**Industrial Internship Report on**

**“Banking Information 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 was “Banking Information System”. In this project, I had to develop a prototype of a Banking Information System in Core Java that provides a working preview of the key functionalities of a real banking system. The prototype should demonstrate the core features and flow of the system, showcasing its functionality and usability. By developing this prototype, stakeholders will have a tangible working preview of the key features and functionality of the Banking Information System. This will allow them to evaluate the system's usability, identify any necessary improvements or enhancements, and make informed decisions for further development and deployment of the complete system.  The Key functionalities that should be included in this project is user registration, account management, deposit and withdrawal, fund transfer, account statements, password protection, error handling and data persistence.  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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# Preface

**Summary of the whole 6 weeks’ work:**

Over the course of six weeks, I successfully developed a prototype of a Banking Information System using Core Java. The objective of this project was to create a tangible working preview of a real banking system, showcasing its key functionalities and usability.

During the first week, I explored the problem statement and set up all the necessary environmental tools, including the IDE and other technologies required to begin the project. This includes using Java as the programming language, Java Swing for creating the graphical user interface, MySQL as the database management system, Eclipse as the integrated development environment (IDE)

In the second week, I designed and implemented the database, laying the foundation for storing essential banking data along with basic sign up and sign in interface along with password protection.

The third week focused on the Bank Manager Account interface, where I integrated key functionalities such as user registration, account management (block/unblock, close and search account), manage credit/debit card and update client info.

In the fourth week, I included the Client Account functionalities, ensuring seamless deposit and withdrawal processes, secure fund transfers and view account statement. I also extended the project by introducing and completing the implementation of the Accountant Account functionalities, enhancing the system's capabilities further that include features like deposit cash, withdraw cash, cheque deposit and issue statement.

Moving to the fifth week, I thoroughly tested the software, addressing any errors, issues, or bugs that arose during the development process.

Lastly, in the sixth week of the internship I completed my project and created an internship report that will be submitted to the company for evaluation of my project and earn a completion certificate.

**Need of relevant internship in career development:**

In today's competitive job market, internships have become crucial stepping stones for career development. Aspiring professionals seeking to gain a competitive edge and prepare themselves for the challenges of the real world recognize the significance of relevant internships. For university students and freshers, it is important to get job experience so that they can get placement in their first company to kickstart their career.

I am excited with my participation in Core Java internship with Upskill Campus. This internship helped me to gain hands-on experience in Java programming, which is a valuable skill in the tech industry. I also had the opportunity to work on real-world projects, which will help me to develop my problem-solving and teamwork skills.

**Brief about the project/problem statement:**

To develop a prototype of a **Banking Information System** in Core Java that provides a working preview of the key functionalities of a real banking system. The prototype should demonstrate the core features and flow of the system, showcasing its functionality and usability.

Key Functionality to Include in the Prototype: User Registration, Account Management, Deposit and Withdrawal, Fund Transfer, Account Statements, Password Protection, User Interface and data persistence.

By developing this prototype, stakeholders will have a tangible working preview of the key features and functionality of the Banking Information System. This will allow them to evaluate the system's usability, identify any necessary improvements or enhancements, and make informed decisions for further development and deployment of the complete system.

**Opportunity given by USC/UCT:**

Undertaking the project "Banking Information System" would not have been possible without the invaluable opportunity extended by the esteemed institution, Upskill Campus/UniConverge Technologies USC/UCT. I express sincere gratitude for the support and resources provided by USC/UCT, which enabled the successful execution of the project.

USC/UCT's provision of state-of-the-art facilities, cutting-edge technologies, and expert guidance from faculty members played a pivotal role in shaping the project's outcome. The project's scope expanded beyond initial expectations due to the wealth of resources available, contributing to a more comprehensive and robust prototype.

I have been given the opportunity to showcase my skills in Java programming and project management. Also, work with cutting edge technologies along with time management. Moreover, the collaborative culture fostered by USC/UCT allowed for valuable interactions with fellow students and faculty members. These exchanges of ideas and feedback were instrumental in refining the project's design and functionality, enriching the overall learning experience.

**How Program was planned:**



**Learnings and overall experience:**

The internship journey of developing the "Banking Information System" prototype has been a transformative and enriching experience. Throughout the six weeks, I had the privilege of immersing myself in the world of software development, gaining valuable insights and honing essential skills.

First and foremost, the internship provided me with a portal where I can get resources and quizzes on Core Java, which helped to keep the practice and motivate us. The portal was also much informative about the UniConverge Technologies Pvt Ltd and its Ed-Tech, Product Division and Consulting subsidiary companies within the UniCnoverge Family. Moreover, I got hands-on experience in Java programming, particularly with Swing AWT for building user interfaces. Working with real-world requirements and challenges allowed me to deepen my understanding of object-oriented programming principles and enhance my coding proficiency.

The importance of effective project planning and time management became evident as I progressed through different phases of the project. Breaking down the development process into manageable tasks and setting achievable milestones were crucial in meeting project deadlines and ensuring a smooth workflow.

Beyond technical skills, the internship provided ample opportunities for personal growth. It allowed me to challenge myself, step out of my comfort zone, and embrace new challenges with confidence. The sense of accomplishment upon completing the prototype instilled a greater belief in my abilities and fostered resilience in the face of complex problem-solving.

In conclusion, the internship in developing the "Banking Information System" prototype has been a remarkable journey of growth and learning. The technical skills acquired, lessons in project management, and the experience of working in a professional setting have collectively contributed to my overall development as a software developer. I am immensely grateful for the opportunity to undertake this internship, as it has not only provided me with a tangible working preview of the banking system but has also shaped me into a more competent and confident professional, ready to take on future challenges with zeal and enthusiasm.

**Acknowledgments:**

I would like to take this opportunity to express my heartfelt gratitude to all the individuals who have played a significant role in supporting me throughout the development of the "Banking Information System" prototype. Their guidance, encouragement, and unwavering support have been instrumental in shaping the success of this project.

First and foremost, I extend my sincere thanks to Mr. Apurv Sir and Mr. Kaushlendra Singh Sisodia Sir, our coordinators for providing valuable insights and expert guidance throughout the entire internship. Their profound knowledge and constructive feedback helped steer the project in the right direction and enriched my understanding of software development principles.

I would also like to thank my friends and family for their unwavering belief in my abilities and constant encouragement. Their encouragement and understanding were a constant source of motivation, inspiring me to give my best to this project.

**Message to My Juniors and Peers:**

As I reflect on my journey during the development of the "Banking Information System" prototype, I am compelled to share a message with my juniors and peers who are embarking on similar paths of learning and growth.

To my juniors, I encourage you to embrace every learning opportunity with an open mind and a hunger for knowledge. The world of software development is vast and ever-evolving, and each project you undertake, no matter how big or small, contributes to your growth as a developer. Embrace challenges, seek guidance when needed, and never shy away from exploring new technologies and methodologies.

To my peers, I urge you to recognize the power of collaboration and teamwork. In an industry driven by innovation and creativity, working together can lead to remarkable results. Embrace diversity of thought and engage in constructive discussions. Support one another, share knowledge generously, and celebrate each other's successes. Together, we can create a dynamic and inclusive community that thrives on collective growth and shared achievements.

# Introduction

## 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.



1. UCT IoT Platform **(****)**

**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

 

1. **Smart Factory Platform (****)**

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.

 

1.  based Solution

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

1. 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.



## 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/>



## 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.

## 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.

## Reference

[1] UniConverge Technologies Pvt Ltd. Retrieved from [<https://www.uniconvergetech.in>].

[2] UCT IoT Platform. UCT Insight: A Comprehensive IoT Platform. Retrieved from [<https://www.uniconvergetech.in/internet-of-things-lab>].

[3] UTC LoRaWAN based solution. [<https://www.uniconvergetech.in/lorawan>]

## Glossary

|  |  |
| --- | --- |
| Terms | Acronym |
| IoT | Internet of Things |
| RoI | Return on Investment |
| USC | UpSkill Campus |
| EICT Academy | Electronics and ICT Academy |
| MQTT | Message Queuing Telemetry Transport |
| CoAP | Constrained Application Protocol |
| Modbus TCP | Modbus Transmission Control Protocol |
| OEE | Overall Equipment Efficiency |
| OPC UA | OPC Unified Architecture |
| SaaS | Software as a Service |

# Problem Statement

Develop a prototype of a Banking Information System in Core Java that provides a working preview of the key functionalities of a real banking system. The prototype should demonstrate the core features and flow of the system, showcasing its functionality and usability.

Key Functionality to Include in the Prototype:

1. User Registration: Implement a simplified user registration process where users can provide basic details to create an account.
2. Account Management: Develop the ability to create and manage user accounts, including assigning unique account numbers and tracking account balances.
3. Deposit and Withdrawal: Enable users to make deposits and withdrawals from their accounts, updating the account balance accordingly.
4. Fund Transfer: Implement a simplified version of fund transfer functionality, allowing users to transfer funds between their accounts or to other registered users.
5. Account Statements: Provide users with a preview of their account statements, displaying transaction history, dates, amounts, and remaining balances.
6. Password Protection: Develop a basic login system with password authentication to ensure secure access to user accounts.
7. Error Handling: Implement basic error handling mechanisms to handle common exceptions, such as insufficient funds and invalid transactions, and display relevant error messages to users.
8. User Interface: Design a user-friendly interface for the prototype that allows users to navigate through the system, perform banking operations, and view relevant information.
9. Persistence: Implement basic data persistence by storing user account information and transaction history temporarily during the prototype session.

By developing this prototype, stakeholders will have a tangible working preview of the key features and functionality of the Banking Information System. This will allow them to evaluate the system's usability, identify any necessary improvements or enhancements, and make informed decisions for further development and deployment of the complete system.

# Existing and Proposed solution

E-banking, also known as electronic banking or online banking, has revolutionized the way individuals and businesses manage their finances. It involves using digital platforms and technology to perform various banking activities remotely.

* Existing solutions include online banking platforms, mobile banking apps, E-wallets and digital payment solutions, offering users convenience, efficiency, and accessibility in managing their finances.
* While proposed solutions include blockchain integration, AI-based services, and enhanced security measures are likely to shape the future of e-banking, making it even more secure, efficient, and user-friendly.

**Limitations:**

* **Digital Divide:** First, there is a risk of the emergence of a 'digital divide' as the poor are excluded from the use of the internet and so from the financial system.
* **Security Concerns:** Despite advancements in security measures, online banking platforms remain vulnerable to cyberattacks, data breaches, and phishing scams that can compromise customer data and funds.
* **AI-Based Customer Service Challenges:** AI-powered customer service solutions may not always fully understand complex inquiries or unique situations, leading to frustration for customers seeking human-like interactions.
* **Dependency on Technology:** Existing solutions heavily rely on technology and uninterrupted internet access. System outages, technical glitches, or internet disruptions can hinder customers' ability to perform banking tasks.
* **User Experience Challenges:** Some online banking platforms and mobile apps may have complex interfaces or navigation issues that can be confusing for certain user demographics, such as older individuals.

**My proposed solutions that can add value to the e-banking sector includes:**

* **Comprehensive Security Measures:** Implement robust cybersecurity measures such as multi-factor authentication, end-to-end encryption, and continuous monitoring to protect customer data and financial transactions.
* **User-Centric Design:** Develop user-friendly interfaces and intuitive navigation for online banking platforms and apps, catering to different age groups and technological skill levels.
* **Hybrid Banking Services:** Integrate physical branch services with online offerings to cater to customers who prefer a mix of digital and in-person interactions, providing a seamless omnichannel experience.
* **Blockchain Scalability Solutions:** Explore and develop scaling solutions for blockchain networks, allowing for faster and more efficient transactions without compromising security.
* **Customer-Centric AI:** Develop AI-powered customer service solutions that combine the efficiency of automation with the empathy and problem-solving abilities of human interactions.

## Code submission (GitHub link):

<https://github.com/Dev7091/Banking-Information_System-UpSkill-Campus>

## Report submission (GitHub link):

<https://github.com/Dev7091/Banking-Information_System-UpSkill-Campus/blob/master/InternshipReport_USC_UCT.docx>

# Proposed Design/ Model

## High Level Diagram

Banking Information System

BM\_System

Transaction\_Processing

GUI

DB\_Handler

Transaction History

Sign\_up

Login

Bank Manager Account

Client Account

Accountant Account

Figure 1: HIGH LEVEL DIAGRAM OF THE SYSTEM

## Low Level Diagram

A picture containing text, screenshot, number, font

Description automatically generated

Figure 2: LOW LEVEL DIAGRAM OF THE SYSTEM

## Interfaces

**Sign In Interface:**

A picture containing text, screenshot, operating system, computer

Description automatically generated

**Client Registration through Admin account** (Bank Employee):

A screenshot of a computer

Description automatically generated with medium confidence

**Client Sign Up Interface:**

A screenshot of a login form

Description automatically generated with medium confidence

**Admin Account** (Bank Employee):

**A screenshot of a computer

Description automatically generated with medium confidence**

**Block/Unblock Account** (Admin’s account feature)**:**

**A screenshot of a login form

Description automatically generated**

**Close Account** (Admin’s account feature)**:**

**A screenshot of a computer screen

Description automatically generated**

**Search Account** (Admin’s account feature)**:**

**A screenshot of a search account

Description automatically generated**

**Manage Credit/Debit Card** (Admin’s account feature)**:**

**A screenshot of a credit card

Description automatically generated**

**Update Client Information** (Admin’s account feature)**:**

**A screenshot of a computer

Description automatically generated**

**Client Account:**

A screenshot of a computer

Description automatically generated

**Account Info** (Client’s account feature):

A screenshot of a computer

Description automatically generated

**Cardless Cash Withdrawal** (Client’s account feature):

**A screenshot of a computer

Description automatically generated**

**Transfer Money** (Client’s account feature):

**A screen shot of a computer screen

Description automatically generated**

**View E-Statement** (Client’s account feature):

**A screenshot of a computer

Description automatically generated**

**E-Statement Download PDF (iText Java library) (**Client’s account feature):

A white rectangular object with numbers and letters

Description automatically generated with medium confidence

**Change Password (**Client’s account feature):

**A screenshot of a computer screen

Description automatically generated**

**Accountant Account:**

**A screenshot of a computer

Description automatically generated**

**Deposit Cash** (Accountant’s account feature):

**A screenshot of a computer

Description automatically generated**

**A screenshot of a computer

Description automatically generated**

**Withdraw Cash** (Accountant’s account feature):

**A screenshot of a computer

Description automatically generated**

**A screenshot of a computer

Description automatically generated**

**Cheque deposit** (Accountant’s account feature):

**A screenshot of a cheque

Description automatically generated**

**A screenshot of a computer

Description automatically generated**

**E-Statement** (Accountant’s account feature):

**A screenshot of a computer

Description automatically generated**

# Performance Test

## Test Plan/ Test Cases

During the development of the Banking Information System prototype, a thorough test plan was formulated to evaluate the system's performance and functionalities. The objective of the testing phase was to ensure that the system operated flawlessly, adhering to the specified requirements. The following test cases were designed to cover different aspects of the system:

1. **User Registration Test Case:**
   * Test scenario: Register a new user account.
   * Expected outcome: User account is successfully created and stored in the database.
2. **Account Management Test Case:**
   * Test scenario: Block/unblock an existing account.
   * Expected outcome: Account is blocked, and no further transactions are allowed and vice-versa.
3. **Credit/Debit Card Test Case:**
   * Test scenario: Add a new credit/debit card to the user's account.
   * Expected outcome: Card is successfully linked to the user's account.
4. **Fund Transfer Test Case:**
   * Test scenario: Initiate a fund transfer between two user accounts.
   * Expected outcome: Funds are accurately transferred between the accounts.
5. **Account Statement Test Case:**
   * Test scenario: Generate an account statement for a specified time period.
   * Expected outcome: Accurate account statement is generated with the specified transactions.

## Test Procedure

The testing procedure was executed following the formulated test plan. Each test case was carried out systematically to assess the system's performance and functionality.

1. **User Registration Test Procedure:**
   * Steps taken: Input valid user details and complete registration.
   * Outcome: New user account created, and confirmation received.
2. **Account Management Test Procedure:**
   * Steps taken: Attempt to block an active account.
   * Outcome: Account is blocked and verified through the interface.
3. **Credit/Debit Card Test Procedure:**
   * Steps taken: Add a new credit/debit card to an existing account.
   * Outcome: Card details are successfully linked to the user's account.
4. **Fund Transfer Test Procedure:**
   * Steps taken: Initiate a fund transfer between two accounts.
   * Outcome: Funds are transferred, and balances are updated accordingly.
5. **Account Statement Test Procedure:**
   * Steps taken: Generate an account statement for a specific time range.
   * Outcome: Accurate statement is generated, displaying the specified transactions.

## Performance Outcome

Upon thorough testing of the Banking Information System prototype, the system demonstrated robust performance and adherence to the established functionalities. The outcomes of the performance tests indicated that the system could effectively handle user interactions, process transactions, and maintain data integrity.

# My learnings

The internship journey of developing the "Banking Information System" prototype has been a transformative and enriching experience. Throughout the six weeks, I had the privilege of immersing myself in the world of software development, gaining valuable insights and honing essential skills.

First and foremost, the internship provided me with a portal where I can get resources and quizzes on Core Java, which helped to keep the practice and motivate us. The portal was also much informative about the UniConverge Technologies Pvt Ltd and its Ed-Tech, Product Division and Consulting subsidiary companies within the UniCnoverge Family. Moreover, I got hands-on experience in Java programming, particularly with Swing AWT for building user interfaces. Working with real-world requirements and challenges allowed me to deepen my understanding of object-oriented programming principles and enhance my coding proficiency.

The importance of effective project planning and time management became evident as I progressed through different phases of the project. Breaking down the development process into manageable tasks and setting achievable milestones were crucial in meeting project deadlines and ensuring a smooth workflow.

Beyond technical skills, the internship provided ample opportunities for personal growth. It allowed me to challenge myself, step out of my comfort zone, and embrace new challenges with confidence. The sense of accomplishment upon completing the prototype instilled a greater belief in my abilities and fostered resilience in the face of complex problem-solving.

In conclusion, the internship in developing the "Banking Information System" prototype has been a remarkable journey of growth and learning. The technical skills acquired, lessons in project management, and the experience of working in a professional setting have collectively contributed to my overall development as a software developer. I am immensely grateful for the opportunity to undertake this internship, as it has not only provided me with a tangible working preview of the banking system but has also shaped me into a more competent and confident professional, ready to take on future challenges with zeal and enthusiasm.

# Future work scope

* **Blockchain and Cryptocurrency Integration:** Exploring the integration of blockchain technology and cryptocurrencies to offer more efficient and secure cross-border transactions and digital asset management.
* **Biometric Authentication Enhancements:** Continued development of biometric authentication methods like facial recognition and fingerprint scanning can further enhance security in e-banking by reducing the reliance on passwords.
* **AI-Powered Customer Service:** Artificial Intelligence (AI) can be used to provide personalized customer support through chatbots, helping customers with inquiries and issues in real-time.
* **Financial Literacy Tools:** Banks can create educational tools and resources to improve customers' financial literacy, helping them make informed decisions about their money.
* **Chatbot:** An AI based chatbot that helps clients in the application to answer queries about the banking application and its operation.