Lab Experiment 10: Behavioral View Diagram - Collaboration Diagram

Objective

To develop the Collaboration Diagram for the **Inventory Management System** based on the behavioral interactions of objects. This diagram represents object relationships and message flows that facilitate system processes.

Introduction

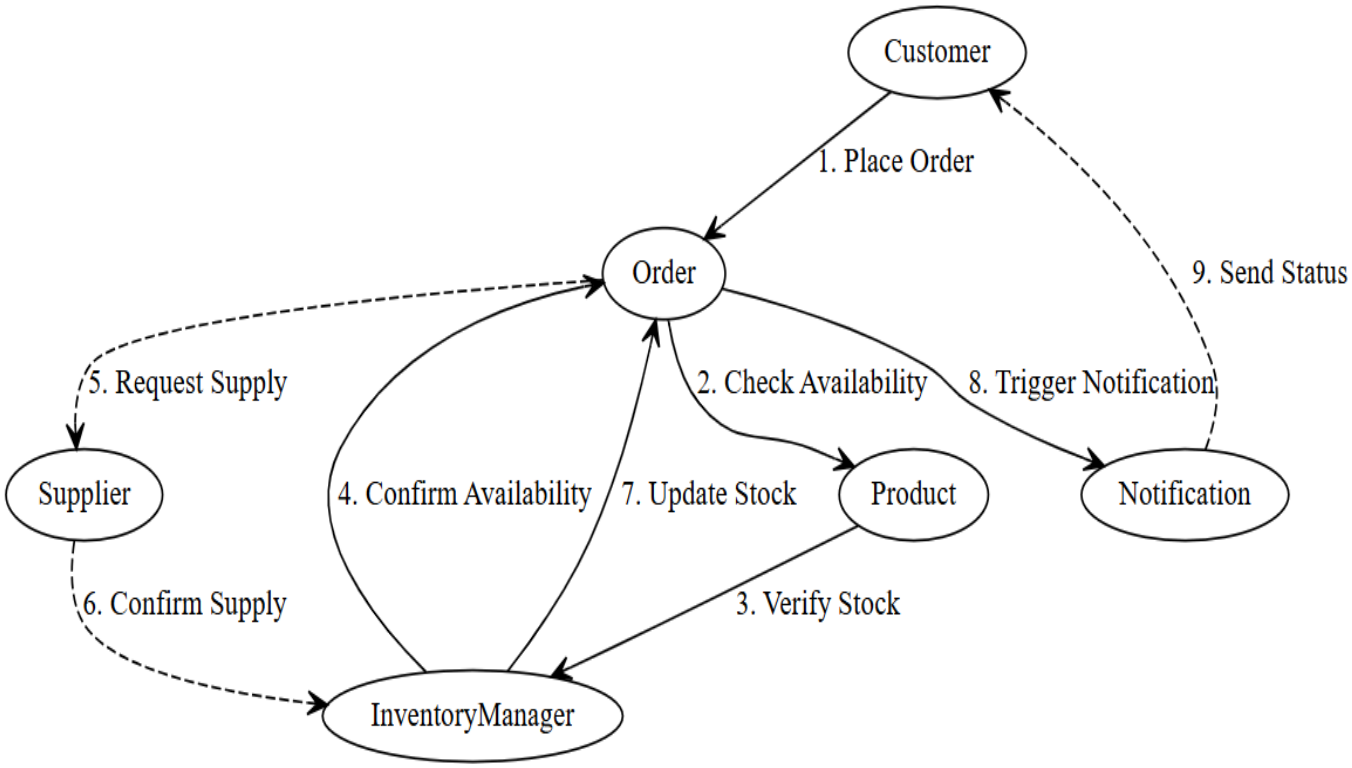
A **Collaboration Diagram (Communication Diagram)** is a behavioral UML diagram that visualizes how objects interact during a process. Unlike Sequence Diagrams that focus on the chronological order of interactions, Collaboration Diagrams emphasize object relationships and message exchanges.

The **Inventory Management System** involves key objects such as **Customer, Order, Product, InventoryManager, Supplier, and Notification.** These objects exchange messages based on system functionality, ensuring inventory tracking and order processing.

Collaboration Diagram of Inventory Management System

Objects Involved:

1. **Customer:** Initiates the order process.
2. **Order:** Handles order requests and status updates.
3. **Product:** Manages product details and availability.
4. **InventoryManager:** Verifies stock levels and manages inventory.
5. **Supplier:** Supplies products when requested.
6. **Notification:** Sends order status updates to the customer.



Message Flow:

1. **Customer → Order:** Place an order request.
2. **Order → Product:** Check product availability.
3. **Product → InventoryManager:** Verify stock levels.
4. **InventoryManager → Order:** Confirm availability.
5. **Order → Supplier:** Request product supply (if out of stock).
6. **Supplier → InventoryManager:** Supply confirmation.
7. **InventoryManager → Order:** Update stock status.
8. **Order → Notification:** Trigger order confirmation.
9. **Notification → Customer:** Send order status update.

Results and Observations

- The **Collaboration Diagram** successfully represents the interactions among objects in the **Inventory Management System**.
- The **Graphviz-based implementation** clearly visualizes object associations and message exchanges.
- The **numbered sequence of messages** provides an intuitive understanding of system behavior.
- **Synchronous and asynchronous interactions** are distinguished using **solid and dashed arrows**.

Conclusion

The Collaboration Diagram effectively captures **object communication and system interactions** in the **Inventory Management System**. This diagram provides clarity on functional dependencies and helps in **software design, debugging, and enhancement**.
