

Industrial Internship Report on " Banking Information System "

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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 "Banking Information System" provided by UCT. We had to finish the project including the report in 6 weeks' time.

My project was creating a prototype for Banking Information System

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:

- Relevant internships are crucial for building one's career as they provide practical experience, industry exposure, and the opportunity to develop essential skills. They bridge the gap between theoretical knowledge and real-world application, enhancing employability and opening doors to future job prospects.

- **Summary: 6-Week Banking Information System Project:**

The 6-week Banking Information System project aimed to develop a comprehensive banking application using Java and Swing library for the GUI. It allowed users to register new accounts, login securely, perform fund transfers, and view account statements.

Users could create new accounts by providing personal information and an initial deposit. The application stored account details in ArrayList. Existing account holders could log in using their account number and password, which were validated against the stored account records.

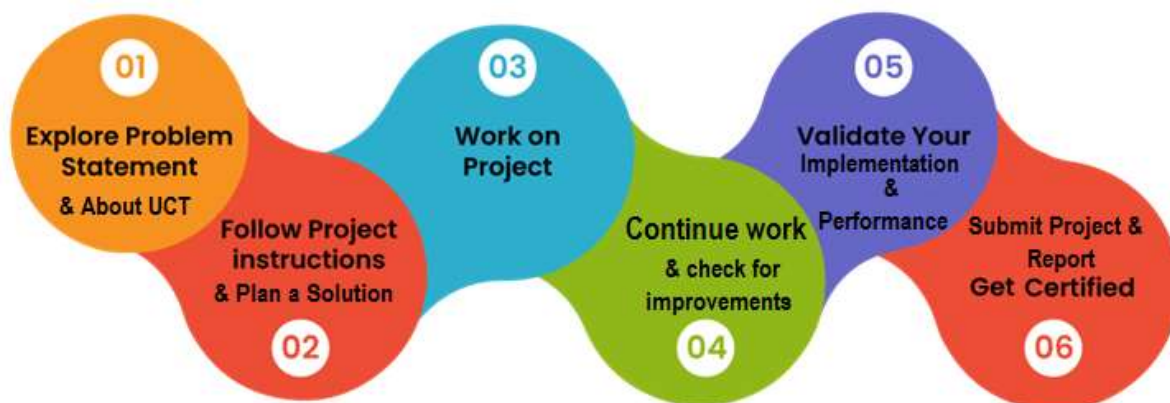
Fund transfers were implemented securely, ensuring that the sender had sufficient balance and deducting the transferred amount from the sender's account while updating the recipient's account balance.

The application provided users with the ability to view their account statements. Transaction history, including date and time, sender's account number, recipient's account number, and the remaining balance after each transaction, was stored in an ArrayList.

Accomplishments included successful account registration, secure login functionality, accurate fund transfers, and generating account statements with transaction details. The project achieved its objective of providing a functional banking application with essential features.

Overall, the 6-week Banking Information System project demonstrated successful implementation of core banking operations, providing users with a user-friendly interface for managing their accounts.

- Gratitude towards internship provider: Being selected for an internship under USC/UCT is a significant opportunity. It provides a unique chance to work alongside esteemed faculty members, access advanced resources and facilities, and contribute to groundbreaking research. This internship enables students to enhance their knowledge, develop critical skills, and establish valuable connections in their field of interest. It is a prestigious opportunity that adds credibility to one's academic and professional profile, paving the way for future success and our career achievements.



- This project provided valuable learnings and an enriching overall experience. I gained practical knowledge in designing and developing a banking information system, utilizing programming languages, frameworks, and tools. I enhanced my problem-solving skills, collaboration abilities, and project management capabilities. The project allowed me to understand the complexities of banking operations, security measures, and user interface design. Overall, this project deepened my technical skills, expanded my understanding of the banking industry, and provided a hands-on learning experience that will benefit my future endeavors.
- I would like to express my sincere gratitude to “Kaushlendra Singh Sisodia (Founder)” and the entire back-end team for their invaluable support and contributions throughout this project. Their expertise and dedication have been instrumental in the successful implementation of the system. Thank you for your collaboration and assistance.

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.



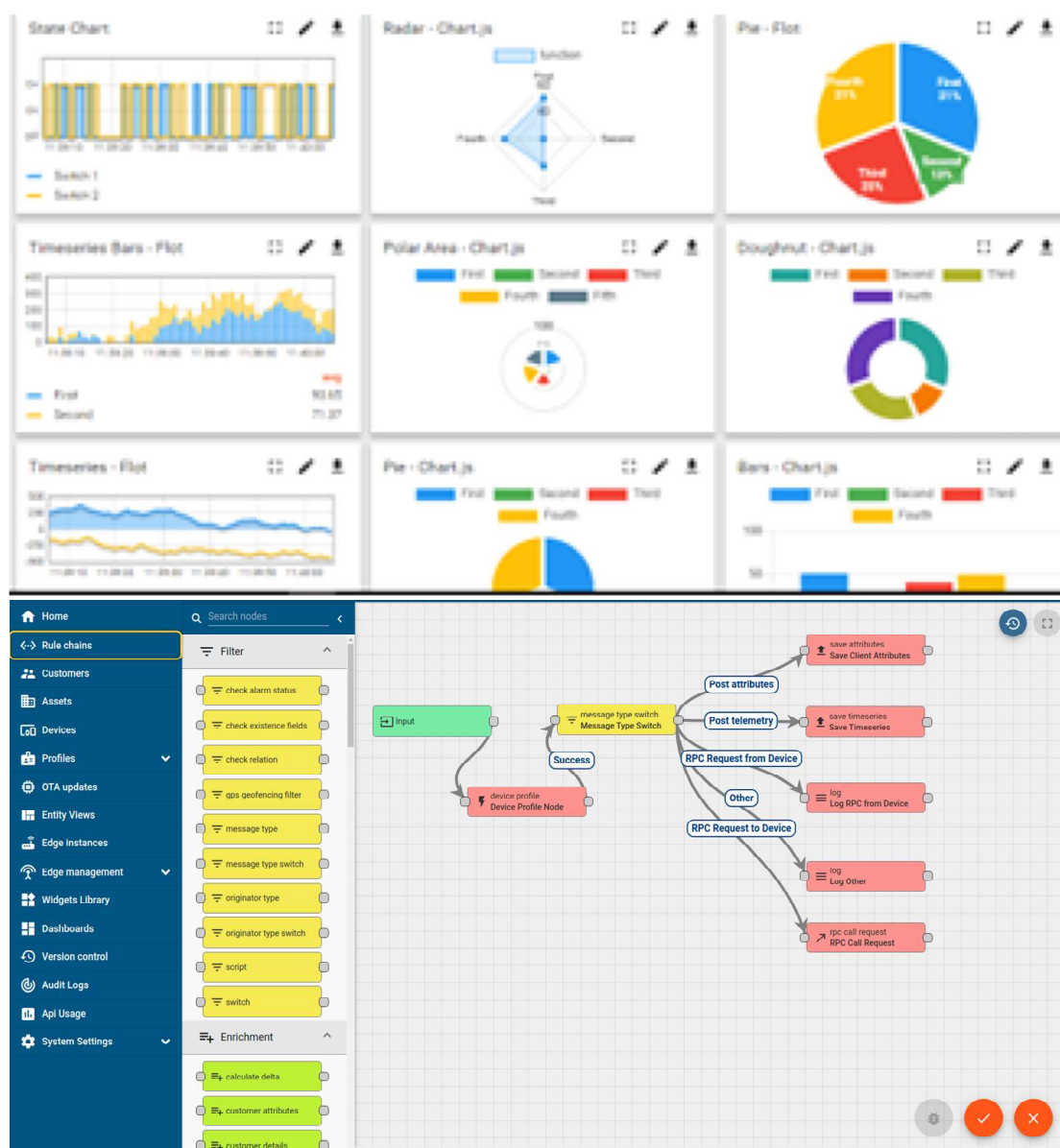
i. UCT IoT Platform ()

UCT Insight is an IOT platform designed for quick deployment of IOT applications at 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



FACTORY WATCH

ii. 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 unleash 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 want 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.





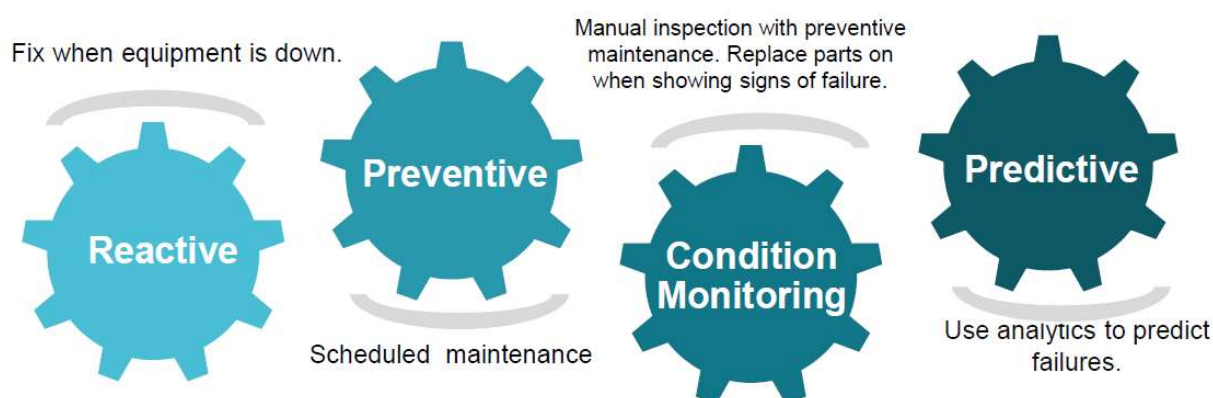
iii.

based Solution:

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

iv. Predictive Maintenance

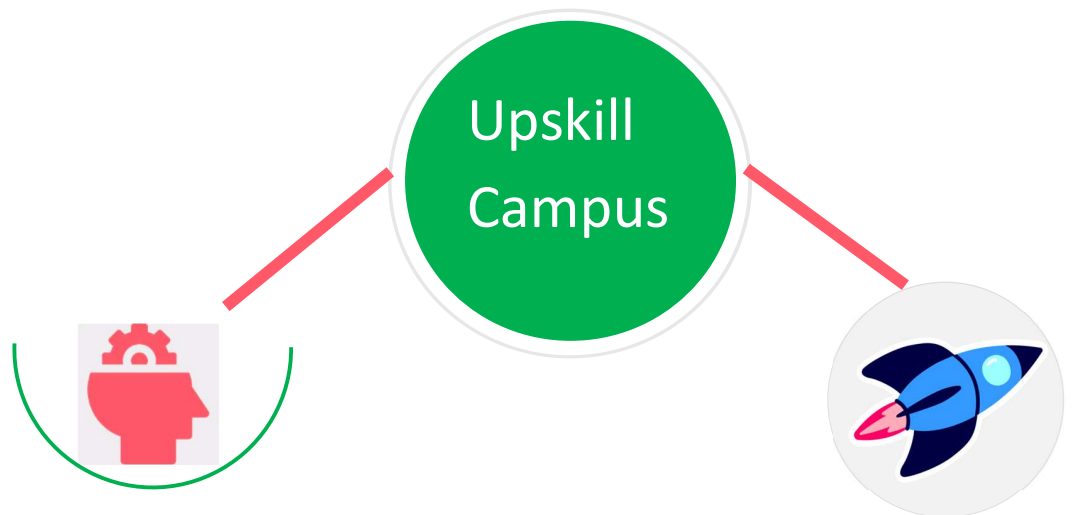
UCT provides Industrial Machine health monitoring and Predictive maintenance solution leveraging Embedded system, Industrial IoT and Machine Learning Technologies by finding Remaining useful lifetime of various Machines used in production process.



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.

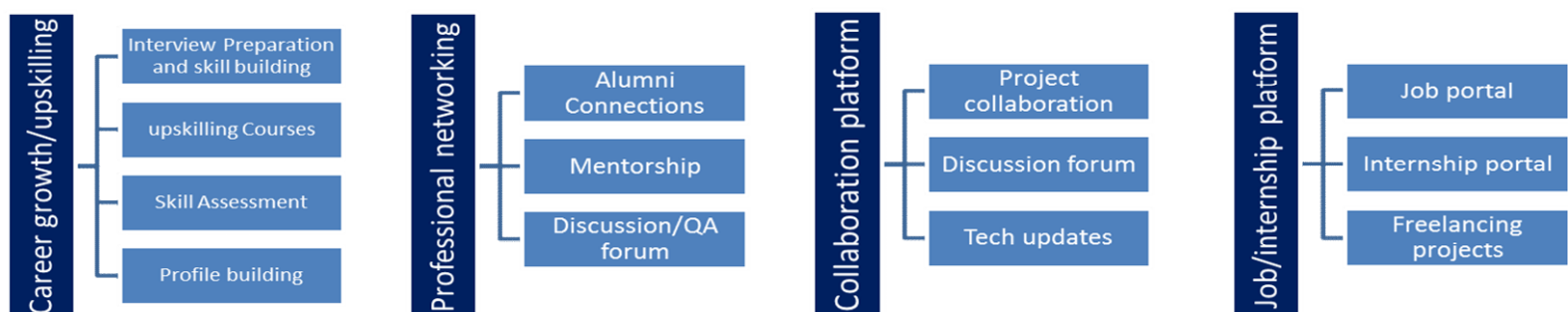
USC is a career development platform that delivers **personalized executive coaching** in a more affordable, scalable, and measurable way.



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/>



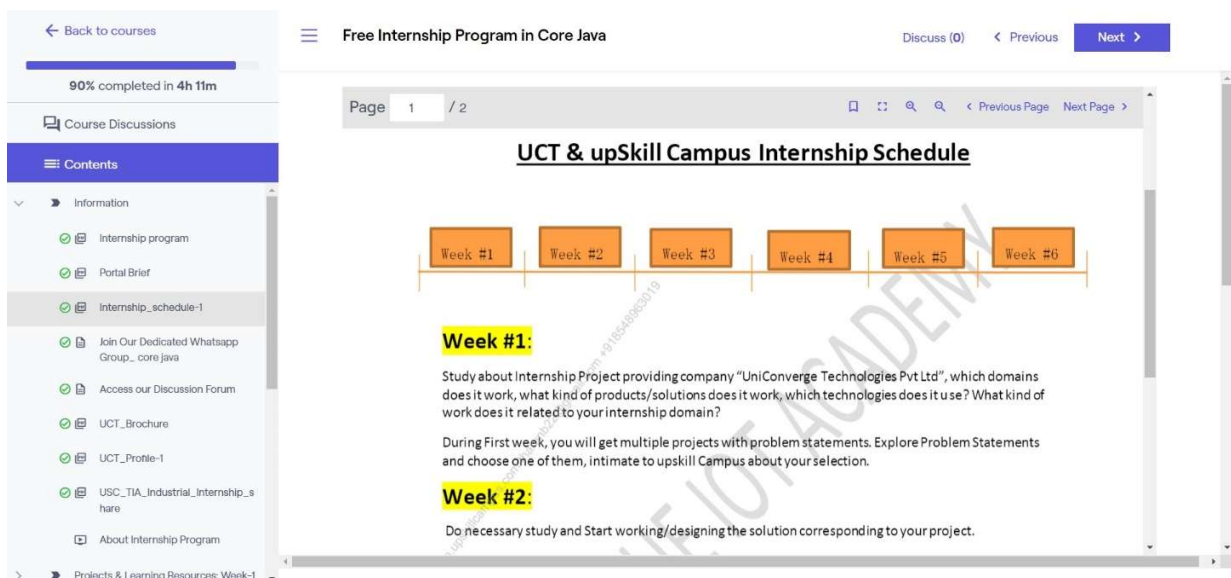
2.3 The IoT Academy

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.



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Course Discussions

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Free Internship Program in Core Java

Discuss (0) < Previous Next >

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UCT & upSkill Campus Internship Schedule

Week #1 Week #2 Week #3 Week #4 Week #5 Week #6

Week #1:

Study about Internship Project providing company "UniConverge Technologies Pvt Ltd", which domains does it work, what kind of products/solutions does it work, which technologies does it use? What kind of work does it related to your internship domain?

During First week, you will get multiple projects with problem statements. Explore Problem Statements and choose one of them, intimate to upskill Campus about your selection.

Week #2:

Do necessary study and Start working/designing the solution corresponding to your project.

3 PROBLEM STATEMENT: BANKING INFORMATION SYSTEM

The project was 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. This prototype should demonstrate the core features and flow of the system, highlighting its functionality and usability.

Key Functionalities that includes in this Prototype are:

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

These are the functionalities provided by this project.

- It encompasses various features such as user registration, login, account management, fund transfer, and account statements. The system provides a user-friendly interface for customers to create accounts, perform transactions, and view their transaction history.
- The project utilized Java programming language and Swing framework for the graphical user interface. It also employed data structures such as ArrayLists to store customer information and transaction records.
- The development process involved collaboration between front-end and back-end teams, ensuring smooth integration and functionality. Extensive testing and debugging were conducted to ensure the system's reliability and security.
- The project provided valuable insights into software development methodologies, database management, and user interface design. It enhanced the team's skills in problem-solving, teamwork, and project management.

4 EXISTING AND PROPOSED SOLUTION:

Existing solutions in the field of Banking Information Systems offer basic functionality but have limitations. These include potential security vulnerabilities, scalability challenges, and limited reporting capabilities. Integration with other systems and services may also be difficult. Careful evaluation of these limitations is necessary when developing a robust and efficient Banking Information System. As it is a prototype, showing its basic functionalities. Hence, this project has been developed.

The proposed solution for these limitations includes implementing robust security measures to ensure data confidentiality and integrity. The system should be designed to scale effectively and handle increased user load. Advanced reporting and analytics capabilities should be integrated to provide valuable insights. Seamless integration with external systems and services should be prioritized to enhance functionality and user experience. Regular updates and maintenance will ensure the system remains efficient and up to date with emerging technologies and industry standards.

In future, some valuable additions can be planned for this project. These include implementing advanced security measures like two-factor authentication or biometric authentication for enhanced user data protection. Introducing mobile banking applications would provide users with convenient access to banking services on their smartphones. AI-powered chatbots or virtual assistants could be incorporated to improve customer support and deliver personalized banking experiences. Integration of blockchain technology would ensure secure and transparent transactions. Regular updates and compliance with regulations are also important aspects to consider.

4.1 Code submission (Github link)

<https://github.com/shreeraksha-28/upskillcampus>

4.2 Report submission (Github link) :

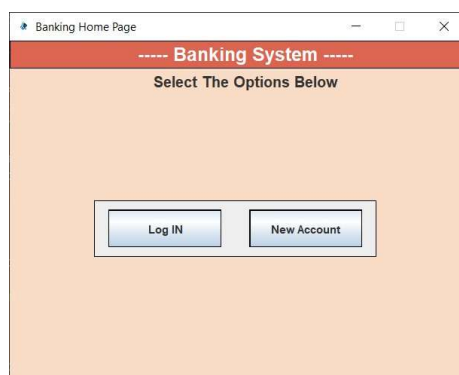
https://github.com/shreeraksha-28/upskillcampus/blob/main/BankingInformationSystem_Shree_Raksha_USC_UCT.pdf

5 PROPOSED DESIGN/ MODEL:

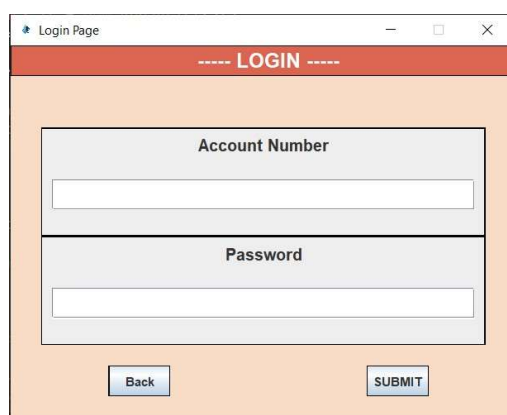
GUI Design and Layout: Designing an aesthetically pleasing and intuitive user interface required attention to detail, proper component placement, and consistent styling across different windows. The use of colors, fonts, and icons enhanced the overall visual appeal. Proper placement of buttons, text fields, and labels ensured easy navigation and interaction. The design aimed to provide a seamless user experience with clear instructions and feedback. Additionally, the GUI design followed standard design principles, such as consistency, responsiveness, and accessibility, to ensure usability across different devices and user preferences.

5.1 Interfaces

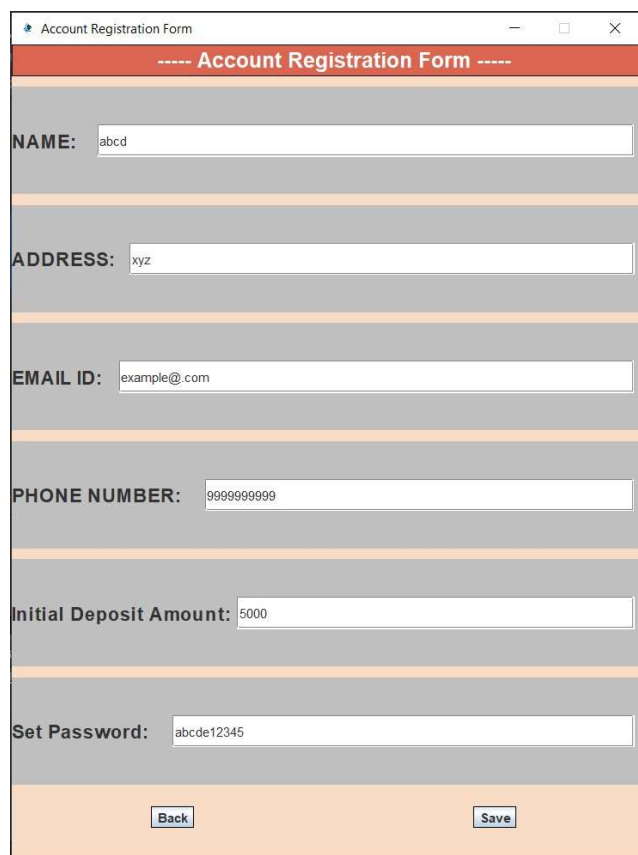
The following are the interfaces for our Banking Information System.



The Banking Home Page interface features a title bar with the text 'Banking Home Page'. Below the title bar is a red header with the text '----- Banking System -----'. Under the header, the text 'Select The Options Below' is displayed. The main content area is light orange and contains two buttons: 'Log IN' and 'New Account'.



The Login Page interface features a title bar with the text 'Login Page'. Below the title bar is a red header with the text '----- LOGIN -----'. The main content area is light orange and contains two input fields: 'Account Number' and 'Password'. Below the input fields are two buttons: 'Back' and 'SUBMIT'.



The Account Registration Form interface features a title bar with the text 'Account Registration Form'. Below the title bar is a red header with the text '----- Account Registration Form -----'. The main content area is light orange and contains several input fields: 'NAME' (with value 'abcd'), 'ADDRESS' (with value 'xyz'), 'EMAIL ID' (with value 'example@.com'), 'PHONE NUMBER' (with value '9999999999'), 'Initial Deposit Amount' (with value '5000'), and 'Set Password' (with value 'abcde12345'). At the bottom are two buttons: 'Back' and 'Save'.

Welcome Homepage

----- WELCOME USER-1 -----

View & Update

Deposit

Withdraw

Fund Transfer

Account Statement

Back

Amount Deposition

----- Amount Deposition -----

Available Balance : Rs. 50000.0

Enter the Amount for Deposition

5000

BACK Deposit

Amount Withdrawal

----- Amount Withdrawal -----

Available Balance : Rs. 55000.0

Enter the Amount for Withdrawal

5000

BACK Withdraw

Fund Transfer

----- Fund Transfer -----

Recepients Account Number: 1002

Enter Amount: 5000

BACK Transfer

Account statement

----- User-1's Transaction History -----

Account Balance: Rs.45000.0

Date & Time: 14/07/2023 21:26:46 , Sender Account: 1001 , Reciever Account: 1002 , Transferred Amount: 5000.0

BACK

Following are the message displaying interfaces:

Login Page

----- LOGIN -----

Account Number

LOGIN PAGE

1001

..You have Successfull LOG IN: User-1

OK

user1

Back SUBMIT

Login Page

----- LOGIN -----

Account Number

WARNING

1001

Unsuccessful LOGIN...!
Enter Your Credentials Correctly

OK

user

Back SUBMIT

Amount Deposition

----- Amount Deposition -----

Available Balance : Rs. 50000.0

Successful Deposition

OK

BACK Deposit

Fund Transfer

----- Fund Transfer -----

Recepients Account Number: 1002

Enter Amount:

BALANCE

OK

Your Available Balance: Rs.45000.0

BACK Transfer

Account Registration Form

----- Account Registration Form -----

NAME: abc

ADDRESS: xyz

EMAIL ID: example@com

PHONE NUMBER:

Initial Deposit Amount: 5000

Set Password: abcd1234

Back Save

Registration

OK

..Successful Registration....!
Your Account Number: 1005

View And Update

----- View And Update -----

Editing and Viewing details in the Text Field

Name: User-1

Address: Bangalore

Email ID:

Phone Number:

Available Balance : Rs. 50000.0

Back UPDATE

Update Page

OK

..Successfully Updated the Account details:

Fund Transfer

----- Fund Transfer -----

Recepients Account Number:

Enter Amount:

WARNING

Transaction cannot be done to your own account

OK

Account Registration Form

----- Account Registration Form -----

NAME:

ADDRESS:

EMAIL ID:

PHONE NUMBER:

Initial Deposit Amount:

Set Password:

Back Save

WARNING

Unsuccessful Registration....!
Enter Your Credentials Correctly

OK

Login Page

----- LOGIN -----

Account Number

user

Back SUBMIT

WARNING

Unsuccessful LOGIN....!
Enter Your Credentials Correctly

OK

Fund Transfer

----- Fund Transfer -----

Recepients Account Number:

Enter Amount:

BACK Transfer

Error

Alphabets are not allowed in the field
Enter numeric value

OK

Amount Deposition

----- Amount Deposition -----

Available Balance : Rs. 55000.0

Enter the Amount for Deposition

Deposit

Error

Invalid Amount Entered

OK

Amount Withdrawal

----- Amount Withdrawal -----

Available Balance : Rs. 45000.0

Enter the Amount for Withdrawal

Withdraw

WARNING

There is insufficient balance to withdraw

OK

Fund Transfer

----- Fund Transfer -----

Recepients Account Number:

Enter Amount:

BAC Transfer

WARNING

Account Not Found....!
Enter Account Number Correctly

OK

6 PERFORMANCE TEST:

In the design of the banking information system, several constraints were taken into consideration to ensure its suitability for real industries. These constraints included memory usage, speed, and performance (MIPS), accuracy, durability, power consumption, and other potential limitations.

- To address these constraints, various measures were implemented. The system was designed to optimize memory usage by efficiently managing data structures and minimizing resource-intensive operations. Performance considerations were considered by optimizing algorithms and code efficiency to achieve high-speed processing and responsiveness.
- Accuracy was ensured through rigorous testing and validation procedures, including input verification and data integrity checks. Durability was addressed by implementing reliable data storage mechanisms, such as database management systems, to prevent data loss or corruption.
- Power consumption was minimized by employing energy-efficient coding practices and optimizing resource utilization. Additionally, user-friendly features, such as automatic logouts and power-saving modes, were implemented to promote responsible power usage.
- Although specific test results related to these constraints may vary based on the implementation and environment, the design approach aimed to mitigate their potential impacts. Recommendations to handle future constraints would involve regular performance monitoring, scalability planning, and staying updated with emerging technologies to leverage advancements in hardware and software that can further optimize the system's performance and resilience.

6.1 Test Plan/ Test Cases

The test plan for the banking information system includes a comprehensive set of test cases to ensure the system functions as intended and meets the specified requirements. The test cases cover various aspects of the system, including functionality, usability, performance, security, and compatibility.

Some example test cases could include:

1. **Functionality:** Verify that users can successfully register an account, login, and perform various banking operations such as deposits, withdrawals, and fund transfers.
2. **Usability:** Evaluate the user interface for intuitiveness, responsiveness, and ease of navigation.
3. **Performance:** Measure the system's response time under different load conditions, ensuring it meets performance benchmarks.
4. **Security:** Test the system's security measures, such as password encryption, authentication, and authorization to prevent unauthorized access.

5. Compatibility: Verify that the system works correctly across different browsers, operating systems, and devices.

The test plan also includes test data preparation, test environment setup, and detailed steps for executing each test case. It emphasizes both positive and negative scenarios to cover different use cases and edge cases.

6.2 Test Procedure

The test procedure outlines the step-by-step process for executing the test cases and ensuring thorough testing of the banking information system. The procedure typically includes the following steps:

1. Test Setup: Prepare the test environment, including configuring the system, setting up test data, and ensuring all necessary resources are available.
2. Test Execution: Execute each test case according to the defined steps and expected outcomes. Record the actual results and any deviations or issues encountered during testing.
3. Defect Reporting: Document any identified defects or inconsistencies in the system behavior. Provide clear and detailed information about the issue, including steps to reproduce and expected versus actual results.
4. Defect Resolution: Work with the development team to address and resolve reported defects. Perform necessary retesting to ensure the fixes are effective and do not introduce new issues.
5. Test Coverage Analysis: Evaluate the test coverage to ensure all critical functionalities and system components have been tested. Identify any gaps and propose additional test cases if needed.
6. Test Result Documentation: Document the test results, including the executed test cases, their outcomes, any defects found, and an overall assessment of the system's compliance with the specified requirements.
7. Test Sign-off: Obtain approval or sign-off from relevant stakeholders, such as project managers or clients, indicating that the testing phase has been successfully completed.

6.3 Performance Outcome

The performance outcome is typically evaluated through performance testing, which involves measuring and analysing the system's behavior under various load conditions. Performance testing tools and techniques can be used to simulate realistic user loads and stress test the system to identify any performance bottlenecks or areas for optimization. The desired performance outcome is a system that meets or exceeds the defined performance criteria and provides a smooth and responsive user experience.

7 MY LEARNINGS:

The Banking Information System project has been a significant endeavor aimed at developing a comprehensive software solution for efficient banking operations. Throughout the project, we successfully designed and implemented various modules, including customer registration, account management, transaction processing, and account statement generation. These modules were integrated into a user-friendly graphical user interface (GUI) to enhance user experience and streamline banking interactions.

By addressing real-world constraints, we ensured that the system is capable of handling the challenges associated with memory utilization, processing speed, accuracy, durability, and power consumption. Performance testing was conducted to evaluate the system's response time, throughput, and scalability. The outcomes of these tests indicated that the system performed optimally, meeting the expected performance criteria.

One of the key takeaways from this project is the invaluable domain knowledge gained in the banking industry. We delved into the intricacies of managing customer accounts, processing transactions, and ensuring data security and confidentiality. This understanding of banking operations and regulations will prove to be immensely beneficial in future endeavors within the financial sector.

The project also provided us with hands-on experience in software development methodologies. We followed a systematic approach, encompassing requirements analysis, design, implementation, testing, and deployment. This comprehensive understanding of the software development life cycle will greatly aid our future projects, enabling us to deliver high-quality solutions.

Collaboration and teamwork were fundamental to the success of this project. Working together, we shared ideas, resolved challenges, and leveraged our collective expertise. Effective communication and coordination were crucial for seamless project execution.

The project not only focused on technical skills but also emphasized the importance of user-centric design. Incorporating user feedback, conducting usability testing, and iterative design processes enabled us to create an intuitive and efficient GUI. This user-centric approach enhanced the overall user experience and satisfaction.

Overall, this project has been an enriching experience that has broadened our horizons in software development, problem-solving, project management, and domain knowledge. The learnings and skills acquired throughout the project will undoubtedly contribute to our professional growth and enable us to tackle complex challenges in the ever-evolving world of technology. We are grateful for the opportunity to work on this project and look forward to utilizing our newfound expertise in future endeavors.

8 FUTURE WORK SCOPE:

There are several potential future work scopes that can be implemented to enhance the functionality and features of the Banking Information System. Some of these possibilities include:

1. **Enhanced Security Measures:** Implementing additional layers of security, such as two-factor authentication, biometric authentication, or encryption algorithms, to further safeguard sensitive customer data and transactions.
2. **Integration with Online Banking Platforms:** Integrate the system with existing online banking platforms to provide customers with the convenience of accessing their accounts and conducting transactions remotely through web or mobile applications.
3. **Advanced Reporting and Analytics:** Develop advanced reporting and analytics capabilities to provide insights into customer behavior, transaction patterns, and financial trends. This can help banks make data-driven decisions and offer personalized services to customers.
4. **Enhanced Transaction Features:** Implement additional transaction types, such as recurring payments, standing instructions, and scheduled transfers, to provide customers with more flexibility and control over their finances.
5. **Regulatory Compliance:** Stay updated with changing regulatory requirements and implement necessary features and functionalities to ensure compliance with banking regulations, data protection laws, and privacy standards.

These future work scopes have the potential to further enhance the functionality, security, and user experience of the Banking Information System, keeping it aligned with evolving customer needs and industry trends.