***ShopFlow*  
Mall Sales and Inventory Management Software**

**Project Overview**

**Objective:** To develop a comprehensive system that allows malls to efficiently manage their sales and inventory, providing real-time insights and seamless operations.

**Technology Stack:**

* **Programming Language:** Java
* **Framework:** Spring Boot
* **Database:** MySQL/PostgreSQL
* **Build Tool:** Maven/Gradle
* **Version Control:** Git (GitHub/GitLab)
* **API Documentation:** Swagger/OpenAPI
* **UI Framework (Optional):** Thymeleaf

**Development Methodology:** Agile Software Development Life Cycle (Agile SDLC)

**1. Initiation Phase**

**Vision**

Provide malls with an intuitive system that integrates sales tracking and inventory management, offering real-time reporting and analytics to enhance decision-making.

**Stakeholders**

* Mall managers
* Sales staff
* Vendors

**Product Backlog**

* **User Stories:**
  1. *As a manager, I want to add new products to the system so that I can track their inventory.*
  2. *As a cashier, I want to record sales easily so that the inventory updates automatically.*
  3. *As a manager, I want to view detailed reports of sales and stock levels so that I can make informed decisions.*

**2. Planning Phase**

**Development Environment Setup**

* **IDE:** IntelliJ IDEA or Eclipse
* **Database:** MySQL/PostgreSQL
* **Dependencies:** Spring Boot (Web, JPA, Security), Lombok
* **Tools:** Swagger for API documentation, Postman for testing

**System Architecture**

* **Architecture Pattern:** RESTful API using MVC (Model-View-Controller)
* **Core Modules:**
  + User Management
  + Product Inventory
  + Sales Tracking
  + Reporting

**Entity Relationship Diagram (ERD)**

**Entities:**

* **User:** id, name, role, username, password
* **Product:** id, name, category, quantity, price
* **Sale:** id, product\_id, user\_id, quantity\_sold, total\_price, sale\_date

**3. Iterative Development**

**Sprint 1: Initial Setup and Basic Features**

* Initialize a Spring Boot project.
* Implement authentication and authorization using Spring Security.
* Develop CRUD operations for the Product module.

**Sprint 2: Sales and Inventory**

* Build a sales tracking module that updates inventory upon each transaction.
* Implement database relationships between Product, Sale, and User.
* Create APIs for recording and retrieving sales data.

**Sprint 3: Reporting and UI Integration**

* Develop APIs for generating sales and inventory reports.
* Create a basic UI for managers and staff using Thymeleaf or integrate with a modern frontend framework like Angular.

**4. Testing**

**Testing Strategies**

* **Unit Testing:** JUnit and Mockito for individual modules.
* **Integration Testing:** Test API endpoints using Postman or automated scripts.
* **End-to-End Testing:** Simulate real-world scenarios to validate functionality.

**5. Deployment**

**Deployment Steps**

* **Containerization:** Use Docker to package the application.
* **Server Setup:** Deploy on AWS, Google Cloud, or Azure.
* **CI/CD Pipelines:** Set up automated pipelines using Jenkins or GitHub Actions.

**6. Review and Adjust**

**Agile Feedback Loop**

* Conduct sprint reviews with stakeholders.
* Gather feedback and adjust the backlog accordingly.
* Continuously improve the system based on user input.

**7. Documentation**

**Technical Documentation**

* API documentation using Swagger.
* Detailed system architecture diagrams and ERDs.

**User Manual**

* **For Managers:** Instructions for managing inventory, generating reports, and monitoring sales.
* **For Staff:** Guide to recording sales and updating inventory.

**Project Timeline**

| **Sprint** | **Duration** | **Key Deliverables** |
| --- | --- | --- |
| Sprint 1 | 2 weeks | Project setup, User Authentication, Product CRUD |
| Sprint 2 | 3 weeks | Sales module, Inventory integration |
| Sprint 3 | 3 weeks | Reporting APIs, Basic UI integration |
| Final Review | 1 week | Testing, Deployment, Documentation |

**Future Enhancements**

1. **Integration with Point-of-Sale (POS) Systems**
2. **Mobile App Development for On-the-Go Management**
3. **AI-Driven Analytics for Demand Forecasting**
4. **Multi-Language Support**