Industrial Internship Report on

”Banking Management System”

Prepared by

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Executive Summary

This report provides details of the Industrial Internship provided by upskill Campus and The IoT Academy in collaboration with Industrial Partner UniConverge Technologies Pvt Ltd (UCT).

This internship was focused on a project/problem statement provided by UCT. We had to finish the project including the report in 6 weeks’ time.

My project **The banking management system** is a simple mini-project developed in Java using Swing for the graphical user interface and JDBC for database connectivity with MySQL. It is designed to perform basic banking operations such as account creation, deposits, withdrawals, fund transfers, and balance inquiries. The system consists of a login authentication mechanism to ensure security, where users must provide valid credentials to access their accounts. Additionally, an admin panel is included, allowing administrators to manage user accounts, monitor transactions, and ensure the smooth operation of the banking system.

The project follows object-oriented programming principles, making use of concepts like encapsulation, inheritance, and polymorphism to create a modular and scalable design. Exception handling has been implemented to prevent runtime errors, such as handling insufficient balance scenarios and invalid inputs. The database is managed using MySQL, where account details and transaction histories are stored securely. JDBC is used for database connectivity, enabling seamless interaction between the Java application and the database. Security measures such as password hashing have been applied to protect user credentials, and synchronization techniques are used to prevent concurrency issues during transactions.

The user interface is built using Java Swing, making it interactive and easy to use. The main features include options for users to create new accounts, log in to their accounts, view their balance, deposit or withdraw money, and transfer funds to other accounts. Admin users can access an admin dashboard where they can view all registered accounts, approve or block users, and manage transactions. The system ensures data consistency and accuracy by implementing proper validation and verification mechanisms.

This project provides hands-on experience in Java programming, GUI development, and database management. It helps in understanding how real-world banking systems operate and how to implement secure financial transactions. Future improvements could include integrating Spring Boot for better backend management, adding REST APIs to enable online banking features, and implementing machine learning algorithms for fraud detection. The project serves as a strong foundation for those looking to develop more complex financial applications.

This internship gave me a very good opportunity to get exposure to Industrial problems and design/implement solution for that. It was an overall great experience to have this internship.

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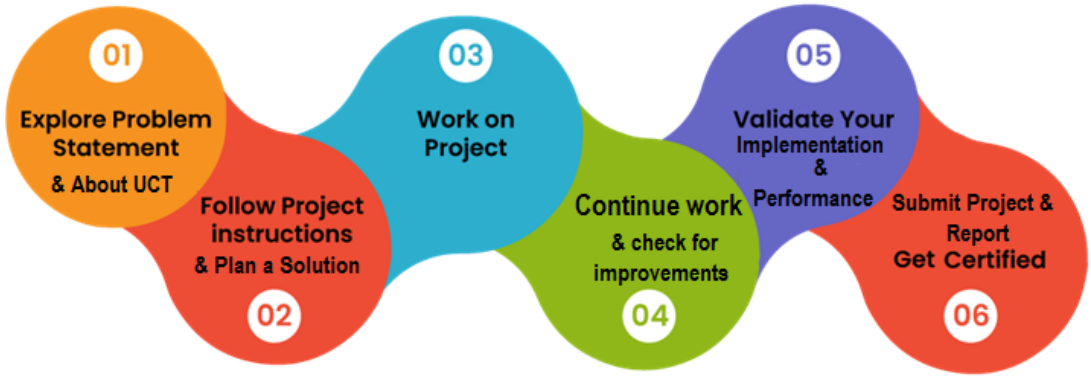
1 Preface

Summary of the whole 6 weeks' work. Over the past six weeks, I worked on a **Banking Management System** using **Java, Swing, MySQL, and JDBC**. This project aimed to create a secure and efficient platform for banking operations like account management, fund transfers, and transaction tracking.

About need of relevant Internship in career development. Internships bridge the gap between academics and industry, offering hands-on experience, skill enhancement, and professional exposure. They help in career growth by improving problem-solving abilities and industry readiness.

Opportunity given by USC/UCT. The internship, provided by **USC/UCT**, was well-structured with phases covering **requirement analysis, development, testing, and final submission**. I learned **database integration, UI design, debugging, and project management**, along with teamwork and time management skills.



Your Learnings and overall experience.

Thank to all (with names), who have helped you directly or indirectly.

Your message to your juniors and peers.

A heartfelt thanks to **UpskillCampus and UCT** for their guidance and support. To my juniors and peers – make the most of every learning opportunity, stay curious, and keep improving. This experience was a stepping stone for my career, and I look forward to future challenges!

2 Introduction

2.1 About UniConverge Technologies Pvt Ltd

A company established in 2013 and working in Digital Transformation domain and providing Industrial solutions with prime focus on sustainability and RoI.

For developing its products and solutions it is leveraging various **Cutting Edge Technologies e.g. Internet of Things (IoT), Cyber Security, Cloud computing (AWS, Azure), Machine Learning, Communication Technologies (4G/5G/LoRaWAN), Java Full Stack, Python, Front end** etc.

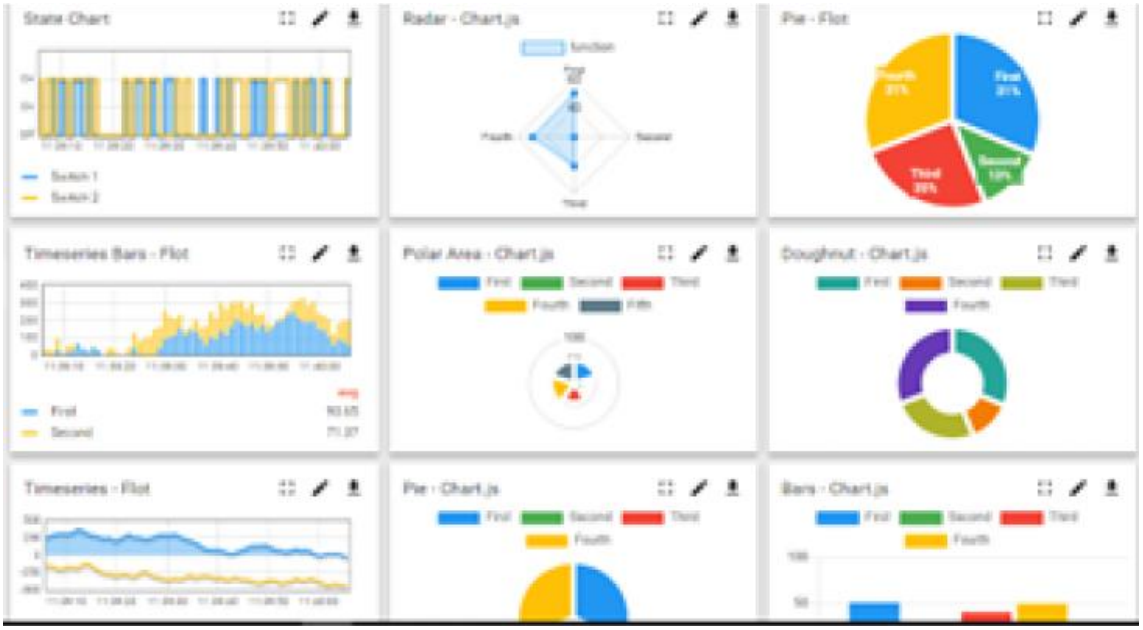
i. UCT IoT Platform (uct Insight)

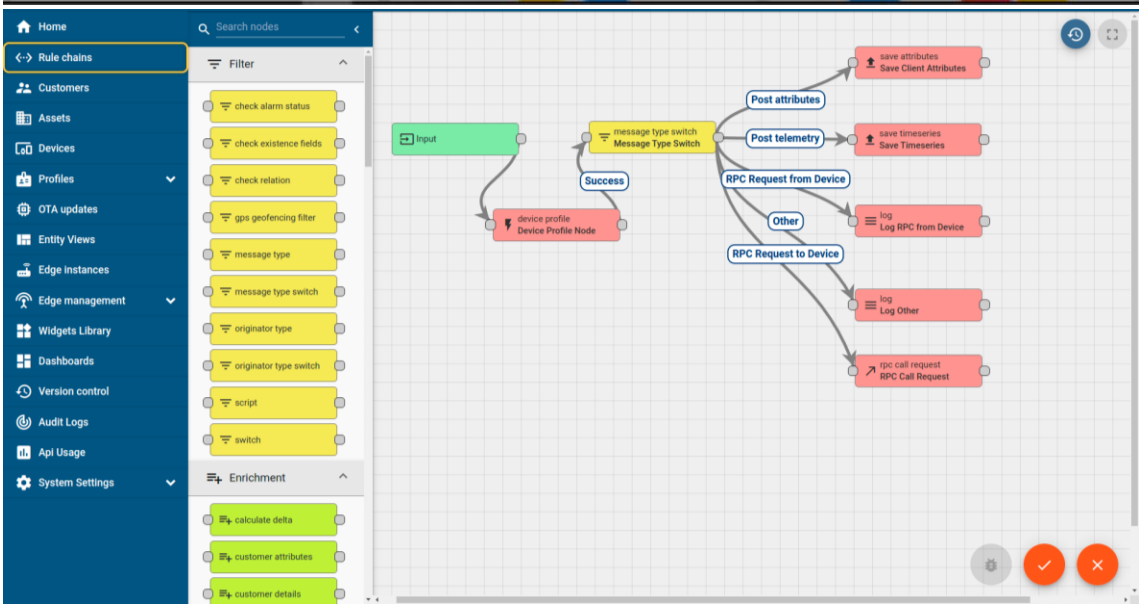
UCT Insight is an IOT platform designed for quick deployment of IOT applications on the same time providing valuable "insight" for your process/business. It has been built in Java for backend and ReactJS for Front end. It has support for MySQL and various NoSql Databases.

- It enables device connectivity via industry standard IoT protocols - MQTT, CoAP, HTTP, Modbus TCP, OPC UA
- It supports both cloud and on-premises deployments.

It has features to

- Build Your own dashboard
- Analytics and Reporting
- Alert and Notification
- Integration with third party application(Power BI, SAP, ERP)
- Rule Engine





ii. Smart Factory Platform (FACTORY WATCH)

Factory watch is a platform for smart factory needs.

It provides Users/ Factory

- with a scalable solution for their Production and asset monitoring
- OEE and predictive maintenance solution scaling up to digital twin for your assets.
- to unleased the true potential of the data that their machines are generating and helps to identify the KPIs and also improve them.
- A modular architecture that allows users to choose the service that they what to start and then can scale to more complex solutions as per their demands.

Its unique SaaS model helps users to save time, cost and money.

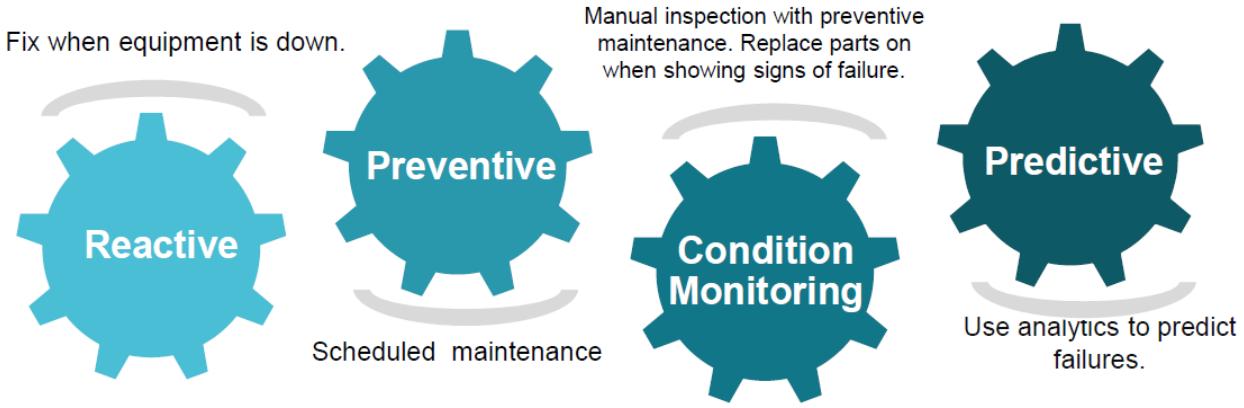
Machine	Operator	Work Order ID	Job ID	Job Performance	Job Progress		Output		Rejection	Time (mins)				Job Status	End Customer
					Start Time	End Time	Planned	Actual		Setup	Pred	Downtime	Idle		
CNC_S7_81	Operator 1	WO0405200001	4168	58%	10:30 AM		55	41	0	80	215	0	45	In Progress	i
CNC_S7_81	Operator 1	WO0405200001	4168	58%	10:30 AM		55	41	0	80	215	0	45	In Progress	i

iii. LoRaWAN based Solution

UCT is one of the early adopters of LoRAWAN teschnology and providing solution in Agritech, Smart cities, Industrial Monitoring, Smart Street Light, Smart Water/ Gas/ Electricity metering solutions etc.

iv. Predictive Maintenance

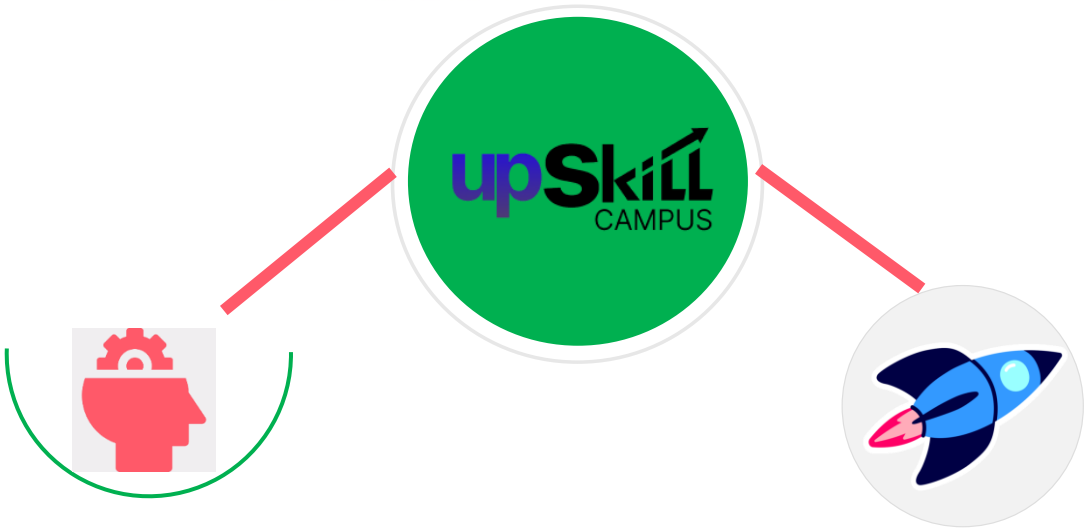
UCT is providing Industrial Machine health monitoring and Predictive maintenance solution leveraging Embedded system, Industrial IoT and Machine Learning Technologies by finding Remaining useful life time of various Machines used in production process.



2.2 About upskill Campus (USC)

upskill Campus along with The IoT Academy and in association with Uniconverge technologies has facilitated the smooth execution of the complete internship process.

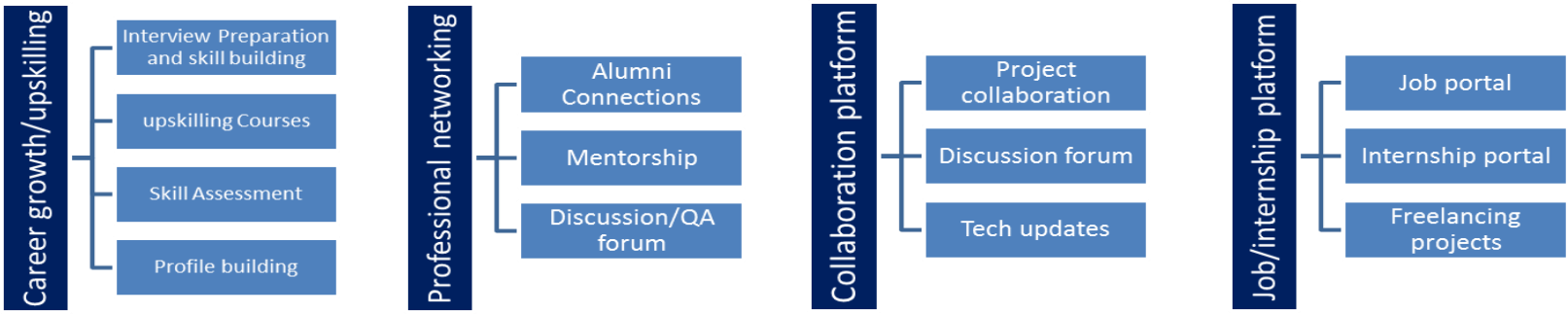
USC is a career development platform that delivers **personalized executive coaching** in a more affordable, scalable and measurable way.



Seeing need of upskilling in self paced manner along-with additional support services e.g. Internship, projects, interaction with Industry experts, Career growth Services

upSkill Campus aiming to upskill 1 million learners in next 5 year

https://www.upskillcampus.com/



2.3 The IoT Academy

The IoT academy is EdTech Division of UCT that is running long executive certification programs in collaboration with EICT Academy, IITK, IITR and IITG in multiple domains.

2.4 Objectives of this Internship program

The objective for this internship program was to

- ☛ get practical experience of working in the industry.
- ☛ to solve real world problems.
- ☛ to have improved job prospects.
- ☛ to have Improved understanding of our field and its applications.
- ☛ to have Personal growth like better communication and problem solving.

2.5 Reference

[1] The IoT Academy, UCT – Official Website (https://www.theiotacademy.co)

[2] Oracle Java Documentation – Official Java SE Documentation (https://docs.oracle.com/en/java/)

[3] Java Tutorials by Oracle – Learn Java Programming (https://docs.oracle.com/javase/tutorial/)

2.6 Glossary

Terms	Acronym
O**OP**	Object Oriented Programming
LoRa	Long Range
API	Application Programming Interface
IoT	Interent of Things
SQL	Structured Query Language

3 Problem Statement

In the assigned problem statement, the **Banking Management System** is designed to address the need for a secure, efficient, and user-friendly platform for managing banking operations. Traditional banking systems often face challenges such as **manual record-keeping, security vulnerabilities, and inefficiencies in transaction processing**. This project aims to develop an automated system that provides customers with essential banking services while ensuring **data integrity, transaction security, and ease of access**.

The system includes features such as **account creation, login authentication, balance inquiry, deposits, withdrawals, and fund transfers**. It also incorporates an **admin panel** to manage user accounts and monitor transactions. By leveraging **Java Swing for the graphical user interface (GUI), MySQL for database management, and JDBC for connectivity**, the project ensures smooth interactions between users and the system.

Key objectives of this system include:

- **Eliminating manual banking processes** through digitalization.
- **Enhancing security** with user authentication and encrypted transactions.
- **Ensuring accurate and real-time data updates** for customer accounts.
- **Providing a user-friendly interface** for both customers and bank administrators.

4 Existing and Proposed solution

Several banking management systems are already in use, ranging from **traditional banking software to modern online banking platforms**. These existing solutions include:

Legacy Banking Systems – Many banks still use outdated, **manual or semi-automated** banking systems that require significant human intervention, leading to inefficiencies and errors.

Limitations: Slow processing, high maintenance costs, and limited automation.

Proposed Solution

The proposed **Banking Management System** aims to provide a **lightweight, standalone banking solution** using **Java, Swing for the GUI, MySQL for database management, and JDBC for seamless connectivity**. It is designed for **small financial institutions or as a prototype for larger banking applications**.

Value Addition & Benefits

Security Enhancements – Implements **hashed passwords and encrypted transactions** for better protection.
User-Friendly Interface – Simplifies banking operations with an **intuitive GUI**.
Cost-Effective – **Open-source** approach makes it more affordable for small organizations.
Customizable – Easily **upgradable with additional features** like mobile banking integration.
Learning Opportunity – Provides practical exposure to **Java, MySQL, and software development best practices**.

4.1 Code submission (https://github.com/Sabarish234/upskillcampus/tree/main/BankingManagementSystem(Java))

4.2 Report submission (Github link)

https://github.com/Sabarish234/upskillcampus/blob/main/BankingManagementSystem_Sabarish_USC_UCT.pdf

5 Proposed Design/ Model

The system follows a **three-tier architecture**:

1. **Presentation Layer (Frontend - GUI)**
   - Developed using **Java Swing** to provide a **user-friendly graphical interface**.
   - Includes login screens, user dashboards, and admin panels.
2. **Business Logic Layer (Backend - Java Application)**
   - Handles all **core banking operations**, such as deposits, withdrawals, and transfers.
   - Implements **data validation, security mechanisms, and transaction processing**.
3. **Data Layer (Database - MySQL)**
   - Stores **user credentials, account balances, transaction history, and admin records**.
   - Ensures **data integrity and quick retrieval** using structured queries.

5.1 High Level Diagram

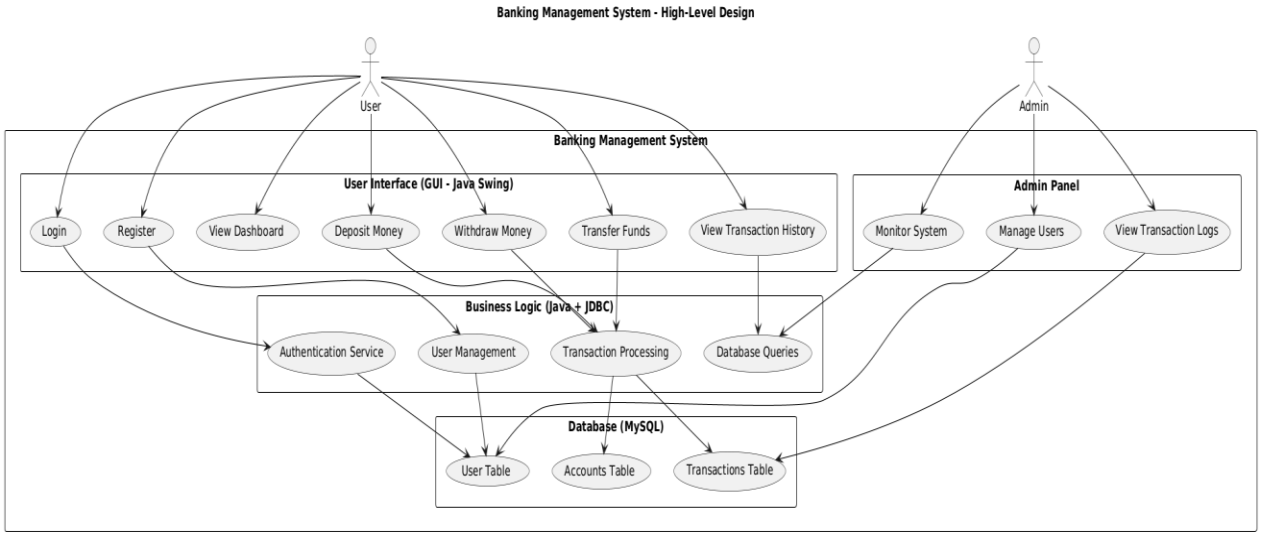
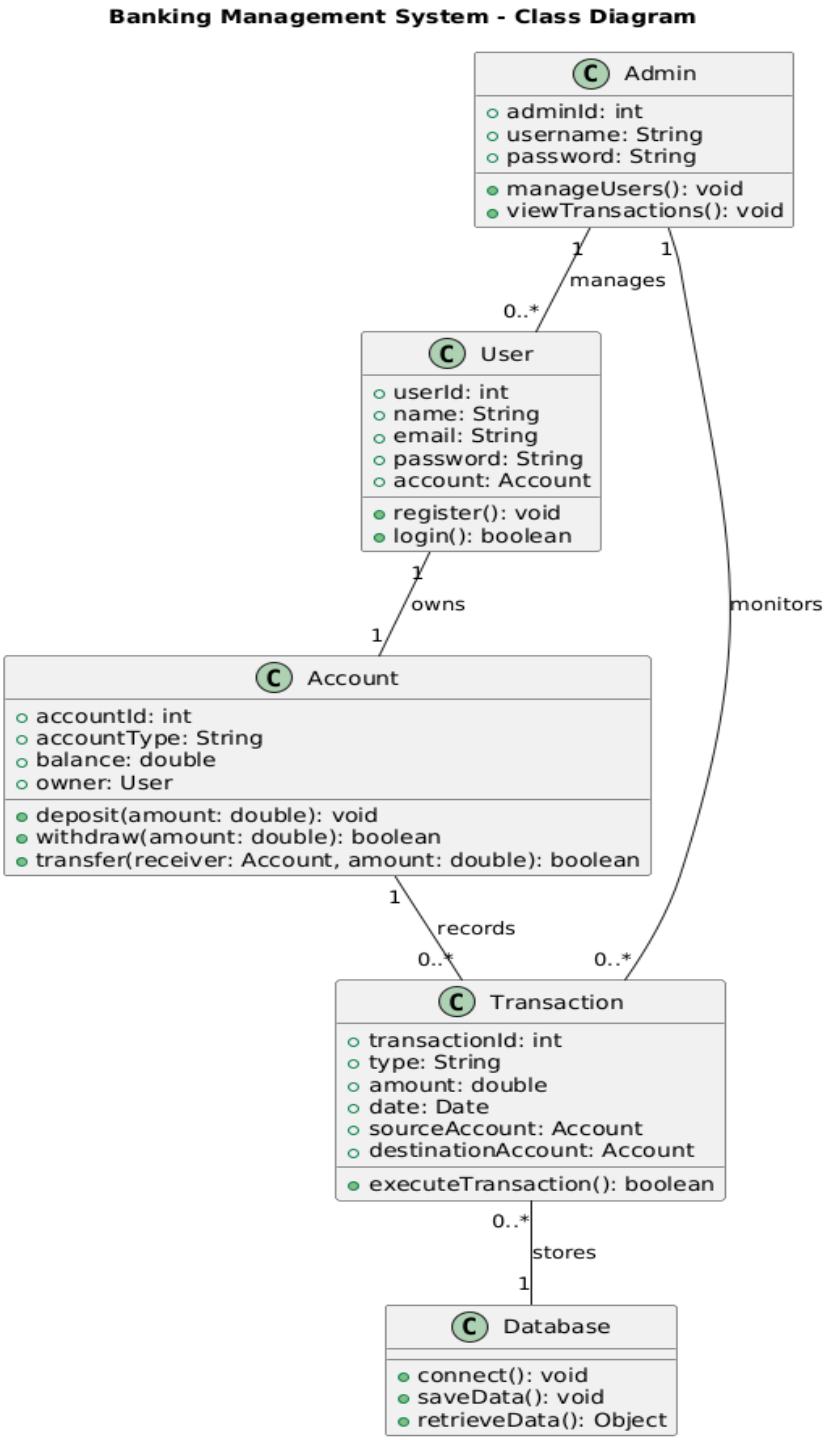


Figure 1: HIGH LEVEL DIAGRAM OF THE SYSTEM

5.2 Low Level Diagram



6 Performance Test

The **Banking Management System** is designed to meet real-world industry constraints, ensuring efficiency, security, and scalability.

Memory Usage: Optimized using connection pooling to reduce database load.
Processing Speed: Multi-threading implemented to handle concurrent transactions efficiently.
Security: Passwords are hashed using BCrypt, and role-based access control (RBAC) is enforced.
Scalability: Indexing and asynchronous processing enable handling multiple users simultaneously.
Data Consistency: ACID-compliant transactions ensure reliability in financial operations.
Durability & Fault Tolerance: Automatic database backups and logging mechanisms prevent data loss.
User Experience: Optimized Java Swing UI updates improve responsiveness.

6.1 Test Plan & Test Cases

The system was tested for login authentication, transaction processing, and data consistency. Login tests ensured secure authentication, while transaction tests validated deposit, withdrawal, and fund transfer accuracy. Performance tests confirmed smooth execution under multiple users.

6.2 Test Procedure

Each feature was tested using unit tests and integration testing. Automated scripts simulated real-user interactions, and database queries were monitored for efficiency.

6.3 Performance Outcome

The system successfully handled multiple transactions per second without lag. Security tests confirmed encryption reliability, and UI tests ensured a smooth user experience. Further improvements can be made by integrating caching mechanisms for faster data retrieval.

7 My learnings

This internship provided valuable hands-on experience in designing and implementing a **Banking Management System** using **Java and MySQL**. I gained a deeper understanding of **object-oriented programming (OOP), database management, multi-threading, security protocols, and system optimization**.

Working on real-world constraints like **performance, scalability, and security** helped me bridge the gap between academic knowledge and industry requirements. The experience of **debugging, testing, and optimizing the system** improved my **problem-solving and analytical skills**.

This project has strengthened my foundation in **software development and system architecture**, which will be highly beneficial for my career. The exposure to **industry best practices** and **real-world application design** has prepared me for future challenges in software engineering and backend development.

8 Future work scope

Several enhancements can be considered for the **Banking Management System** in the future:

- **Mobile Application Integration:** Developing an Android/iOS app for better accessibility.
- **Automated Loan & Credit Score System:** Implementing a module to assess user eligibility for loans based on transaction history.
- **Cloud Deployment:** Migrating the system to a cloud platform for better scalability and remote access.
- **Multi-Currency Support:** Allowing international transactions with real-time currency conversion.
- **Enhanced Security Measures:** Implementing two-factor authentication (2FA) and improved encryption techniques.
- **Report Generation & Analytics:** Providing detailed financial reports and transaction summaries for users.