

Employees Cooperative Society Management System

ABSTRACT

The Employees Cooperative Society Management System is an application for maintaining a person's account in a bank. This project shows the working of a banking account system and covers the basic functionality of a Bank Account Management System. To develop a project for solving financial applications of a customer in a banking environment in order to nurture the needs of an end banking user by providing various ways to perform banking tasks. Also to enable the user's workspace to have additional functionalities which are not provided under a conventional banking project. The Employees Cooperative Society Management System undertaken as a project is based on relevant technologies.

The main aim of this project is to develop software for the Bank Account Management System. This project has been developed to carry out the processes easily and quickly, which is not possible with the manual systems, which are overcome by this software. This project is developed using JAVA language and MYSQL for database connection. Creating and managing requirements is a challenge of IT, systems and product development projects or indeed for any activity where you have to manage a contractual relationship. Organizations need to effectively define and manage requirements to ensure they are meeting the needs of the customer, while providing compliance and staying on the schedule and within budget. The impact of a poorly expressed requirement can bring a business out of compliance or even cause injury or death. Requirements definition and management is an activity that can deliver a high, fast return on investment. The project analyzes the system requirements and then comes up with the requirements specifications. It studies other related systems and then comes up with system specifications. The system is then designed in accordance with specifications to satisfy the requirements.

The system design is then implemented with MYSQL and JAVA. The system is designed as an interactive and content management system. The content management system deals with data entry, validation confirmation and updating while the interactive system deals with system interaction with the administration and users. Thus, the above features of this project will save transaction time and therefore increase the efficiency of the system.

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INTRODUCTION

I. PREFACE

The “ Employees Cooperative Society Management System ” project is a model Banking Application. This application enables the customers to perform the basic banking transactions by sitting at their office or at homes through PC or laptop. The system provides the access to the customer to create an account, deposit/withdraw the cash from his account, and also to view reports of all accounts present. The customers can access the banks website for viewing their Account details and perform the transactions on account as per their requirements. With Internet Banking, the brick and mortar structure of the traditional banking gets converted into a click and portal model, thereby giving a concept of virtual banking a real shape. Thus today's banking is no longer confined to branches. E-banking facilitates banking transactions by customers round the clock globally. The primary aim of this “Employees Cooperative Society Management System” is to provide an improved design methodology, which envisages the future expansion, and modification, which is necessary for a core sector like banking. This necessitates the design to be expandable and modifiable and so a modular approach is used in developing the application software. Anybody who is an Account holder in this bank can become a member of the Bank Account Management System. He has to fill a form with his personal details and Account Number.

II. MOTIVATION

Bank is a place where customers feel a sense of safety for their property. In the bank, customers deposit and withdraw their money. Transaction of money also is a part where customers take shelter of the bank. Now to keep the belief and trust of customers, there is the positive need for management of the bank, which can handle all this with comfort and ease. Smooth and efficient management affects the satisfaction of the customers and staff members, indirectly. And of

course, it encourages the management committee in taking some needed decisions for future enhancement of the bank. Nowadays, managing a bank is a tedious job up to a certain limit. So software that reduces the work is essential. Also today's world is a genuine computer world and is getting faster and faster day-by-day. Thus, considering the above necessities, the software for bank management has become necessary which would be useful in managing the bank more efficiently. All transactions are carried out online by transferring from accounts in the bank. This software is meant to overcome the drawbacks of the manual system.

III. FEATURES

Users first need to login to his/her account with the help of account number and pin. After the authentication process if the credentials entered are correct then the user can access the further features. Also there is an option for creating a new account. To create a new account users have to fill a form with fields asking for basic information.

The Employees Cooperative Society Management System provides all the basic functionalities required to carry out the day to day activities of a regular bank. The features provided to the customers of the bank includes: withdraw amount, transfer money to other accounts, view all transactions, sort the transactions, apply for loan, pay Equated Monthly Installments (EMI) and manage profile information. All these features are very secure and user friendly. Before a user can get access to these features, the user must login to his/her account using account number and a pin number. The credentials entered are checked and verified by the bank using the bank database. If the credentials are correct then only the user can take advantage of the above features.

While withdrawing an amount from the account the system takes care of the balance available in the account. If the balance is less than the amount requested then it will surely give an error message indicating the same.

In order to transfer money from one account to another, the user first needs to verify the other bank account information. Users can verify the account by entering the account number of the beneficiary. The system will check if such an

account exists and if it exists the system will show the name of the account holder for verification. The user then needs to verify the information and he/she may proceed further by entering the amount to transfer. If the transfer is successful then such a message will be displayed to the user.

The users can see their transaction history in the transactions tab. This tab displays the date of transaction, type of transaction along with the amount. The different types of transactions can be: deposit, withdrawal, transfer, loan, installments(EMI), Early settlements on loan, interest on savings and salary credited. Also users can sort these logs by date of transactions or types of transactions.

One of the most important features is to apply for a loan. User has the facility provided to apply for a loan. The user has to specify the amount and the duration in years to repay the loan. After applying for the loan, the bank will then decide whether or to approve or reject the loan request. The user will be notified after the bank has taken the decision. If the user has applied for a loan and the request has been approved by the bank, the amount of loan will be transferred to the user's account. The user will be given the facility to repay the loan amount as Equated Monthly Installments (EMIs). The user then has to pay his installments on a monthly basis. If the user misses the due date of installments a late fee will be added to his installment.

In this system the bank charges an interest rate of 13% per annum for loan amounts. When a customer fails to pay the EMI before the due date then late fees are charged on the installment amount on the basis of 2.7% per month.

The profile tabs show the basic information about the user. The user can edit some fields in the profile. After editing the profile user needs to click on save button to save the changes in the profile.

All the above mentioned features are accessible to all the users of the system. These users are customers of the bank and thus these features are included in the user module. The application provides many other features which are used by the admins of the bank and also some features are used by the chairman of the bank. These features include depositing requested amounts to the customer's, account accepting/rejecting the loan request, accessing the list of all customers, and accessing information about all currently active loans. The chairman of the bank has the features to add/remove admins, monitor the funds

of the bank, manage designation of all employees and delete any account from the bank database.

Other features of the system include an automatic service for providing interest over savings amount and providing the salaries of all the employees present in the system.

IV. MODULES AND REQUIREMENTS

The Modules description of the Employees Cooperative Society Management System project. These modules will be developed in JAVA source code and MYSQL database.

1. Create New Account: A customer who has an account in the world can create a virtual account through this module. This module receives the customer profile details and the bank account details with the proof of the ownership of the bank account.
2. Login: Virtual account holders can login in to the system using this module. Thus this is the secured login page for the customers in the website.
3. Virtual Account: After the approval of new virtual account creation, the customer assigned a unique virtual account number to make the online money transactions. This module views the details of the logged customer's virtual account.
4. Fund Transfer: This is the module to make fund transfer to the virtual bank account holders or the usual bank account holders from the customer's specific bank account.
5. Transactions: This module displays the transactions made by the customer on a particular date with the transaction details.
6. Administrative Control: This module contains the administrative functions such as view all virtual accounts, transactions, approve bank accounts, approve virtual accounts etc.

MODULES

User Module

A simple user can access their account and can withdraw money from their account. Users can also transfer money from their account to any other bank account. Users can see their transaction history and can check their balance. Also some features related to loan are provided to users which include applying for a new loan or paying EMI of existing loan.

- User login, use PIN system
- Creating/open new account registration
- Funds transfer
- View transaction
- Apply for Loan
- Pay EMI
- User account details

Admin Module

Admin can access several authoritative processes. If a user logs in as an Admin then the user's Home Page will be having more options than a standard user. The admin can perform the following functions: Approve/Decline loan request, view list of all customers, view list of currently active loans, Deposit amount to particular account.

- Deposit transaction
- Approve/Reject Loan
- Customers list
- Loan list
- All other features standard user gets

Chairman Module

Chairman has different features to manage the overall bank. If a user logs in as an Chairman then the user's Home Page will have more options than a standard user and also different options than an admin. The Chairman can perform the following functions: Add/Remove admins, Monitor the bank funds, Delete any account, Manage and update information of particular account.

- Monitor Bank Funds
- Add/Remove Admins
- Delete accounts
- Manage Designations of Employees
- All other features standard user gets

TOOLS AND TECHNOLOGY :

This project is successfully implemented using JAVA, SQL with the use of some libraries and frameworks.

Languages used in the project :

- JAVA
- SQL

JAVA

The system was implemented using java because of various unique features it possesses . Some of them are listed below.

JAVA SUPPORTS MULTI-THREADING :

Java has the multi-threading capability hence applications written in Java can manage multiple users or threads at the same time. Hence the developers don't have to execute the multiple copies of the code on the same hardware as Java helps to create as many threads within a single copy of the software as required by the application. This results in faster response time, less issues, multiple operations, better performance and faster concurrent access.

JAVA IS SCALABLE :

Java is highly scalable as the software solutions which are built using Java can handle increased load of work easily. This can be higher request rates, larger data sets etc. Java can adapt to the needs of the web application and provides the developer the capability to scale the application as per the new requirements. This means that whenever you want to improve the response time and the performance of your web application, you need to add minimal and simple codes.

MEMORY MANAGEMENT

The heap is the area of memory used to store objects instantiated by applications running on the JVM. A heap is created when a web application starts and can increase or decrease as the web application is executed. If the memory is filled, then the "garbage" is collected and eliminated. So basically, objects that are no longer used are deleted and new objects have space to enter. So the point I am trying to make is that Java provides an automatic system to manage the memory which in turn, helps in managing the effectiveness and speed of the web application.

SQL

- High Performance
SQL provides high performance programming capability for highly transactional, heavy workload and high usage database systems. SQL programming gives various ways to describe the data more analytically.
- High Availability
SQL is compatible with databases like MS Access, Microsoft SQL Server, MySQL, Oracle Database, SAP HANA, SAP Adaptive Server, etc. All of these

relational database management systems support SQL and it is easy to create an application extension for procedural programming and various other functions which have additional features thus converting SQL into a powerful tool.

- Scalability and Flexibility
SQL provides Scalability and Flexibility. It is very easy to create new tables and previously created or not used tables can be dropped or deleted in a database.
- Robust Transactional Support
SQL programming can handle large records and manage numerous transactions.

SWING

Swing provides many new features; two of its popular features are:

- Lightweight components
- Pluggable look and feel

Lightweight Components :

Swing components are lightweight as they are written entirely in Java and do not depend on native peers (platform specific code resources). Rather, they use simple drawing primitives to render themselves on the screen. The look and the feel of the component is not controlled by the underlying operating system but by Swing itself. Thus, they are not restricted to platform-specific appearance like, rectangular or opaque shape.

Pluggable Look and Feel :

The pluggable look and feel feature allows us to tailor the look and feel of the application and applets to the standard looks of Windows . We can even switch to a different look and feel at runtime. Swing has the capability to support several looks and feels, but at present, it provides support for Windows and Motif. As the

look and feel of components is controlled by Swing rather than by operating system, the feel of components can also be changed. The look and feel of a component can be separated from the logic of the component. Thus, it is possible to “plug in” a new look and feel for any given component without affecting the rest of the code.

V. System and Database Design

System design

Design is the first step into the development phase for any engineered product or system. Design is a creative process. A good design is the key to an effective system. The term “design” is defined as “the process of applying various techniques and principles for the purpose of defining a process or a system in sufficient detail to permit its physical realization”. It may be defined as a process of applying various techniques and principles for the purpose of defining a device, a process or a system in sufficient detail to permit its physical realization. Software design sits at the technical kernel of the software engineering process and is applied regardless of the development paradigm that is used. The system design develops the architectural detail required to build a system or product. As in the case of any systematic approach, this software too has undergone the best possible design phase fine tuning all efficiency, performance and accuracy levels. The design phase is a transition from a user oriented document to a document to the programmers or database personnel.

System design also consists of logical design. The logical flow of a system defines the boundaries of a system. It includes the following steps: review the current system, its data flow, file content, volumes, frequencies etc. Prepare output specifications that determine the format and content in the output. Prepare input specifications i.e. format, content and most of the input functions. Prepares the security and control specifications. Specify the implementation plan. Prepares a logical design walkthrough of the information flow, output, input, controls and implementation plan.

Another important part in system design is the physical design. Physical system produces the working systems by defining the design specifications that tell the programmers exactly what the candidate system must do. It includes the following steps: Design the physical system, specify input and output media. Design physical information flows through the system and a physical design

walkthrough. Prepare a conversion schedule and target date. Determine training procedures and timetable, etc.

Database design

A database is a collection of data, usually stored in electronic form. A database is typically designed so that it is easy to store and access information. A good database is crucial to any company or organisation. This is because the database stores all the pertinent details about the company such as employee records, transactional records, salary details etc. This system uses the SQL database for storing and managing the data of the application. The software is based on Java language and the database is managed using MYSQL. SQL is a query language, whereas MySQL is a relational database that uses SQL to query a database. To establish connection between Java application and database JDBC is required. JDBC stands for Java Database Connectivity. JDBC is a Java API to connect and execute the query with the database. It is a part of JavaSE (Java Standard Edition). JDBC API uses JDBC drivers to connect with the database. We can use JDBC API to access tabular data stored in any relational database. By the help of JDBC API, we can save, update, delete and fetch data from the database. MySQL Connector/J is the official JDBC driver for MySQL.

To connect a Java application with the MySQL database, we need to follow 5 following steps.

1. Driver class: The driver class for the mysql database is `com.mysql.jdbc.Driver`.
2. Connection URL: The connection URL for the mysql database is `jdbc:mysql://localhost:3306/dbname`, where jdbc is the API, mysql is the database, localhost is the server name on which mysql is running, we may also use IP address, 3306 is the port number and sonoo is the database name. We may use any database, in such case, we need to replace the sonoo with our database name.
3. Username: The default username for the mysql database is root.
4. Password: It is the password given by the user at the time of installing the mysql database. In this example, we are going to use root as the password.

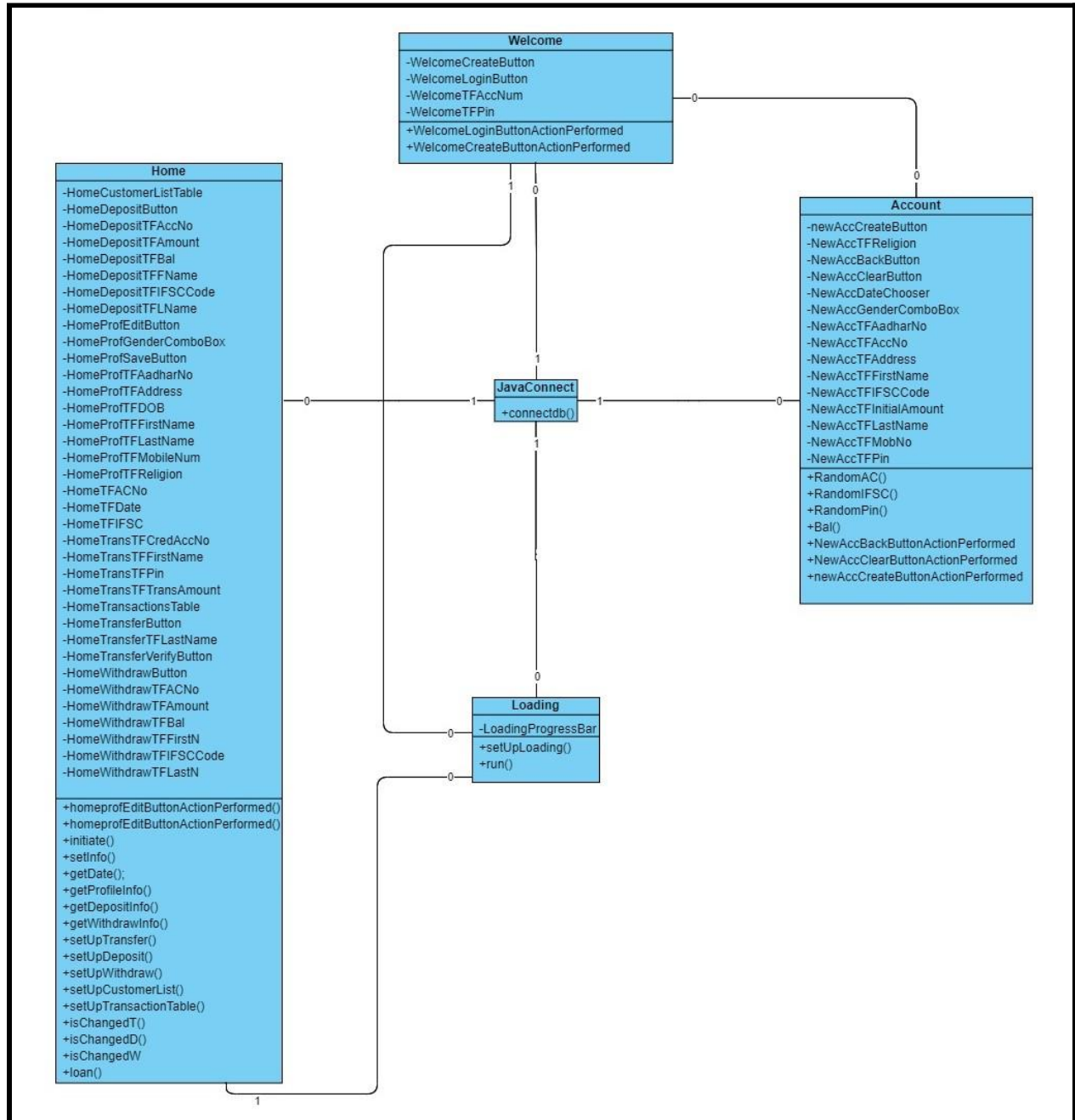
The database of this system contains 5 tables. These tables are account, balance, transaction, bank and logs. The account table is the most important table and it contains important information about users such as name, address, mobile number, etc. Along with that it also contains the vital information related to loan, interests and EMI. The balance table contains information about account balance and some other details like IFSC Code.

The transaction table contains information about each and every transfer that occurs in the system. It contains a column of unique transaction id which refers to a particular transaction. The logs table keeps record of transactions like deposit, withdrawal, loans, etc. It also assigns a unique id to each transaction in the database. The bank table contains the information about the bank's funds.

Literature survey

Paper	Author	Description
Bank Account Management System	Jasim Uddin & Nuruzzaman	The Bank Account Management System is an application for maintaining a person's account in a bank.
Bank Management Mini DBMS project	A.O. Oke, O.M. Olaniyi	The main aim of the Bank Management Mini DBMS project is to keep record of customer transactions in the bank. To demonstrate the use of create, read, update and delete MySQL operations through this project.
Big banks' management control systems' software	Alexey Yu. Zalozhnev	This report shows that the architecture of Big Banks' Management Control Systems can be presented as a two or three-tier structure without separating the functional components to the front and back office.
A Multi Layer Bank Security System	Amit Verma	A Multi Layer Bank Security System is a system for validating, monitoring and controlling the security at a bank.

DESIGN - CLASS DIAGRAM

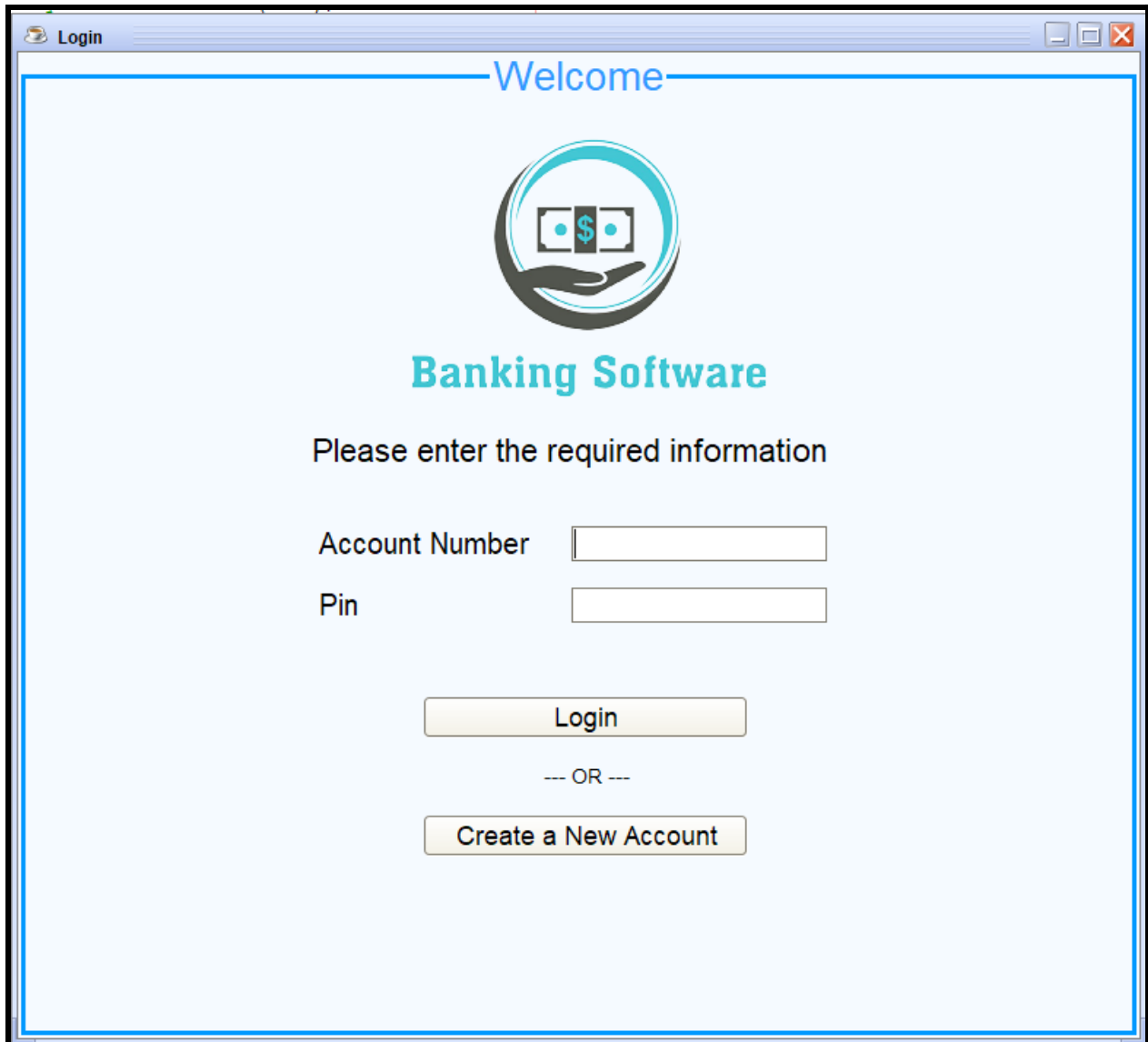


Class Diagram

To implement the Employees Cooperative Society Management System we created 5 different classes in the project. These five classes are Welcome, Account, Loading, Home and JavaConnect. Out of these five classes, four classes except JavaConnect extend the Java Swing JFrame to create the GUI. The JavaConnect class establishes the connection between the application and the database. The class Welcome includes the login option and a create new account option. This class is responsible for carrying out authentication of the user credentials in order to login. The class Account deals with creation of new accounts. It takes the information entered in the text fields and stores the information in the database.

The Loading class creates a loading window for transition between two different windows. It contains a progress bar for indicating the loading time. The most important class of all the five classes is the Home class. It provides all the features to the user depending on the user type. A simple user will get all the basic operations while an administrator will have options to manage the bank operations and if the user is a chairman then it will also provide options for managing admins and monitoring bank funds, etc.


SNAPSHOTS



A screenshot of a web browser window titled "Login". The page has a light blue background and a blue border. At the top, the word "Welcome" is written in blue. In the center, there is a circular logo featuring a hand holding three banknotes with dollar signs. Below the logo, the text "Banking Software" is displayed in a bold, teal font. Underneath, the instruction "Please enter the required information" is shown. The login form consists of two input fields: "Account Number" and "Pin", each with a corresponding label to its left. Below these fields are two buttons: "Login" and "Create a New Account", separated by the text "--- OR ---".

Login

Welcome



Banking Software

Please enter the required information

Account Number

Pin

Login

--- OR ---

Create a New Account

Login Page

Home



Date

30/5/2021


Funds: '29272030' Rs.

A/C Number

86384

IFSC Code

ECMS5764

 Refresh

Banking Software

Deposit

Withdraw

Transfer

Transactions

Loan

Pay Loan

Profile

About

Loan Requests

Customer List

Loan List

Admins

Manage Accounts



Deposit

Add money to your account

Account Number

 Search

IFSC Code

First Name

Last Name

Available Balance


Deposit Amount

Deposit

Home Page of Chairman

19

Home



Date

30/5/2021

A/C Number

14922

IFSC Code

ECMS1145

Refresh

Banking Software

Withdraw

Transfer

Transactions

Loan


Pay Loan

Profile

About

Transactions


Your transaction history



Date ▼	Type	Name	A/C Number	Amount
2021-05-30 18:49:22	EMI	-	-	-6333
2021-05-30 18:48:43	Deposit	-	-	+5500
2021-05-28 20:30:29	Salary	-	-	+90000
2021-05-28 19:53:45	Withdraw	-	-	-3000
2021-05-26 15:40:27	Sent	Karan Gawali	28039	-22000
2021-05-12 15:04:54	Received	Nishant Labh...	23713	+4000
2021-05-07 15:41:20	Sent	Karan Gawali	28039	-250
2021-05-07 15:40:33	Sent	Rohini Khare	61132	-1200
2021-05-07 15:35:54	Sent	Saurabh Parate	86384	-6500

Transaction records of a simple user

Create Account



New Account

Create a new account

Please enter the following information:

Account Number	<input type="text" value="32989"/>	Date of Birth	<input type="text" value="29 Jun, 2001"/>
First Name	<input type="text" value="Parikshit"/>	Aadhar Number	<input type="text" value="777788889666"/>
Last Name	<input type="text" value="Deshmukh"/>	Address	<input type="text" value="Amravati"/>
Gender	<input type="text" value="Male"/>	Initial Amount	<input type="text" value="200000"/>
Mobile Number	<input type="text" value="9999988887"/>	IFSC Code	<input type="text" value="ECMS710530194858"/>
Religion	<input type="text" value="Hindu"/>	Pin	<input type="text" value="555"/>
Designation		<input type="text" value="Dean"/>	

Back

Clear

Create

Create New Account

PROBLEMS FACED

Every project faces many problems during the course of implementation. For each problem the developers need to think of some new approaches or new ideas. During the implementation of this project, we also faced many problems. We tried different solutions and made sure that the problem was resolved. The very first problem was the biggest of them all. When we decided to go with this project we did our planning and work distribution and time management, pretty much all basics. But initially we thought we were going to implement the program using C++ programming language. As we thought about the end product we suddenly realized that GUI is a very important factor that we must implement. Also we realized that we need to use a reliable database for the project. Considering these factors we decided to go for Java rather than C++ because, Java has AWT and Swing which are easier to use and will solve the issue of GUI and also Java has JDBC which helps to connect the database to the project easily.

At that point we had already lost some 2 weeks of time from the time allocated for completion of the project. But realizing the potential of java for the project we started to work in Java. Java being a platform independent language also helped with the portability of the code.

Another problem was to keep track of every transfer of money that takes place in the system. Initially we tried creating a table which contains the information about the sender and receiver like their name and account numbers but that was not enough to make a transaction unique. This created havoc as transfers were not recorded in the proper way and transaction history reported many wrong transactions. To overcome this we realized that we need to create a unique id for each transaction and thereby manage transactions. To create a unique transaction id every time, we took the help of the current date and time which always resulted with a random number. Example- 20210504142325. This method may generate the random number for a transaction performed at the same instant of time and to fix that we added 3 more random digits at the end of the number which were generated using a random number generator.

Another problem faced was regarding the automatic interest calculation on the savings amount in the bank account. Initially we did not store the date of creating an account and what was the initial balance of the account. But to implement the interest calculation we had to modify the tables in the database in order to incorporate the date of next interest and the savings balance on which we are going to calculate the interest.

There were lots of different problems other than the above mentioned but these three were the major problems and the ways in which we tackled and resolved those problems really set the flow and implementation of the project.

Future Scope

The Employees Cooperative Society Management System has a big future scope since a lot of further integrations can be made in the project. Biggest one is to connect to the internet and thereby provide the facilities across different branches of the bank. Further the existing system can be reproduced as a mobile application which will allow more users to connect with the system.

Also, in future banks can leverage the power of AI and ML in banking, along with data science acceleration, to enhance customer's portfolio offerings. The use of AI and ML will offer predictive data analysis as banks and financial institutions will look to offer better services with more actionable information.

Conclusion

This project is developed to nurture the needs of a user in a banking sector by embedding all the tasks of transactions taking place in a bank. Future version of this project will still be much enhanced than the current version. Writing and depositing checks are perhaps the most fundamental ways to move money in

and out of a checking account, but advancements in technology have added ATM and debit card transactions.

All banks have rules about how long it takes to access your deposits, how many debit card transactions you're allowed in a day, and how much cash you can withdraw from an ATM. Access to the balance in your checking account can also be limited by businesses that place holds on your funds. Banks are providing internet banking services also so that the customers can be attracted. By asking the bank employees we came to know that the maximum numbers of internet bank account holders are youth and businessmen.

Online banking is an innovative tool that is fast becoming a necessity. It is a successful strategic weapon for banks to remain profitable in a volatile and competitive marketplace of today. If proper training should be given to customers by the bank employees to open an account will be beneficial secondly the website should be made friendlier from where the first time customers can directly make and access their accounts.