

Industrial Internship Report on " Bank 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).

The internship focused on solving an industry-relevant problem statement within a six-week timeframe. My project, "Bank Management System", is a Java + SQL-based application designed to manage banking operations, including user authentication, account creation, transactions, and balance inquiries.

This internship provided valuable exposure to real-world industry problems, enabling me to design and implement solutions in a structured environment. It was an enriching experience that enhanced my technical and problem-solving skills.

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1 Preface

During my six-week internship, I worked on the Bank Management System project, which aimed to streamline banking operations using Java and MySQL. This internship was a great learning opportunity as it provided hands-on experience in software development, database management, and real-world problem-solving.

Internships play a crucial role in career development, allowing students to apply their academic knowledge to practical industry scenarios. My project involved building a secure, user-friendly banking system with features like authentication, transactions, and balance inquiries.

This internship, offered by Upskill Campus and The IoT Academy, in collaboration with UniConverge Technologies Pvt Ltd (UCT), helped me enhance my technical skills and gain industry exposure. The program was well-structured and provided a clear roadmap to follow.

I would like to express my gratitude to all mentors and peers who guided and supported me throughout this journey. Special thanks to Upskill Campus, The IoT Academy, and UniConverge Technologies Pvt Ltd for this wonderful opportunity.

2 Introduction

2.1 About UniConverge Technologies Pvt Ltd

UniConverge Technologies Pvt Ltd (UCT) is a company specializing in Digital Transformation and Industrial Solutions, with a strong focus on sustainability and Return on Investment (RoI). It leverages cutting-edge technologies such as IoT, Cybersecurity, Cloud Computing (AWS, Azure), Machine Learning, and Full Stack Development to provide innovative industry solutions.

UCT offers multiple platforms, including:

- UCT IoT Platform – A Java and ReactJS-based IoT platform that supports device connectivity, analytics, and dashboard customization.
- Smart Factory Platform – A solution for industrial monitoring, predictive maintenance, and digital twin implementations.
- LoRaWAN-based Solutions – Industrial monitoring solutions in AgriTech, Smart Cities, and Utility Management.
- Predictive Maintenance – Solutions for machine health monitoring and predictive maintenance using IoT and AI.

2.2 About upskill Campus (USC)

Upskill Campus is a career development platform that provides personalized training programs in software development, AI, and IoT. Along with The IoT Academy, it facilitated the smooth execution of this internship program.

2.3 The IoT Academy

The IoT Academy is the EdTech division of UCT, offering executive certification programs in collaboration with EICT Academy (IITK, IITR, IITG) in multiple domains, including IoT, AI, and Full Stack Development.

2.4 Objectives of this Internship program

The objectives of this internship program were:

- Gain **practical industry experience**
- Solve **real-world problems**
- Improve **technical and problem-solving skills**
- Enhance **understanding of full-stack development and database integration**
- Develop **communication and teamwork skills**

2.5 Reference

- [1] Java Documentation
- [2] MySQL Database Guide
- [3] JDBC API Guide

2.6 Glossary

| Terms | Acronym |
|----------------------------|---------|
| Database Management System | DBMS |
| Java Database Connectivity | JDBC |
| Graphical User Interface | GUI |
| Structured Query Language | SQL |

3 Problem Statement

The primary challenge was to develop a secure and efficient banking system that allows users to:

- Authenticate securely
- Manage accounts (create, update, delete)
- Perform transactions (deposit, withdraw, check balance)
- View transaction history
- Ensure data security with encryption and validation mechanisms

4 Existing and Proposed solution

Existing Solutions and Their Limitations

There are several **bank management systems** developed by different companies, each with varying features and capabilities. Some well-known solutions include:

1. Core Banking Systems (CBS)

- Used by banks for centralized account management and transactions.
- Examples: **Finacle (Infosys), TCS BaNCS, Temenos T24.**
- **Limitations:**
 - Expensive and complex to implement.
 - Requires high maintenance and IT infrastructure.
 - Not ideal for small financial institutions or startups.

2. Open-Source Bank Management Systems

- Free solutions available with limited features.
- Examples: **Mifos, OpenCBS, MyBanco.**
- **Limitations:**
 - Lack of robust security and compliance.
 - Limited support and documentation.
 - Difficult to customize for specific business needs.

3. Traditional Banking Software with Limited Digital Features

- Older banking software still in use lacks modern digital features.
- Examples: Legacy banking applications in some government or rural banks.
- **Limitations:**
 - Poor user experience and outdated interfaces.
 - Lack of mobile or online banking support.
 - Security vulnerabilities due to outdated technologies.

Proposed Solution

The **Bank Management System (BMS)** I developed addresses the **limitations of existing solutions** by offering a **secure, lightweight, and user-friendly system** designed specifically for:

- **Individual users and small financial institutions** who need a secure and easy-to-use banking system.
- **Developers and startups** looking for a **scalable banking solution** that can be integrated with other financial services.
- **Educational and research purposes**, allowing students and professionals to learn about **banking operations and security best practices.**

Key Features of My Proposed Solution:

Secure Authentication:

- Implements **password hashing and encryption** for login security.
- Prevents unauthorized access through **role-based authentication**.

Efficient Transactions:

- Supports **deposit, withdrawal, and fund transfers** with real-time balance updates.
- Uses **optimized SQL queries** to reduce transaction processing time.

Database Management:

- Stores **user details, transaction history, and account information** securely using **MySQL**.
- Uses **JDBC connectivity** for smooth interaction between Java and the database.

User-Friendly Interface:

- Built using **Java Swing** for a clean and interactive GUI.
- Enables easy navigation for **non-technical users**.

Error Handling and Logging:

- Implements **exception handling** for transaction failures.
- Uses **logging mechanisms** to track system activity and errors.

Value Addition & Future Enhancements

Enhanced Security Mechanisms

- Implement **two-factor authentication (2FA)** for an extra layer of security.
- Use **AES encryption** for storing sensitive user data.

Multi-User Role Access

- Expand system capabilities to include **Admin, Manager, and Customer roles**.
- Allow bank managers to **approve/monitor transactions**.

Web & Mobile Banking Integration

- Develop a **web-based and mobile-friendly** version of the system using **React.js and Node.js**.

- Enable users to **access their accounts from anywhere**.

Automated Interest Calculation & Loan Management

- Implement **automated interest calculations** for savings accounts.
- Introduce **loan management features** for tracking repayments.

AI-Based Fraud Detection

- Integrate **machine learning algorithms** to detect **suspicious activities and fraud attempts**.
- Send **real-time alerts** for unusual transactions.

4.1 Code submission (Github link):

<https://github.com/kshitish28/upskillscampus.git>

4.2 Report submission (Github link) :

<https://github.com/kshitish28/upskillscampus.git>

5 Proposed Design/ Model

The Bank Management System follows a modular architecture using Java and MySQL for database operations.

5.1 High Level Diagram (if applicable)

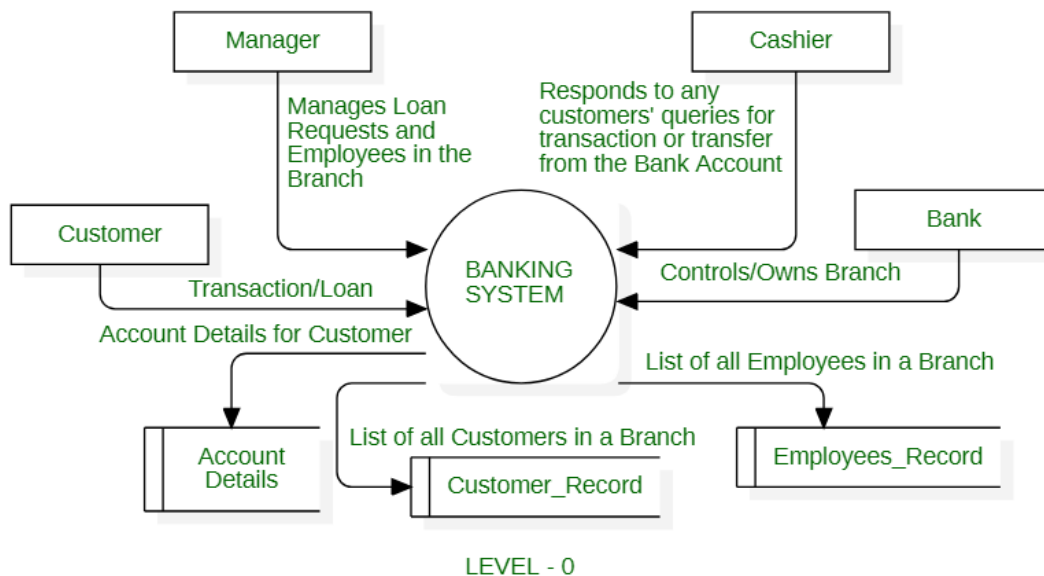


Figure 1: HIGH LEVEL DIAGRAM OF THE SYSTEM

5.2 Low Level Diagram (if applicable)

- **Database Schema** (Tables: Users, Accounts, Transactions)
- **Class Diagrams** (Login.java, Transactions.java, DatabaseConnection.java, etc.)

5.3 Interfaces (if applicable)

- GUI-based authentication and account management using Java Swing
- Database interactions using JDBC

6 Performance Test

6.1 Test Plan/ Test Cases

- **User authentication test** (Valid and invalid credentials)
- **Transaction test** (Deposit, withdrawal, balance check)
- **Database integrity test** (Ensuring correct record updates)

6.2 Test Procedure

Each function was tested using **unit testing, integration testing, and manual testing.**

6.3 Performance Outcome

- Secure and efficient authentication
- Smooth transaction execution
- Optimized database queries for real-time balance updates
-

7 My learnings

- Enhanced Java and SQL skills
- Hands-on experience with JDBC and database integration
- Understanding of security mechanisms in financial applications
- Collaboration and teamwork in software development

8 Future work scope

- **Admin Dashboard for Bank Managers**
- **Interest Calculation on Savings Accounts**
- **Multi-Bank Branch Support**
- **ATM Functionality Integration**