Title: Online Bank Management System

- **Subtitle:** Ex. 4 Requirement modelling using Context flow diagram, DFD (Functional Modeling) using StarUML

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Introduction

The Online Banking Management System (OBMS) is designed to streamline banking operations, improve user interactions, and ensure secure financial transactions. This requirement modeling document provides a comprehensive representation of OBMS using Context Flow Diagram (Level 0), Level 1 Data Flow Diagram (DFD), and Level 2 DFD, adhering to structured modeling techniques.

This document outlines the entities, processes, and data flows involved in OBMS, focusing on structural modeling for clarity and scalability. Additional refinements include expanded entities, relationships, and granular detail in DFD levels for complete coverage.

Level 0 Data Flow Diagram (DFD)

1. Components

- **Processes**: These represent the core system functionalities.

    - **Online Bank Management System**: The main process managing all transactions, customer accounts, loans, and external communication.
- **External Entities**: Represent the sources and destinations of data interacting with the system.

    - **Manager**: Reviews flagged transactions and provides loan approval details.
    - **Customer**: Provides login credentials and transaction requests; receives transaction status, balance updates, and account details.
    - **Branch**: Supplies branch information and interacts with the system for configurations.
    - **Admin**: Configures branch settings and receives performance reports.
    - **Third-Party Services**: Handles payment gateway processing and SMS/email notifications.

- **Data Stores**: Represent the repositories of data within the system.

  - **Account Details**: Stores detailed information about customer accounts.
  - **Customer Records**: Maintains a list of all customers associated with a branch.
  - **Employees Record**: Contains the details of all employees in a branch.
  - **Branch Record** : Provides Information about the branch of the bank.

- **Data Flows**: The **data flows** between the entities, processes, and data stores are as follows:

1. **Manager ↔ Online Bank Management System**:

   - Sends **Approval Data** for loans.
   - Receives **Flagged Transactions and Analytics Reports**.

2. **Customer ↔ Online Bank Management System**:

   - Sends **Login Credentials** and **Transaction Requests**.
   - Receives **Transaction Status**, **Balance Updates**, and **Account Details**.

3. **Branch ↔ Online Bank Management System**:

   - Provides **Branch Details** and **Configuration Requests**.
   - Receives **System Configuration Updates** and **Reports**.

4. **Admin ↔ Online Bank Management System**:

   - Sends **Branch Settings Configurations** and **System Updates**.
   - Receives **System Performance Reports**.

5. **Third-Party Services ↔ Online Bank Management System**:

   - Processes **Payment Gateway Transactions**.
   - Sends **SMS/Email Notifications**.

6. **Online Bank Management System ↔ Account Details**:

   - Updates and retrieves **Account Details for Customers**.

7. **Online Bank Management System ↔ Customer Records**:

- Accesses **Customer Registration Information** and updates customer-related data.

8. **Online Bank Management System ↔ Employees Record**:

- Accesses **List of Employees in a Branch**.

DATA FLOW DIAGRAM LEVEL 0 (DFD)
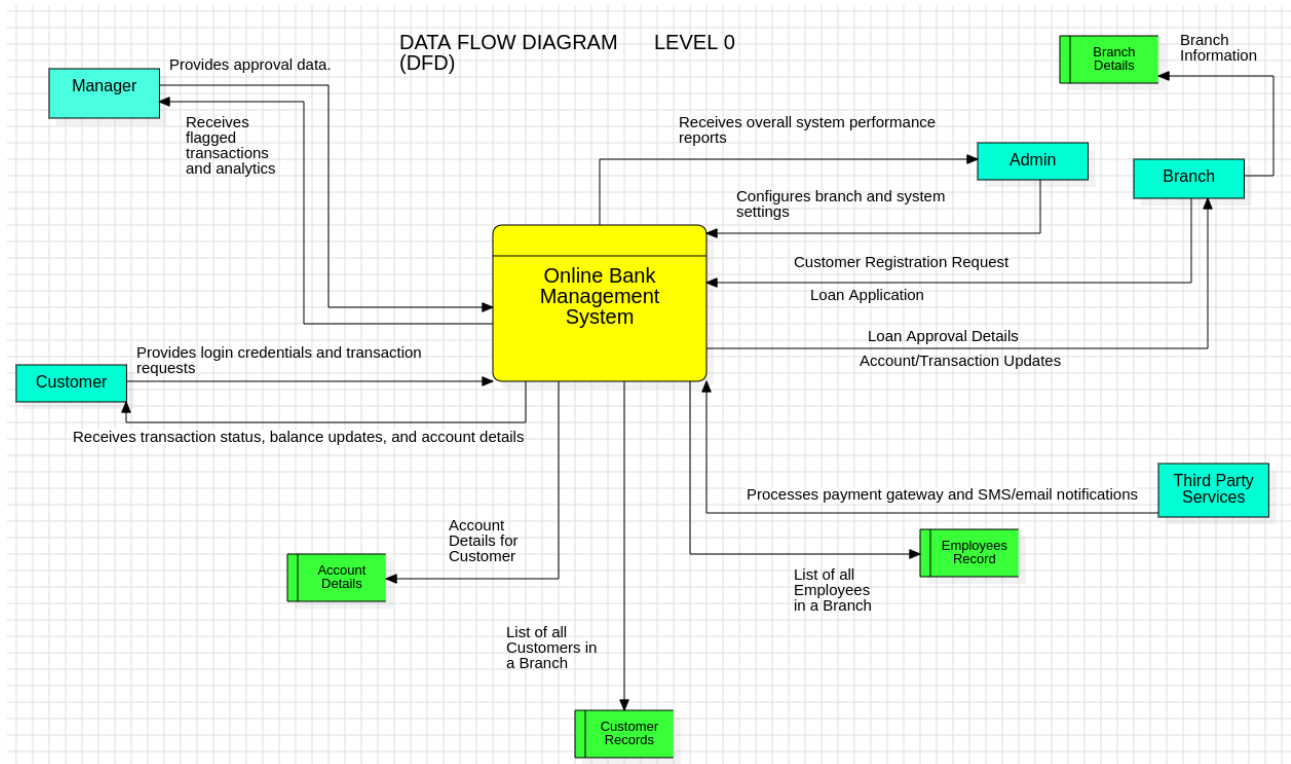
Level 1 Data Flow Diagram (DFD)

The Level 1 DFD provides a deeper breakdown of the processes and interactions from the Level 0 DFD, showing the granularity of data management in a banking system.

1. Components

1. **Processes**:

   - **Customer Management**: Handles customer registration, profile updates, and other customer-related tasks.
   - **Account Management**: Manages customer accounts, including balance updates, account status, and transaction requests.
   - **Transaction Management**: Processes transaction requests and logs transaction details for reporting.
   - **Loan Management**: Handles loan applications, approvals/rejections, and updates loan details.
   - **Analytics and Reporting**: Generates reports and performance analytics.
   - **Notification System**: Sends notifications to customers and other entities based on events such as loan approvals, transactions, and account updates.
   - **Online Bank Management System**: Acts as the central controller, integrating all processes and external entities.

2. **External Entities**:

   - **Customer**: Interacts with the system for profile management, transactions, account updates, and loan applications.
   - **Manager**: Provides loan approval/rejection instructions and reviews reports.
   - **Branch**: Submits customer registration requests and branch details.
   - **Admin**: Requests performance reports and configures system settings.
   - **Third Party Services**: Facilitates notification delivery and integrates with external services for smooth operation.

3. **Data Stores**:

  - **Account Details**: Stores account information for customers.
  - **Customer Record**: Contains all customer-related data.
  - **Loan Details**: Maintains details of loans including type, interest rate, and payment history.
  - **Transaction Details**: Logs all transactions for reporting and auditing.
  - **Employee Record**: Stores employee data for operational purposes.
  - **Notification Logs**: Records details of sent notifications

2. Data Flows

The **data flows** connecting the processes, entities, and data stores are as follows:

1. **Customer ↔ Customer Management**:

   - Sends **Customer Registration Requests**, **Profile Updates**, and **Login Requests**.
   - Receives **New/Updated Customer Information**.

2. **Customer ↔ Account Management**:

   - Sends **Transaction Requests** and **Account Status/Update Requests**.
   - Receives **Account Details and Updates**.

3. **Customer ↔ Loan Management**:

   - Sends **Loan Application Requests**.
   - Receives **Loan Approval/Denial Notifications**.

4. **Branch ↔ Customer Management**:

   - Sends **Customer Registration Requests** and **Branch Details**.

5. **Customer Management ↔ Customer Record**:

   - Stores and retrieves **Customer Information**.

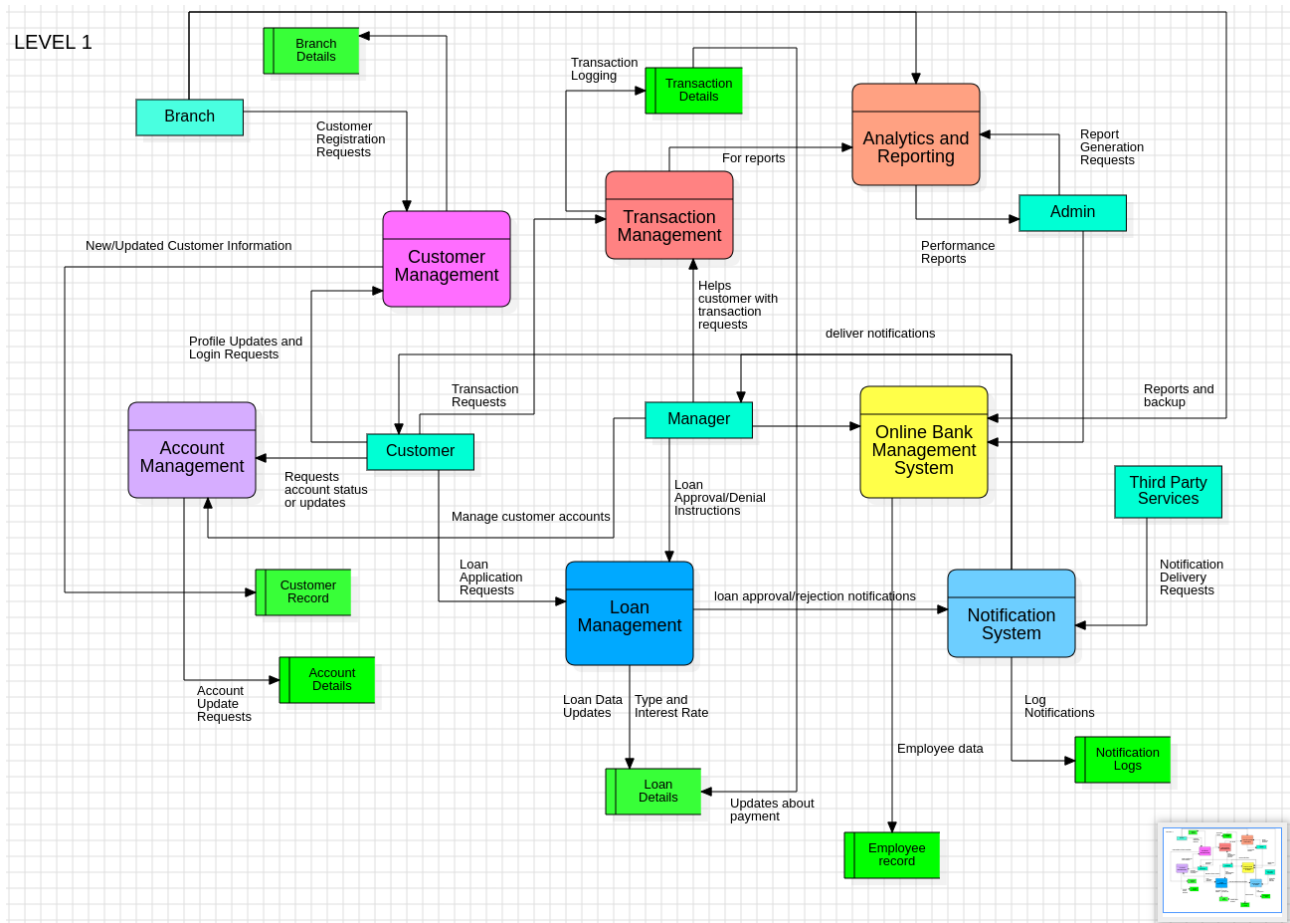6. **Account Management ↔ Account Details**:

   - Updates and retrieves **Account Information**.

7. **Transaction Management ↔ Transaction Details**:

- Logs **Transaction Data** and retrieves it for reporting.

8. **Loan Management** ↔ **Loan Details**:

- Updates **Loan Data** such as type, interest rate, and payment status.

9. **Loan Management** ↔ **Manager**:

- Sends **Loan Approval/Denial Instructions**.

10. **Analytics and Reporting** ↔ **Admin**:

- Sends **Performance Reports**.
- Receives **Report Generation Requests**.

11. **Analytics and Reporting** ↔ **Transaction Management**:

- Retrieves **Transaction Logs** for reporting.

12. **Notification System** ↔ **Customer**:

- Sends **Notifications** such as loan status or account updates.

13. **Notification System** ↔ **Notification Logs**:

- Logs **Notification History** for auditing.

14. **Notification System** ↔ **Third-Party Services**:

- Sends **Notification Delivery Requests**.

15. **Online Bank Management System** ↔ **Analytics and Reporting**:

- Receives **Reports and Analytics**.

16. **Online Bank Management System** ↔ **Notification System**:

- Sends **Notification Requests** for delivery to customers or managers.

17. **Online Bank Management System** ↔ **Loan Management**:

- Sends and receives **Loan Application Data** and **Loan Updates**.

18. **Online Bank Management System** ↔ **Employee Record**:

- Accesses **Employee Data** for operational purposes.

19. **Manager** ↔ **Online Bank Management System**:

- Receives **Reports and Analytics**.
- Sends **Approval/Denial Instructions**.

20. **Branch ↔ Online Bank Management System**:

- Provides **Branch Details** for configuration and updates.

Level 2 Data Flow Diagram (DFD)

1. Components

1. **Processes**:

- **Customer Management Subsystem**:
  - Customer Registration
  - Profile Updates
  - Login Management
- **Account Management Subsystem**:
  - Account Information Updates
  - Balance Inquiry
  - Account Transaction Management
- **Transaction Management Subsystem**:
  - Transaction Logging
  - Fraud Monitoring (if applicable)
- **Loan Management Subsystem**:
  - Loan Applications
  - Loan Approval/Denial Processing
  - Loan Repayment Management
- **Analytics and Reporting Subsystem**:
  - Performance Reporting
  - Transaction Analysis
- **Notification System Subsystem**:
  - Notification Creation
  - Notification Delivery
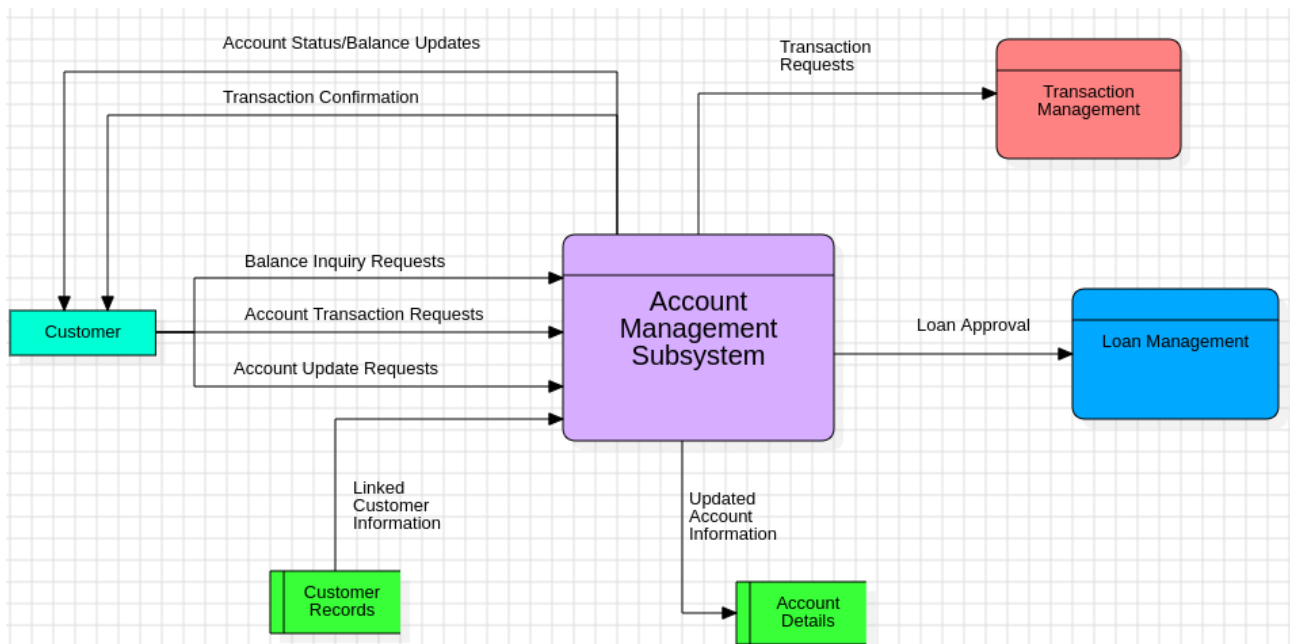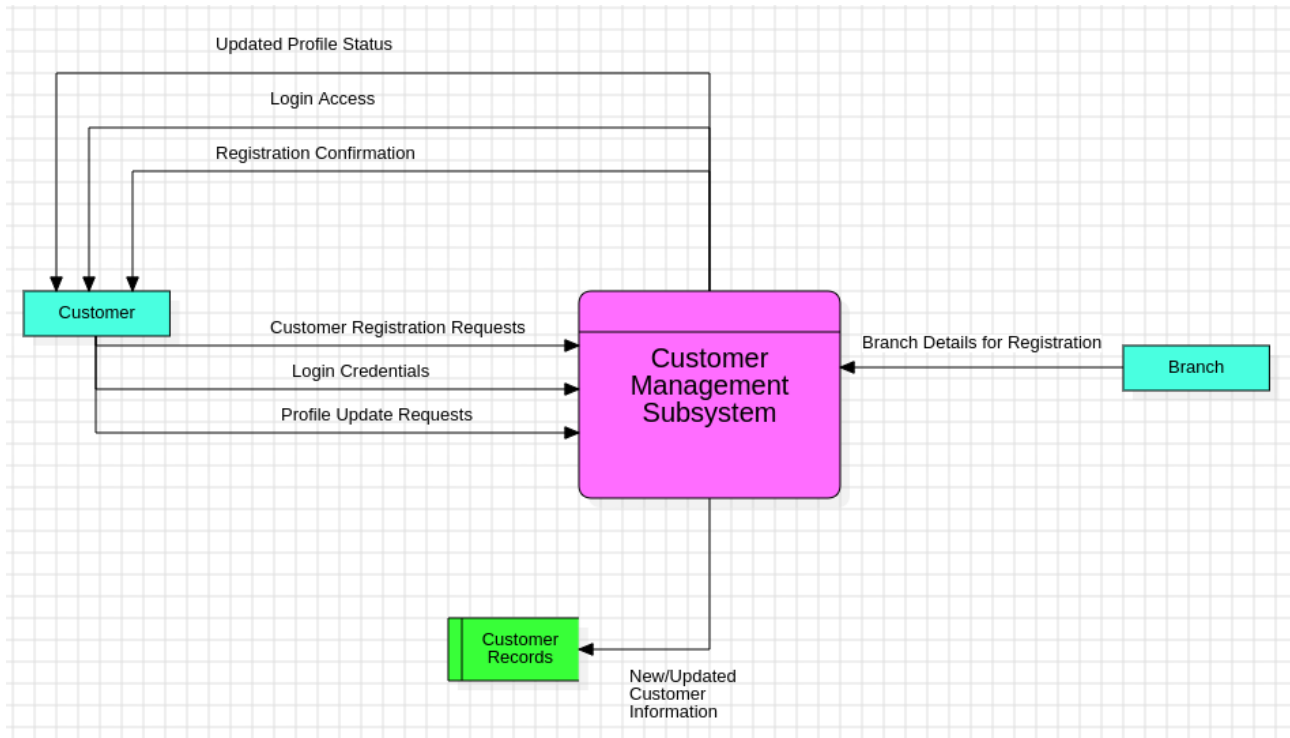 - Notification History Management

2. **External Entities**:

- **Customer**: Initiates transactions, updates profiles, and applies for loans.
- **Manager**: Reviews loan requests and provides approvals/rejections.
- **Branch**: Provides branch-specific data, including customer registration requests.
- **Admin**: Oversees reporting and system performance.
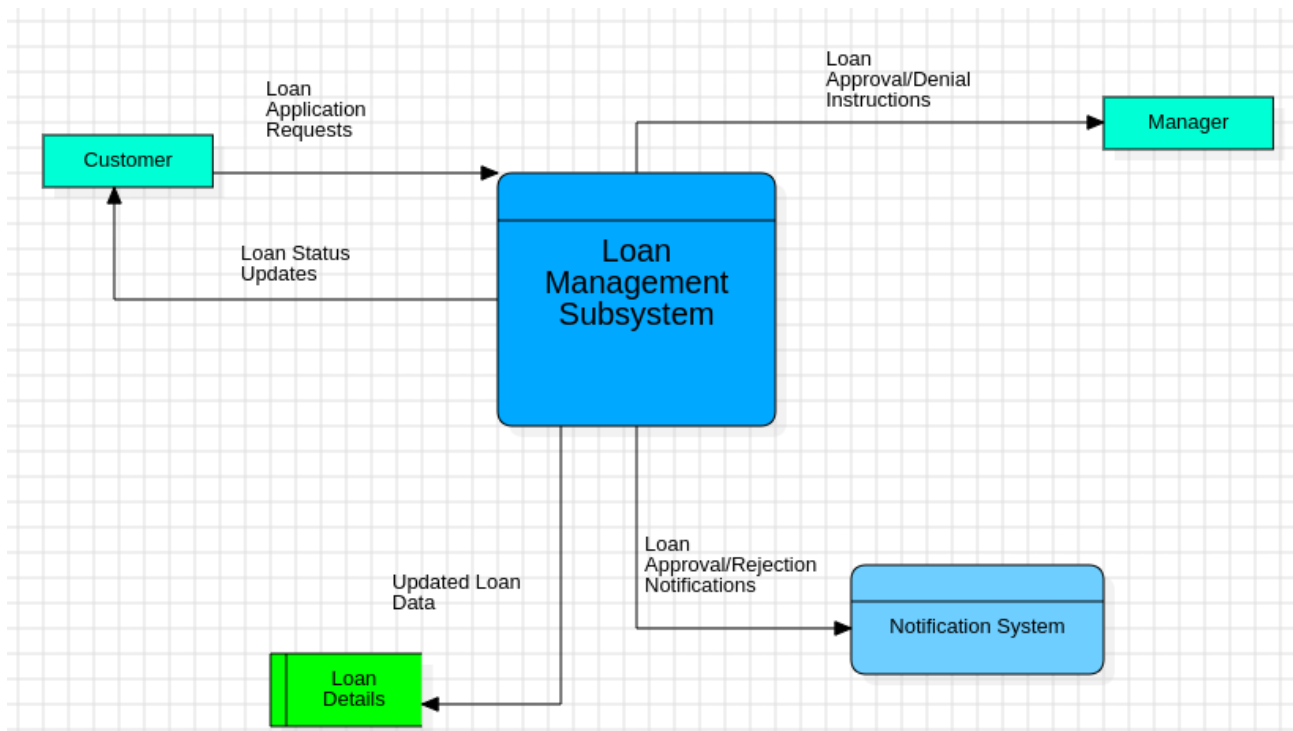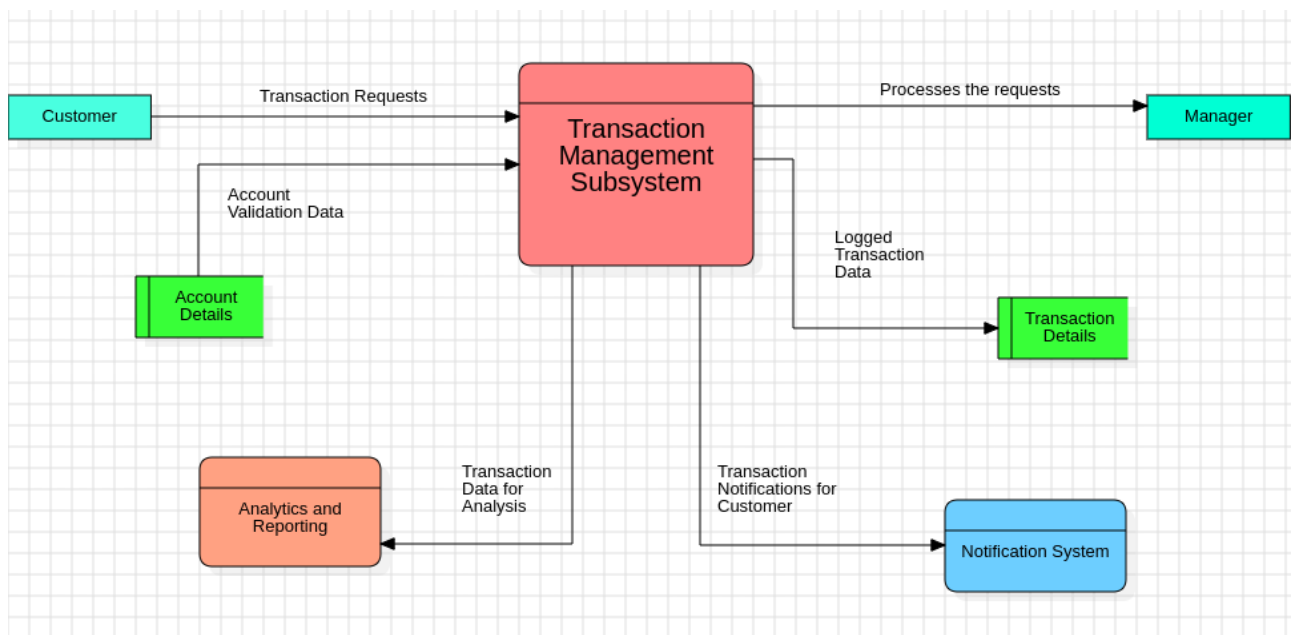- **Third-Party Services**: Delivers notifications (e.g., SMS, email).

3. **Data Stores**:

- **Customer Records**: Stores customer details.
- **Account Details**: Contains account-specific information.

- **Loan Details**: Maintains loan-related data.
- **Transaction Details**: Logs all transactions.
- **Employee Records**: Tracks employee data.
- **Notification Logs**: Stores notification history.

Level 2 DFD

Transaction Management Subsystem Diagram

Customer → Transaction Requests → **Transaction Management Subsystem**

Transaction Management Subsystem → Processes the requests → **Manager**

Account Details → Account Validation Data → **Transaction Management Subsystem**

Transaction Management Subsystem → Logged Transaction Data → **Transaction Details**

Transaction Management Subsystem → Transaction Data for Analysis → **Analytics and Reporting**

Transaction Management Subsystem → Transaction Notifications for Customer → **Notification System**

Loan Management Subsystem Diagram

Customer → Loan Application Requests → **Loan Management Subsystem**

Loan Management Subsystem → Loan Approval/Denial Instructions → **Manager**

Loan Management Subsystem → Loan Status Updates → **Customer**

Loan Management Subsystem → Updated Loan Data → **Loan Details**

Loan Management Subsystem → Loan Approval/Rejection Notifications → **Notification System**

The series of Data Flow Diagrams (DFDs) – Level 0, Level 1, and Level 2 – collectively provide a comprehensive representation of the **Online Bank Management System** and its processes. Each level of abstraction offers progressively deeper insights into the flow of data, interactions between entities, and system functionality.

- **Level 0** gives an overview of the system's main components, including external entities (customers, managers, branches, admin, and third-party services), core processes, and the exchange of high-level data flows. It highlights the system's primary purpose: enabling transactions, managing customer accounts, and processing loans.

- **Level 1** breaks down the primary processes into subsystems such as Customer Management, Account Management, Loan Management, Transaction Management, Analytics, and Notification Systems. It demonstrates the intricate interaction between these subsystems, external entities, and data stores, ensuring system functionality and responsiveness.

- **Level 2** further decomposes the processes into their individual components and specific operations, showcasing the detailed data flows within subsystems. It provides clarity on how customer requests are handled, accounts are updated, loans are processed, and notifications are delivered.

These diagrams together depict the **logical architecture** of the Online Bank Management System, emphasizing the efficient and secure flow of data between various components

This structured visualization not only facilitates seamless operations but also allows for scalability, adaptability, and troubleshooting within the system.