

Chapter Two

2.1 High Level Sequence Diagram

A high-level sequence diagram is a critical tool in system design and architecture. It visually represents the interactions between different entities or components in a system. For a pharmacy Management System, this diagram serves as a blueprint illustrating how administrator and pharmacist interact and communicate with each other.

Importance of Sequence Diagrams

Sequence diagrams offer several benefits:

Clarity: They provide a clear visualization of the system's behavior and flow of operations.

Communication: They facilitate better communication among stakeholders by presenting complex interactions in an easily understandable format.

Analysis helps spot slowdowns, inefficient areas, or parts that need improvement in the system design.

2.2 Components of High-level Sequence Diagram

Sequence diagram consists

Actors: Entities that interact with the system, such as, admin and Pharmacist.

Objects: Instances of classes or components within the system, like, medicine management system, sell system registration system.

Lifelines: Vertical lines representing the timeline or existence of an actor or object during the interaction.

Messages: Arrows indicating the flow of communication or method calls between actors and objects.

Activations: Rectangular boxes showing the duration of a method call or process

Actors in the pharmacy management system

1. Administrator

- **Role:** Oversees the entire Pharmacy Management System, ensuring it functions smoothly.
- **Responsibilities:**
 - **System Management:** Configures and maintains system settings and updates.
 - **User Management:** Adds, removes, and assigns roles to pharmacists.

- **Data Management:** Ensures data accuracy, security, and handles backup procedures.
- **Interactions:**
 - Adds or removes pharmacists and assigns roles.
 - Monitors system logs and user activity (e.g., who sold medicine, who updated stock).
 - Views weekly reports (sold, expired, stock levels).
 - Reviews stock alerts and ensures critical inventory is managed.
 - Manages expired medicines and ensures proper disposal or removal.

2. Pharmacist

Role: Frontline staff responsible for daily pharmacy operations.

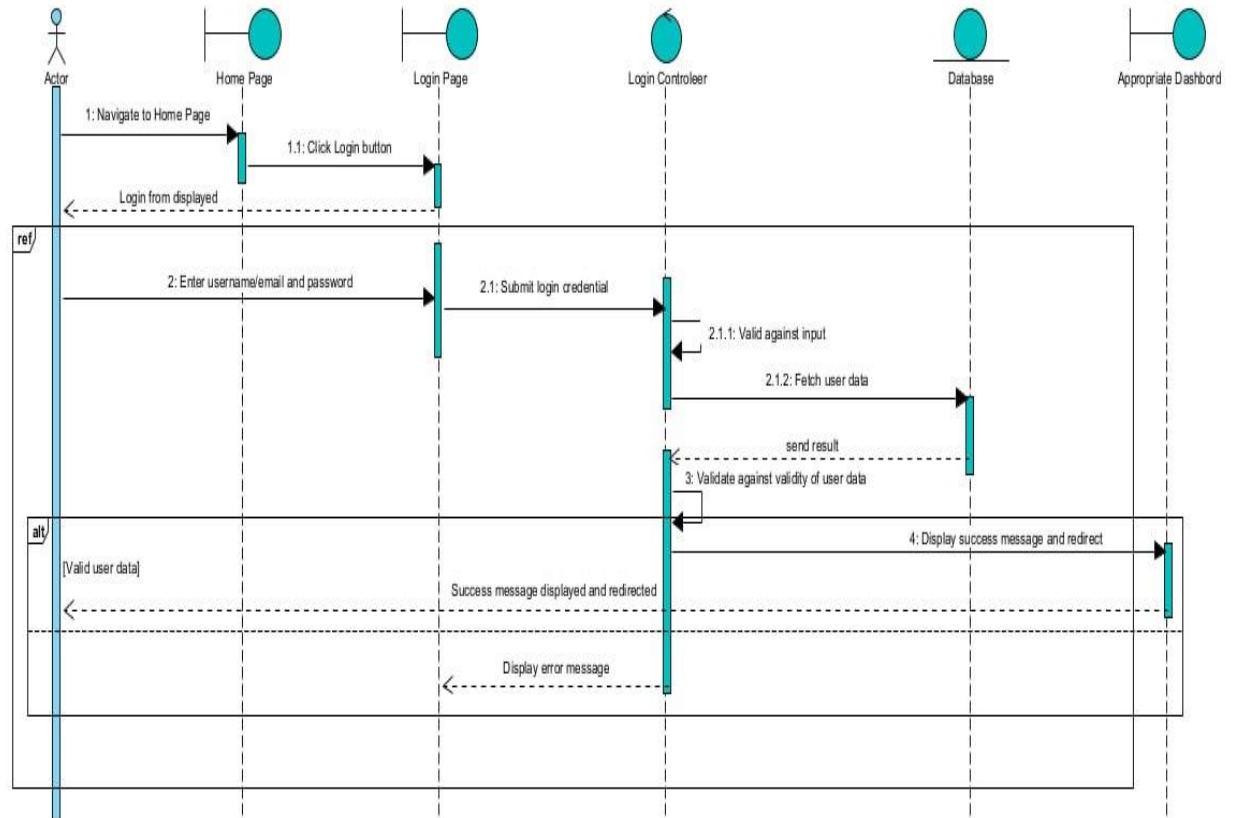
Responsibilities:

- **Medicine Management:** Add, update, and delete medicines from inventory.
- **Inventory Tracking:** Monitor current stock levels and receive stock alerts.
- **Sales Processing:** Sell medicine, ensuring accurate deduction from stock.
- **Reporting:** Generate and view sales reports and weekly summaries.

Interactions:

- Registers new medicines into the system.
- Processes sales: selects medicine, confirms quantity, and completes sale.
- Views medicine details by name, category, or availability.
- Monitors inventory and updates.
- Generates reports (weekly sold, expired, stock level).
- Receives automated alerts for low stock or nearing expiry.

2.3 Example of High Level Sequence



1. Login Sequence Diagram Description

This sequence diagram describes the step-by-step flow of how a user logs into the Pharmacy Management System. It demonstrates how user credentials are validated and how users are redirected based on role after successful authentication.

Actors Involved:

- **Actor (User):** Initiates the login process.
- **Home Page:** Interface to navigate to the login page.
- **Login Page:** Accepts user credentials.
- **Login Controller:** Handles validation and data verification.
- **Database:** Stores user information.
- **Appropriate Dashboard:** Redirects to user-specific dashboard (Admin, Pharmacist, etc.).

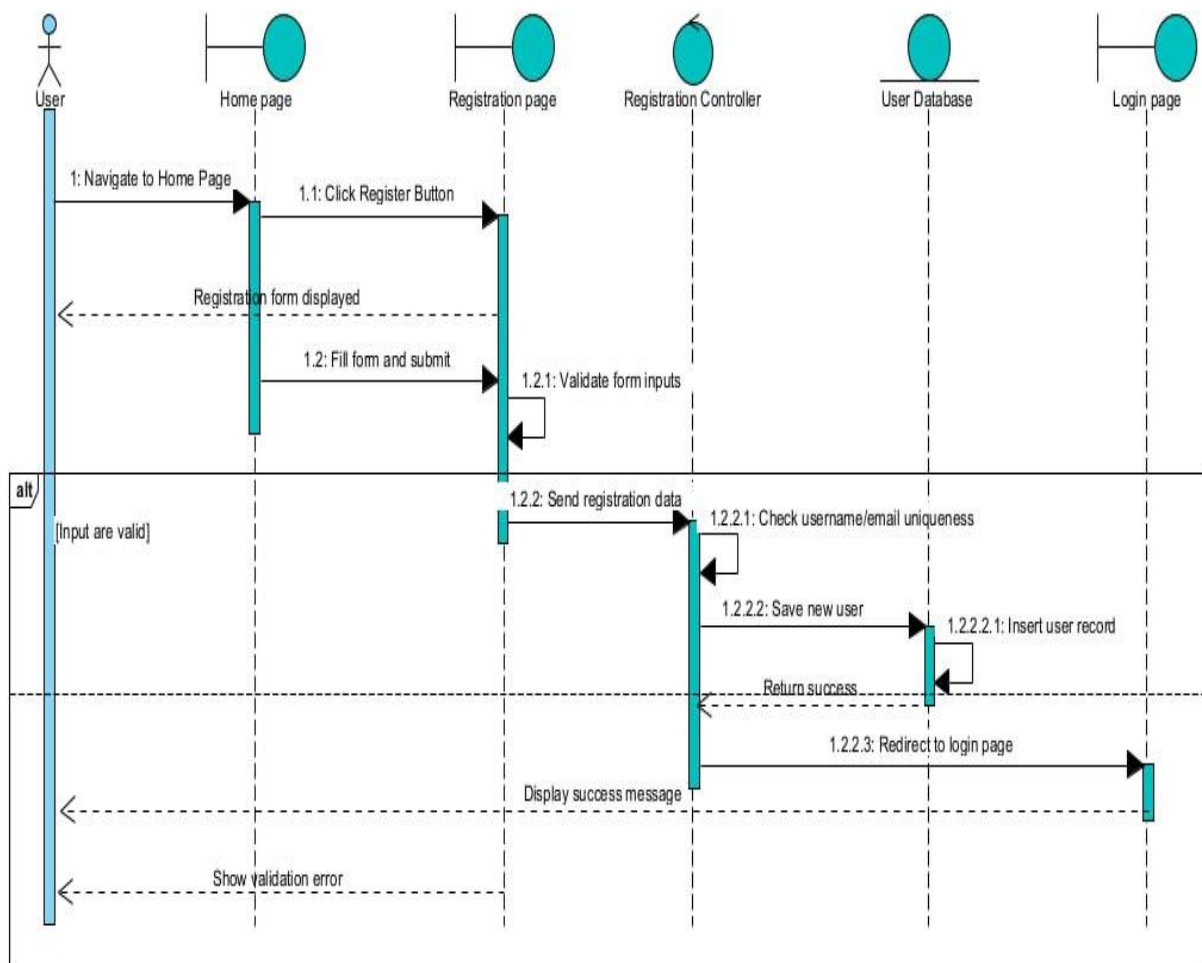
Sequence Flow:

1. The user navigates to the home page.

2. The user clicks on the login button, and the login form is displayed.
3. The user enters their username/email and password.
4. The login page submits the credentials to the login controller.
5. The controller performs:
 - Input validation.
 - Fetches user data from the database.
 - Validates credentials against database records.
6. Based on the result:
 - If valid, a success message is shown and the user is redirected to their appropriate dashboard.
 - If invalid, an error message is displayed.

Alternative Flow:

- If the credentials are invalid, the system informs the user with an error message instead of proceeding to the dashboard.



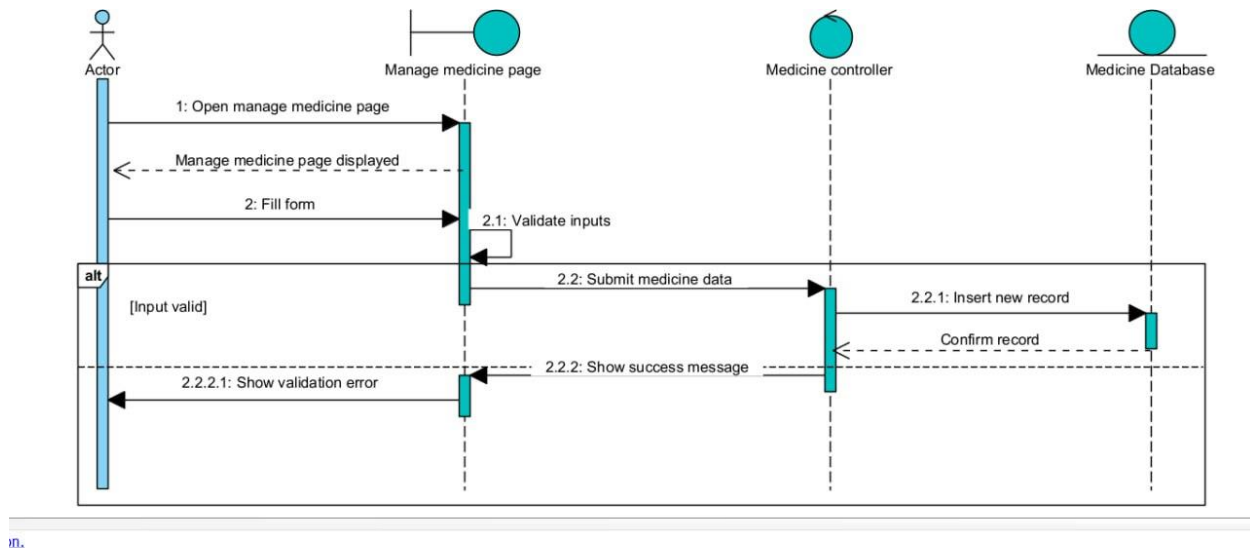
Pharmacist Registration Sequence Diagram

This diagram outlines the process for a new Pharmacist to register in the system. The actors and systems involved are:

- **Admin:** The Administration attempting to create a new Pharmacist account.
- **Home page:** The initial page of the application.
- **Registration page:** The page containing the registration form.
- **Registration Controller:** A component responsible for handling registration logic.
- **User Database:** The database storing user account information.
- **Login page:** The page where users can log in after registration.

The steps are as follows:

1. The Admin navigates to the Home page.
2. The Admin clicks the "Register" button on the Home page, which displays the Registration page.
3. The Admin fills in the registration form and submits it.
4. The Registration page sends the form inputs to the Registration Controller.
5. The Registration Controller validates the form inputs.
6. [Alternative path: Input are valid]
 - The Registration Controller sends the registration data to the User Database.
 - The User Database checks if the username/email is unique.
 - The User Database saves the new user record by inserting a record.
 - The User Database returns a success message to the Registration Controller.
7. **[Alternative path: Input are invalid]**
 - The Registration Controller sends a validation error message back to the Registration page, which is then shown to the Admin



Manage Medicines Sequence Diagram

This sequence diagram illustrates the process of managing medicines in the Pharmacy Management System. It covers how a user accesses the manage medicine page, enters medicine details, and how the system validates and stores the data.

Actors Involved:

- **Actor (User):** Initiates the medicine management process by interacting with the system.
- **Manage Medicine Page:** Interface where the user inputs medicine data.
- **Medicine Controller:** Handles form submission and communicates with the database.
- **Medicine Database:** Stores the medicine records.

Sequence Flow:

1. The Actor opens the Manage Medicine Page.
2. The system displays the Manage Medicine Page to the Actor.
3. The Actor fills the medicine form.
4. The Manage Medicine Page validates the inputs.

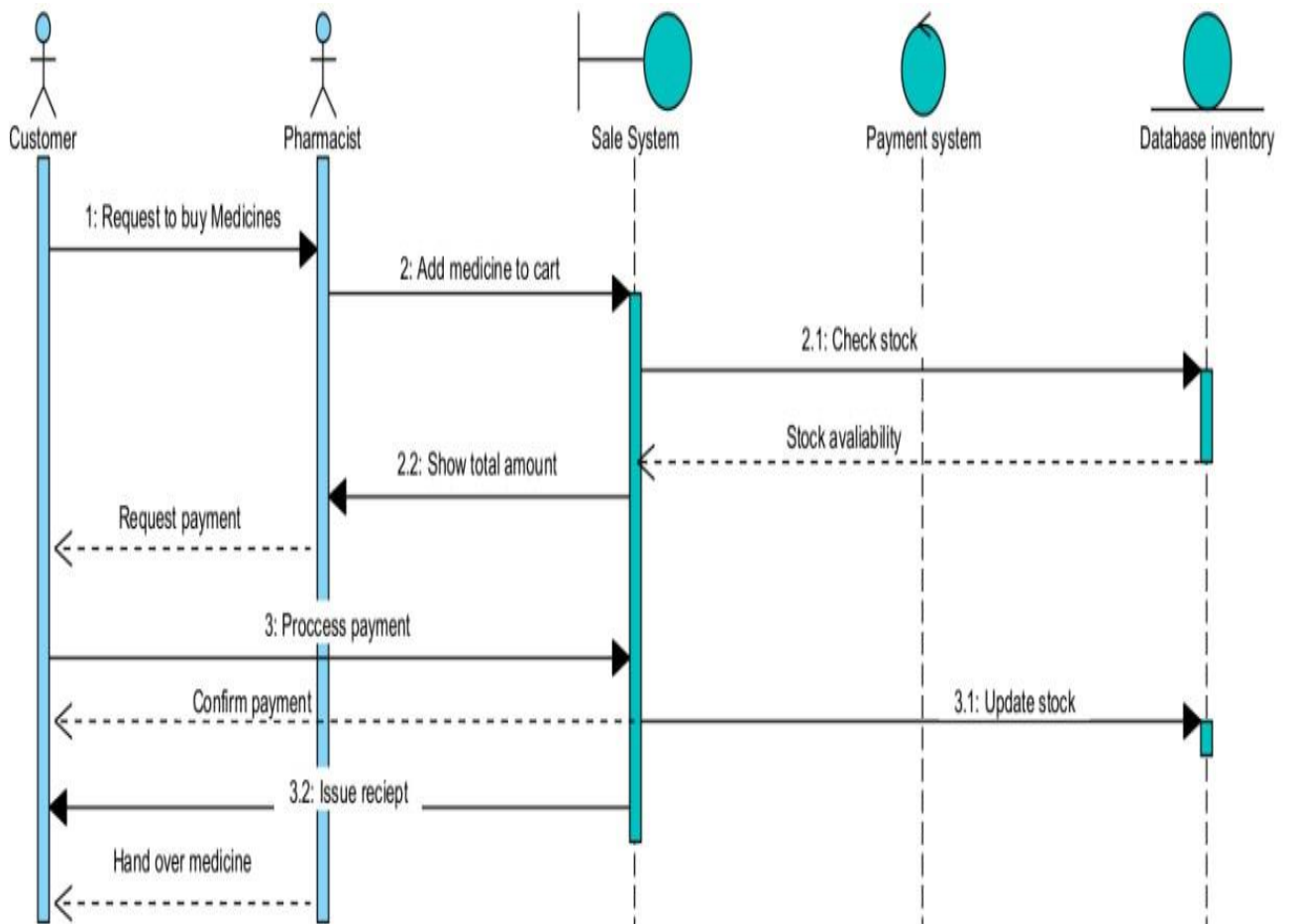
Alternative Flow:

- If the input is valid:

1. The Manage Medicine Page submits the medicine data to the Medicine Controller.
2. . The Medicine Controller inserts the new record into the Medicine Database
3. The Medicine Database confirms the insertion.
4. The Medicine Controller shows a success message to the Actor.

If the input is invalid:

The system displays a validation error to the Actor.



Sell Medicine Sequence Diagram

This sequence diagram illustrates the step-by-step process of managing a medicine purchase in the Pharmacy Management System. It demonstrates how a customer's purchase request is handled, including stock verification, payment processing, and inventory updates.

Actors Involved:

- **Customer:** Initiates the purchase request and completes payment.
- **Pharmacist:** Manages the cart, calculates totals, issues receipts, and hands over medicines.
- **Sale System:** Verifies stock, processes payments, and updates inventory.
- **Database Inventory:** Stores real-time stock data.

Sequence Flow:

1. **Customer** requests to purchase medicines.
2. **Pharmacist** adds the selected medicines to the cart.
3. **Sale System** checks stock availability in the Database Inventory:
 - If stock is available, proceed.
 - If unavailable, notify the Pharmacist/Customer (see *Alternative Flow*).
4. **Pharmacist** displays the total amount to the Customer.
5. **Customer** initiates payment.
6. **Sale System** processes the payment
7. **Sale System** updates the stock in the Database Inventory post-payment.
8. **Pharmacist** issues a receipt to the Customer.
9. **Pharmacist** confirms payment success and hands over the medicines.

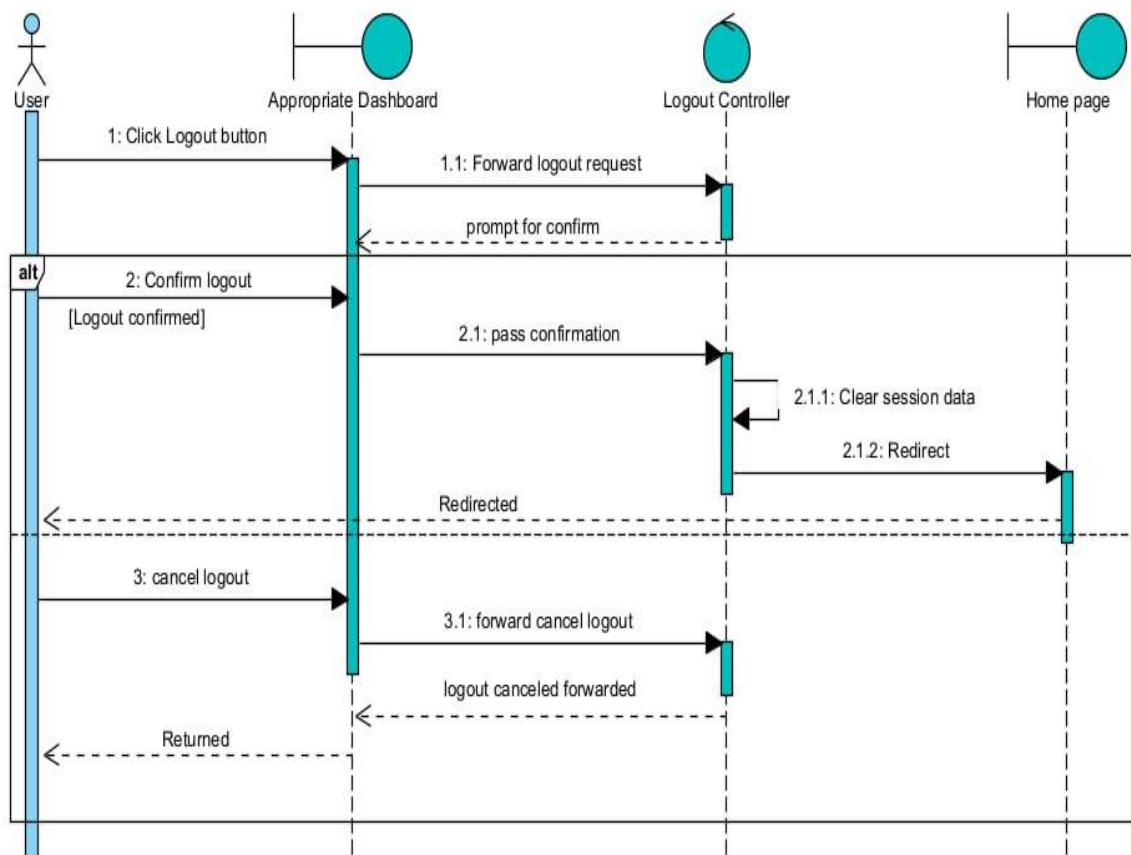
Alternative Flow:

- **Stock Unavailable**

- The Sale System alerts the Pharmacist about insufficient stock.
- Pharmacist informs the Customer, and the payments canceled.

- **Payment Failure**

- The Sale System notifies the Customer to retry or use an alternative payment method.
- If payment retries fail, the transaction is terminated, and stock remains unchanged



Logout Sequence Diagram

This diagram details the process of a user logging out of the system. The involved components are:

- **User:** The logged-in individual wishing to log out.
- **Appropriate Dashboard:** The user's currently viewed dashboard or main application area.

- **Logout Controller:** A component responsible for handling the logout process.
- **Home page:** The page the user is redirected to after logging out.

The sequence of events is as follows:

1. The User clicks the "Logout" button on the Appropriate Dashboard.
2. The Appropriate Dashboard forwards the logout request to the Logout Controller and may prompt the user for confirmation.
3. **[Alternative path: Logout confirmed]**
 - The User confirms the logout.
 - The Appropriate Dashboard passes the confirmation to the Logout Controller.
 - The Logout Controller clears the user's session data.
 - The Logout Controller redirects the User to the Home page.
4. **[Alternative path: Cancel logout]**
 - The User cancels the logout.
 - The Appropriate Dashboard forwards the cancel logout request to the Logout Controller.
 - The Logout Controller acknowledges the cancellation, and the user is returned to the Appropriate Dashboard.

2.4 Tools and Steps to Draw High-Level Sequence Diagram using Visual Paradigm

Step 1: Open Visual Paradigm and Create a New Project

- Launch Visual Paradigm.
- Create a new project or open an existing one where you want to create the sequence diagram.

Step 2: Access Sequence Diagram Tool

- In the Project Explorer or Toolbar, locate and click on "Diagram" or "New Diagram".
- Choose "Sequence Diagram" from the list of available diagram types.

Step 3: Define Actors and Objects

Drag and drop "Actor" shapes to represent key users such as Pharmacist; and Admin,.

- Drag and drop "Object" shapes to represent system components like Inventory System, Sales Module, medicine Management, and Stock Alert System.

Step 4: Add Lifelines

- Connect each actor and object with a lifeline, representing the timeline of their interaction.
- Right-click on the actor or object and choose "Add Lifeline", or simply drag a lifeline from the actor/object into the diagram.

Step 5: Add Messages and Interactions

- Use message arrows to show interactions (method calls, data exchanges) between actors and objects.
- Click on the lifeline of an actor/object to add messages such as:
 - "check stock availability "
 - " Receive Stock Alerts "
 - "Generate sale report"

Step 6: Add Activation Bars (Optional)

- To represent the duration of an operation, add activation bars.
- Drag and extend a bar from the lifeline to show how long the operation takes during the interaction.

Step 7: Add Comments and Notes (Optional)

- Use comments or notes to clarify interactions, explain system logic, or highlight business rules.
- Right-click on the diagram and choose "Note" or "Comment" to insert these explanations.

Step 8: Review and Validate

- Carefully review the sequence diagram to ensure it accurately captures all necessary interactions and logic.
- Use Visual Paradigm's validation features to check for any errors, inconsistencies, or missing elements.