

**Higher Institute of
Digital Engineering**



Data Structures and Algorithms
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Banking Management System

Project Report

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Introduction :

In this project we developed a banking-management software system — Banking Management System — to simulate core banking operations: customer management, account handling, transactions, loans, and daily transaction logging. Given that manually managing bank data (accounts, loans, branches, employees) is tedious and error-prone, the system offers a computerized approach that ensures consistency and ease of use.

The program is intended as a console-based banking system (in C++) to allow creation/management of customers and employees, facilitate deposits/withdrawals, manage loans, and record daily transactions.

2. Objectives :

1. Allow **account operations**: deposit, withdrawal.
2. Implement **loan management**: loan requests , loan approvals/denials, storing loan data.
3. Manage **employee records** .
4. Gather and analyze **statistics** related to employee accounts and customer accounts.

3. System Features :

The proposed system will have the following features :

- **Customer Management**: add new customers, modify customer data, delete closed accounts.
- **Account Operations**: deposit money, withdraw money, submit loan request.
- **Loan Handling**: queue for loan requests (FIFO), process loan requests (approve / deny), assign loans to customers.
- **Employee Management**: Add, delete, or modify an employee and sort employees.
- **Daily Transactions Log**: maintain a log of all transactions of the day and then finalize at end-of-day.
- **Real-Time Date Access**: retrieve the current system date in order to timestamp transactions and loan requests.
- **Statistics**: gather and analyze key information about both customer accounts and employee records.

4. System Architecture & Design :

The Banking Management System is designed using a modular architecture. This approach keeps the `main()` function simple and focused on coordinating program flow rather than implementing detailed logic.

This modular design improves maintainability, readability, and facilitates future extension, such as adding new features or modules

5. Data Structure:

The system uses a variety of data structures to meet different functional requirements:

- Structures :
Customer
Loan
Transaction
- Linear Data Structures:
Array
Singly Linked List
Doubly Linked List
Stack
Queue
- Auxiliary Modules:
Data handling
Date management
Statistics

6. User Interface Samples:

Home Menu :

```
=====
===== Welcome to the Banking Management System =====
===== Today's Date : 07-12-2025 =====
=====
1. Employee Interface
2. Customer Interface
=====
0. Exit
=====
===== PLEASE CHOOSE AN OPERATION: =====
```

Employee Interface Menu :

```
=====
===== Welcome to the EMPLOYEE MANAGEMENT SYSTEM =====
=====
1. Add Employee
2. Delete Employee
3. Modify Employee
4. Display All Employees
5. Display All Employees Sorted By Alphabetical Order
6. Display All Employees Grouped By Bank Branch
7. Display Earliest And Most Recent Employees
8. Add Customer
9. Display All Customers
10. Change Customer Account Status
11. Delete all accounts whose status is closed
12. Display archived accounts
13. Display the list of loans for a specific customer
14. Change the status of a loan
15. Delete Loans Whose Status is completed
16. Display Completed Loans
17. Manage Loan Requests
18. Finalize the Day
19. View Statistics
0. Return to Home
=====
Please Choose an operation :
```

Customer Interface Menu once Login Successful :

```
=====
=====
=====
          Welcome to the CUSTOMER MANAGEMENT SYSTEM
=====
=====
1.View loan list.
2.Submit loan request
3.Perform transaction.
4.View list of today's transactions.
5.Undo last transaction.
0.Return to Home.
=====
Enter your choice:
```

Statistics Menu :

```
===== Statistics Menu =====
1. Total Number of Loans
2. Number of Loans by Type
3. Number of Loans by Status
4. Active Loans within a Specified Date Range
5. Customer with the Highest Number of Loans
6. Customer with the Highest Account Balance
7. Customer with the Lowest Account Balance
8. Total Number of Employees
9. Number of Employees per Bank Branch
0. Exit Statistics Menu
Enter your choice: |
```

7. Conclusion:

In this project, our team successfully developed a Banking Management System that simulates core banking operations, including customer account management, loan handling, employee management, daily transaction logging, statistics reporting, and real-time date tracking.

The system demonstrates a modular design with separate, well-structured modules for each functionality, ensuring readability, maintainability, and ease of future expansion.

Throughout the project, we applied good software engineering practices, including modular programming and use of appropriate data structures (queues, stacks, linked lists).

Additionally, our team used GitHub for version control and collaboration, which allowed us to track changes efficiently, work concurrently, and manage the project effectively.

Overall, the project not only met the functional requirements but also provided valuable experience in teamwork, version control, and structured software development.

Possible future improvements include adding a graphical user interface, database integration, enhanced security features, and more advanced statistical reporting.

Github Repository link :

<https://github.com/oumaymahmida06-qif/Banking-Management-System->