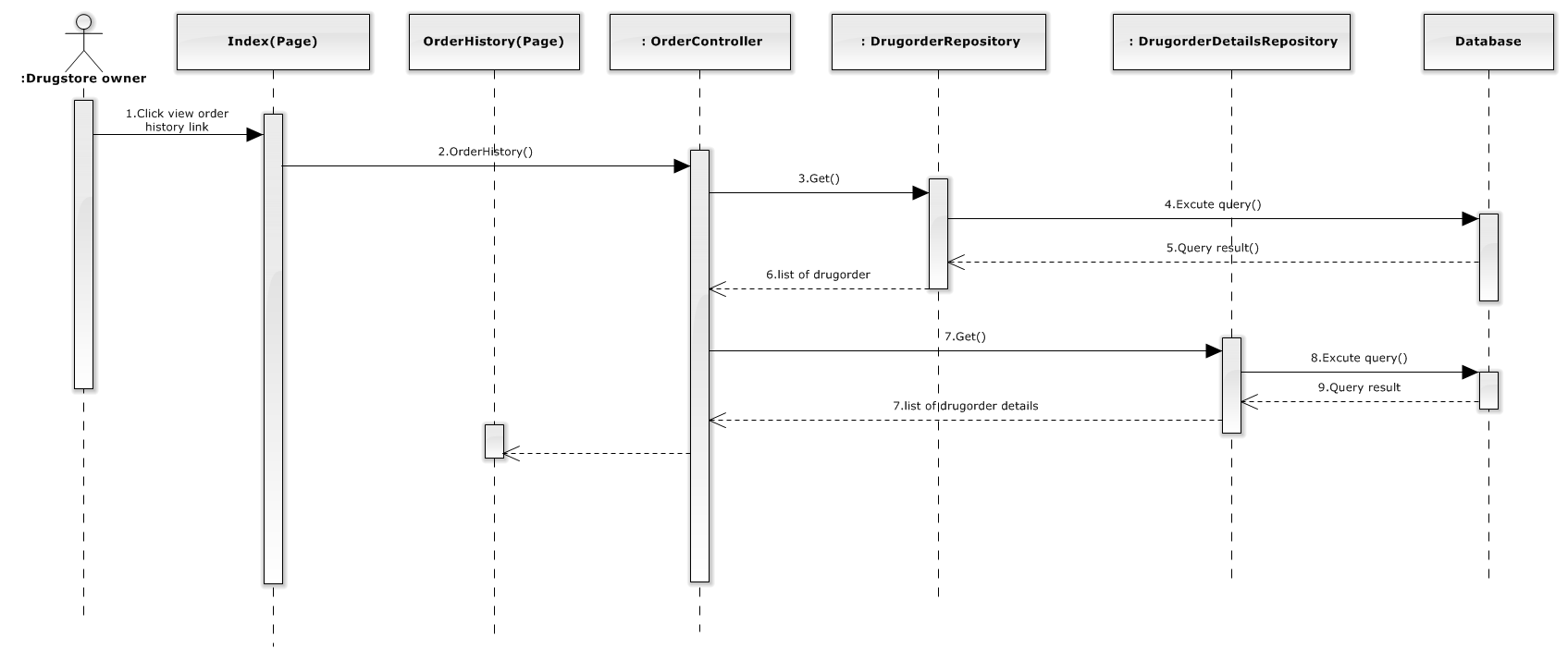
### <Guest> ForgotPassword



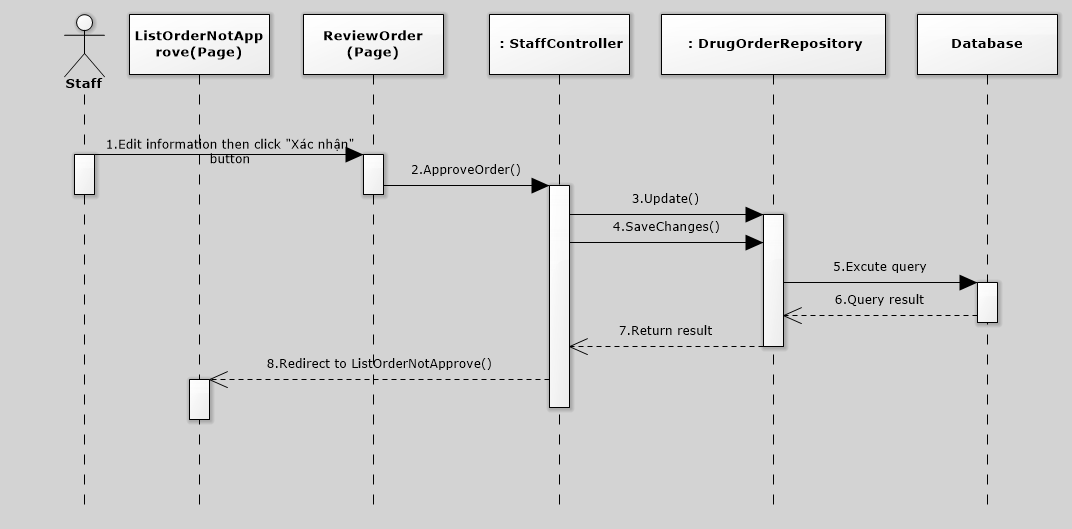
### <User> Create Order



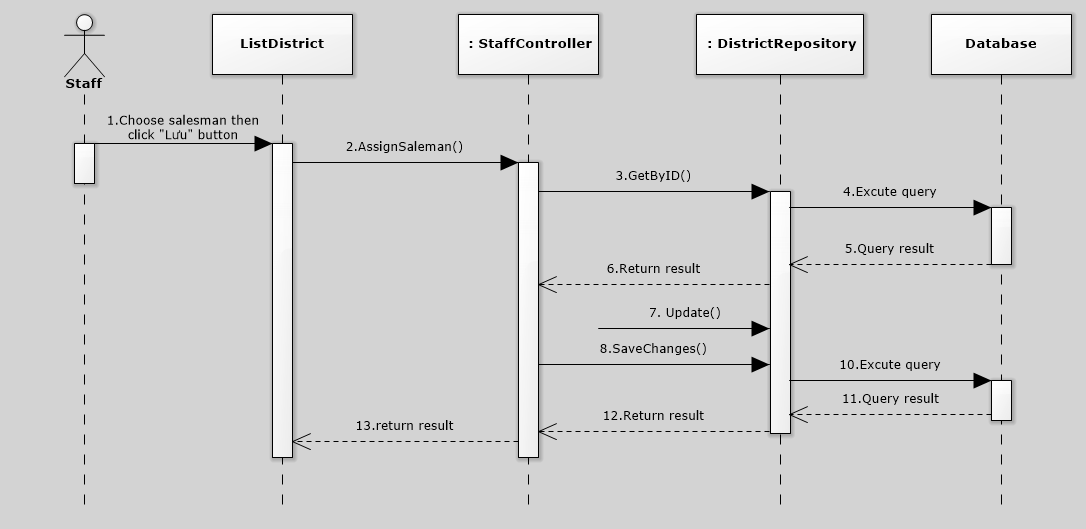
### <User> View order history



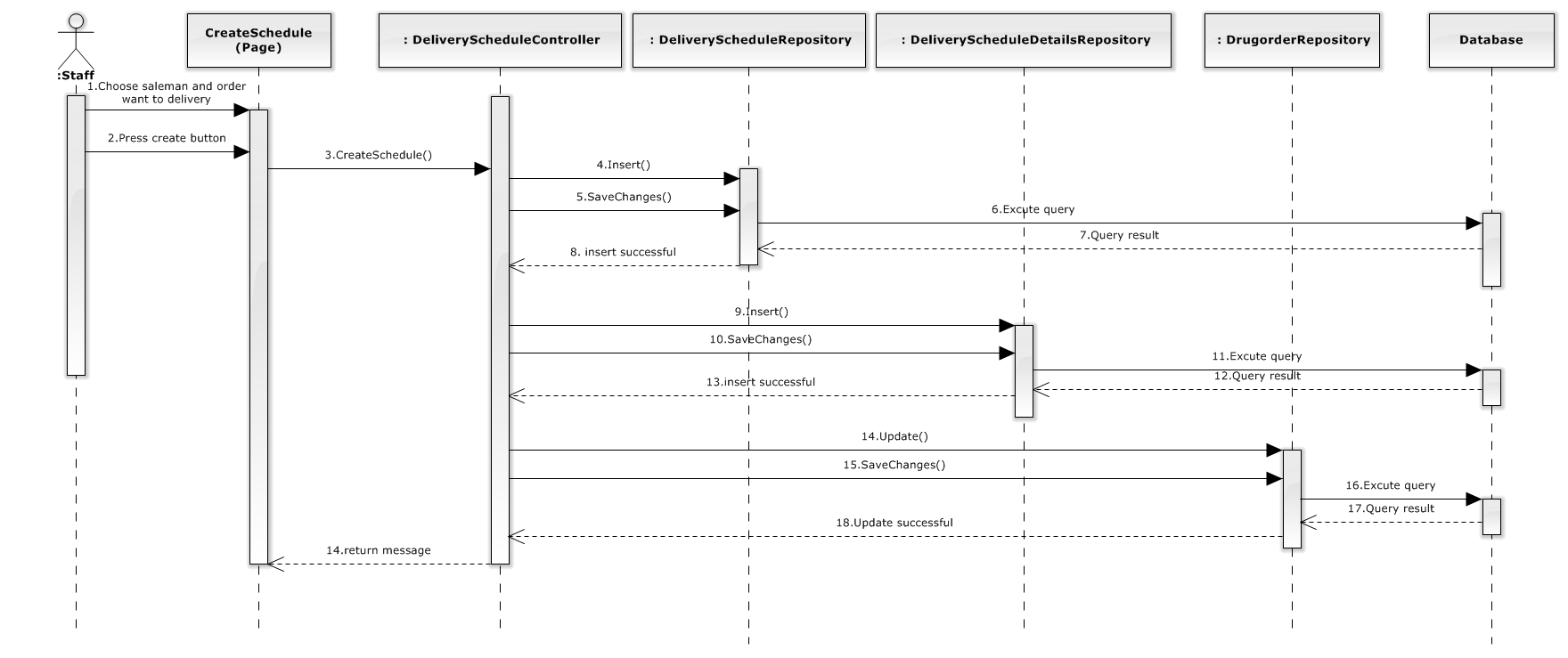
### <Staff> Approve order



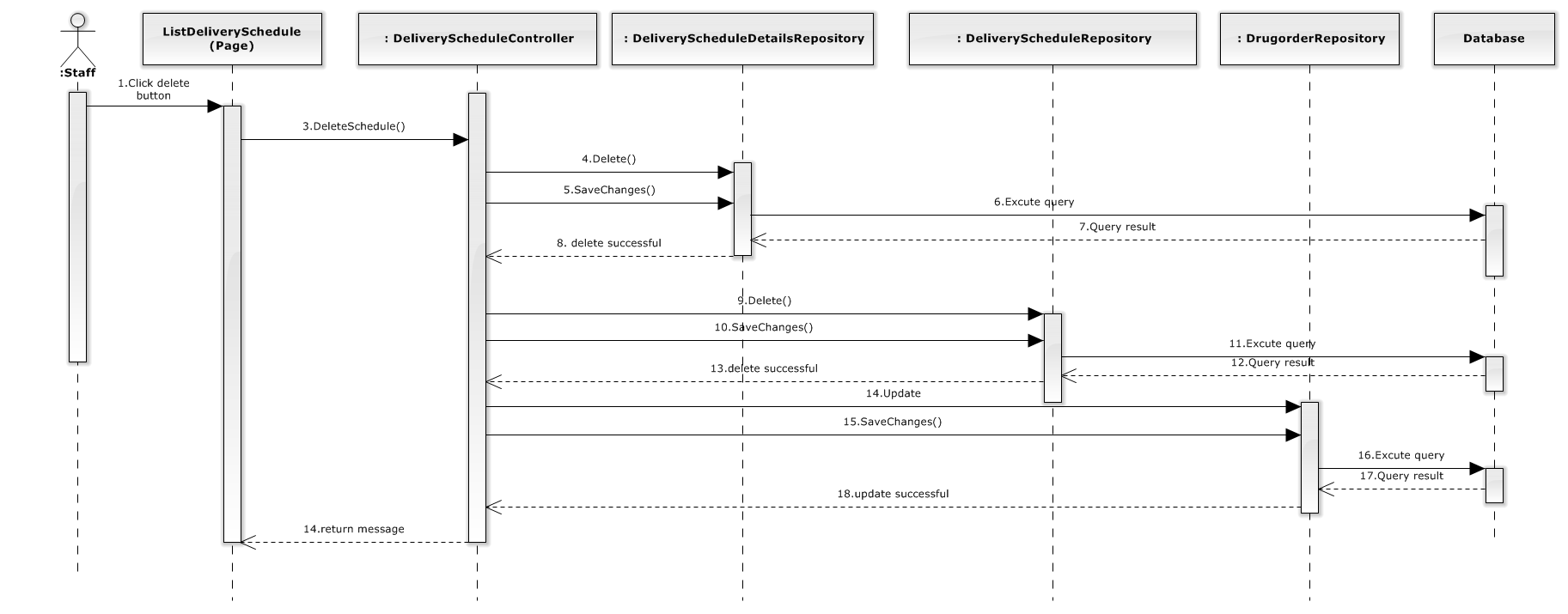
### <Staff> Assign salesman



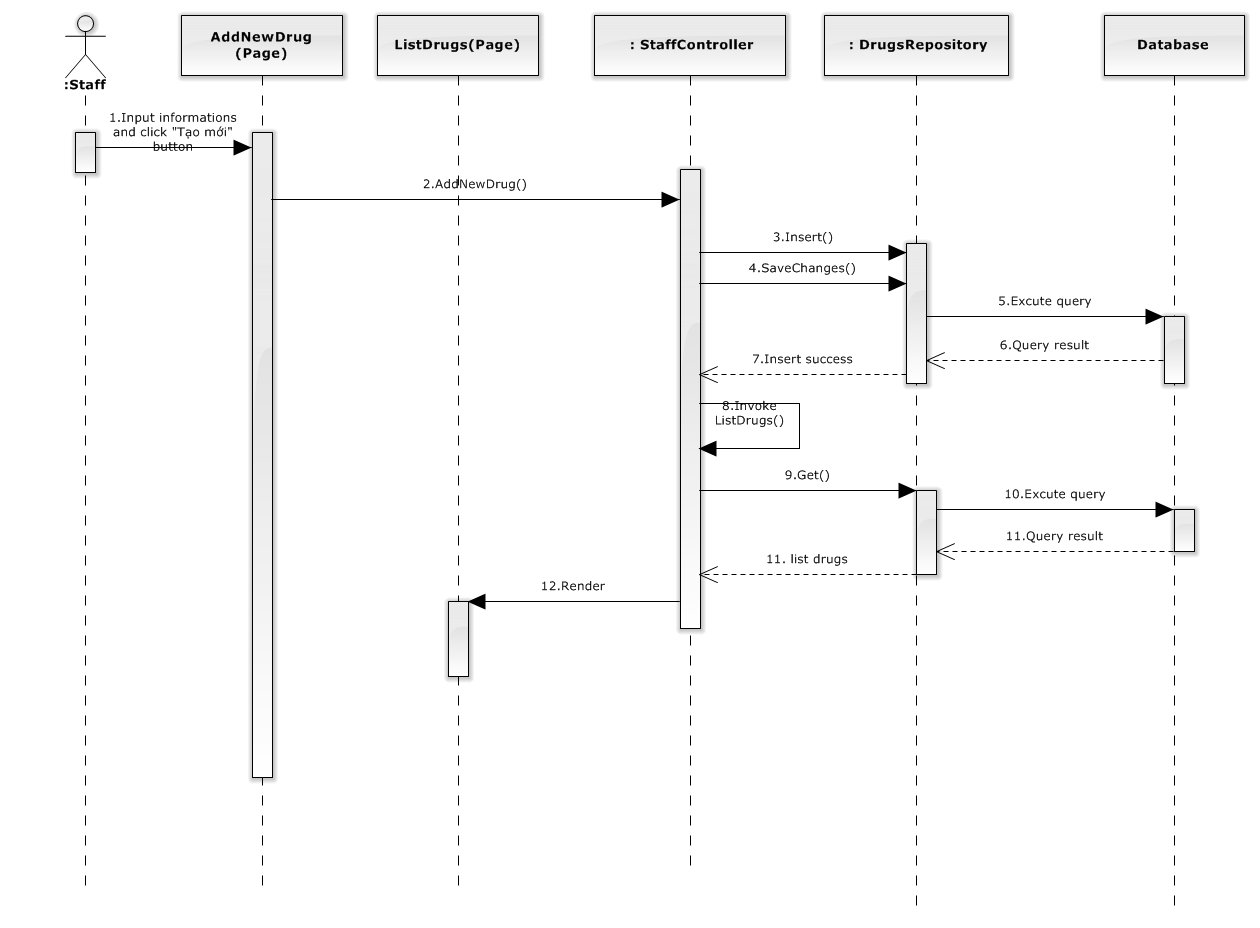
### <Staff> Create delivery schedule



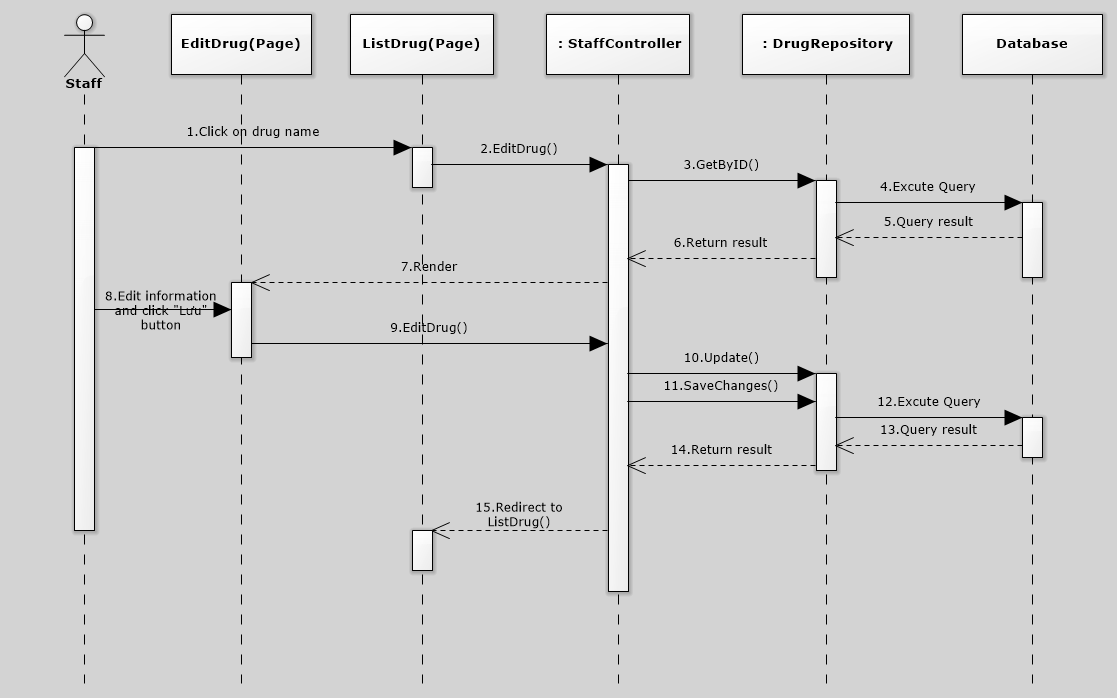
### <Staff> Delete delivery schedule



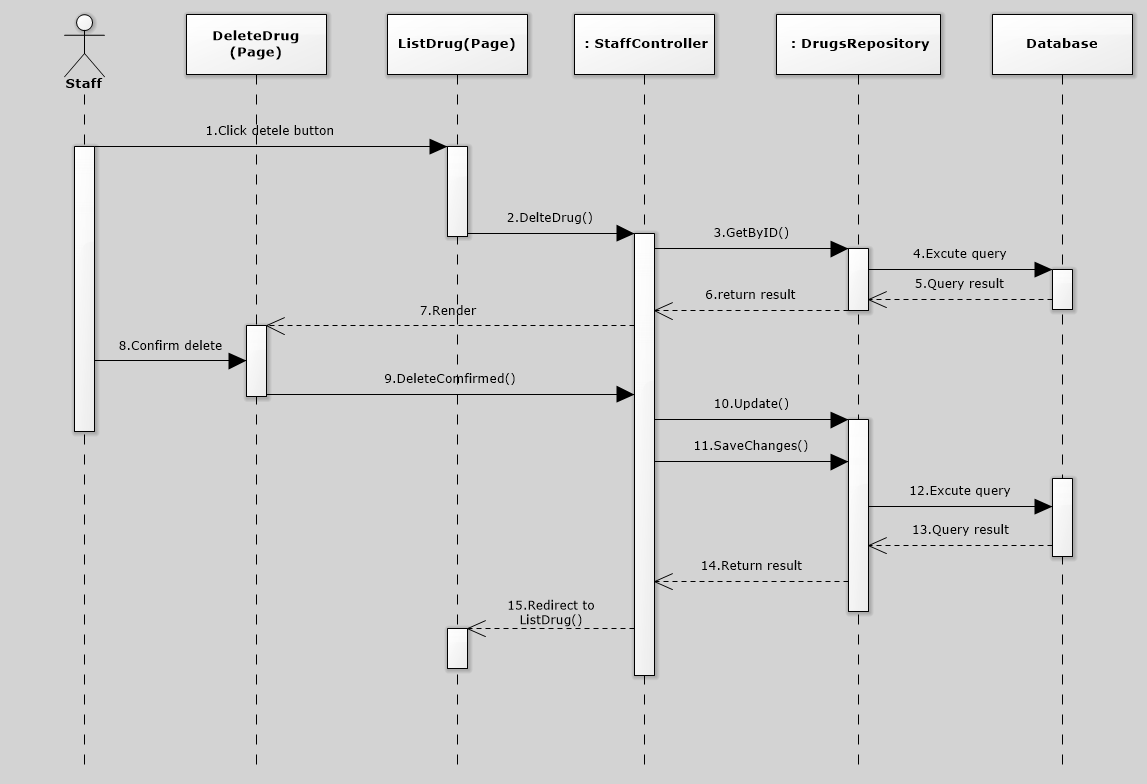
### <Staff> Add drug



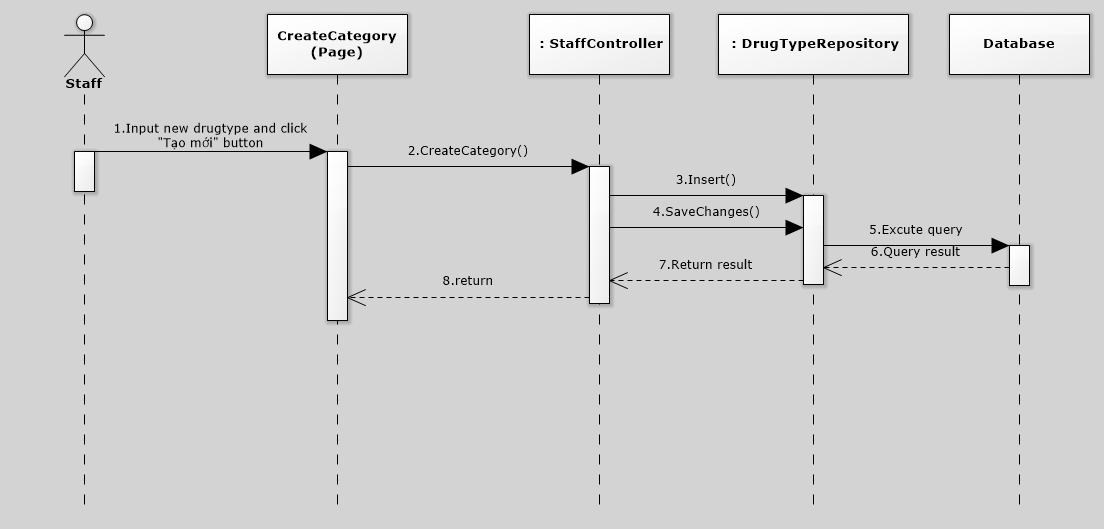
### <Staff> Edit drug



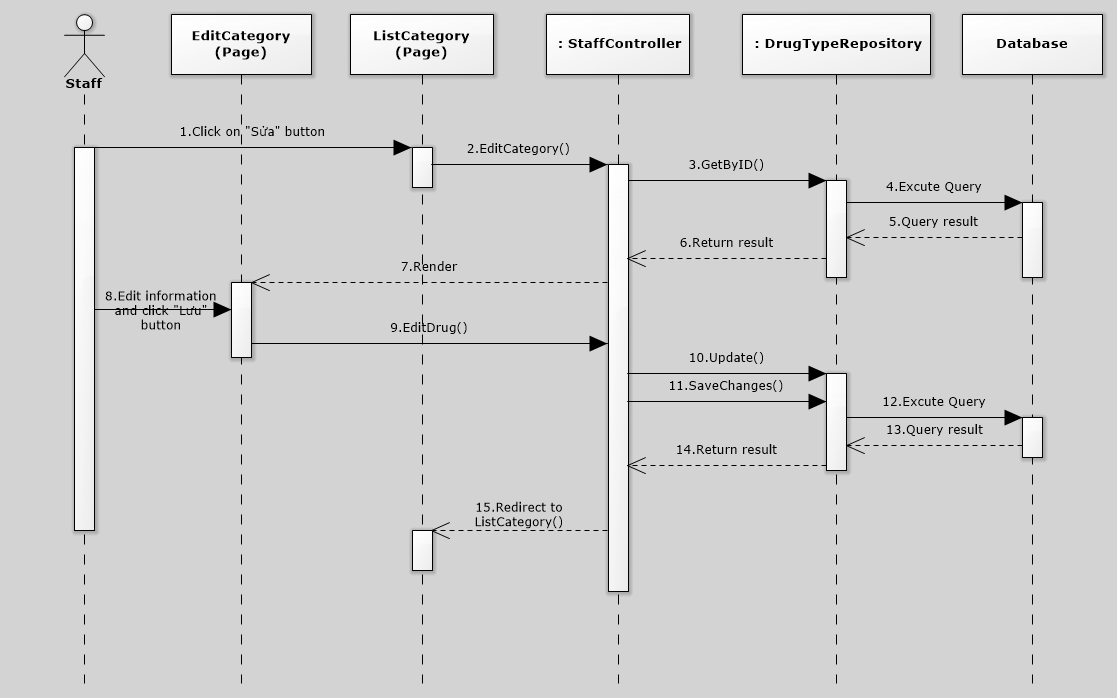
### < Staff > Delete drug



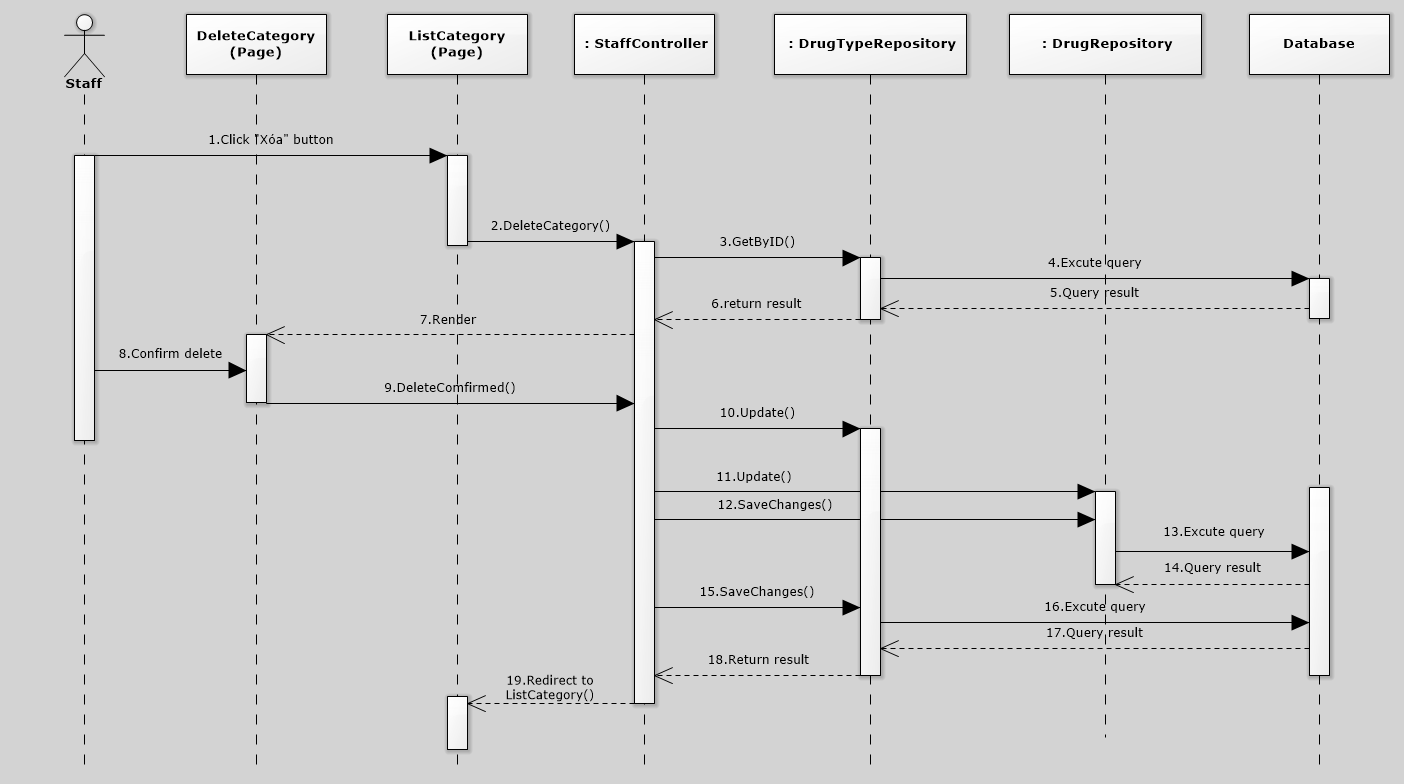
### <Staff> Add drug type



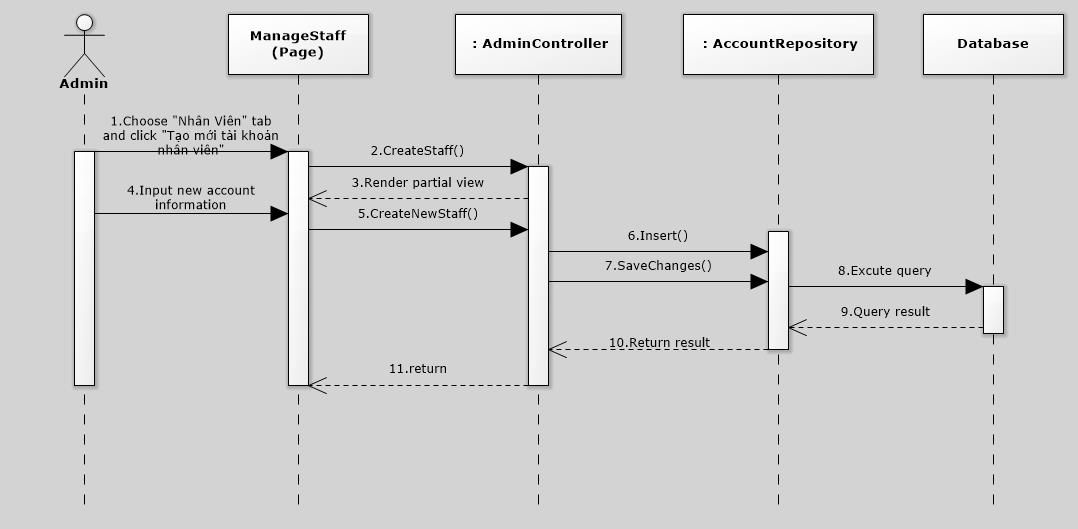
### <Staff> Edit drug type



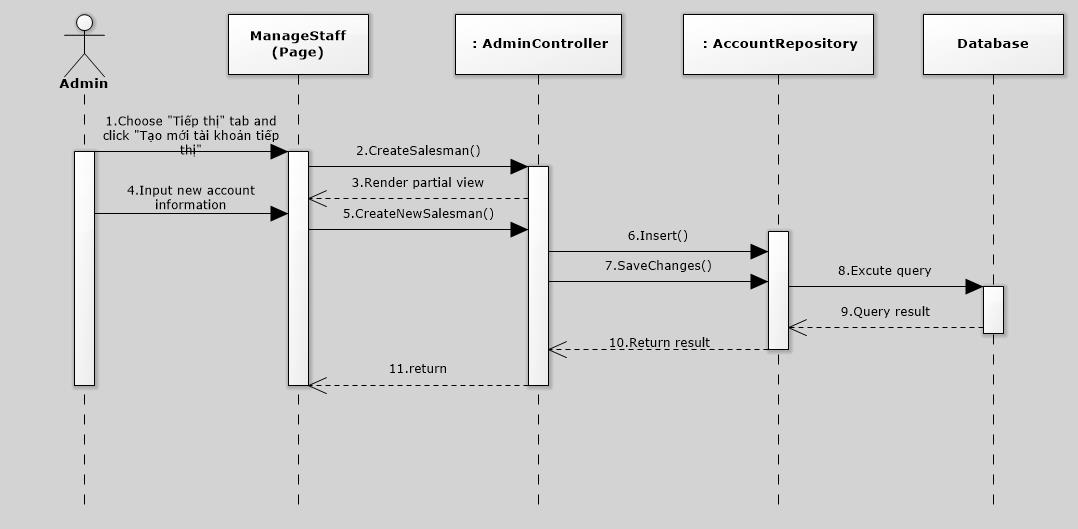
### <Staff> Delete drug type



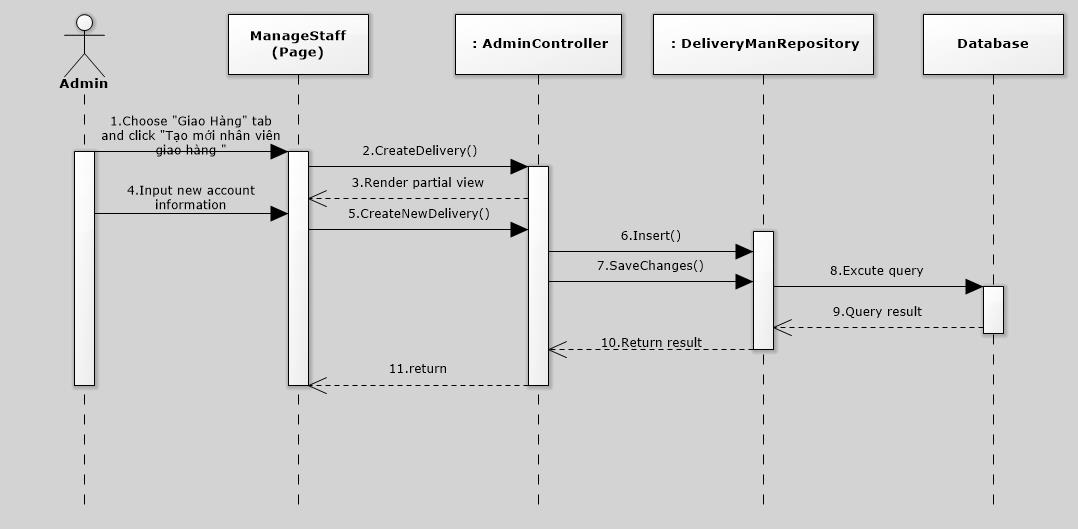
### <Admin> Create staff



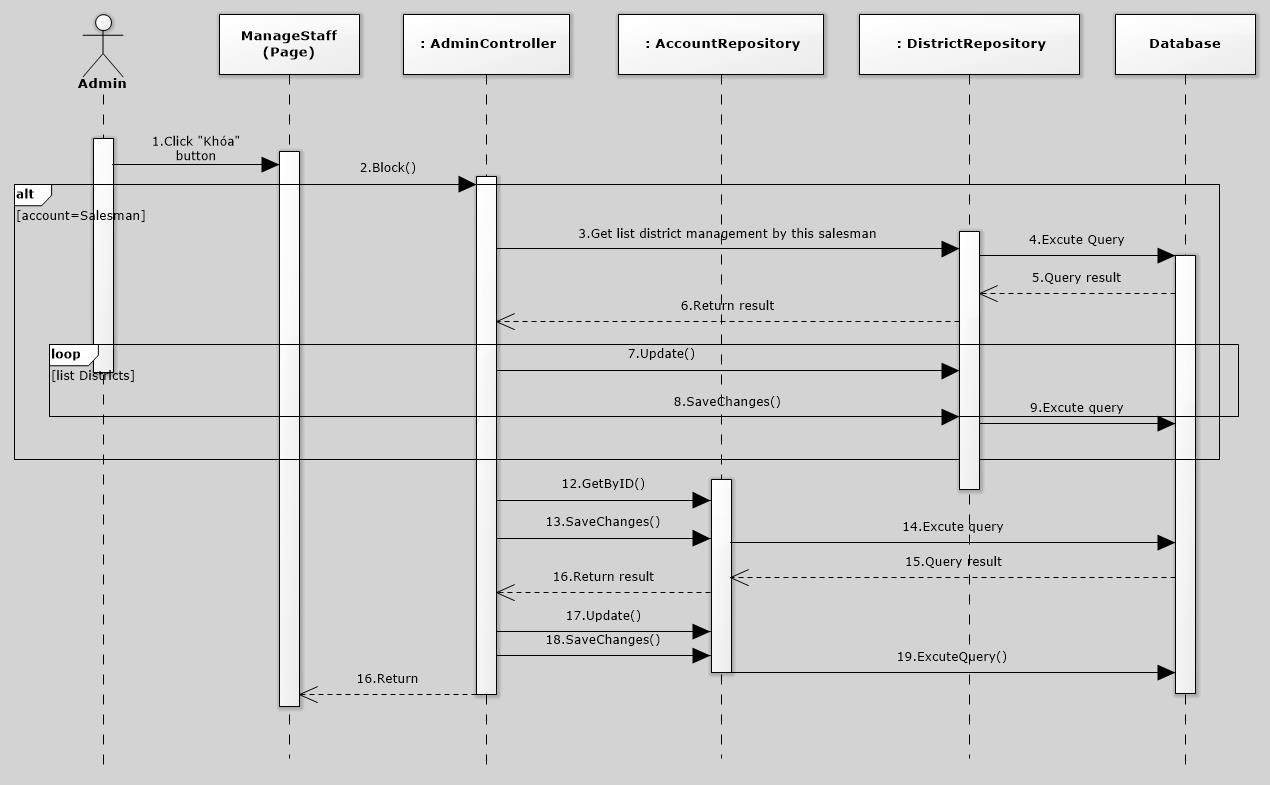
### <Admin> Create salesman



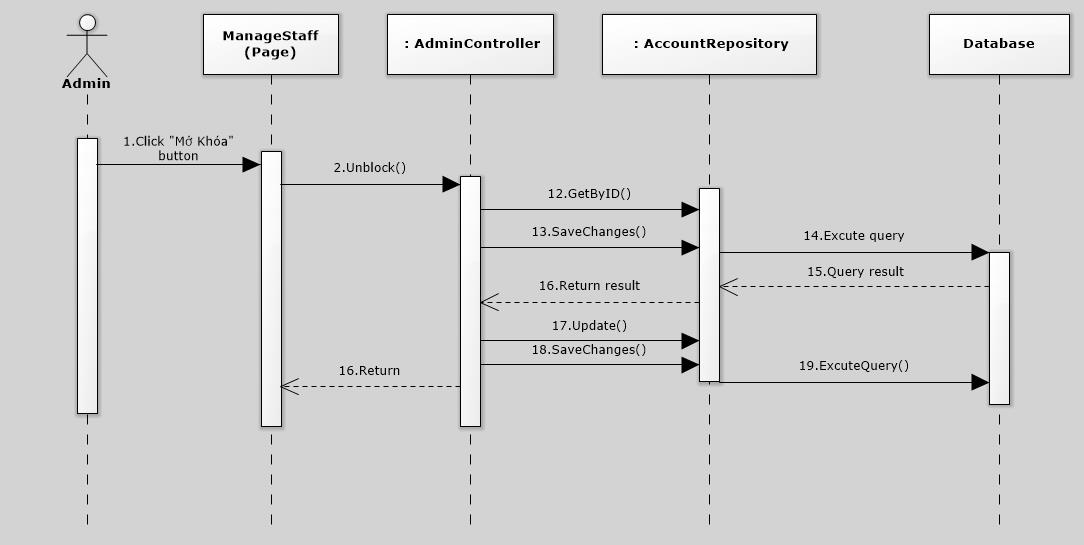
### <Admin> Create deliveryman



### <Admin> Deactivate account



### <Admin> Activate account



# Database Design

## Physical database design



The details of each relation are specified below

### Account

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Null** | **Default Value** | **P/F Key** | **Description** |
| AccountID | int |  | Auto generated | PK | Uniquely identifies of the account |
| Password | nvarchar(50) |  | - |  | Password of user |
| Username | nvarchar(50) |  | - |  | Username of user |
| RoleID | int |  | - | FK | Role of user in the system:customer, admin, salesman or staff |
| ProfileID | int |  | - | FK | Profile Id of user |
| IsPending | bit |  | - |  | Status of user |
| IsActive | bit |  | - |  | User is banned or not |

Unique: AccountID

Foreign key: RoleID, ProfileID

### AccountProfile

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Null** | **Default Value** | **P/F Key** | **Description** |
| ProfileID | int |  | Auto generated | PK | Uniquely identifies of the profile |
| Fullname | nvarchar(50) |  | - |  | Fullname of user registered to the system |
| Phone | nvarchar(50) |  | - |  | Phone of user registered to the system |
| Email | nvarchar(50) |  | - |  | Email of user registered to the system |
| Address | nvarchar(250) |  | - |  | Address of user registered to the system |
| Coordinate | nvarchar(500) |  | - |  | Coordiante of address. |

### DeliveryMan

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Null** | **Default Value** | **P/F Key** | **Description** |
| DeliveryManID | int |  | Auto generated | PK | Uniquely identifies of the DeliveryMan |
| Fullname | nvarchar(50) |  | - |  | Fullname of delivery man |
| Phone | nvarchar(50) |  | - |  | Phone of delivery man |
| Email | nvarchar(50) |  | - |  | Email delivery man |

Unique: DeliveryManID

Foreign key: N/A

### DeliverySchedule

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Null** | **Default Value** | **P/F Key** | **Description** |
| DeliveryScheduleID | int |  | Auto generated | PK | Uniquely identifies of the schedule |
| CreateDate | date |  | - |  | Date of create schedule |
| DueDate | date |  |  |  | Date of delivery product |
| DeliveryManID | int |  |  | FK | Deliveryman is assigned to delivery schedule |
| Status | int |  |  |  | Status of schedule |

Unique: DeliveryScheduleID.

Foreign key: DeliveryManID.

### DeliveryScheduleDetails

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Null** | **Default Value** | **P/F Key** | **Description** |
| DeliveryScheduleDetailsID | int |  | Auto generated | PK | Uniquely identifies a schedule details |
| DeliveryScheduleID | int |  | - | FK | Delivery details belong to delivery schedule |
| DrugOrderID | int |  |  | FK | Orders belong to delivery schedule. |

Unique: DeliveryScheduleDetailsID

Foreign key: DeliveryScheduleID, DrugOrderID

### DiscountRate

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Null** | **Default Value** | **P/F Key** | **Description** |
| DrugstoreTypeID | int |  | - | FK | Type of drugstore has different discount rate |
| DrugID | int |  | - | FK | Drug has price discount |
| Discount | float |  | - |  | Price discount of drug |

Unique: N/A.

Foreign key: DrugID, DrugstoreTypeID

### Drugorder

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Null** | **Default Value** | **P/F Key** | **Description** |
| DrugOrderID | int |  | Auto generated | PK | Uniquely identifies the drug order. |
| DrugstoreID | int |  |  | FK | Drugstore order delivery |
| Note | nvarchar(50) |  |  |  | Some more information for order |
| TotalPrice | float |  |  |  | Total price of order |
| DateOrder | datetime |  |  |  | Date that user order |
| IsActive | bit |  |  |  |  |
| Status | int |  |  |  | Status of order |

Unique: DrugOrderID

Foreign key: DrugstoreID

### DrugOrderDetails

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Null** | **Default Value** | **P/F Key** | **Description** |
| DrugOrderDetailsID | int |  | Auto generated | PK | Uniquely identifies the Drug order details |
| DrugOrderID | int |  |  | FK | Details is belong drug order |
| DrugID | int |  |  | FK | All of drug that user order |
| UnitID | int |  |  | FK | Type of drug( box, package) |
| Quantity | int |  |  |  | Quantity of drug |

Unique: DrugOrderDetailsID.

Foreign key: DrugOrderID, DrugID, UnitID

### Drugstore

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Null** | **Default Value** | **P/F Key** | **Description** |
| DrugstoreID | int |  | Auto generated | PK | Uniquely identifies an drugstore |
| DrugstoreName | nvarchar(100) |  |  |  | Name of drugstore |
| Address | nvarchar(100) |  |  |  | Address of drugstore |
| Coordinate | nvarchar(100) |  |  |  | Address location of drugstore |
| OwnerID | int | - |  | FK | The account owner of drugstore |
| DistrictID | int |  |  | FK | District which drugstore belong to |
| DrugstoreTypeID | int |  |  | FK | Type of drugstore |
| IsActive | bit |  |  |  | Check active drugstore |
| Debt | float |  |  |  | Debt of drugstore |

Unique: DrugstoreID.

Foreign key: OwnerID, DistrictID, DrugstoreTypeID

### DrugstoreType

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Null** | **Default Value** | **P/F Key** | **Description** |
| DrugstoreTypeID | int |  | Auto generated | PK | Uniquely identifies the drugstore type |
| DrugstoreTypeName | nvarchar(50) |  | - | FK | Name of drugstore type |

Unique: DrugstoreTypeID.

Foreign key: N/A.

### Drugtype

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Null** | **Default Value** | **P/F Key** | **Description** |
| DrugTypeID | int |  | Auto generated | PK | Uniquely identifies the drug type |
| DrugTypeName | nvarchar(50) |  |  | FK | Name of drug type |

Unique: DrugTypeID

Foreign key: N/A

### Payment

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Null** | **Default Value** | **P/F Key** | **Description** |
| PaymentID | int |  | Auto generated | PK | Uniquely identifies the payment |
| DrugstoreID | int |  |  | FK | Payment belong to this drugstore |
| PaymentType | bit |  |  |  | Check drugstore paid or loan |
| Amount | float |  |  |  | Amount of payment |
| Balance | float |  |  |  | Price after paid or loan |
| Date | datetime |  |  |  | Date of payment |

Unique: PaymentID.

Foreign key: DrugstoreID.

### UnitPrice

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Null** | **Default Value** | **P/F Key** | **Description** |
| DrugID | int |  | - | PK | The ID of drug |
| UnitID | int |  | - | The ID of Unit |
| UnitPrice | float |  | - |  | Price of unit |

Unique: DrugID, UnitID

Foreign key: N/A

### Role

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Null** | **Default Value** | **P/F Key** | **Description** |
| RoleID | int |  | Auto generated | PK | Uniquely identifies the role |
| RoleName | int |  | - |  | The name of role(admin, drugstoreuser, staff, salesman) |

Unique: N/A.

Foreign key: N/A.

### Unit

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Null** | **Default Value** | **P/F Key** | **Description** |
| UnitID | int |  | Auto generated | PK | Uniquely identifies the unit |
| UnitName | Int |  | - |  | Name of unit |

Unique: UnitID.

Foreign key: N/A

### City

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Null** | **Default Value** | **P/F Key** | **Description** |
| CityID | int |  | Auto generated | PK | Uniquely identifies the unit |
| CityName | string |  | - |  | Name of city |

Unique: CityID.

Foreign key: N/A

### District

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Null** | **Default Value** | **P/F Key** | **Description** |
| DistrictID | int |  | Auto generated | PK | Uniquely identifies the unit |
| DisctricName | string |  | - |  | Name of disctrict |
| CityID | Int |  | - |  | ID of city belong to |
| SalesmanID | int |  | - |  | ID of account managed |
|  |  |  |  |  |  |

Unique: DistrictID.

Foreign key: CityID, SalesmanID

# Algorithms

### Nearest neighbor algorithms:

#### Definition

The **nearest neighbour algorithm** was one of the first [algorithms](http://en.wikipedia.org/wiki/Algorithm) used to determine a solution to the [travelling salesman problem](http://en.wikipedia.org/wiki/Travelling_salesman_problem). In it, the salesman starts at a random city and repeatedly visits the nearest city until all have been visited. It quickly yields a short tour, but usually not the optimal one.

Reference: <http://en.wikipedia.org/wiki/Nearest_neighbour_algorithm>

#### Flowchart

