

# Lab Experiment: Behavioral View Diagram - Statechart Diagram

**Course:** Software Engineering & Project Management

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## Objective

To develop the **Statechart Diagram** for the **Inventory Management System** to represent the dynamic behavior of objects by defining states and transitions.

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## Introduction

A **Statechart Diagram** (State Machine Diagram) is a UML behavioral diagram that represents the states an object can be in and the transitions between those states. This diagram is useful for modeling the **lifecycle of an order in an Inventory Management System**, ensuring smooth workflow visualization.

The **Inventory Management System** primarily focuses on the **Order Processing Flow**, where an order moves through various states, triggered by system interactions.

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## Statechart Diagram of Inventory Management System

### States Involved:

1. **Order Created:** The order is placed by the customer.
2. **Order Processing:** The system validates the order and checks inventory.
3. **Stock Verified:** InventoryManager confirms stock availability.
4. **Awaiting Supplier (If Out of Stock):** The order is placed with the supplier.
5. **Order Approved:** The order is ready for dispatch.
6. **Order Shipped:** The order is dispatched to the customer.

7. **Order Delivered:** The order reaches the customer.
8. **Order Canceled:** The order is canceled (if stock is unavailable or by user request).

#### Transitions Between States:

1. **Customer places an order → Order Created**
  2. **System verifies stock → Order Processing**
  3. **Stock available → Stock Verified → Order Approved**
  4. **Stock unavailable → Awaiting Supplier → Stock Verified**
  5. **Order ready for shipping → Order Shipped**
  6. **Shipment delivered → Order Delivered**
  7. **User cancels order → Order Canceled**
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#### Results and Observations

- The **Statechart Diagram** successfully represents the **order lifecycle** in the **Inventory Management System**.
  - The **Graphviz-based implementation** clearly visualizes **states and transitions**.
  - The **dashed arrow for order cancellation** differentiates optional transitions.
  - The **double-circle notation for 'Order Canceled' state** signifies the final terminating state.
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#### Conclusion

The **Statechart Diagram** effectively captures the **state changes and transitions** of an **order in the Inventory Management System**. It helps developers understand the **workflow, conditions, and decision-making processes** within the system.

