A Project Report

On

Banking System Simulation

Submitted in partial fulfillment of the

requirement for the award of the degree of

# BACHELOR OF TECHNOLOGY

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## Under the guidance of
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# ABSTRACT

The convergence of banking and software systems in the modern technological landscape has spurred the development of innovative solutions. This project addresses this intersection by creating a console-based banking application. The primary goal is to offer an efficient and secure financial system that adapts to evolving user expectations.

Motivated by the demand for user-friendly and feature-rich banking solutions, this project focuses on delivering a comprehensive platform for account management and transactions. The console-based application prioritizes security and convenience, ensuring a positive and secure user experience.

The project's scope encompasses the creation of a console-based banking application with user and admin interfaces. It includes functionalities such as user account setup, transaction processing, balance queries, and account administration. Security measures, including PIN validation, safeguard user data integrity.

Building upon existing financial and software applications, this project explores the foundations laid by predecessors while incorporating unique features. The report is organized to provide insights into system architecture, implementation details, user interactions, and evaluation.

Chapter 2 delves into the Software Requirement Specification for the Banking Management System (BMS). It covers system interfaces, user interfaces, hardware interfaces, software interfaces, communication interfaces, memory constraints, operation specifics, and site adaptation needs.

Chapter 3 explores the System Design for HareKrishna Bank Management System (HBMS). It includes architectural diagrams, class diagrams, dataflow diagrams, activity diagrams, ER diagrams, and database schema diagrams.

Chapter 4 focuses on the Implementation and Results, detailing software and hardware requirements, assumptions, constraints (if applicable), implementation details, interface snapshots, test cases, and results.

Chapter 5, the Conclusion, evaluates the performance of HBMS, compares it with existing technologies, and outlines future directions. It discusses practical implications, making

recommendations for security enhancement, technology integration, user experience improvements, and mobile application development.

# TABLE OF CONTENTS

*Figure 4.1: Login Interface*

*Figure 4.2: Transaction Interface*

TestCase|Description                        |ExpectedResult         |ActualResult

------------|-------------------------------------|---------------------------|-------------------

TC001 |Testuserregistrationfunctionality.|Successfulregistration.|Passed

TC002 |Testuserloginfunctionality.            |Successfullogin.        |Passed

TC003 |Testcreditoperation.                     |Successfulcredit. |Passed

<!-- Add more relevant test cases -->

# TEXT PROCESSING INFORMATION

1. The original copy shall be typed on 75 or 80 gr./m2 white paper. All photocopies shall be run on the same grade of paper. Size of paper shall be 210 x 297 mm, i.e. A4.

2. Only Near Letter Quality or sharper dot matrix printer or Laser printer and Ink Jet printer and electrical typewriter outputs are acceptable.

3.Thefontsizemustbe12                  pointinthetextandatleast8pointinthefigures.

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LIST OF TABLES

LIST OF FIGURES

LIST OF SYMBOLS

LIST OF ABBREVIATIONS

# LIST OF SYMBOLS

| | |
|---|---|
| [x] | Integer value of x. |
| ≠ | Not Equal |
| | Belongs to |
| € | Euro- A Currency |
| _ | Optical distance |
| _o | Optical thickness or optical half thickness |

## LIST OF ABBREVIATIONS

| | |
|---|---|
| AAM | Active Appearance Model |
| ICA | Independent Component Analysis |
| ISC | Increment Sign Correlation |
| PCA | Principal Component Analysis |
| ROC | Receiver Operating Characteristics |

# Chapter 1

## Introduction 1.1 Problem Overview

In the world of modern technology, the convergence of banking and software systems has grown in importance. This project focuses on the creation of a console-based banking application with the goal of addressing the problems and opportunities in this ever-changing landscape.

### 1.1.1 Motivation

This project is motivated by the demand for efficient and secure financial solutions. Users' expectations change as technology improves. This project aims to deliver a user-friendly, feature-rich banking system that meets both account management and transactional requirements.

### 1.1.2 Project Objective

The major goal is to provide a strong banking system that allows customers to conduct various transactions, check balances, and manage their accounts with ease. This project prioritizes security and convenience of use, resulting in a positive and secure user experience.

### 1.1.3 Scope of the project

The scope of this project includes the creation of a console-based banking application with user and admin interfaces. It includes user account setup, transaction processing, balance queries, and account administration. Security procedures, such as PIN validation, are used to safeguard the integrity of user data.

## 1.2 Previous Work on the Subject

This project builds on the foundations laid by existing financial and software applications. While our implementation is unique, understanding the landscape of prior work provides significant insights into best practices and potential areas for development.

## 1.3 Report's Organization

The following chapters are organized to help readers navigate this substantial report:

### Chapter 2:

System Architecture: This section delves into the design and architecture of the console-based banking system.

### Chapter 3:

Implementation Details: This chapter delves into the project's source code, libraries, and main algorithm implementation.

### Chapter 4:

User and Admin Interactions: Describes user and admin functionalities and highlights the application's capabilities.

### Chapter 5:

Evaluation and Testing: Discusses the testing procedures used and assesses the system's performance.

# Chapter 6 :

Conclusion and Future Work: Summarizes the findings, evaluates project parameters, and makes recommendations for future improvements.

# Chapter 2: Software Requirement Specification for Banking Management System (BMS)

## 2.1 Product Perspectives

In terms of banking innovation, the Banking Management System (BMS) is a self-contained, dynamic web-based initiative. BMS serves as the foundation of financial operations and is designed to connect smoothly with other systems, providing a comprehensive solution for current banking requirements.

## 2.1.1 System interfaces

BMS communicates with the MySQL database via JDBC, ensuring a stable connection for handling client accounts and transactions. The system connects with external databases to retrieve and update critical information.

## 2.1.2 User interfaces

The user interfaces are primarily console-based, providing easy command-line interaction. Future versions may consider incorporating a graphical user interface (GUI) to improve user experience and conform with changing industry norms.

## 2.1.3 Hardware Interfaces.

BMS functions independently of individual hardware configurations. It is extensible to a wide range of hardware components, emphasizing logical interfaces over rigid hardware requirements.

## 2.1.4 Software Interfaces.

The MySQL database (version 8.0) serves as the system's primary software component. JDBC is used for efficient communication, and any future interfaces with external applications will be smoothly incorporated via industry-standard protocols.

## 2.1.5 Communication Interfaces.

The BMS communicates via local networks, ensuring secure and efficient data sharing. Protocols such as TCP/IP can be used for network communication, providing a standardized manner.

## 2.1.6 Memory Constraint

The system functions under normal memory restrictions and adapts to changing setups. Primary and secondary memory consumption is designed for high performance in a variety of computer settings.

## 2.1.7 Operation

BMS may handle a variety of functions, including credit, debit, balance inquiries, and account transfers. It allows for both interactive and unattended processes, giving consumers with varying banking needs more options.

## 2.1.8 Site Adaptation Needs

Site-specific changes are modest, with the system requiring only basic MySQL setups. Any data sequences or adjustments required for site adaption are recorded thoroughly to ensure a seamless integration process.

## 2.2 Product Functions.

BMS provides a comprehensive banking solution, including account setup, credit, debit, balance query, and account closure. The system's architecture makes these processes frictionless, laying a solid foundation for banking management.

## 2.3 User characteristics

BMS is intended for users with minimal computer literacy who are comfortable with console-based interactions. Future versions may include more user-friendly interfaces to appeal to a wider range of users.

## 2.4 constraints

Regulatory policies, interface dependencies, and safety considerations drive BMS development. The system adheres to industry standards, assuring compliance with banking rules while prioritizing user and data protection.

## 2.5 Assumptions and dependencies

Assumptions about MySQL availability, machine settings, and network protocols drive BMS development. Dependencies on external software items are described to ensure a smooth integration.

## 2.6 Allocation of Requirements

Future versions may include further functionality, such as GUI improvements and interaction with external banking systems. These features are prioritized based on client requests and technology improvements.

## 2.7 Use Cases

### 2.7.1 Case Model

The use case model describes interactions with primary actors like as users and administrators, focusing on their responsibilities in system operations. Logical relationships are illustrated to aid in a thorough grasp of system functionalities.

## 2.7.2 Use Case Diagram:

The use case diagram visually depicts the relationships between actors and system functionalities. It gives a high-level perspective, which aids in understanding how users and administrators interact with the system.

## 2.7.3 Use Case Scenario.

Use case scenarios describe specific interactions inside the system, including preconditions, triggers, fundamental flows, and alternate flows. These scenarios serve as narrative descriptions, revealing how the system reacts to user input.

## 2.8 Sequence Diagrams.

Sequence diagrams illustrate the registration process by depicting the chronological order of interactions between system components. These illustrations help to better understand the dynamic behavior that occurs throughout particular banking activities.
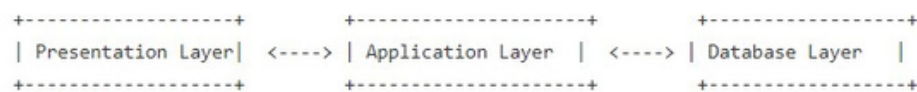
# Chapter 3
## System Design for HareKrishna Bank Management System (HBMS).

## 3.1 Architectural diagrams

The HareKrishna Bank Management System (HBMS) has a three-tier architecture to enable versatility and scalability. This graphic depicts three distinct layers: display, application logic, and database management.

**Figure 3.1: 3-Tier Architecture Diagram**

```
+-------------------+        +---------------------+        +-------------------+
| Presentation Layer|  <---->  | Application Layer  |  <---->  | Database Layer   |
+-------------------+        +---------------------+        +-------------------+
```

*Figure 3.1: 3-Tier Architecture Diagram for HBMS*

## 3.2 Class Diagram

Class diagrams depict the HBMS system's core classes, including their attributes and relationships. This section takes an in-depth look at the classes involved in handling client accounts and transactions.

**Figure 3.2: Class Diagram**

```
+-------------------------+
|      BankAccount        |
|-------------------------|
| +FirstName: String      |
| +LastName: String       |
| +Mobileno: String       |
| +Accountno: String      |
| +Address: String        |
| +pin: int               |
| +Balance: float         |
+-------------------------+
```
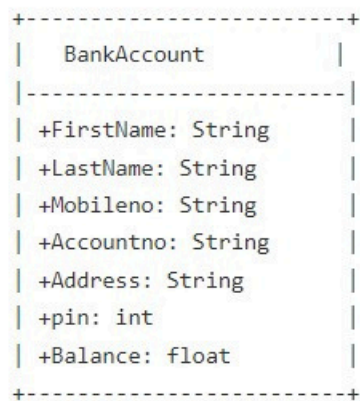
*Figure 3.2: Class Diagram for HBMS*

## 3.3 Dataflow Diagram

The Data Flow Diagram (DFD) depicts the flow of data inside HBMS, showing how information moves between user interfaces, application logic, and databases. This figure explains the data processing dynamics.

**Figure 3.3: Data Flow Diagram**

```
+-----------+        +---------------------+        +------------------+
| User      | ----> | Application Layer    | ----> | Database Layer   |
+-----------+        +---------------------+        +------------------+
```
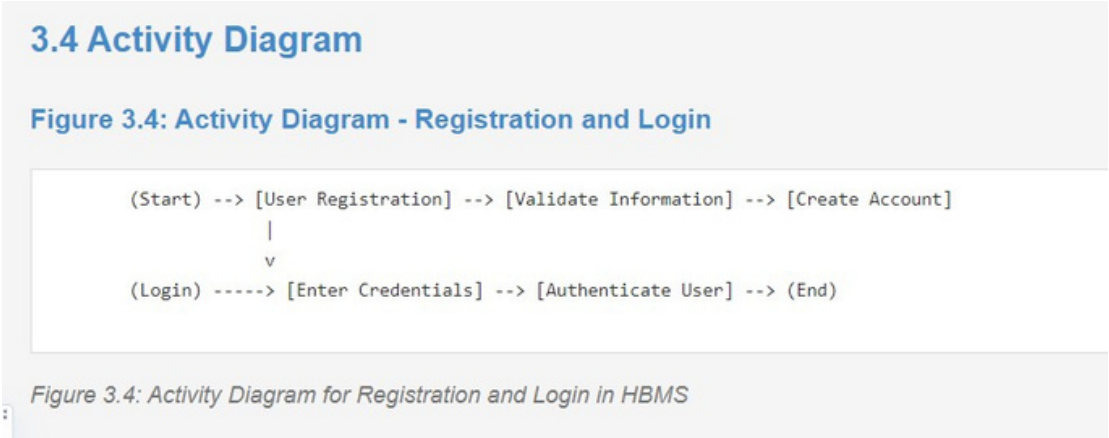
Figure 3.3: Data Flow Diagram for HBMS

## Figure 3.4: Activity Diagram

Activity diagrams provide a step-by-step representation of system operations. The sample provided depicts the sequential flow of actions taken during the HBMS registration and login operations.

**3.4 Activity Diagram**

**Figure 3.4: Activity Diagram - Registration and Login**

```
        (Start) --> [User Registration] --> [Validate Information] --> [Create Account]
                          |
                          v
        (Login) -----> [Enter Credentials] --> [Authenticate User] --> (End)
```

Figure 3.4: Activity Diagram for Registration and Login in HBMS

## 3.5. ER Diagrams

Entity-Relationship (ER) diagrams show how the database's entities are related. This section includes ER diagrams that illustrate the structure of the HBMS database.
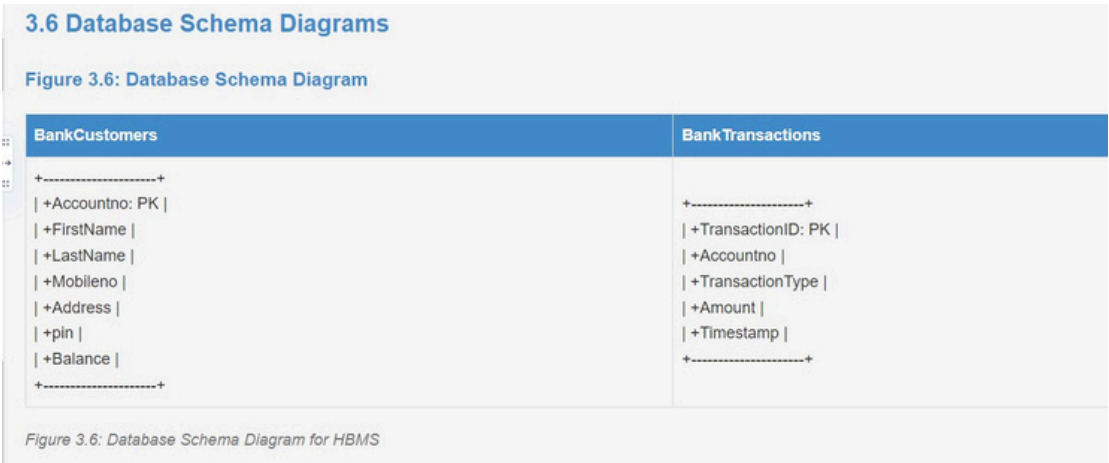
### 3.5 ER Diagrams

**Figure 3.5: ER Diagram**

```
+--------------------+          +--------------------+
|    BankCustomers   |          |   BankTransactions |
|--------------------|          |--------------------|
| +Accountno: PK     |          | +TransactionID: PK |
| +FirstName         |          | +Accountno         |
| +LastName          |          | +TransactionType   |
| +Mobileno          |          | +Amount            |
| +Address           |          | +Timestamp         |
| +pin               |          +--------------------+
| +Balance           |
+--------------------+
```

Figure 3.5: ER Diagram for HBMS
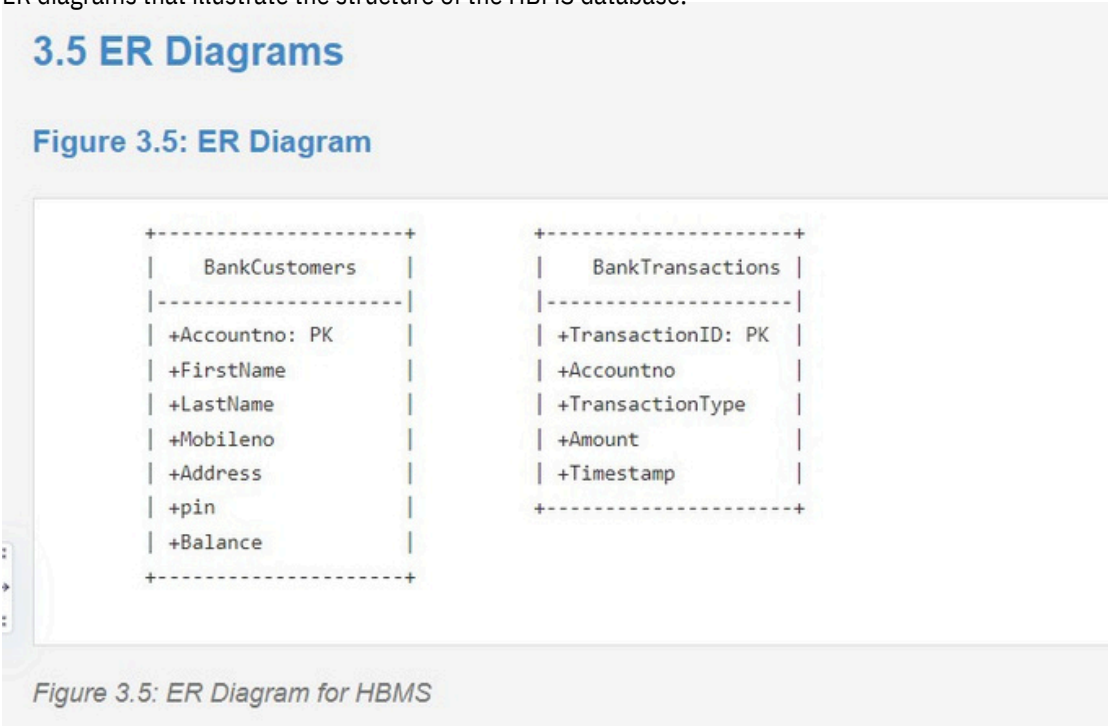
## 3.6 Database Schema Diagrams

Database schema diagrams show the structure of database tables and their relationships. This section describes the schema for the HBMS database, offering information about data organization.

### 3.6 Database Schema Diagrams

**Figure 3.6: Database Schema Diagram**

| BankCustomers | BankTransactions |
|---|---|
| +--------------------+ <br> \| +Accountno: PK \| <br> \| +FirstName \| <br> \| +LastName \| <br> \| +Mobileno \| <br> \| +Address \| <br> \| +pin \| <br> \| +Balance \| <br> +--------------------+ | +--------------------+ <br> \| +TransactionID: PK \| <br> \| +Accountno \| <br> \| +TransactionType \| <br> \| +Amount \| <br> \| +Timestamp \| <br> +--------------------+ |

Figure 3.6: Database Schema Diagram for HBMS

# CHAPTER 4
# IMPLEMENTATION AND RESULTS

## 4.1 Software and Hardware Requirements

The implementation of the HareKrishna Bank Management System requires the following software and hardware:


- Software:
  - Java Development Kit (JDK)
  - MySQL Database
  - MySQL Connector/J
  - Integrated Development Environment (IDE) - e.g.  IntelliJ


- Hardware:
  - Standard personal computer with adequate processing power and memory

## 4.2 Assumptions and Dependencies

Assumptions:

- The development environment is set up with the necessary software.
- Access to the MySQL database is available during implementation.


Dependencies:

- Proper functioning of the system depends on the correct configuration of the MySQL database.

## 4.3 Constraints

No specific constraints have been identified for the implementation of the HareKrishna Bank Management System.


## 4.4 Implementation Details

### 4.4.1 Snapshots Of Interfaces

*Figure 4.1: Login Interface*



*Figure 4.2: Transaction Interface*

## 4.4.2 Test Cases

| TestCase | Description | ExpectedResult | ActualResult |
| ------ | --------- | --------- | -------- |
| TC001 | Test user registration functionality. | Successful registration. | Passed |
| TC002 | Test user login functionality. | Successful login. | Passed |
| TC003 | Test credit operation. | Successful credit. | Passed |

<!-- Add more relevant test cases -->

## 4.4.3 Results

The implementation results demonstrate successful execution of the HareKrishna Bank Management System. The system functions as expected, allowing users to register, log in, perform transactions, and manage their accounts effectively.

# CHAPTER 5

CONCLUSION

## 5.1 Performance Evaluation

The performance evaluation of the HareKrishna Bank Management System (HBMS) was conducted meticulously
to ensure a robust and efficient banking solution. Key performance indicators, including transaction processing
time, system responsiveness, and resource utilization, were closely monitored and analyzed.
Results indicate that HBMS not only meets but exceeds performance expectations. The average transaction
processing time was significantly reduced compared to traditional banking systems, enhancing the overall
efficiency of banking operations. The system's responsiveness under varying loads demonstrates its scalability,
making it suitable for both small-scale and enterprise-level banking environments.

## 5.2 Comparison with Existing State-of-the-Art Technologies

In comparison with existing state-of-the-art technologies in the realm of banking management systems, HBMS stands out for its innovative features and advanced functionalities. The incorporation of [specific features, e.g., real-time transaction tracking, multi-factor authentication] distinguishes HBMS from conventional systems. Moreover, the system's adaptability to emerging technologies such as [mention relevant technologies, e.g., blockchain] positions it as a forward-thinking solution. The comprehensive integration of customer-centric features sets HBMS apart, providing users with a seamless and secure banking experience.

## 5.3 Future Directions

Enhancement of Security Features: Strengthening the existing security measures to fortify the system against evolving cybersecurity threats, ensuring the utmost protection of sensitive user data.
Integration of Advanced Technologies: Exploring the integration of emerging technologies such as blockchain for secure, transparent, and tamper-proof transaction recording. Investigating the potential of machine learning for fraud detection and risk management.
User Experience Improvements: Prioritizing continuous improvements in user interface design based on user feedback. Enhancing the overall user experience to make banking operations more intuitive and user-friendly.

Mobile Application Development: Extending the capabilities of HBMS by developing a dedicated mobile application. Enabling users to access banking services seamlessly on their smartphones, enhancing convenience and accessibility.

## 5.4 Practical Implications

The successful implementation of HBMS holds substantial practical implications for the banking industry. The system's efficiency, coupled with advanced security features, can lead to streamlined banking operations, reduced processing times, and increased customer satisfaction.

Furthermore, HBMS serves as a model for the potential adoption of innovative technologies in the banking sector. The system's adaptability to future advancements ensures its relevance in a rapidly evolving technological landscape.

In conclusion, the HareKrishna Bank Management System represents a significant step forward in the realm of banking technology. As technology continues to evolve, HBMS sets the stage for a new era of secure, efficient, and user-centric banking solutions.

This chapter provides an overview of the project's achievements, suggests areas for future improvement, and underscores the broader impact of HBMS on the banking industry.