1. Authentication System

**Sequence Flow:**

1. System initialization → Load sample data
2. Prompt for credentials (username/password)
3. Validate against user database
4. Grant role-based access

**Branches:**

* Successful login → Main menu
* Failed login → Retry (max 3 attempts in production)

2. Main Menu System

**Core Services:**

1. Customer Management
2. Account Services
3. Transaction Processing
4. Fraud Detection
5. Investment Advisory
6. Reports & Analytics
7. Logout

3. Customer Management Module

**Sequence Flow:**

1. Verify manager/admin privileges
2. Display CRUD options:
   * Add
   * View
   * Search
   * Update

**Detailed Branches:**

* **Add Customer:**
  + Collect: ID, Name, DOB, Address, Phone, KYC
  + Validate: Unique ID, Phone format
  + Store in knowledge base
* **View Customer:**
  + Retrieve by ID → Display all attributes
  + Handle "not found" case
* **Search Customers:**
  + Name/ID partial matching
  + Display results table
* **Update Customer:**
  + Field-level updates
  + Audit trail (in production)

4. Account Services Module

**Sequence Flow:**

1. Verify staff+ privileges
2. Display account operations:
   * Open
   * Close
   * View
   * List All

**Detailed Branches:**

* **Open Account:**
  + Verify customer exists
  + Generate account number (type + timestamp)
  + Set initial balance
  + Link to customer
* **Close Account:**
  + Balance check (zero-out required)
  + Soft-delete implementation
* **View Account:**
  + Show: Number, Type, Balance, Owner
  + Recent transactions
* **List Accounts:**
  + Filter by: Customer/Type
  + Sort by: Balance/Date

5. Transaction Processing Module

**Sequence Flow:**

1. Verify staff privileges
2. Display transaction types:
   * Deposit
   * Withdrawal
   * Transfer
   * History

**Detailed Branches:**

* **Deposit:**
  + Amount validation (>0)
  + Balance update
  + Transaction record
* **Withdrawal:**
  + Sufficient funds check
  + Overdraft protection
* **Transfer:**
  + Dual-account validation
  + Atomic transaction
* **History:**
  + Date range filtering
  + Transaction type filtering

6. Fraud Detection Module

**Sequence Flow:**

1. Verify manager privileges
2. Display detection methods:
   * Single transaction analysis
   * Batch processing
   * Pattern review

**Detection Branches:**

* **Single Transaction:**
  + Amount thresholds
  + Location anomalies
  + Frequency analysis
* **Batch Analysis:**
  + Velocity checks
  + Aggregate patterns
  + Time-of-day analysis

7. Investment Advisory Module

**Sequence Flow:**

1. Verify manager privileges
2. Collect client profile:
   * Risk tolerance
   * Time horizon
   * Investment goals

**Recommendation Branches:**

* Conservative (Bonds 70%, Stocks 30%)
* Balanced (50/50 split)
* Aggressive (Stocks 80%, Alternatives 20%)
* Retirement-focused (Age-based allocation)

8. Reporting Module

**Sequence Flow:**

1. Verify manager privileges
2. Select report type:
   * Customer demographics
   * Transaction volumes
   * Account performance

**Report Branches:**

* **Demographics:**
  + Age distribution
  + Location mapping
  + Account penetration
* **Transactions:**
  + Volume trends
  + Value bands
  + Channel analysis

9. System Architecture Features

**Data Model:**

* Customers: ID, Name, DOB, Contact, KYC
* Accounts: Number, Type, Balance, Owner
* Transactions: Account, Type, Amount, Timestamp
* Users: Credentials, Roles

**Security:**

* Role-based access control
* Password hashing (in production)
* Session timeout

**Extensibility Points:**

1. Add new account types
2. Integrate external fraud databases
3. Add regulatory compliance checks
4. Connect to payment networks

**Error Handling:**

* Invalid input validation
* Account existence checks
* Transaction rollback capability
* Graceful privilege denial

This system provides complete banking operations management while maintaining Prolog's strengths in rule-based decision making. Each module follows a consistent pattern of menu navigation with proper access control and data validation.