

AMERICAN INTERNATIONAL UNIVERSITY-BANGLADESH (AIUB)

Dept. of Computer Science Faculty of Science and Technology

CSC2210: OBJECT ORIENTED PROGRAMMING 2

Fall 2024-2025

Section: [J]

Group No: 01

Project Report On

Project Name [Bank Management System]

Supervised By

Taslimur Rahman

Submitted By:

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|----------------------|------------|
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Obtained Marks for CO2 and CO3 (Description given in the following page)

| Assessment Criteria | Not Atte Incorre | | Inadequate (1-2) | e Average Good (4) | | Excellent (5) |
|-----------------------------------|---------------------|--------|---------------------------|--|---------|---------------|
| Evaluation Criteria (CO2) Total = | | otal = | Evaluation Criteria (CO3) | | Total = | |
| Requirement ful | fillment | | | Organization of the application | | |
| Validation | n | | | Representation and Integration of Database | | |
| Verificatio | on | | | Graphical User Interface | | |

CO2: Display and verify the mean of a real-life Project using the concepts of C# Graphical User Interface based environment with database integration to depict a desktop-based application.

| Assessment Criteria | Not Attended/ Incorrect (0) | Inadequate (1-2) | Average (3) | Good (4) | Excellent (5) | | | |
|-------------------------|--|--|---|--|--|--|--|--|
| Evaluation Criteria | | | Evaluation Definitio | n | | | | |
| Requirement fulfillment | Fails to demonstrate any understanding of real-life scenario- based project development or functional requirement identification. There is no attempt to depict a project or identify functional requirements accurately. | Demonstrates limited understanding of real-life scenario-based project development and functional requirement identification. The project depicted lacks coherence or relevance to real-life scenarios, and functional requirements are inaccurately identified or insufficiently described. | Presents a basic depiction of a real-life scenario-based project and identifies some functional requirements. However, the project lacks depth or complexity, and some functional requirements may be vaguely defined or missing key details. | Effectively demonstrates a realistic scenario- based project and accurately identifies most functional requirements. The project is well-developed with appropriate complexity, and functional requirements are clearly articulated with relevant details. | detail, reflecting a comprehensive understanding of Object-Oriented Programming project development activities. | | | |
| Validation | Fails to demonstrate any understanding or implementation of validation forms in their system. There is no attempt to deal with data validation, and validation requirements are completely ignored or incorrectly applied. | Demonstrates limited understanding of validation forms and data validation techniques. While some attempt may be made to implement validation, it is incomplete or poorly executed, leading to inadequate handling of data validation. | Shows a basic understanding of validation forms and data validation techniques. They attempt to implement validation, but some aspects may be missing or incorrectly implemented, resulting in partial or inconsistent handling of data validation. | Effectively demonstrates the use of validation forms and implements data validation techniques. Validation is mostly accurate and comprehensive, ensuring the proper handling of data input and verification in the system. | Exhibits an exceptional understanding and implementation of validation forms and data validation techniques. Validation is meticulously implemented with thorough attention to detail, ensuring robust data validation procedures and contributing to the overall reliability and integrity of the system. | | | |
| Verification | Fails to demonstrate any attempt to verify the system data or functional requirements. There is no evidence of understanding or implementation | Demonstrates limited understanding of verification processes and data flow in the system. Verification attempts are incomplete or | Shows a basic understanding of verification processes and attempts to verify system data. However, verification efforts may be inconsistent or | Identifies and verifies system data, ensuring proper functional requirements are met. Verification efforts are mostly accurate and thorough, with attention to | Exhibits an exceptional understanding of verification processes and meticulously verifies system data. Verification efforts are comprehensive | | | |

| of verification | inaccurate, and | lack | ensuring data | and precise, with |
|------------------|--------------------|-------------------|------------------|-------------------|
| processes, and | there is | thoroughness, | integrity and | a keen focus on |
| data flow is not | insufficient | and there may be | appropriate data | ensuring all |
| considered. | consideration | gaps in ensuring | flow within the | functional |
| | given to ensuring | proper functional | system. | requirements are |
| | data integrity and | requirements and | | met and |
| | functionality. | data flow. | | maintaining |
| | | | | proper data flow |
| | | | | throughout the |
| | | | | system. |

CO3: Prepare and Explain a real life desktop based application synthesizing several component of C# along with development tools to adhere the given requirements.

| Assessment Criteria | Not Attended/ Incorrect (0) | Inadequate (1-2) | Average (3) | Good (4) | Excellent (5) | |
|--|--|--|--|--|---|--|
| Evaluation Criteria | Evaluation Definition | | | | | |
| Organization of the application | Fails to identify any suitable real time application or requirements for project development activities related to OOP. | Limited understanding about the project scopes and scenarios or identification of functional requirements. | Lacks depth or relevance to OOP project development activities and may contain inaccuracies. Real-life scenarios are mentioned, but the discussion lacks depth or clarity. | Consider and integrate the ide of several core aspects of the project along with relevance to real-life scenarios. Demonstrating a solid understanding of the application presentation. | exceptional understanding of project preparation according to a to real-life scenarios. Also contains proper | |
| Representation and Integration of Database | Fails to identify and present any understanding or implementation of database. Also failed to integrate the data with the project itself. | Limited understanding of the database concepts or their proper way of using in a real time project. While some attempt may be made to implement but it is incomplete or poorly executed, leading to inadequate design. | Lacks depth or relevance to database integration with the application. Shows a basic understanding but some aspects may be missing or incorrectly implemented, resulting in partial or inconsistency. May lack proper normalization. | Integrate the database with the forms properly and implements with proper validation which is mostly accurate and comprehensive, ensuring the proper handling of data input and verification along with general normalization. | Exhibits an exceptional understanding at and implementation of database ensuring attention to detail, and robust data manipulation procedures and contributing to | |
| Graphical User Interface | Fails to present or prepare GUI based application interfaces. There is no evidence of creating or integrating such things according to their usefulness. | Limited understanding of graphical user interfaces. Lack of design knowledge. Very poor attempt to make such things which are currently obsolete or can't be identified as coherent. | Shows a basic understanding of creating user interfaces. Most of them are interconnected but maybe some of them lack it. However, most of it can be described as user friendly. | Effectively identifies and meet the conside the simplicity. Design related works are mostly accurate and taken proper attention to ensuring a userfriendly coherent system. | a high standard of simple and elegant work. Several controls and mechanism has been organized in a | |

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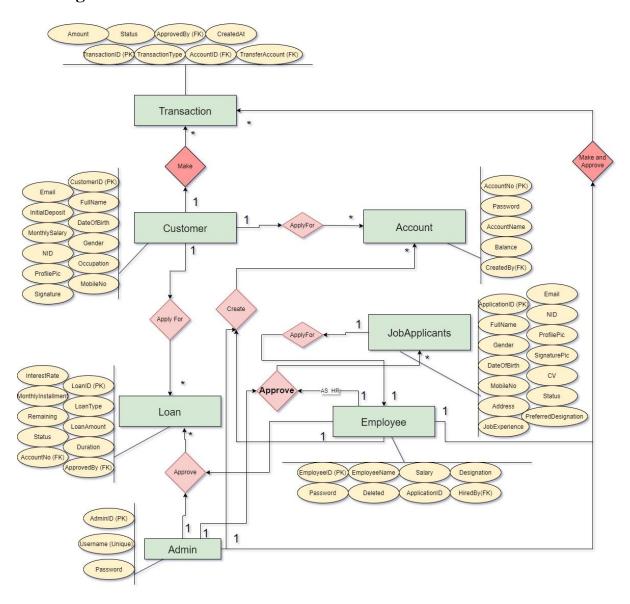
Introduction:

The Global Trust Bank Management System is a comprehensive solution designed to automate and manage various banking operations. It allows customers to open accounts, apply for loans, and manage transactions, while employees, with role-based access, handle tasks like account creation, loan approval, and transaction management. The system ensures efficiency, security, and streamlined workflows by providing tailored functionalities for different employee roles and a user-friendly interface for customers. This bank management enhances operational efficiency and improves the overall banking experience for both employees and customers.

User Story:

The Global Trust Bank Management System is designed to streamline banking operations with role-based access control. The system includes Admins, Employees, Customers, and Job Applicants, each with distinct functionalities. Employees are categorized by designation, including HR, PR, Manager, Loan In charge, and Cashier, with specific role-based functions. Customers can apply for new accounts, manage transactions, and request loans. Job Applicants can apply for positions, and HR and Admins review and approve applications, converting successful candidates into Employees. Once approved, PR, Managers, and HR can create customer accounts. Account holders log in using their Account ID and Password, while Employees use their Employee ID and Password. Customers can request transactions (deposit, withdrawal, transfer), which require approval from Cashiers, Managers, or Admins. Similarly, customers can apply for loans, which can be approved by the Loan In charge, Manager, or Admin. The system enforces designation-based access control, ensuring Employees can only perform tasks aligned with their roles, streamlining the bank's operations while maintaining security and efficiency.

ER Diagram:



```
SQL Queries:
   1. Customer Table:
CREATE TABLE [dbo].[Customers] (
                             IDENTITY (1, 1) NOT NULL,
     [CustomerID]
                    INT
     [FullName]
                   NVARCHAR (100) NOT NULL,
     [Gender]
                  NVARCHAR (10) NOT NULL,
                               NOT NULL,
     [DateOfBirth]
                   DATE
     [MobileNo]
                   NVARCHAR (15) NOT NULL,
                  NVARCHAR (255) NOT NULL,
     [Address]
     [Occupation]
                   NVARCHAR (100) NULL,
     [Salary]
                 MONEY
                              NULL,
     [Age]
                INT
                          NOT NULL,
     [NID]
                 NVARCHAR (10) NOT NULL,
     [Email]
                 NVARCHAR (100) NULL,
     [InitialDeposit] MONEY
                                NOT NULL,
     [ProfilePicture] VARBINARY (MAX) NULL,
     [SignaturePicture] VARBINARY (MAX) NULL,
     [Deleted]
                 BIT
                           NULL.
     [AccountCount]
                              DEFAULT ((0)) NOT NULL,
                    INT
     CONSTRAINT [PK_Customers] PRIMARY KEY CLUSTERED ([CustomerID]
   ASC),
     UNIQUE NONCLUSTERED ([MobileNo] ASC),
     UNIQUE NONCLUSTERED ([NID] ASC),
     CHECK (len([FullName])>(0)),
     CHECK ([Gender]='Male' OR [Gender]='Female' OR [Gender]='Other'),
     CHECK ([DateOfBirth]<=dateadd(year,(-18),getdate())),
     CHECK (len([Address])>(0)),
     CHECK ([Salary]>=(0)),
     CHECK ([Age]>=(18)),
     CHECK ([Email] like '% @%.%').
     CHECK ([InitialDeposit]>=(0)),
     CHECK (len([MobileNo])=(11)),
     CHECK (len([NID])=(10)),
     CHECK ([AccountCount]>=(0))
   );
   2. Account Table:
CREATE TABLE [dbo].[Accounts] (
     [AccountNo] NVARCHAR (20) NOT NULL,
     [Password] NVARCHAR (100) NOT NULL,
     [AccountName] NVARCHAR (100) NOT NULL,
     [Balance]
               DECIMAL (18, 2) NOT NULL,
     [CustomerID] INT
                           NOT NULL.
     [CreatedBy] NVARCHAR (50) NOT NULL,
     [Deleted]
                         DEFAULT ((0)) NULL,
              BIT
```

PRIMARY KEY CLUSTERED ([AccountNo] ASC),

);

FOREIGN KEY ([CustomerID]) REFERENCES [dbo].[Customers] ([CustomerID]), FOREIGN KEY ([CreatedBy]) REFERENCES [dbo].[Employee] ([EmployeeID]),

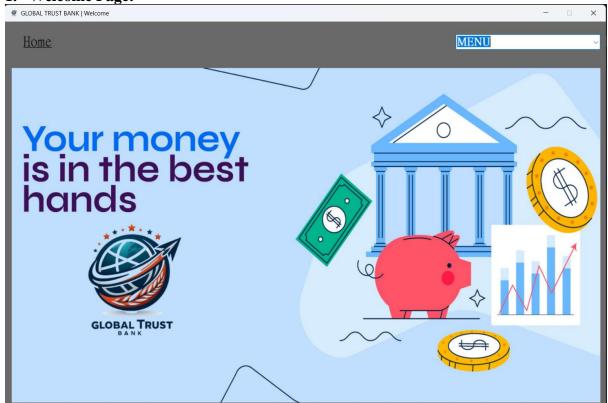
FOREIGN KEY ([CreatedBy]) REFERENCES [dbo].[Admin] ([AdminID])

```
3. Job Applications Table:
CREATE TABLE [dbo].[JobApplications] (
                                IDENTITY (1, 1) NOT NULL,
     [ApplicationID]
                      INT
                     NVARCHAR (100) NOT NULL,
     [FullName]
     [Gender]
                    NVARCHAR (10) NOT NULL,
     [DateOfBirth]
                     DATE
                                 NOT NULL,
                     NVARCHAR (15) NOT NULL,
     [MobileNo]
     [Address]
                    NVARCHAR (255) NOT NULL,
                      NVARCHAR (500) NULL,
     [JobExperience]
     [PreferredDesignation] NVARCHAR (100) NOT NULL,
     [Email]
                   NVARCHAR (100) NOT NULL,
     [NID]
                   NVARCHAR (20) NOT NULL,
     [ProfilePic]
                    VARBINARY (MAX) NULL,
     [SignaturePic]
                     VARBINARY (MAX) NULL,
     [CV]
                   VARBINARY (MAX) NOT NULL,
                   NVARCHAR (20) DEFAULT ('Not Hired') NOT NULL,
     [Status]
     [Deleted]
                   BIT
                             NULL,
     CONSTRAINT [PK JobApplications] PRIMARY KEY CLUSTERED
   ([ApplicationID] ASC),
     UNIQUE NONCLUSTERED ([NID] ASC),
     UNIQUE NONCLUSTERED ([MobileNo] ASC),
     CHECK (len([FullName])>(0)),
     CHECK ([Gender]='Other' OR [Gender]='Female' OR [Gender]='Male'),
     CHECK ([DateOfBirth]<=dateadd(year,(-18),getdate())),
     CHECK (len([MobileNo])>=(10) AND len([MobileNo])<=(15)),
     CHECK (len([Address])>(0)),
     CHECK (len([PreferredDesignation])>(0)),
     CHECK ([Email] like '% @%.%'),
     CHECK (len([NID])>(0)),
     CHECK ([Status]='Hired' OR [Status]='Not Hired')
   );
   4. Employee Table:
CREATE TABLE [dbo]. [Employee] (
     [EmployeeID] NVARCHAR (10) NOT NULL,
     [EmployeeName] NVARCHAR (100) NOT NULL,
     [Salary]
               MONEY
                            NOT NULL,
     [Designation] NVARCHAR (100) NOT NULL,
     [Password]
                 NVARCHAR (100) NOT NULL,
     [Deleted]
                         DEFAULT ((0)) NULL,
                BIT
     [ApplicationID] INT
                            NOT NULL,
                NVARCHAR (50) NOT NULL,
     [HiredBy]
     PRIMARY KEY CLUSTERED ([EmployeeID] ASC),
     CHECK ([Salary]>=(0)),
     FOREIGN KEY ([HiredBy]) REFERENCES [dbo].[Admin] ([AdminID])
```

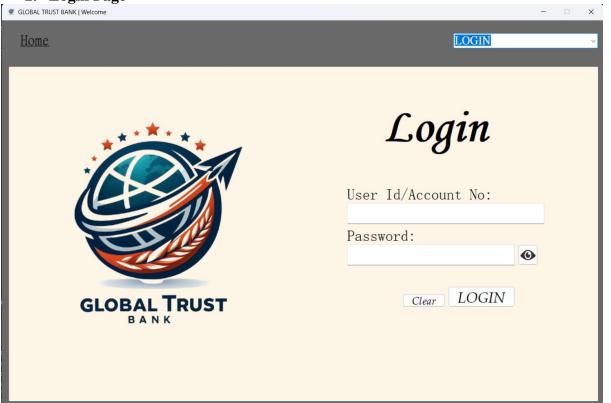
);

```
5. Loan Table
CREATE TABLE [dbo].[Loan] (
     [LoanID]
                             IDENTITY (1, 1) NOT NULL,
                    NVARCHAR (50) NOT NULL,
     [LoanType]
     [LoanAmount]
                     DECIMAL (18, 2) NOT NULL,
     [Duration]
                  INT
                            NOT NULL,
                   DECIMAL (5, 2) NOT NULL,
     [InterestRate]
     [MonthlyInstallment] DECIMAL (18, 2) NOT NULL,
                    DECIMAL (18, 2) NOT NULL,
     [Remaining]
                 NVARCHAR (20) NOT NULL,
     [Status]
     [AccountNo]
                    NVARCHAR (20) NOT NULL,
                     NVARCHAR (50) NULL,
     [ApprovedBy]
     CONSTRAINT [PK_Loan] PRIMARY KEY CLUSTERED ([LoanID] ASC),
     FOREIGN KEY ([AccountNo]) REFERENCES [dbo].[Accounts] ([AccountNo]),
     FOREIGN KEY ([ApprovedBy]) REFERENCES [dbo]. [Employee] ([EmployeeID]),
     FOREIGN KEY ([ApprovedBy]) REFERENCES [dbo].[Admin] ([AdminID])
   );
   6. Transaction Table
CREATE TABLE [dbo].[Transaction] (
  [TransactionID] NVARCHAR (20) NOT NULL,
  [TransactionType] NVARCHAR (50) NOT NULL,
  [AccountID]
               NVARCHAR (20) NOT NULL,
  [TransferAccount] NVARCHAR (20) NULL,
  [Status]
             NVARCHAR (20) NOT NULL,
  [ApprovedBy]
                NVARCHAR (50) NULL,
                             DEFAULT (getdate()) NOT NULL,
  [CreatedAt]
               DATETIME
  [Amount]
              DECIMAL (18, 2) NOT NULL,
  PRIMARY KEY CLUSTERED ([TransactionID] ASC),
  FOREIGN KEY ([AccountID]) REFERENCES [dbo].[Accounts] ([AccountNo]),
  FOREIGN KEY ([TransferAccount]) REFERENCES [dbo].[Accounts] ([AccountNo]),
  FOREIGN KEY ([ApprovedBy]) REFERENCES [dbo]. [Employee] ([EmployeeID]),
  FOREIGN KEY ([ApprovedBy]) REFERENCES [dbo].[Admin] ([AdminID])
);
   7. Admin Table
CREATE TABLE [dbo].[Admin] (
                     IDENTITY (1, 1) NOT NULL,
  [AdminID] INT
  [Username] NVARCHAR (50) NOT NULL,
  [Password] NVARCHAR (100) NOT NULL,
  PRIMARY KEY CLUSTERED ([AdminID] ASC),
  UNIQUE NONCLUSTERED ([Username] ASC)
);
   8. Bank Table
CREATE TABLE [dbo].[Bank] (
  [BankID]
              INT
                        NOT NULL,
  [TotalBalance] DECIMAL (18, 2) DEFAULT ((0)) NOT NULL,
  [TotalEmployees] INT
                         DEFAULT ((0)) NOT NULL,
  [TotalCustomers] INT
                          DEFAULT ((0)) NOT NULL,
                          DEFAULT ((0)) NOT NULL,
  [TotalAccounts] INT
  PRIMARY KEY CLUSTERED ([BankID] ASC) );
```

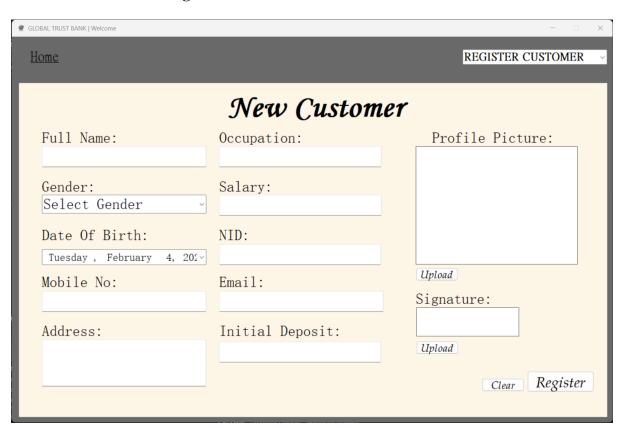
1. Welcome Page:

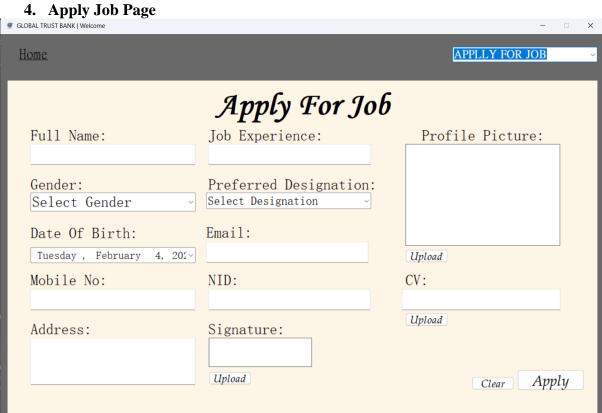


2. Login Page

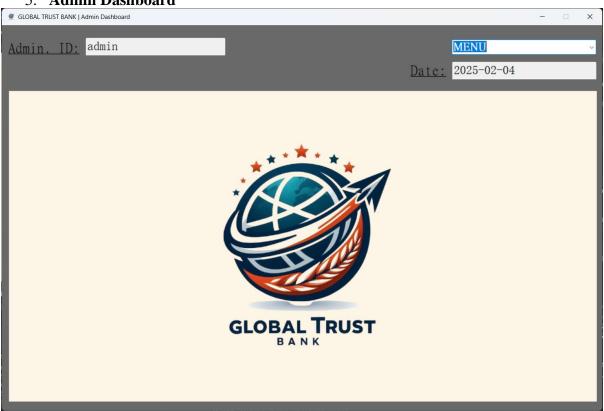


3. New Customer Page

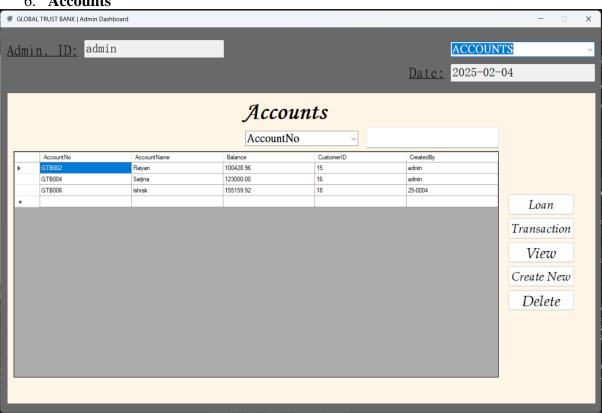




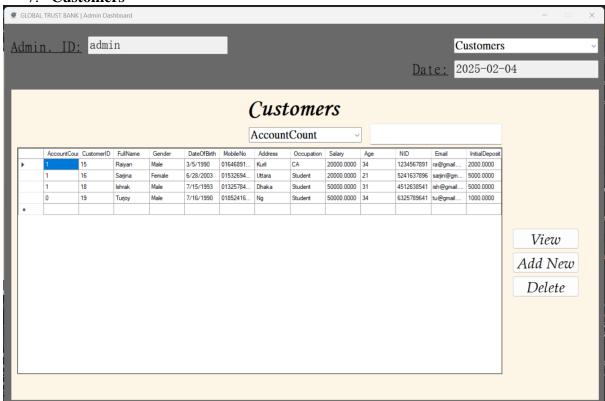
5. Admin Dashboard



6. Accounts



7. Customers



8. View Customers



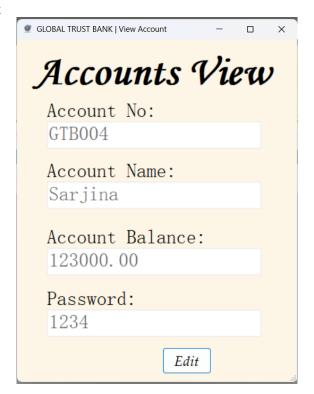
9. Loan Operations



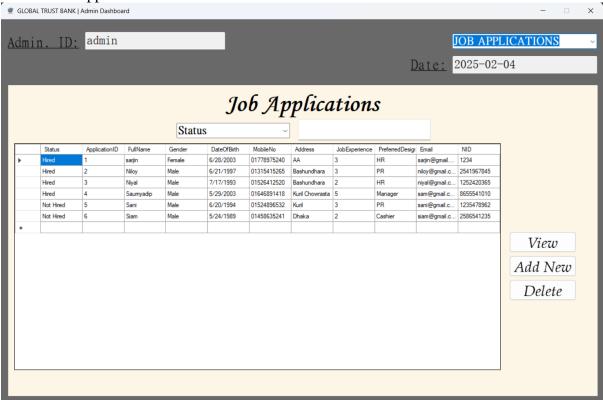
10. Transaction Operations

| GLOBAL TRUST BANK Transaction Operations | | - | × |
|--|--------------|---|----|
| | Transactions | | |
| Amount: | | | |
| Operation: | Transfer ~ |] | |
| To: | GTB002 ~ |] | |
| | Proceed | | |
| | | | |
| | | | .: |

11. View Account



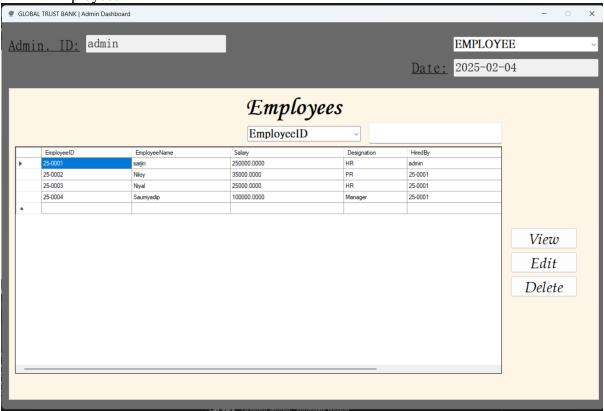
12. Job Applications



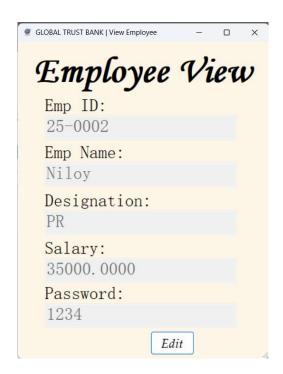
13. View Job Application



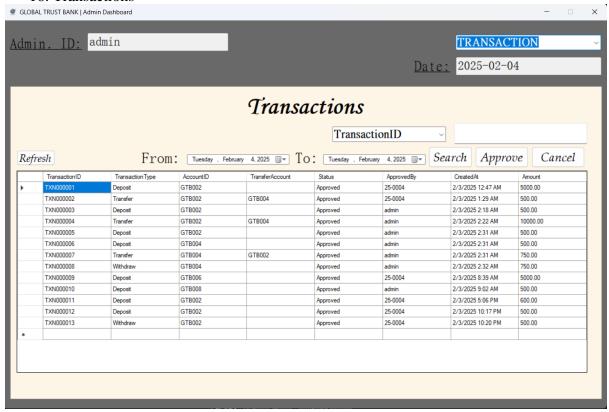
14. Employees



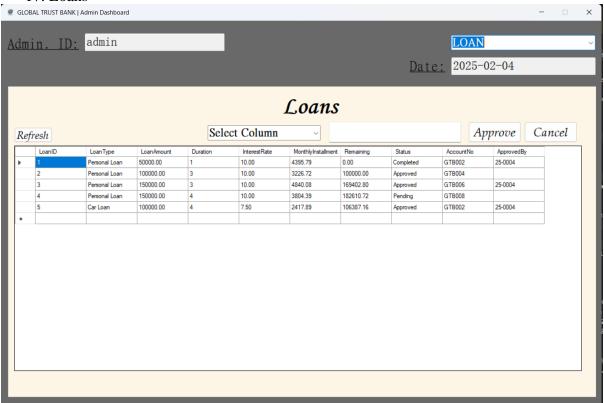
15. View Employee



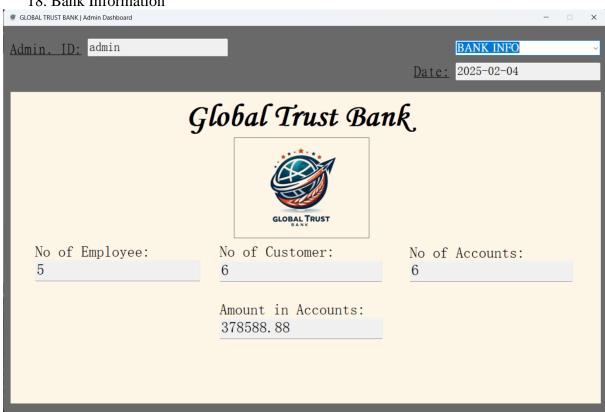
16. Transactions



17. Loans



18. Bank Information



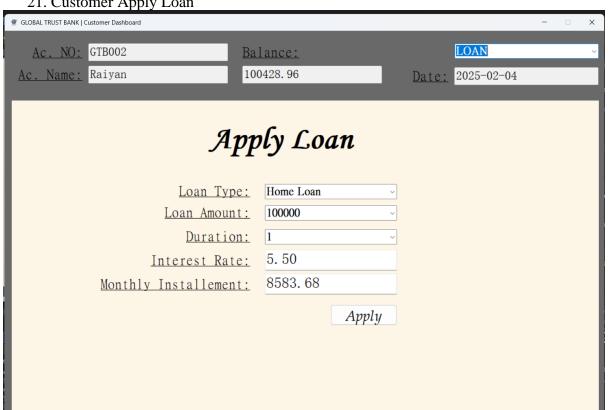
19. Employee Dashboard + Profile



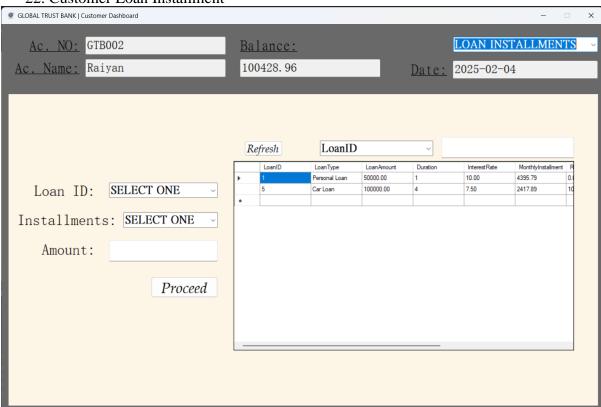
20. Customer Dashboard



21. Customer Apply Loan



22. Customer Loan Installment



23. Customer Profile

