Volere Requirements Specification: Bank Management System (BMS)

Project Drivers

1. The Purpose of the Project

1a. The User Business or Background of the Project Effort The project aims to create an integrated Bank Management System (BMS) for a Portsaid International Bank (PIB). This system is required to manage core banking operations, handle customer information, and process various types of financial transactions. The BMS must support secure and efficient collaboration among different departments, specifically Customer Service, the Credit Department, and Transaction Processing. The banking process typically starts when a new customer submits an Account Application, which is registered with a unique customerID used to track all subsequent customer activities and accounts.

1b. Goals of the Project The project goal is to develop a comprehensive system that minimizes manual work and ensures accuracy, transaction speed, and security.

Purpose (P)	**Advantage (A)**	**Measurement (M) / Fit Criterion**
P: Create or update customer profiles.	A: Maintain accurate customer records.	M: The system validates data and prevents duplicate customer email addresses.
P: Automate calculation and posting of monthly interest.	A: Ensure account balances remain accurate without manual work.	M: Interest calculations must be completed and entries posted for all eligible accounts upon the scheduled monthly trigger time.
P: Enable staff to perform cash transactions.	A: Reduce queue times by performing deposits and withdrawals efficiently.	M: Transaction records must be instant and the system must provide fast, accurate transaction handling (Internal Operational Stakeholder interest).

2. The Stakeholders of the Product (PIB Bank Management System)

This section identifies all individuals, groups, organizational units, and external parties who have an interest in, contribute to, or are affected by the Portsaid International Bank (PIB) Bank Management System (BMS). Stakeholders are classified by their relationship to PIB and their role in achieving the system's objectives.

2a. The Client

Client	Description	Responsibilities
Portsaid International Bank (PIB) Executive Board	The primary sponsoring body funding and owning the BMS project.	Approves budget, defines high-level objectives, signs off on final deployment.
Chief Information Officer (CIO)	Responsible for overseeing PIB's digital transformation and IT strategy.	Ensures alignment with PIB's technology roadmap and regulatory constraints.

2b. The Customer (Organization Using the Product)

Customer	Description	Responsibilities
Portsaid International Bank (PIB)	The financial institution implementing the BMS system across its branches.	Provides business rules, operational requirements, and domain expertise.

2c. Other Stakeholders

These stakeholders influence or interact with the system but are not the primary users.

Internal – Operational Stakeholders

Stakeholder	Relationship to PIB	Interests / Concerns
Tellers / Cashiers	Direct employees operating PIB front desks.	Fast and accurate cash transactions; minimal errors; stable connection to backend systems.

Customer Service Officers (CSO)	**Handle onboarding, customer profiles, and support.**	**Efficient customer lookup; clear unified dashboards; reduced manual data entry.**
Loan Officers / Credit Department	**Evaluate and approve loan applications.**	**Access to complete loan data; automated eligibility checks; clear status tracking.**
Account Managers	**Manage customer relationships and account portfolios.**	**Reliable account data; easy retrieval of customer financial summaries.**

Internal – Executive Stakeholders

Stakeholder	Relationship to PIB	Interests / Concerns
Branch Managers	**Leaders of individual PIB branches.**	**Operational performance, staff productivity, accurate transaction handling.**
Chief Financial Officer (CFO)	**Oversees PIB's financial integrity.**	**Accurate reporting, fraud prevention, financial transparency.**
Compliance & Internal Audit Division	**Ensures regulatory adherence.**	**Audit trails, transaction logs, compliance with Central Bank of Egypt regulations.**
IT Department (Infrastructure, Database, Security)	**Maintains PIB's technical environment.**	**System stability, manageable deployment, low downtime, secure architecture.**

External – Operational Stakeholders

Stakeholder	Relationship to PIB	Interests / Concerns
PIB Customers / Account Holders	**Use PIB's online and in-branch services.**	**Real-time access to accounts, transaction reliability, financial data privacy.**

Loan Applicants	**Individuals requesting loan services.**	**Transparent loan application status and fast processing.**
Third-party Payment Gateways	**External financial service integrations.**	**Secure API connections, accurate transaction forwarding.**

External – Executive Stakeholders

Stakeholder	Relationship to PIB	Interests / Concerns
Central Bank of Egypt (CBE)	**Regulatory body overseeing PIB's operations.**	**Compliance, accurate reporting, secure financial controls.**
Shareholders / Investors	**Financial backers of PIB.**	**Bank performance, financial transparency, stable system operations.**

2d. The Hands-On Users of the Product

These are the primary operators of the BMS.

User Category	Role	Subject Matter Expertise	Technical Expertise	Interaction with BMS
Admin	**System Administrator**	**Master**	**Journeyman/Master**	**Full system access, user management, configuration.**
Teller	**Cash Transaction Operator**	**Journeyman**	**Novice/Journeyman**	**Performs deposits, withdrawals, account inquiries.**
Customer Service	**Customer Onboarding**	**Journeyman**	**Journeyman**	**Creates and updates**

Officer (CSO)				**customer profiles.**
Credit Officer	**Loan Reviewer**	**Master**	**Journeyman**	**Reviews and approves/rejects loan applications.**
Customer	**External User**	**Novice/Journeyman**	**Novice**	**Uses online banking for statements, transfers, requests.**

2e. User Personas (PIB-Specific)

Persona 1: Ahmed – Teller at PIB Portsaid Branch

- **Handles 150+ cash transactions daily.**
- **Needs fast UI with minimal loading time.**
- **Concerned about data accuracy and queue reduction.**

Persona 2: Mariam – PIB Customer

- **Uses online banking via mobile.**
- **Expects instant fund transfers and clear statements.**
- **Values security and privacy.**

Persona 3: Hossam – Credit Officer

- **Reviews 30+ loan applications weekly.**
- **Needs structured loan data and automated risk indicators.**
- **Prefers efficient workflows to reduce turnaround time.**

Persona 4: Eng. Nour – PIB System Administrator

- **Manages users, permissions, and logs.**
- **Ensures system uptime and backup reliability.**

- **Requires configuration tools and audit dashboards.**

2f. User Prioritization

Priority	User Group	Reason
Primary Users	Teller, CSO, Customer, Admin	Direct daily interaction with core banking operations.
Secondary Users	Credit Officer, Account Managers	Regular but not constant interaction.
Tertiary Users	Auditors, External Gateway Partners	Partial or indirect system usage.

2g. User Participation

User Group	Planned Involvement
Tellers & CSOs	Workflow validation, UI usability testing.
Credit Officers	Loan process validation.
Admin & IT Staff	Security, configuration, and integration feedback.
Customer Focus Group (PIB Clients)	Optional usability testing for mobile/online banking features.

2h. Maintenance Users

User Type	Responsibilities
IT Support Team	Troubleshooting, post-deployment fixes.
System Administrators	Manage configurations, backups, logs.
Database Administrators (DBA)	Maintain data integrity, indexing, and backups.

Project Constraints

3. Mandated Constraints

3a. Solution Constraints

SC-1: Mandatory Database Technology

Description: The product shall use MSSQL Server as the primary relational database management system.

Rationale: PIB's IT Department standardizes all core systems on MSSQL Server for compatibility, support, and security auditing. Using another DBMS would violate internal policy and increase operational costs.

Fit Criterion: The delivered system shall run entirely on MSSQL Server and pass all PIB database validation checks (backup, restore, schema validation, role-based permissions).

3b. Implementation Environment

1. Technical Environment

   The backend will use MSSQL as the primary database.

   Staff at PIB branches use Windows PCs (Chrome/Firefox browsers).

   Customer access is provided through a web interface (desktop/mobile browsers).

   The system will operate completely inside PIB's private secured network.

2. Organizational Environment

   The main users interacting with the system are:

   Tellers (cash transactions)

   Customer Service Officers (customer profiles)

   Credit Officers (loan decisions)

   System Administrators / IT Staff (maintenance and monitoring)

   Customers (online banking tasks)

   These departments rely on accurate data, stable operation, and secure access.

3. Adjacent / Connected Systems

   The BMS must work with:

PIB Identity Provider for login

SMS/Email services for notifications

Backup system used by PIB

Central Bank reporting interface (regulatory compliance)

4. Physical Environment

   The system is hosted in PIB's data center in a secure, controlled environment.

   Branch offices access the system through PIB's internal network.

3c. Partner or Collaborative Applications The development and tracking processes require integration with existing external tools:

- The project management tracking must utilize **Jira** for managing tasks and tracking progress (To Do, In Progress, Done).
- Source code management must utilize **Github.**

3d. Off the shelf Software

The BMS will use a small set of trusted off-the-shelf software components already approved by PIB:

MSSQL (database engine used across PIB).

SMS gateway service used by PIB for customer notifications.

Email SMTP server for sending statements and alerts.

These tools are mandatory because they are part of PIB's standard IT infrastructure

3e. Workplace Environment

The BMS will be used in the following working environments:

Bank branches where tellers and CSOs use Windows PCs.

Back-office departments (IT, Credit, Management) using office desktops.

Customer access through mobile and web browsers from home or on the move.

Data center hosting the servers in a secure, climate-controlled environment.

No special hardware is required beyond existing PIB equipment

3f. Schedule Constraints

PIB requires the project to fit within the following time limits:

A working MVP (customer profiles, accounts, basic transactions) must be delivered within 6 months.

The complete BMS, including loans, statements, and automation, must be ready within 12 months.

Maintenance windows must occur outside banking hours to avoid service interruption.

These deadlines are fixed by PIB's executive board.

3g. Budget Constraints

The BMS project must stay within PIB's approved IT budget:

Only approved technologies and existing licenses may be used.

No additional commercial databases or proprietary frameworks may be purchased.

Infrastructure must run on existing servers unless explicitly approved by management.

The budget does not allow expansion into expensive or experimental technologies.

3h. Enterprise Constraints

The system must follow PIB's enterprise rules:

Must comply with Central Bank of Egypt regulations and reporting rules.

Must follow PIB's security policies, including encryption and role-based access.

Must integrate with PIB's identity provider for authentication.

Must store and protect customer data according to bank data-retention policies.

Must be compatible with PIB's internal network architecture.

These rules are non-negotiable and apply to all PIB systems.

4. Naming Conventions and Terminology

4a. Definitions of All Terms The core entities (domain classes) used throughout the documentation include:

- **Customer:** A unique entity whose personal information the system stores and tracks.
- **Account:** A core banking entity that holds the Balance and tracks transactions.
- **Transaction:** A record generated by every banking action (e.g., Deposit, Withdrawal, Payment, Interest Posting).
- **Loan Application:** A specific record required for the loan process lifecycle, tracked separately from an issued Loan.
- **Transfer:** A specific subtype of Transaction requiring separate fields (from–to account).
- **Interest Posting :** A specific subtype of Transaction requiring interest amount.
- **Admin/Teller/Employee:** Roles or staff members responsible for internal operations.

5. Relevant Facts and Assumptions

5a. Relevant Facts

1. Each customer at PIB has a unique national ID, which is used across all banking operations for identification and verification.
2. Most PIB customers hold multiple account types (e.g., Savings, Current), so the system must expect customers to have several linked accounts.
3. All financial transactions must be traceable for a minimum of five years, according to banking retention regulations.
4. PIB processes a high volume of daily branch transactions, especially deposits and withdrawals during peak hours.
5. Loan applications follow a multi-step approval workflow involving customer service, credit officers, and management.
6. Interest on savings accounts is posted monthly, and this process is currently semi-automated.
7. Overdraft events must be reported immediately for both customer notification and compliance monitoring.
8. The existing banking system stores some legacy customer and account records, which must remain accessible for reference.
9. PIB must comply with Central Bank of Egypt (CBE) reporting standards, requiring accurate financial summaries at defined intervals.

5b. Business Rules

- **Business Rule:** New accounts shall be automatically generated with unique account numbers and maintained with an initial balance of zero.
- **Business Rule:** Account deletion shall be prevented if the account has a non-zero balance.
- **Business Rule:** The system validates customer applications based on sufficient and correct information, including desired Account Type (e.g., Savings, Checking).
- **Business Rule:** Customer profiles are classified into tiers ("Standard," "Premium," or "Business"), influencing fee structures and benefits (e.g., interest rates or waived fees).

5c. Assumptions

Assumption: PIB's internal network and infrastructure will remain stable and available.

Effect if false: System performance will degrade, and branch operations may be interrupted.

Assumption: PIB's existing identity provider (OAuth2/LDAP) will be fully ready for integration during development.

Effect if false: A temporary internal login system may be required, increasing development effort.

Assumption: The SMS and email notification services currently used by PIB will continue operating without major API changes.

Effect if false: Notification features may require redesign or integration with new providers.

Assumption: Branch employees (tellers, CSOs, credit officers) will receive basic training on the new system before rollout.

Effect if false: Support requests will increase, and operational efficiency will drop.

Assumption: PIB will provide all necessary business rules (loan policies, interest rules, overdraft rules) before development milestones.

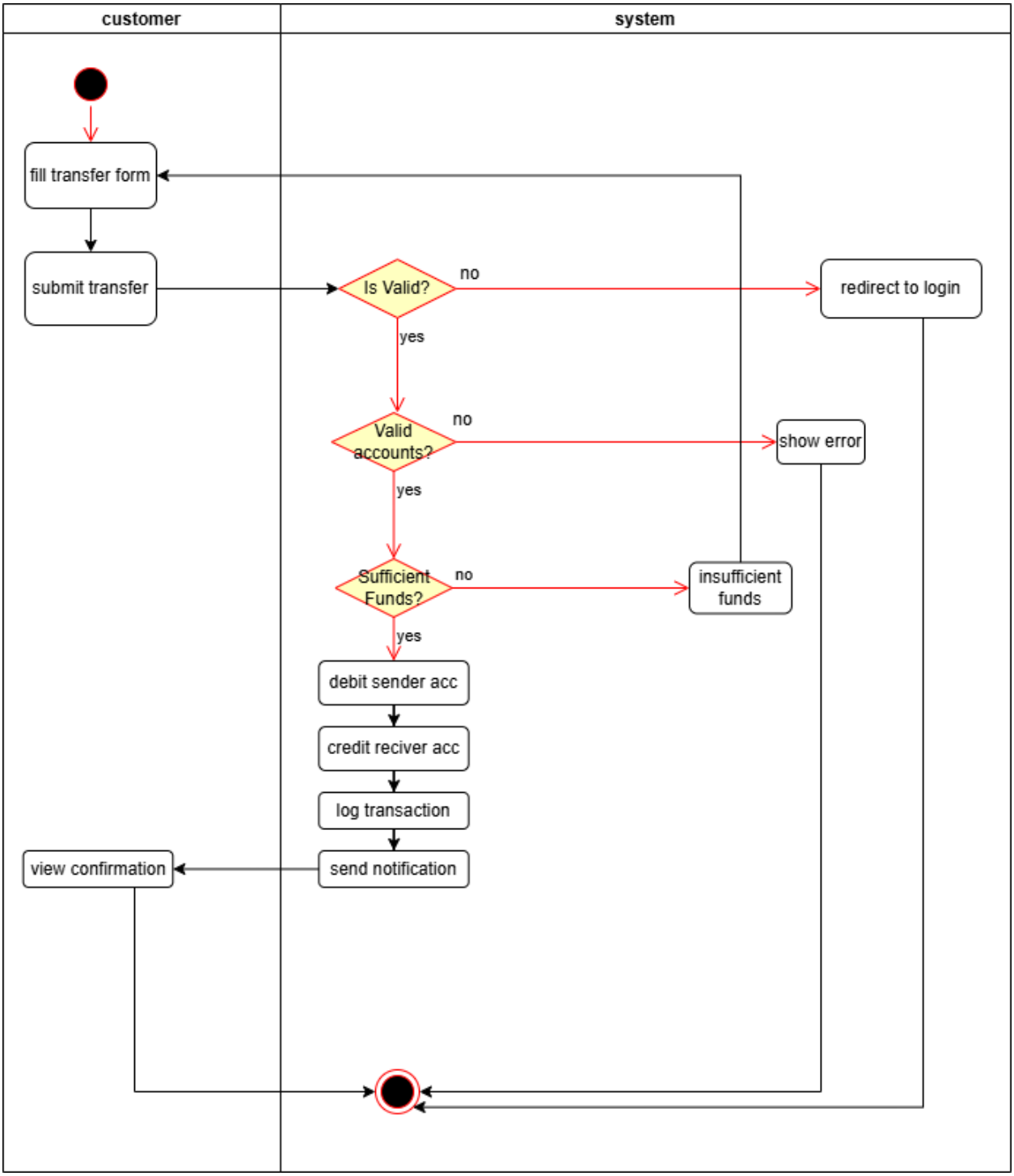
Effect if false: Some modules may require rework or redesign to match updated policies.

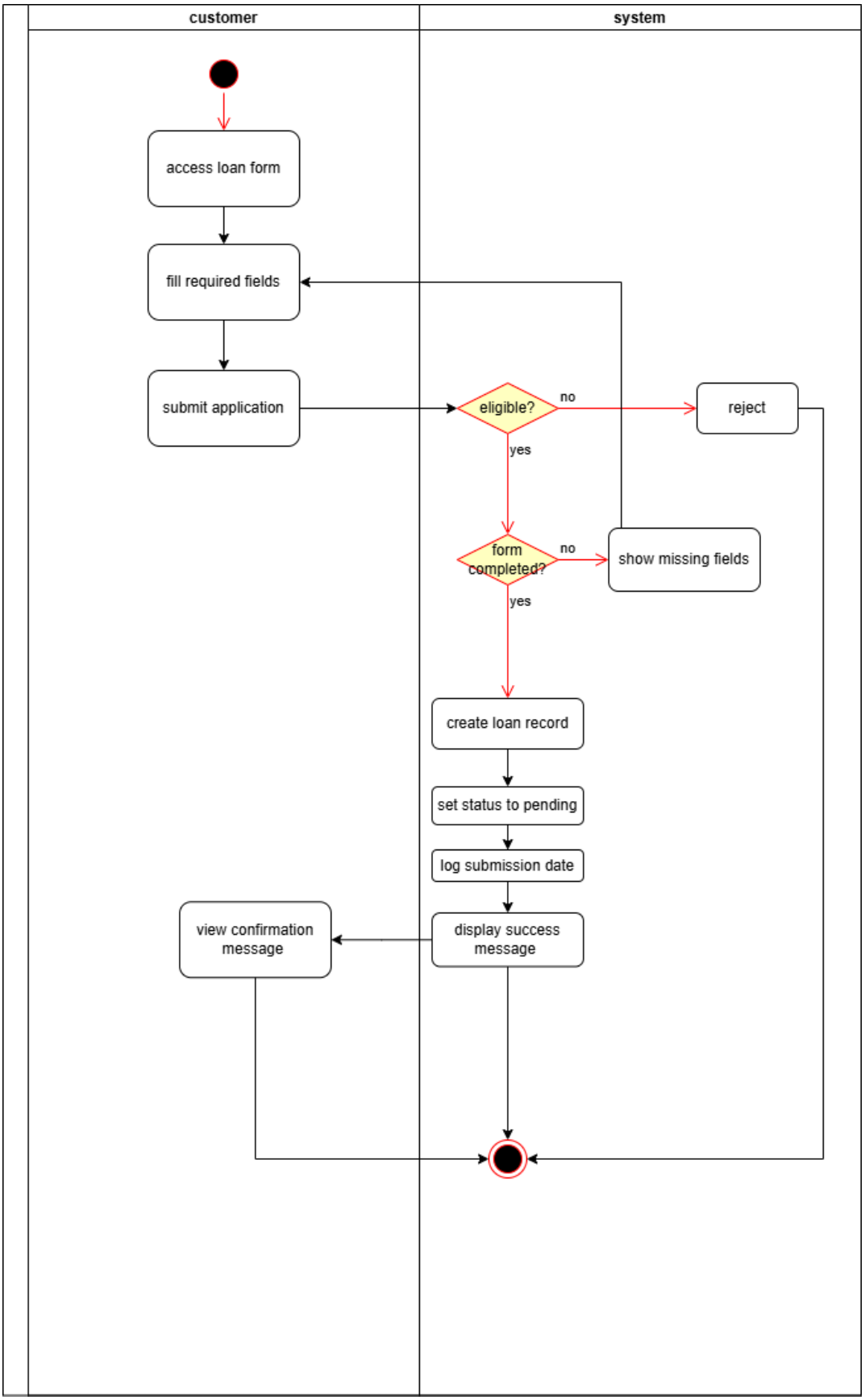
Functional Requirements

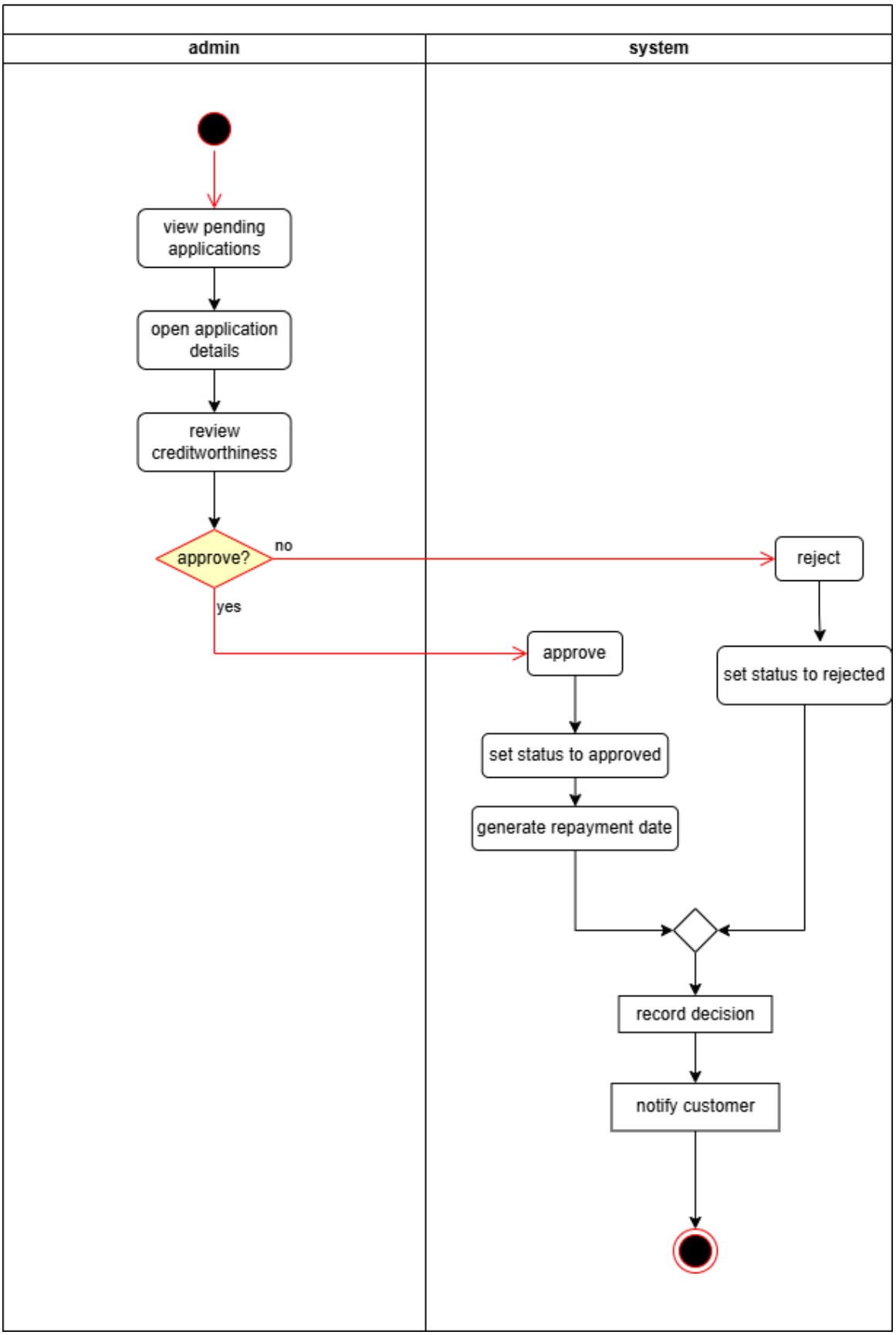
6. The Scope of the Work

6a. The current situation

Swimlane Activity Diagrams:



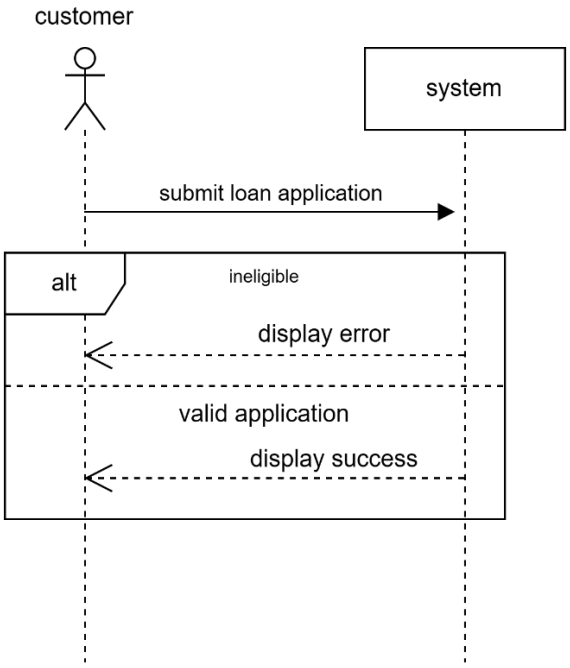

customer
system
access loan form
fill required fields
submit application
eligible?
no
reject
yes
form completed?
no
show missing fields
yes
create loan record
set status to pending
log submission date
display success message
view confirmation message


admin
system
view pending applications
open application details
review creditworthiness
approve?
no
yes
reject
approve
set status to rejected
set status to approved
generate repayment date
record decision
notify customer

6c. Work Partitioning (Business Use Cases - BUCs) The system addresses eight primary business events:

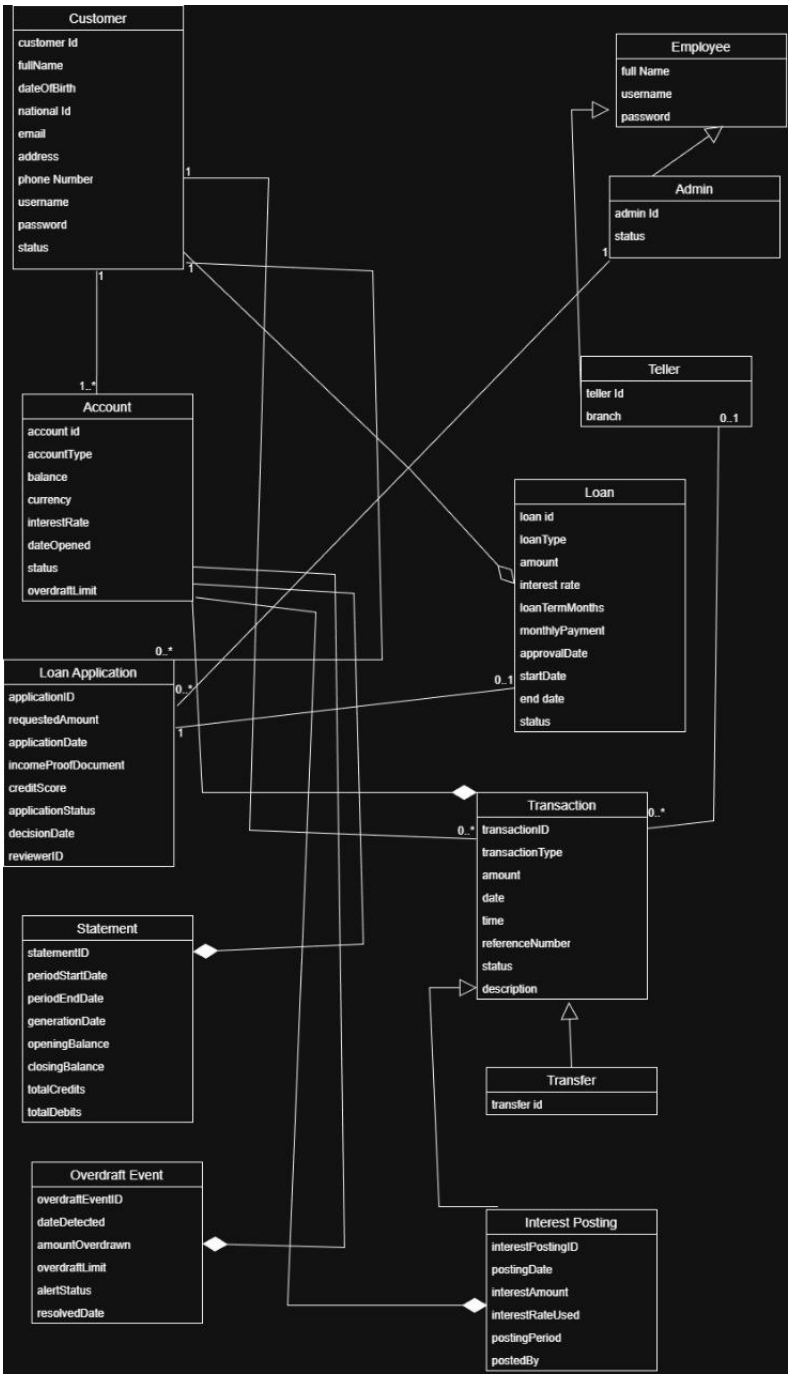
BUC No.	Event Name	Event Type	Summary of BUC (Goal)
UC-1	Create & Manage Customer Profile	External	Create or update customer profiles to maintain accurate records.
UC-2	Process Cash Transaction (Deposit/Withdrawal)	External	Handle deposits or withdrawals and update account balances.
UC-3	Transfer Funds Between Accounts	External	Transfer funds securely between valid accounts.
UC-4	Apply for Loan	External	Capture and validate customer loan requests for processing.
UC-5	Review & Decide Loan Application	External	Review pending loan applications and decide approval or rejection.
UC-6	View Transaction History & Generate Statement	External	Retrieve and display transaction history or generate account statements.
UC-7	Accrue & Post Monthly Interest	Temporal	Automatically calculate and post interest to eligible accounts.
UC-8	Overdraft Detection & Alert	State	Detect overdrafts and alert customers instantly when balance becomes negative.

6d. Specifying a business use case



Customer Applying for Loan

7a. Business Data Model



7b. Data Dictionary

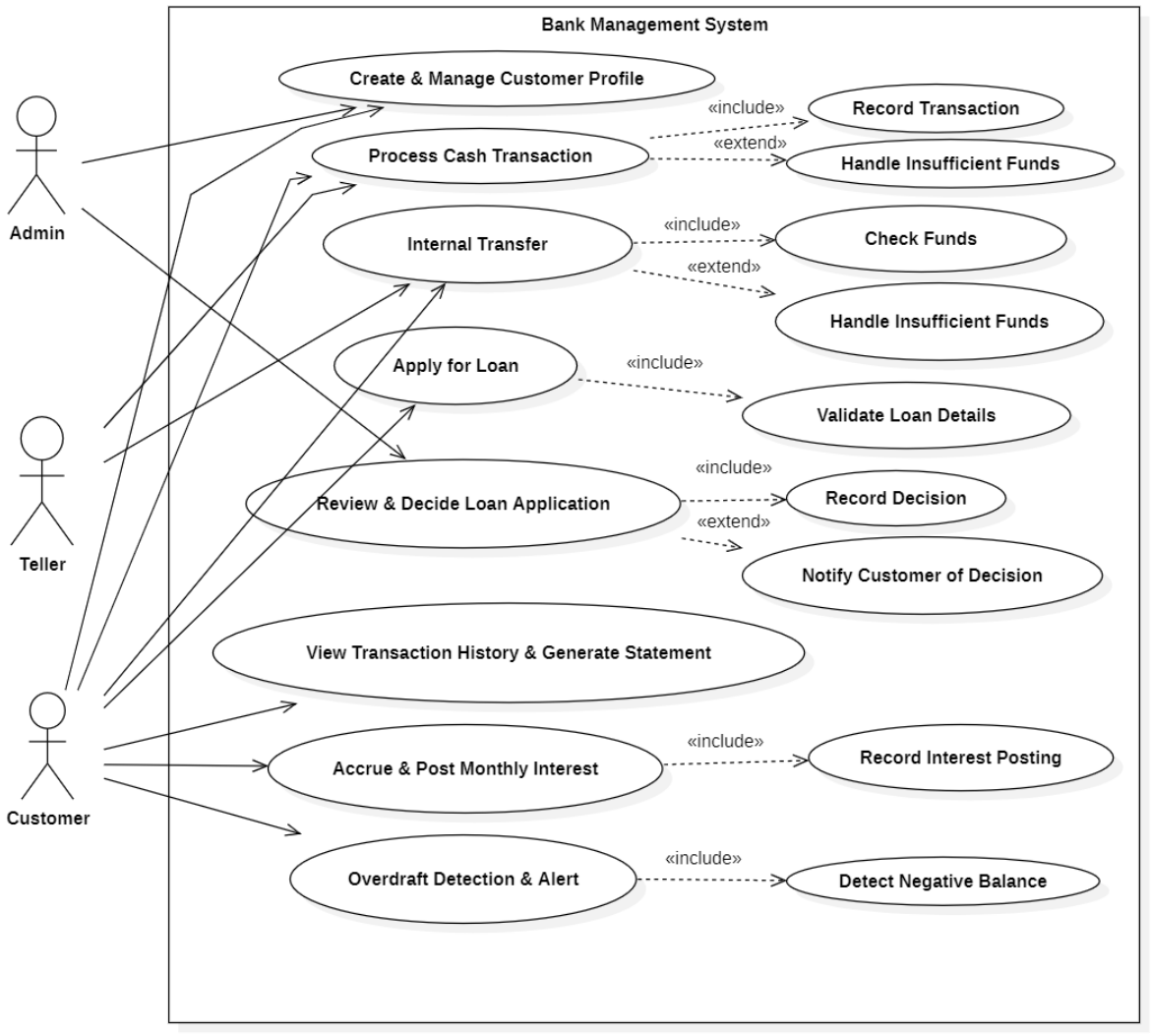
Entity	Attribute	Description
Customer	customerID	System-generated unique customer identifier.
	nationalID	Government-issued ID for identity verification.

Entity	Attribute	Description
	fullName	Customer’s full legal name.
	email	Unique email address.
	phoneNumber	Contact phone number.
	address	Residential address.
	customerTier	Standard / Premium / Business.
	dateCreated	Date when profile was created.
	status	Active / Inactive.
Employee	employeeID	Unique employee identifier.
	fullName	Employee name.
	email	Work email address.
	role	Teller / CSO / Credit Officer / Admin.
	branchID	Branch location of the employee.
Account	accountNumber	Unique account number.
	customerID	Owner of the account.
	accountType	Savings / Current / Business.
	balance	Current account balance.
	currency	Currency code (EGP, USD, EUR).
	status	Active / Closed / Frozen.
	dateOpened	Date account was created.
Transaction	transactionID	Unique transaction identifier.
	accountNumber	Target account.
	type	Deposit / Withdrawal / Payment / Interest Posting.
	amount	Amount transferred.
	timestamp	Date and time of transaction.
	performedBy	EmployeeID, CustomerID, or System.
	note	Optional description.
Transfer	transactionID	Links to Transaction.
	fromAccount	Sender account.
	toAccount	Receiver account.
	amount	Amount transferred.
	timestamp	Time of transfer.
Loan Application	applicationID	Unique application ID.
	customerID	Applicant ID.
	loanAmount	Requested principal amount.
	loanType	Personal / Car / Mortgage / Business.

Entity	Attribute	Description
	requestDate	Submission date.
	status	Pending / Approved / Rejected.
	creditOfficerID	Reviewing employee.
	notes	Officer remarks.
Loan	loanID	Unique loan identifier.
	applicationID	Linked approved application.
	customerID	Borrower.
	loanAmount	Approved loan amount.
	interestRate	Assigned interest rate.
	installmentAmount	Monthly installment amount.
	durationMonths	Duration of loan in months.
	startDate	Loan activation date.
	status	Active / Completed / Defaulted.
Statement	statementID	Unique statement identifier.
	accountNumber	Account linked to the statement.
	periodStart	Start date of statement period.
	periodEnd	End date of statement period.
	generatedDate	Date of statement generation.
	filePath	File storage location.
Overdraft Event	overdraftID	Unique overdraft ID.
	accountNumber	Account that went below zero.
	timestamp	Overdraft trigger time.
	amount	Negative balance amount.
	alertSent	Whether alert notification was sent.
Interest Posting	postingID	Unique identifier.
	accountNumber	Savings account receiving interest.
	amount	Interest added.
	timestamp	Posting date/time.
	rateUsed	Interest rate applied.

8. The Scope of the Product

8a. Product Boundary



8b. Product Use Case (PUC) Summary Table The product use cases correspond directly to the defined business use cases, detailing the specific automated functionality provided to the actors:

PUC No.	PUC Name	Actor/s	Summary of Product Functionality
UC-1	Manage Customer Profile	CSO / Admin	Allows Admin users to view, update, and search customer details.
UC-2	Process Cash Transaction	Teller / Customer	Allows users to deposit or withdraw money (FR-4.1 to FR-4.4).

UC-3	Transfer Funds	Customer	Allows Customer users to transfer funds between their own accounts (FR-4.5).
UC-4	Submit Loan Application	Customer / Admin	Captures loan request date, amount, and type, setting status to "Pending".
UC-5	Decide Loan Application	Credit Officer / Admin	Allows Admin users to approve or reject pending loan applications.
UC-6	Generate Statement	Customer / Admin	Maintains transaction history and generates reports/statements for specified periods.
UC-7	Post Monthly Interest	System (Scheduler)	Creates interest postings and updates account balances.
UC-8	Detect Overdraft	System / Customer	Flags negative balance events, creates an overdraft alert, and notifies the customer.

8c. Individual Product Use Cases

PUC-1: Manage Customer Profile

Goal: View, search, and update customer information

Primary Actor: CSO / Admin

Preconditions

Actor is authenticated and authorized (role = CSO or Admin).

Customer profile exists (for updates).

Main Flow

Actor opens “Customer Management” screen.

Actor searches for a customer using name, email, or ID.

BMS displays matching results.

Actor selects a customer profile.

BMS displays full customer details.

Actor updates fields (email, phone, address, tier).

Actor saves changes.

System validates and stores updates**.**

Alternatives / Exceptions

E1: Invalid email format → System rejects update and shows error.

E2: Duplicate email → System rejects update.

E3: Customer not found → System shows “no results”.

Postconditions

Customer profile is updated and audit log is recorded.

PUC-2: Process Cash Transaction (Deposit/Withdrawal)

Goal: Perform deposit or withdrawal.

Primary Actor: Teller / Customer

Preconditions

Actor authenticated.

Account exists and is active**.**

Main Flow

Actor selects “Deposit” or “Withdrawal”.

Actor enters account number and amount.

System validates amount.

For withdrawal: system checks available balance.

System performs transaction atomically.

System updates account balance.

System generates transaction record.

System returns confirmation.

Exceptions

E1: Insufficient balance → Withdrawal is rejected.

E2: Invalid amount → Transaction rejected.

E3: Account is frozen/closed → Rejected.

Postconditions

Account balance updated.

Transaction logged.

PUC-3: Transfer Funds

Goal: Transfer money between customer-owned accounts.

Primary Actor: Customer

Preconditions

Customer is logged in.

Both accounts belong to the customer.

Main Flow

Customer selects “Transfer Funds”.

Enters source account, destination account, and amount.

System validates ownership.

System checks balance in source account.

System performs atomic transfer.

System records 2 transaction entries (debit & credit).

System shows confirmation.

Exceptions

E1: Not enough balance → Transfer canceled.

E2: Destination account invalid → Error shown.

E3: Same account selected → Error shown.

Postconditions

Funds transferred successfully.

Both accounts updated.

PUC-4: Submit Loan Application

Goal: Allow customer/Admin to submit a loan request.

Primary Actor: Customer / Admin

Preconditions

Customer profile exists.

Main Flow

Customer/admin opens “Loan Application”.

Enters loan amount, type, and supporting info.

System validates mandatory fields.

System creates new loan application with status “Pending”.

Confirmation displayed.

Exceptions

E1: Missing required fields → System rejects submission.

E2: Invalid loan amount → Error shown**.**

Postconditions

Application stored with “Pending” status.

PUC-5: Decide Loan Application

Goal: Approve or reject loan applications.

Primary Actor: Credit Officer / Admin

Preconditions

Actor authenticated with proper role.

Pending application exists.

Main Flow

Actor opens “Loan Review”.

System displays list of pending applications.

Actor selects one application.

Actor clicks “Approve” or “Reject”.

System updates status.

System logs reviewer and timestamp.

Exceptions

E1: Application already decided → Show error.

E2: Missing officer permissions → Deny action.

Postconditions

Loan application marked Approved or Rejected.

PUC-6: Generate Statement

Goal: Produce account statement for selected period.

Primary Actor: Customer / Admin

Preconditions

Account exists.

Actor is authorized to view account**.**

Main Flow

Actor selects account and date range.

BMS retrieves all matching transactions.

BMS compiles statement.

BMS displays result and offers PDF download.

BMS stores a copy in system logs.

Exceptions

E1: Invalid date range → Show error.

E2: No transactions → Show "empty statement".

Postconditions

Statement generated and available for viewing/export.

PUC-7: Post Monthly Interest

Goal: Automatically post monthly interest**.**

Primary Actor: Customer

Preconditions

Monthly trigger time reached.

Account is interest-eligible.

Main Flow

Scheduler triggers interest calculation.

System retrieves all savings accounts.

Calculates interest (balance × rate).

Creates interest posting transaction.

Updates account balance.

Logs posting.

Exceptions

E1: Account disabled → Skip.

E2: Calculation error → System logs failure.

Postconditions

Interest added to all eligible accounts.

PUC-8: Detect Overdraft

Goal: Detect negative balance and alert customer.

Primary Actor: Customer

Preconditions

Account balance becomes negative.

Main Flow

After each transaction, system checks balance.

If balance < 0 → overdraft triggered.

System creates overdraft event record.

System sends SMS/email alert to customer.

System logs notification status.

Exceptions

E1: SMS/email service unavailable → Retry later and log failure.

Postconditions

Customer notified.

Overdraft event stored.

9. Functional Requirements

1. Authentication & Authorization

FR-1.1: The system shall allow users to log in using their username and password.

FR-1.2: The system shall authenticate users and assign them one of two roles: Admin, or Customer.

FR-1.3: The system shall restrict access to features based on user roles (role-based access control).

FR-1.4: The system shall allow users to log out of the system securely.

FR-1.5: The system shall lock user accounts after 3 consecutive failed login attempts.

FR-1.6: The system shall maintain user session information during active use.

2. Customer Management

FR-2.1: The system shall allow Admin users to view customer details including associated accounts.

FR-2.2: The system shall allow Admin users to update customer information (name, email, phone).

FR-2.3: The system shall allow Admin users to deactivate customer accounts.

FR-2.4: The system shall prevent duplicate customer email addresses in the system.

FR-2.5: The system shall allow Admin users to search for customers by name, email, or customer ID.

FR-2.6: The system shall display a list of all registered customers to Admin users.

3. Account Management

FR-3.1: The system shall allow Admin users to create new bank accounts for customers.

FR-3.2: The system shall generate unique account numbers automatically for each new account.

FR-3.3: The system shall support multiple account types: Savings, Checking, and Fixed Deposit.

FR-3.4: The system shall allow customers to have multiple accounts.

FR-3.5: The system shall display account details including account number, type, balance, and status.

FR-3.6: The system shall allow Admin users to change account status (Active, Inactive, Closed).

FR-3.7: The system shall allow users to view all accounts associated with a specific customer.

FR-3.8: The system shall maintain an initial balance of zero for newly created accounts.

FR-3.9: The system shall prevent deletion of accounts with non-zero balances.

FR-3.10: The system shall display real-time account balance information.

4. Transaction Processing

FR-4.1: The system shall allow Admin users to deposit money into customer accounts.

FR-4.2: The system shall allow Admin users to withdraw money from customer accounts.

FR-4.3: The system shall allow Customer users to deposit money into their own accounts.

FR-4.4: The system shall allow Customer users to withdraw money from their own accounts.

FR-4.5: The system shall allow Customer users to transfer funds between their own accounts.

FR-4.6: The system shall validate sufficient balance before processing withdrawal

transactions.

FR-4.7: The system shall update account balances immediately after transaction completion.

FR-4.8: The system shall accept only positive amounts for transactions.

FR-4.9: The system shall allow users to add optional descriptions to transactions.

FR-4.10: The system shall automatically record transaction date and time.

FR-4.11: The system shall calculate and store the balance after each transaction.

FR-4.12: The system shall support decimal precision up to 2 decimal places for monetary amounts.

FR-4.13: The system shall rollback transactions if any error occurs during processing.

5. Transaction History & Statements

FR-5.1: The system shall maintain a complete history of all transactions for each account.

FR-5.2: The system shall allow users to view transaction history for specific accounts.

FR-5.3: The system shall display transaction details including date, type, amount, and description.

FR-5.4: The system shall display the balance after each transaction in the history.

FR-5.5: The system shall sort transactions by date in descending order (most recent first).

FR-5.6: The system shall allow Customer users to view only their own transaction history.

FR-5.7: The system shall allow Admin users to view transaction history for any account.

FR-5.8: The system shall allow users to filter transactions by type (Deposit, Withdrawal, Transfer).

FR-5.9: The system shall allow users to filter transactions by date range.

FR-5.10: The system shall generate account statements showing all transactions for a specified period.

6. Loan Management

FR-6.1: The system shall allow Customer users to apply for loans by specifying amount and

loan type.

FR-6.2: The system shall support multiple loan types: Personal, Home, Auto, and Business.

FR-6.3: The system shall allow Admin users to submit loan applications on behalf of customers.

FR-6.4: The system shall automatically set loan status to "Pending" upon submission.

FR-6.5: The system shall record the loan request date automatically.

FR-6.6: The system shall allow Admin users to approve pending loan applications.

FR-6.7: The system shall allow Admin users to reject pending loan applications.

FR-6.8: The system shall record the approval/rejection date when Admin processes a loan.

FR-6.9: The system shall display all loan applications with their current status.

FR-6.10: The system shall allow Customer users to view only their own loan applications.

FR-6.11: The system shall allow Admin users to view all loan applications in the system.

FR-6.12: The system shall allow filtering of loans by status (Pending, Approved, Rejected).

FR-6.13: The system shall allow customers to have multiple loan applications.

FR-6.14: The system shall track loan amounts with decimal precision up to 2 decimal places.

FR-6.15: The system shall prevent modification of loan amount after submission.

7.Dashboard & Reporting

FR-7.1: The system shall display a dashboard with key statistics upon login.

FR-7.2: The system shall display total balance across all accounts to Admin users.

FR-7.3: The system shall display total number of active accounts to Admin users.

FR-7.4: The system shall display total number of registered customers to Admin users.

FR-7.5: The system shall display Customer users' account balances on their dashboard.

FR-7.6: The system shall display recent transactions (last 5-10) on the dashboard.

FR-7.7: The system shall display pending loan applications count to Admin users.

FR-7.8: The system shall generate summary reports for Admin users showing:

Total deposits and withdrawals for a time period

Number of new accounts opened

Total loan amounts disbursed

Number of active customers

FR-7.9: The system shall allow Admin users to export reports in common formats.

FR-7.10: The system shall display real-time data updates without requiring page refresh.

8. Data Validation & Integrity

FR-8.1: The system shall validate all user inputs before processing.

FR-8.2: The system shall prevent duplicate usernames in the system.

FR-8.3: The system shall prevent duplicate account numbers in the system.

FR-8.4: The system shall validate email format for customer records.

FR-8.5: The system shall ensure all monetary amounts are non-negative.

FR-8.6: The system shall maintain referential integrity between customers and accounts.

FR-8.7: The system shall maintain referential integrity between accounts and transactions.

FR-8.8: The system shall ensure transaction atomicity (all-or-nothing execution).

FR-8.9: The system shall prevent concurrent modifications to the same account balance.

FR-8.10: The system shall validate that account exists before processing transactions.

9. Error Handling & Notifications

FR-9.1: The system shall display clear error messages when operations fail.

FR-9.2: The system shall display success messages when operations complete successfully.

FR-9.3: The system shall notify users of insufficient balance during withdrawal attempts.

FR-9.4: The system shall notify users when account is not found.

FR-9.5: The system shall notify Admin users when a new loan application is submitted.

FR-9.6: The system shall log all errors for administrative review.

FR-9.7: The system shall provide user-friendly error messages without exposing system

details.

10. Search & Filter Capabilities

FR-10.1: The system shall allow users to search for accounts by account number.

FR-10.2: The system shall allow users to search for customers by name or email.

FR-10.3: The system shall allow filtering of transactions by date range.

FR-10.4: The system shall allow filtering of transactions by type.

FR-10.5: The system shall allow filtering of loans by status.

FR-10.6: The system shall allow filtering of accounts by account type.

FR-10.7: The system shall display search results in a clear, organized format

Non-functional Requirements

11. Usability and Humanity Requirements

11a. Ease of Use

Description:

The BMS interface must be simple enough for tellers and CSOs to complete transactions with minimal training.

Rationale:

Frontline staff must serve customers quickly to reduce branch queue times.

Fit Criterion:

A teller must be able to complete a deposit or withdrawal in under 20 seconds during usability testing.

11b. Personalization / Internationalization

Description:

The system must support English and Arabic interfaces.

Rationale:

PIB operates in Egypt with bilingual staff and customers.

Fit Criterion:

Users can switch languages, and all text is correctly translated.

11c. Learning Requirements

Description:

New employees must be able to learn basic BMS operations quickly.

Rationale:

Reduces onboarding time for tellers and CSOs.

Fit Criterion:

New tellers must perform basic transactions independently after 2 hours of guided practice.

11d. Understandability

Description:

The system must present customer and account data in a clear, unified dashboard.

Rationale:

Staff need a “single view of customer” for accuracy**.**

Fit Criterion:

All customer information must be accessible within 2 clicks from the main dashboard.

12. Performance Requirements

12a. Speed and Latency Requirements

- **Description:** The system must display real-time account balance information (FR-3.10).
- **Fit Criterion:** Account balances shall be updated immediately after transaction completion, allowing the display to reflect the change without requiring a page refresh.

12b. Capacity

Description:

The system must support large-scale daily banking operations.

Rationale:

PIB branches handle thousands of customers.

Fit Criterion:

At least 10,000 transactions/hour

Up to 200 concurrent employees

Up to 50,000 online customers concurrently

12c. Precision or Accuracy Requirements

- **Description:** All monetary amounts, including transaction amounts and loan amounts, shall be accurate.
- **Fit Criterion:** The system shall support decimal precision up to 2 decimal places .

12d. Reliability and Availability Requirements

- **Description:** The system shall ensure data integrity during transaction processing.
- **Fit Criterion:** The system must ensure transaction atomicity (all-or-nothing execution, FR-8.8), and rollback transactions if any error occurs.

12e. Robustness / Fault Tolerance

Description:

Failures (network, timeout, server restart) must not corrupt data.

Fit Criterion:

Failed operations automatically roll back and generate an internal error log.

13. Operational & Environmental Requirements

13a. Physical Environment

Description:

Used in branches, back-office, customer homes, and data centers.

Fit Criterion:

System must function on normal office PCs and mobile devices.

13b. Technological Environment

Description: Must operate within PIB infrastructure (Windows PCs, MSSQL)

Fit Criterion: System deployment validated by PIB IT.

14. Maintainability & Support Requirements

14a. Adaptability

Description:

System must allow new account types, loan types, and interest rules.

Fit Criterion:

Such changes must be configurable without code changes.

14b. Maintainability

Description:

Codebase must follow PIB coding standards and modular architecture.

Fit Criterion:

A new developer must understand module structure within 1 hour.

15. Security Requirements

15a. Access Requirements

- **Description:** Users must be authenticated and authorized according to their role (FR-1.2, FR-1.3).
- **Fit Criterion:** Customer users shall only be able to view their own transaction history (FR-5.6) and loan applications (FR-6.10); Admin users must be able to view all transactions (FR-5.7) and applications (FR-6.11).

15b. Integrity Requirements

- **Description:** The system shall protect the integrity and consistency of stored data.
- **Fit Criterion:** The system shall maintain referential integrity between customers and accounts and accounts and transactions. It must also prevent concurrent modifications to the same account balance.
- **Description:** The system shall protect itself from intentional abuse via logins.
- **Fit Criterion:** The system shall lock user accounts after 3 consecutive failed login attempts.

15d. Auditability

Description:

System must log user actions, especially financial activities.

Fit Criterion:

Logs must include timestamp, user ID, old/new values.

16. Cultural & Political Requirements

16a. Cultural

Description:

System must support Arabic right-to-left UI.

Fit Criterion:

Arabic UI renders correctly in RTL.

16b. Political

Description:

Must comply with Central Bank of Egypt standards.

Fit Criterion:

All reports match CBE-required format

17. Legal Requirements

17a. Data Protection Laws

Description:

Must comply with Egyptian data protection & banking laws.

Fit Criterion:

Audit confirms no unencrypted personal data.

17b. Financial Regulations

Description:

Must support anti-money-laundering (AML) policies.

Fit Criterion:

Suspicious transactions ≥ threshold must be flagged.

18. Health & Safety Requirements

Description:

The system must not pose ergonomic or physical risks.

Fit Criterion:

System UI follows standard accessibility guidelines.

19. Environmental Requirements

Description:

No special environmental conditions required.

Fit Criterion:

Runs in standard office environment (20–30°C).

20. External Interface Requirements

20a. Hardware Interfaces

PCs, mobile devices, POS-like teller terminals.

20b. Software Interfaces

MSSQL

LDAP / OAuth2

SMS Gateway

Email SMTP

CBE reporting API

20c. Communications Interfaces

HTTPS

Secure internal LAN

Project Issues

21. Tasks

21a. Project Planning The project development lifecycle must be managed using established tools.

- **Description:** The project shall be managed with clear task stages (To Do, In Progress, and Done) assigned to team members.
- **Form:** Utilization of **Jira** to streamline collaboration, requirement documentation, and milestone completion.

22. Risks

- **Risk:** Insufficient balance during a withdrawal or transfer attempt.
- **Contingency:** The system must validate sufficient balance before processing withdrawals and notify the user of insufficient balance during attempts.
- **Risk:** Concurrent modifications to the same account balance leading to inaccurate data.
- **Contingency:** The system must prevent concurrent modifications and enforce atomicity.

23. Costs
Description:

Costs limited to existing PIB infrastructure.

Fit Criterion:

No licensing beyond approved tools.

24. User Documentation Requirements

Description:

Must include training manual, quick-start guide, and API documentation.

Fit Criterion:

Tellers trained within 2 hours using manual.

25. Training Requirements

Description:

Staff must receive training sessions for new modules.

Fit Criterion:

All tellers must pass a 10-question quiz demonstrating understanding.

26. Waiting Room

Requirements that are currently outside the immediate project scope but identified as desirable future features, such as those mentioned in the questionnaire for new system priorities:

- **Feature:** Automated alerts for compliance (e.g., large cash transactions, suspicious activity).
- **Feature:** Integration with a document scanner for IDs and forms.

27. Ideas for the Future

Possible future enhancements:

Chatbot customer assistant

Voice banking

Biometric login

Real-time currency exchange engine

This SRS provides a specification for the Bank Management System, laying out the required functionality and quality attributes based on the identified core domain entities and use cases derived from the sources. The document acts like a **detailed instruction manual**, where the domain classes are the fundamental building blocks (like bricks and steel), the use cases are the major operations (like assembling walls), and the functional and non-functional requirements define the precise characteristics of those operations (like the thickness of the walls and the security of the doors).