

# Requirement Document

## Console-Based E-Commerce Cart System

**Project Objective:** Build a console-based e-commerce application using Core Java concepts.

The system must use Collections Framework only for data storage. No database, no file handling, and no frameworks are allowed.

### 1. Functional Requirements

#### 1.1 Product Management

- ✓ Display all available products.
- ✓ Search product by name using Stream API.
- ✓ Sort products by price (ascending/descending).
- ✓ Prevent duplicate product IDs.
- ✓ Product fields: id (int), name (String), price (double), stock (int).

#### 1.2 Cart Management

- ✓ Add product to cart.
- ✓ Remove product from cart.
- ✓ Update quantity.
- ✓ View cart items.
- ✓ Calculate total price.
- ✓ Use HashMap<Product, Integer> for cart storage.
- ✓ Validate stock before adding to cart.

#### 1.3 Checkout Process

- ✓ Validate stock before checkout.
- ✓ Reduce stock after successful purchase.
- ✓ Generate final bill.
- ✓ Clear cart after checkout.
- ✓ Throw custom OutOfStockException if stock is insufficient.

### 2. Non-Functional Requirements

- ✓ Console-based menu-driven UI.
- ✓ Proper package structure.
- ✓ Follow OOP principles.
- ✓ No business logic inside Main class.
- ✓ Clean and readable code.

### 3. Technical Requirements

#### Mandatory Concepts:

- ✓ Encapsulation
- ✓ Constructors
- ✓ equals() and hashCode()
- ✓ Collections (List and Map)
- ✓ Generics
- ✓ Comparator
- ✓ Stream API
- ✓ Custom Exception

### 4. Application Flow

1. Load sample products (hardcoded).
2. Display menu.
3. View products.
4. Add to cart.
5. Remove from cart.
6. View cart.
7. Checkout.
8. Exit.