

Smart Supply Chain Management System - Implementation Rubric

OOP Features Implementation Summary

OOP Feature	Requirement	Implementation Count	Implementation Details
I. Overloaded Methods	Minimum 2	10+	<ul style="list-style-type: none">- <code>User.login(String)</code> and <code>User.login(String, String)</code>- <code>Inventory.addStock(Product, int)</code> and <code>Inventory.addStock(Object...)</code>- <code>NotificationService.sendLowStockAlert()</code> (3 versions)- <code>ReportGenerator.generateInventoryReport()</code> methods- <code>Admin.generateSystemReport()</code> methods- <code>Supplier.updateProductPrice()</code> methods- <code>WarehouseManager.allocateSpace()</code> methods
II. Overloaded Constructors	Minimum 2	8+	<ul style="list-style-type: none">- <code>User</code> class (4 constructors)- <code>Product</code> class (4 constructors)- <code>Order</code> class (4 constructors)- <code>Inventory</code> class (2 constructors)- <code>Admin</code>, <code>Supplier</code>, <code>WarehouseManager</code>, <code>Retailer</code> classes (4+ constructors each)
III. Vararg Overloading	Minimum 2	6+	<ul style="list-style-type: none">- <code>User</code> constructor with varargs for contact methods- <code>NotificationService.sendLowStockAlert(Object...)</code>- <code>Supplier.updateProductPrices(Object...)</code>- <code>Order</code> constructor with varargs- <code>Product</code> constructor with varargs for attributes- <code>FileHandler.deleteFiles(String...)</code>
IV. Nested Classes	At least 1	3	<ul style="list-style-type: none">- <code>User.UserSession</code> (static inner class for session tracking)- <code>Product.Dimensions</code> (static nested class)- <code>Analytics.AdvancedAnalytics</code> (nested interface)
V. Abstract Class	Minimum 1	1	<ul style="list-style-type: none">- <code>User</code> abstract class with abstract <code>hasPermission()</code> method
VI. Interface	Minimum 1	2	<ul style="list-style-type: none">- <code>Analytics</code> interface- <code>Analytics.AdvancedAnalytics</code> nested interface
VII. Hierarchical Inheritance	At least 1	1	<ul style="list-style-type: none">- <code>User</code> → <code>Admin</code>, <code>Supplier</code>, <code>WarehouseManager</code>, <code>Retailer</code>
VIII. Multiple Inheritance	At least 1	1	<ul style="list-style-type: none">- <code>AnalyticsImpl</code> implements both <code>Analytics</code> and <code>AdvancedAnalytics</code> interfaces
IX. Wrappers	Required	Many	<ul style="list-style-type: none">- Used throughout: <code>Integer</code>, <code>Double</code>, <code>Boolean</code> objects- Autoboxing/unboxing with collections and maps- Wrapper utility methods
X. Package	Required	4	<ul style="list-style-type: none">- <code>com.smartsupply.model</code>- <code>com.smartsupply.service</code>- <code>com.smartsupply.util</code>- <code>com.smartsupply.exception</code>
XI. Exception Handling	At least 2 cases	3+	<ul style="list-style-type: none">- Custom <code>AuthenticationException</code> for login/user management errors- Custom <code>InventoryException</code> for inventory operations- Try-catch blocks for file operations- Input validation with exception handling
XII. I/O Operations	At least 1 from each	Multiple	<ul style="list-style-type: none">- File Handling: <code>FileHandler</code> methods for reading/writing files- Scanner: User input handling in <code>SupplyChainManagementSystem</code>

Additional Features Implemented

- Enum types for `Role` and `OrderStatus`
- Service-oriented architecture

- Utility classes for common operations
- Main application with interactive console interface
- Comprehensive error handling
- In-memory data persistence (with serialization capability)
- Report generation and export

Class Organization

The system consists of the following major classes:

Model Classes

- User (abstract)
 - Admin
 - Supplier
 - WarehouseManager
 - Retailer
- Product
- Inventory
- Order
- Role (enum)
- OrderStatus (enum)

Service Classes

- Authentication
- NotificationService
- Analytics (interface)
- AnalyticsImpl

Utility Classes

- FileHandler
- BarcodeScanner
- ReportGenerator

Exception Classes

- AuthenticationException
- InventoryException

Main Application

- SupplyChainManagementSystem