**📘 Problem Statement: Telecom Pack Management System**

**🎯 Objective:**

Design a system that allows users to **subscribe to telecom packs** like Data Pack, Talktime Pack, and Combo Pack. Each pack deducts balance and is stored in the user's profile.

**🧱 Key Requirements:**

**1. User**

* Fields: userId, name, phoneNumber, balance, List<Pack> activePacks
* Methods: Add/Remove pack, Get balance, etc.

**2. Pack *(Abstract Class)***

* Fields: packName, validityDays
* Abstract Method: getCost()

**3. Pack Types**

* DataPack – 28 days, ₹149
* TalktimePack – 14 days, ₹99
* ComboPack – 56 days, ₹249

Each class implements a Billing interface with deduct(User) method.

**4. PackManager**

* Methods:
  + subscribe(User, Pack)
  + unsubscribe(User, packName)
  + getSubscribedPacks(User)
  + Uses a Map<String, Set<String>> for tracking users' pack names.
  + Bonus: Show users who are subscribed to a specific pack

**💡 Java Concepts to Use:**

| **Feature** | **Java Concept** |
| --- | --- |
| Data manipulation | Java 8 Streams & Lambdas |
| Pack Hierarchy | Inheritance & Polymorphism |
| Subscription Map | HashMap, HashSet |
| Input validation | Optional, Exception handling |
| Testing | JUnit 5 lifecycle, assertions, parameterized, nested tests |
| Reporting | JaCoCo for code coverage |

**✅ Sample Scenario:**

1. User U1 subscribes to DataPack:
   * ₹149 deducted from balance
   * Active pack stored in both user and global Map
2. User U2 subscribes to ComboPack
3. unsubscribe(U1, "DataPack") removes it from user and map
4. System prints all users subscribed to TalktimePack

**🧪 Suggested Test Cases:**

| **Test Case** | **Type** |
| --- | --- |
| Subscribe to valid pack | Unit Test |
| Insufficient balance | Exception Test |
| Duplicate subscription | Exception Test |
| Unsubscribe | Unit Test |
| User subscription check | Collection validation |
| Parameterized pack test | JUnit 5 @ParameterizedTest |
| Nested tests for multiple packs | @Nested |
| Global subscription map check | Integration + Collection |
| Code coverage for billing logic | JaCoCo |