

# MAJOR – PROJECT

## Development of a Web Application for Bank

### Project Overview:

The bank web application is designed to provide a comprehensive online banking solution, improving the overall customer experience while enhancing operational efficiency for the bank. This system will enable users to manage their bank accounts, apply for loans, and interact with customer support seamlessly. Additionally, it will offer banking staff and administrators the tools to oversee customer management, transaction approvals, and system settings efficiently.

The application integrates modern security practices, including role-based JWT authentication and multi-factor authentication, to ensure secure access for both customers and staff. The backend, developed using .NET Core with the repository pattern, will handle business logic, while Entity Framework Core will manage database interactions. The frontend will be developed using Angular, ensuring a responsive and dynamic user interface that adapts to various devices and screen sizes. The use of SQL Server for relational database management ensures robust and scalable data storage.

### Objective:

The primary objective of this project is to develop a secure, user-friendly web application that provides a wide range of banking services to both customers and staff, thereby improving customer satisfaction and operational efficiency. The key goals include:

#### 1. Enhanced Customer Experience:

- Provide a responsive and intuitive interface for managing accounts, applying for loans, and accessing customer support.
- Allow customers to track loan applications and view account details easily.

#### 2. Secure Transactions:

- Implement secure login mechanisms with multi-factor authentication and role-based JWT authentication for access control.
- Ensure data encryption and regular audits to safeguard sensitive information.

#### 3. Operational Efficiency:

- Streamline banking operations such as account management, loan processing, and customer service.
- Equip banking staff with tools for customer management, high-value transaction approval, and report generation.
- Provide administrators with user management, audit tracking, and system configuration capabilities to maintain smooth operations.

## **Key Features of the Bank Web Application:**

### **1. User Module:**

- **Login/Registration:**
  - Secure access to customer profiles via role-based JWT authentication.
  - Multi-factor authentication (MFA) for additional security.
  - User registration with personal details validation and account creation.
- **Account Management:**
  - View account details such as balances and recent transactions.
  - Modify personal information and account settings.
- **Loan Application:**
  - Apply for various types of loans by submitting relevant details.
  - Track the status of loan applications from submission to approval.
- **Customer Support:**
  - Submit queries or requests for assistance.
  - View the status of support tickets and receive follow-up actions.

### **2. Banking Staff Module:**

- **Login for Staff:**
  - Secure login for banking staff with role-specific access.
- **Customer Management:**
  - Access and manage customer profiles, account details, and services.
  - Assist with customer requests and queries.
- **Transaction Approval:**
  - Review and approve high-value transactions and loan applications.
- **Reporting:**
  - Generate reports on customer activities, transactions, and loan data.
  - Access operational reports to monitor bank performance.

### **3. Admin Module:**

- **User Management:**
  - Manage system users, assign roles, and set permissions for customers, staff, and admins.
  - Ensure compliance by monitoring user activity through audit trails.
- **Audit Trails:**
  - Track and log all system activities for security, monitoring, and compliance purposes.
- **System Configuration:**
  - Configure system-wide operational parameters and security settings.
  - Manage configurations related to user roles, transaction limits, and other critical operations.

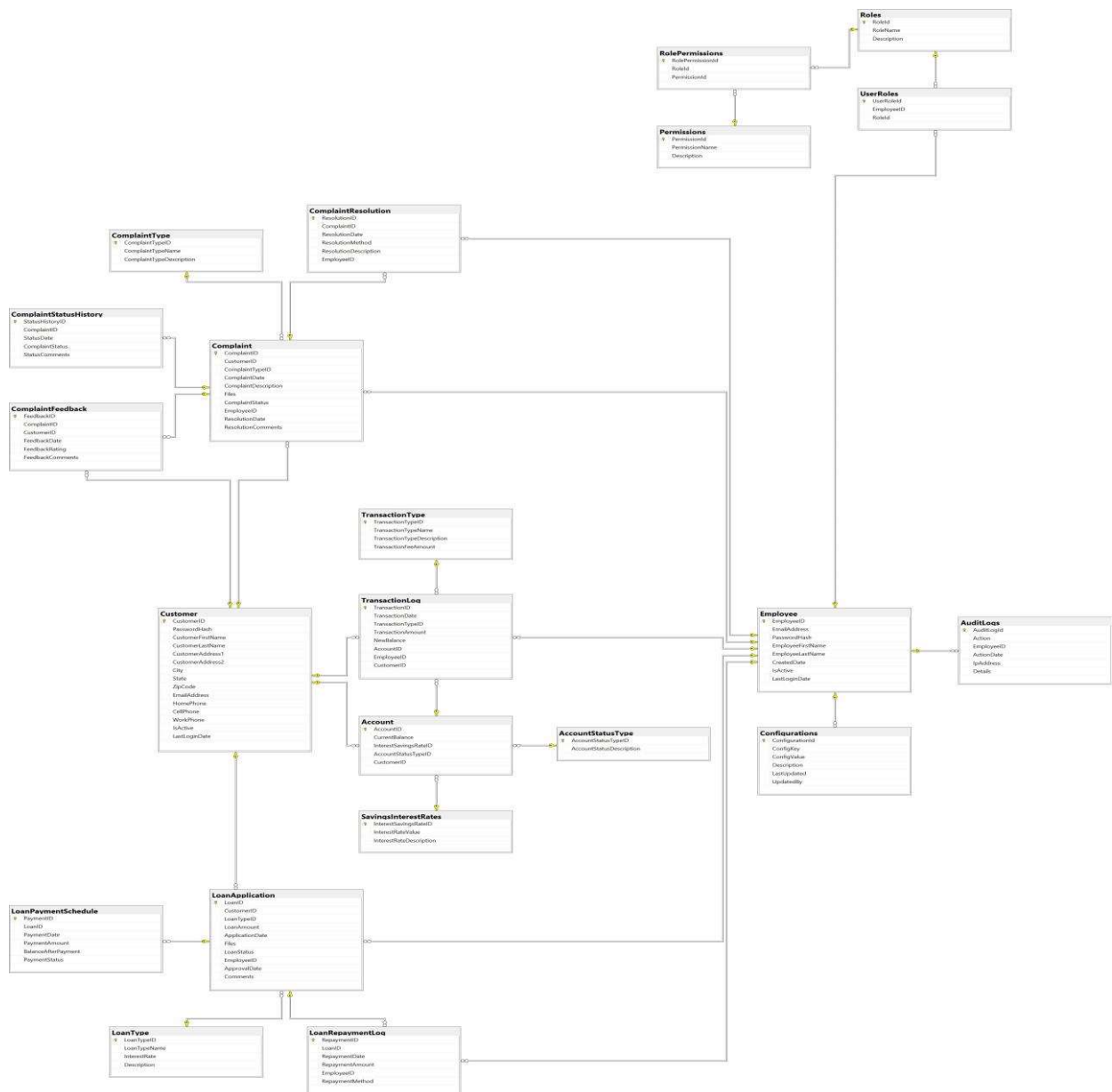
#### 4. Security Features:

- **Role-Based JWT Authentication:**
  - Role-specific access to different parts of the application for customers, staff, and admins.
  - Secure API endpoints with token-based authentication.
- **Multi-Factor Authentication (MFA):**
  - Additional security layer for user logins, requiring multiple verification methods.
- **Data Encryption:**
  - Sensitive data such as account information and transaction details are encrypted both in transit and at rest.
- **Regular Audits and Compliance Checks:**
  - Periodic system audits to ensure security policies and industry compliance are maintained.

#### 5. Performance Optimization:

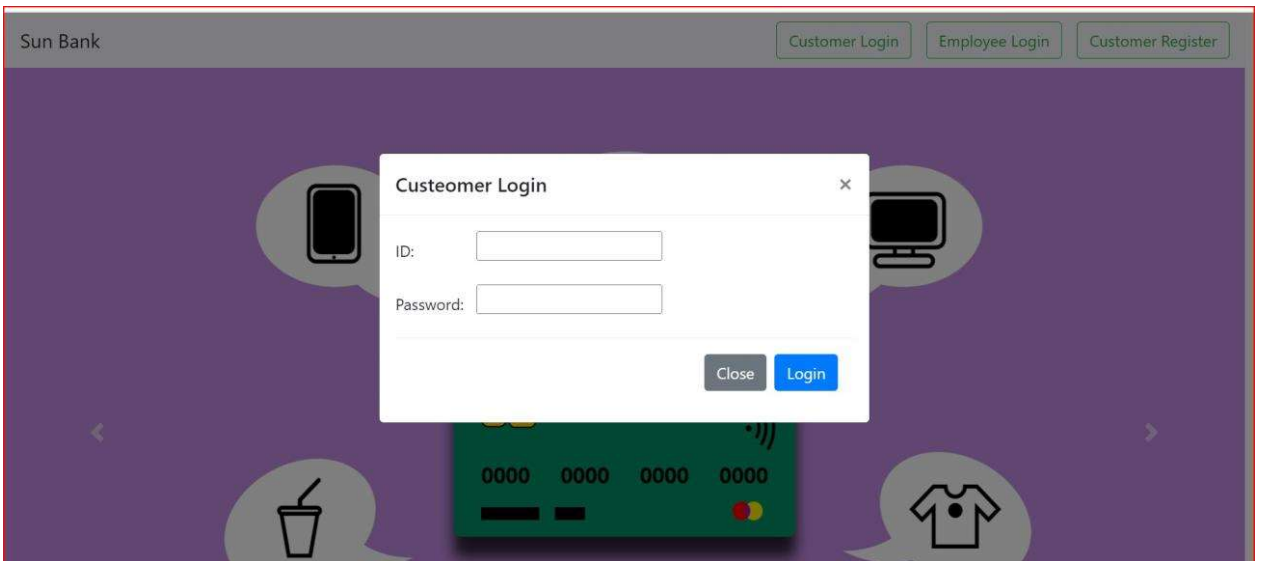
- Implement caching strategies and optimized queries with **Entity Framework Core** to improve application performance and reduce load times.
- Use asynchronous processing for non-critical tasks like email notifications to improve responsiveness.

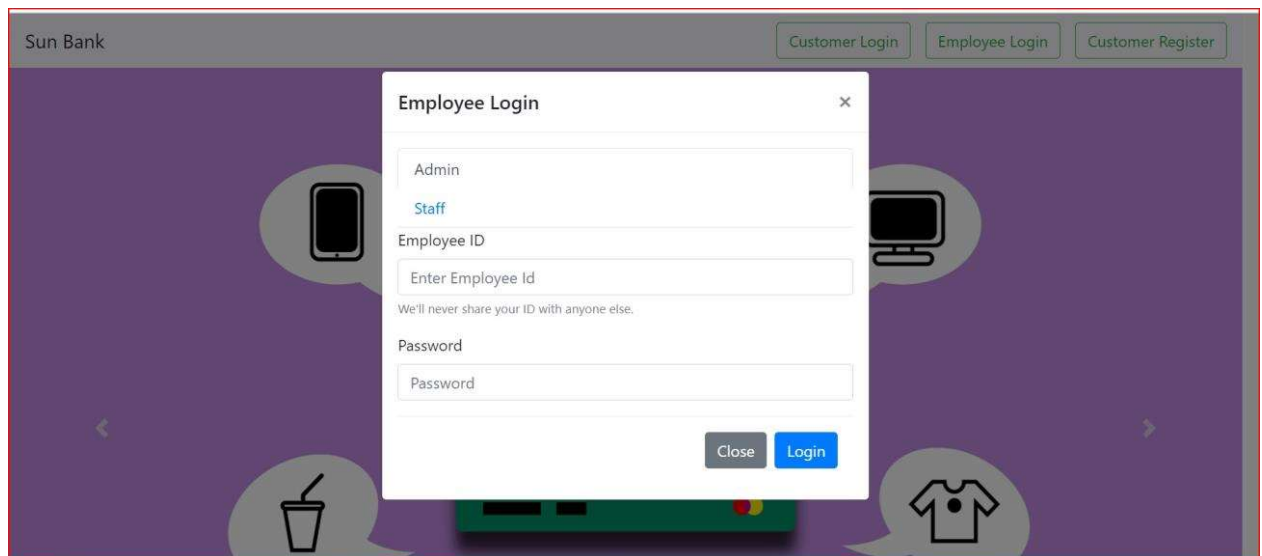
#### Database Design:



Output:

Login Page:





## Register a New Customer

First Name:	Last Name:	
<input type="text" value="Enter first name"/>	<input type="text" value="Enter last name"/>	
Address 1:	Address 2:	
<input type="text" value="Enter address line 1"/>	<input type="text" value="Enter address line 2"/>	
City:	State:	Zip Code:
<input type="text" value="Enter city"/>	<input type="text" value="Enter state"/>	<input type="text" value="Enter zip code"/>
Email:	Cell Phone:	
<input type="text" value="Enter email address"/>	<input type="text" value="Enter cell phone"/>	
Password:		
<input type="text" value="Enter password"/>		
Password is required (minimum 6 characters) & 1 uppercase, 1 lowercase, 1 number, 1 special character		
<div><button>Back to Login</button><button>Register</button></div>		

UserLogin:

## Account Information

sanjeev kumar

## Accounts

Account ID: 1 - Balance: \$2997

## Transactions

Transaction Id: 1 - Amount: \$1000  
Balance: 6000Transaction Id: 6 - Amount: \$1000  
Balance: 4000Transaction Id: 8 - Amount: \$1003  
Balance: 2997

Previous

Next

View Full Profile

## Transfer Funds

From Account

To Account

Amount

Transaction Type

Transfer

# Customer Complaints

Register New Complaint

Search complaints

PreviousNext

Complaint ID #1

Status: Open

Issue with transaction

Sep 20, 2024

View Details

# Complaint Details

Complaint ID:

1

Customer ID:

C111111

Description:

Issue with transaction

Status:

Open

Resolution Comments:

Pending

Assigned Employee:

Amit Sharma

Complaint Feedbacks

9/20/24: Waiting for response

Complaint Date:

September 20, 2024 at 7:56:31 PM GMT+5

Complaint Type:

Transaction

Resolution Date:

N/A

File:

No file attached

Complaint Resolutions

Investigated

Back to Complaints



# Register a New Complaint

Complaint Type

Complaint Description

Upload Files

Choose FileNo file chosen

Submit Complaint

# Applied Loans

Apply for a New Loan

Filter by loan type, status, or amount

Loan ID	Loan Type	Loan Amount	Application Date	Loan Status	Approval Date	Actions
1	Personal	\$10,000.00	Sep 10, 2024	Approved	Sep 15, 2024	<div>View Details</div>
6	Personal	\$10,000.00	Sep 20, 2024	Pending	N/A	<div>View Details</div>

Previous

1 / 1

Next

Loan Details

Loan ID: 1

Customer ID: C111111

Loan Type: Personal

Loan Amount: \$10,000.00

Application Date: Sep 10, 2024

Loan Status: Approved

Approval Date: Sep 15, 2024

Comments: Approved for personal loan

Payment Schedules

Due Date	Amount	Payment Status
Sep 19, 2024	\$1,000.00	Completed

Repayment Logs

Repayment ID	Amount	Date
1	\$1,000.00	Sep 19, 2024

Apply for a New Loan

Loan Type

Loan Amount

0

Application Date

dd-mm-yyyy

Supporting Documents

Choose File

No file chosen

Comments

Apply for Loan

Account Information

sanjeev kumarUpdate Details

Contact Information

Email: sanjeev@example.com

Cell Phone: 9876543210

Home Phone:

Work Phone:

Address

Address 1:

Address 2:

City: Mumbai, Maharashtra - 10001

Profile Information

Status: Active

Last Login Date: Sep 20, 2024, 3:46:13 PM

Update Customer

First Name:

sanjeev

Last Name:

kumar

Address 1:

Enter address line 1

Address 2:

Enter address line 2

City:

Mumbai

State:

Maharashtra

Zip Code:

10001

Email:

sanjeev@example.com

Cell Phone:

9876543210

Home Phone:

Enter home phone

Work Phone:

Enter work phone

Password:

.....

when you change profile must change Password and is required (minimum 6 characters).

Back to Profile

Update

Admin DashBoard:

## Customer Management

Add New Customer

C111111 : sanjeev kumar

Email: sanjeev@example.com

Phone: 9876543210

Details

Delete

C111112 : sanjay ray

Email: sanjay@example.com

Phone: 9876543212

Details

Delete

C111113 : kumar reddy

Email: kumar@example.com

Phone: 9876543213

Details

Delete

C111114 : jay kumar

Email: jay@example.com

Phone: 9876543214

Details

Delete

C111115 : pavan kumar

Email: pavan@example.com

Phone: 9876543215

Details

Delete

Previous

1

Next

Customer Details

sanjeev kumar

Customer ID: C111111

Email: sanjeev@example.com

Phone: Cell: 9876543210, Home: , Work:

Address

Mumbai, Maharashtra 10001

Accounts

Account ID: 1 - Balance: \$2,997.00

Complaints

Complaint ID: 1 - Status: Open

Loan Applications

Loan ID: 1 - Amount: \$10,000.00

Loan ID: 6 - Amount: \$10,000.00

Transaction Logs

Transaction ID: 1 - Amount: \$1,000.00

Transaction ID: 6 - Amount: \$1,000.00

Transaction ID: 8 - Amount: \$1,003.00

Back to List

Register a New Customer

First Name:

Enter first name

Last Name:

Enter last name

Address 1:

Enter address line 1

Address 2:

Enter address line 2

City:

Enter city

State:

Enter state

Zip Code:

Enter zip code

Email:

Enter email address

Cell Phone:

Enter cell phone

Password:

Enter password

Password is required (minimum 6 characters) & 1 uppercase, 1 lowercase, 1 number, 1 special character

Back to Customers Page

Register

## Employees List

Add New Employee

Search employees by name

#	First Name	Last Name	Email	Role	Active	Last Login	Actions
1	Amit	Sharma	Amit@example.com	support	Inactive	N/A	Delete
2	Neha	Patel	Neha@example.com	staff	Active	Sep 20, 2024, 8:10:08 PM	Delete
3	Raj	Kumar	Raj@example.com	cashier	Inactive	N/A	Delete
4	Priya	Desai	Priya@example.com	admin	Active	Sep 20, 2024, 9:19:22 PM	Delete

## Add New Employee

Email Address

Enter Email Address

Password

Enter Password

First Name

Enter First Name

Last Name

Enter Last Name

Is Active

Yes

Select Role

Add Employee

## Audit Logs

Search audit logs

#	Id	Action	Employee	Action Date	IP Address	Details
1	1	User Login	Amit Sharma	Sep 20, 2024, 7:56:31 PM	192.168.1.1	User logged in successfully
2	2	Password Reset	Amit Sharma	Sep 20, 2024, 7:46:31 PM	192.168.1.2	Password reset for user John
3	3	Created New User	Amit Sharma	Sep 20, 2024, 6:56:31 PM	192.168.1.3	Admin created a new user
4	4	Failed Login Attempt	Amit Sharma	Sep 19, 2024, 7:56:31 PM	192.168.1.4	User failed login attempt
5	5	Deleted Account	Neha Patel	Sep 18, 2024, 7:56:31 PM	192.168.1.5	Admin deleted user account

## Configuration List

Configuration ID	Key	Value	Description	Last Updated	Updated By
1	MaxLoginAttempts	5	Maximum number of login attempts before account lockout	9/20/24, 7:56 PM	E111111
2	SessionTimeout	30	Session timeout duration in minutes	9/19/24, 7:56 PM	E111111
3	PasswordExpirationDays	90	Number of days before a password expires	9/13/24, 7:56 PM	E111111
4	MinPasswordLength	8	Minimum password length for user accounts	9/20/24, 4:56 PM	E111111
5	EnableTwoFactorAuth	true	Enables or disables two-factor authentication	8/20/24, 7:56 PM	E111111

## Employee Profile

Employee ID: E111114

First Name: Priya

Last Name: Desai

Email: Priya@example.com

Is Active: Yes

Created Date: Sep 20, 2024, 7:27:25 AM

Last Login Date: Sep 20, 2024, 9:19:22 PM

## Audit Logs

No audit logs available.

## Complaints

- Card not working (Sep 20, 2024, 7:56:31 PM)

## Loan Applications

No loan applications available.

## Transaction Logs

No transaction logs available.

## User Roles

- admin

## Welcome to Admin Dashboard

Employee Name:

Priya Desai

Email Address:

Priya@example.com

Last Login Date:

9/20/24, 9:19 PM

Staff DashBoard:



## Welcome to Staff Employee Dashboard

Employee Name:

Neha Patel

Email Address:

Neha@example.com

Last Login Date:

9/20/24, 9:33 PM

## Loan Applications

Search loan applications

#	Customer	Loan Type	Amount	Application Date	Status	Assigned Employee	Actions
1	sanjeev kumar	Personal	\$10,000.00	Sep 10, 2024, 7:56:31 PM	Approved	Amit Sharma	<button>Details</button> <button>Update</button>
2	sanjay ray	Home	\$250,000.00	Sep 12, 2024, 7:56:31 PM	Approved	Neha Patel	<button>Details</button> <button>Update</button>
3	kumar reddy	Personal	\$5,000.00	Sep 14, 2024, 7:56:31 PM	Rejected	Raj Kumar	<button>Details</button> <button>Update</button>
4	jay kumar	Car	\$20,000.00	Sep 16, 2024, 7:56:31 PM	Approved	Raj Kumar	<button>Details</button> <button>Update</button>
5	pavan kumar	Home	\$15,000.00	Sep 18, 2024, 7:56:31 PM	Pending	Amit Sharma	<button>Details</button> <button>Update</button>
6	sanjeev kumar	Personal	\$10,000.00	Sep 20, 2024, 12:00:00 AM	Pending	N/A	<button>Details</button> <button>Update</button>

## Loan Details

**Loan ID:** 1

**Loan Type:** Personal

**Loan Amount:** \$10,000.00

**Application Date:** Sep 10, 2024, 7:56:31 PM

**Approval Date:** Sep 15, 2024, 7:56:31 PM

**Status:** Approved

**Assigned Employee:** Amit Sharma

**Comments:** Approved for personal loan

## Customer Details

**Name:** sanjeev kumar

**Email:** sanjeev@example.com

**Phone:** 9876543210

## Repayment Schedule

#	Due Date	Amount	Status
1	Sep 19, 2024, 7:56:31 PM	\$1,000.00	Completed

## Repayment Logs

#	Payment Date	Amount	Payment Mode
1	Sep 19, 2024, 7:56:31 PM	\$1,000.00	Bank Transfer

## Update Loan Details

Loan Amount

10000

Loan Type

Personal

Loan Status

Approved

Assigned Employee

E111111

Comments

Approved for personal loan

Update Loan

## Customer Management

Add New Customer

**C11111 : sanjeev kumar**

Email: sanjeev@example.com

Phone: 9876543210

Details

**C11112 : sanjay ray**

Email: sanjay@example.com

Phone: 9876543212

Details

**C11113 : kumar reddy**

Email: kumar@example.com

Phone: 9876543213

Details

**C11114 : jay kumar**

Email: jay@example.com

Phone: 9876543214

Details

**C11115 : pavan kumar**

Email: pavan@example.com

Phone: 9876543215

Details

Previous

1

Next

## Customer Details

sanjeev kumar

Customer ID: C111111

Email: sanjeev@example.com

Phone: Cell: 9876543210, Home: , Work:

Address

Mumbai, Maharashtra 10001

Accounts

Account ID: 1 - Balance: \$2,997.00

Complaints

Complaint ID: 1 - Status: Open

Loan Applications

Loan ID: 1 - Amount: \$10,000.00

Loan ID: 6 - Amount: \$10,000.00

Transaction Logs

Transaction ID: 1 - Amount: \$1,000.00

Transaction ID: 6 - Amount: \$1,000.00

Transaction ID: 8 - Amount: \$1,003.00

[Back to List](#)

## Register a New Customer

First Name:

Last Name:

Address 1:

Address 2:

City:

State:

Zip Code:

Email:

Cell Phone:

Password:

Password is required (minimum 6 characters) & 1 uppercase, 1 lowercase, 1 number, 1 special character

[Back to Customers Page](#)[Register](#)

Transaction List

Transaction ID	Customer ID	Amount	Actions
1	C111111	\$1,000.00	Transaction Details
2	C111112	\$1,000.00	Transaction Details
3	C111113	\$1,000.00	Transaction Details
4	C111114	\$1,000.00	Transaction Details
5	C111115	\$5,000.00	Transaction Details
6	C111111	\$1,000.00	Transaction Details
7	C111112	\$997.00	Transaction Details
8	C111111	\$1,003.00	Transaction Details
9	C111112	\$1,000.00	Transaction Details

Transaction Details

Transaction ID: 1

Date: Sep 19, 2024, 7:56:31 PM

Customer ID: C111111

Employee ID: E111111

Account ID: 1

Transaction Amount: \$1,000.00

New Balance: \$6,000.00

Transaction Type: Deposit

Back to Transactions

## Employee Profile

Employee ID: E111112

First Name: Neha

Last Name: Patel

Email: Neha@example.com

Is Active: Yes

Created Date: Sep 20, 2024, 7:27:25 AM

Last Login Date: Sep 20, 2024, 9:33:48 PM

### Audit Logs

- Admin deleted user account (Sep 18, 2024, 7:56:31 PM)

### Complaints

- Incorrect charge (Sep 20, 2024, 7:56:31 PM)

### Loan Applications

- Loan Amount: \$250,000.00 (Sep 12, 2024, 7:56:31 PM)

### Transaction Logs

No transaction logs available.

### User Roles

- staff