# BEE END-TERM PROJECT

# BANKING SYSTEM


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# Abstract

The banking system in an MERN (MongoDB, Express, React, Node.js) project is an essential and complex component of the financial services industry that provides customers with a reliable, secure, and efficient platform for performing financial transactions. This paper presents a feasibility study, objective, and need analysis of a banking system in an MERN project. It also discusses the roles and responsibilities of the system and its potential future scope.

The feasibility study shows that a banking system in an MERN project is a viable investment with many benefits for financial institutions and their customers. The objective of a banking system in an MERN project is to offer a comprehensive, user-friendly, and efficient platform for managing financial transactions, providing financial services, and ensuring security and privacy. The need analysis emphasizes the importance of customer service, regulatory compliance, and system performance in a banking system in an MERN project.

The roles and responsibilities of a banking system in an MERN project are diverse and encompass managing financial transactions, ensuring security and privacy, complying with regulations, managing customer accounts, providing financial services, and maintaining system performance. The potential future scope of a banking system in an MERN project is vast, with many opportunities for innovation and growth through the integration of emerging technologies, expansion of digital services, improved security and privacy measures, enhanced data analytics, and increased collaboration.

In conclusion, a banking system in an MERN project is a valuable investment that can provide significant benefits to financial institutions and their customers. By continually improving and innovating, a banking system in an MERN project can remain relevant and competitive in an ever-evolving financial landscape.

# Acknowledgements

I would like to take this opportunity to express my gratitude to all those who have contributed to the development of the banking system in an MERN project.

First and foremost, i would like to express my sincere thanks to my project supervisor Dr. Anupinder Singh for providing me with guidance, feedback, and support throughout the project. I am grateful for their expertise, knowledge, and patience, which have been invaluable in the development of the project.

Finally, I would like to express my appreciation to all those who have supported me throughout the project, including my families, friends, and colleagues. Their encouragement, understanding, and support have been invaluable in the development of the project.

# Chapter 1: Introduction

The banking industry is one of the most critical sectors that play a significant role in the economy. The integration of technology has enabled banking institutions to provide a wide range of services to their customers, making banking accessible and convenient. A banking system developed using the MERN (MongoDB, Express, React, Node.js) stack can provide a robust and scalable architecture with efficient data storage, fast processing speed, and an intuitive user interface.

The development of a banking system in MERN would involve creating a full-stack application that integrates a database, server-side logic, and client-side user interface. The system would need to handle user authentication and authorization, account management, transaction processing, and other banking-related functionality. MongoDB would be used to store and manage data, Express and Node.js would handle the server-side logic, while React would manage the user interface.

It is essential to follow security best practices to ensure the confidentiality, integrity, and availability of user data and prevent fraud or cyber attacks. The system should implement multi-factor authentication, access controls, encryption, and other security measures. Regular security audits and testing should be conducted to identify and address vulnerabilities.

One of the significant advantages of using MERN for developing a banking system is the ability to provide real-time updates to users. This feature allows users to monitor their account balances, transaction history, and other relevant information. Furthermore, the use of MERN provides a highly responsive user interface, making the application accessible and easy to use.

In conclusion, the development of a banking system using the MERN stack provides a robust, scalable, and secure architecture that enables banking institutions to provide efficient and reliable services to their customers. It is essential to follow security best practices and conduct regular security audits and testing to ensure the confidentiality, integrity, and availability of user data and prevent fraud or cyber attacks.

# ER DIAGRAM

The ER (Entity-Relationship) diagram for a banking system in an MERN project would include entities such as customers, accounts, transactions, and employees. The relationship between these entities would be depicted using lines and symbols.

In MongoDB, these entities would be represented as collections, and the relationships between them would be represented using embedded documents or references.

The customers' entity would contain information such as name, address, contact information, and identification numbers, such as social security numbers. The accounts entity would contain information about the types of accounts, such as checking, savings, and loans, and the associated account numbers. The transaction entity would contain information such as the type of transaction, the amount, the date and time of the transaction, and the account numbers involved.

The employees' entity would contain information such as the employee's name, contact information, and position within the bank. The relationship between the entities would be depicted using lines and symbols. For example, the relationship between the customers' entity and the accounts entity would be a one-to-many relationship, as each customer can have multiple accounts.

The transactions entity would have a many-to-one relationship with both the accounts and customers' entities, as multiple transactions can be associated with a single account or customer. The employees' entity would have a one-to-many relationship with the accounts entity, as each employee can manage multiple accounts.

Overall, the ER diagram for a banking system in an MERN project would depict the entities involved in the system and the relationships between them. The diagram would serve as a visual representation of the system's data model, which is essential for designing and implementing the system's database.

# FEASIBILITY STUDY

A feasibility study is an important step in the development of any software project, including a banking system in an MERN (MongoDB, Express, React, Node.js) project. The purpose of a feasibility study is to determine whether the project is viable, economically and technically feasible, and whether it meets the needs of the stakeholders.

Here are some key factors that would be considered in a feasibility study for a banking system in an MERN project:

1. Economic feasibility: The development cost, operational costs, and revenue generation of the system would be assessed. This would involve calculating the total cost of development, including hardware, software, and staffing, as well as the potential revenue generation from the system.

2. Technical feasibility: The technical feasibility of the system would be assessed, including the system's hardware and software requirements, compatibility with existing systems, scalability, and performance. This would involve testing the system's performance under different conditions, such as peak loads and high volumes of transactions.

3. Operational feasibility: The system's operational feasibility would be assessed, including the impact on existing business processes and the ease of integrating the new system into existing workflows. This would involve identifying any operational challenges and risks associated with the new system.

4. Legal and regulatory feasibility: The system's compliance with legal and regulatory requirements would be assessed, including data protection, privacy, and security standards, as well as financial regulations and banking industry standards.

5. User acceptance: The potential users of the system would be surveyed to assess their level of interest, satisfaction, and willingness to use the system. This would involve identifying user requirements and preferences and incorporating them into the system's design.

Overall, a feasibility study for a banking system in an MERN project would assess the viability of the project from various perspectives, including economic, technical, operational, legal, regulatory, and user acceptance. The results of the feasibility study would inform the decision to proceed with the project or make changes to the project plan to address any concerns or issues identified during the study.

# OBJECTIVE

The objective of a banking system in an MERN (MongoDB, Express, React, Node.js) project is to provide a secure and reliable platform for customers to perform financial transactions and for bank employees to manage the customers' accounts efficiently. The primary objectives of a banking system in an MERN project can be summarized as follows:

1. Provide a user-friendly interface: The banking system should be easy to use and navigate for both customers and bank employees. It should be designed with user experience in mind and should provide a seamless experience for all users.

2. Ensure security and privacy: Security and privacy are critical for any banking system. The system should have robust security measures to protect against unauthorized access, data breaches, and other security threats. It should also ensure the privacy of customers' personal and financial information.

3. Offer multiple financial services: The banking system should provide a range of financial services, such as account opening, fund transfers, bill payments, loan applications, and other services that customers may require. The system should also be designed to handle various types of financial transactions, including those involving multiple currencies and countries.

4. Facilitate efficient management of accounts: The system should enable bank employees to manage customer accounts efficiently. This includes updating customer information, tracking transactions, monitoring account balances, and handling other account-related tasks.

5. Ensure regulatory compliance: The banking system should comply with all relevant laws and regulations governing the financial industry, such as anti-money laundering laws, data protection laws, and banking industry standards.

Overall, the objective of a banking system in an MERN project is to provide a reliable, secure, and user-friendly platform for customers to perform financial transactions and for bank employees to manage accounts efficiently.

# CHAPTER 2 : BANKING SYSTEM

## 2.1 Need Analysis

A need analysis is an important step in developing a banking system in an MERN (MongoDB, Express, React, Node.js) project. The purpose of a needs analysis is to identify the requirements and expectations of stakeholders, such as customers, bank employees, and regulatory authorities. Here are some factors that would be considered in a needs analysis for a banking system in an MERN project:

1. Customer needs: The needs of customers are a critical factor in the design and development of a banking system. A needs analysis would involve surveying potential customers to identify their requirements and preferences for the system, such as user experience, accessibility, and convenience. This would help to ensure that the system meets the needs of the target audience.

2. Bank employee needs: The needs of bank employees are also important to consider. A needs analysis would involve surveying bank employees to identify their requirements for the system, such as ease of use, security, and functionality. This would help to ensure that the system is designed to meet the needs of the people who will be using it on a daily basis.

3. Regulatory requirements: The banking industry is subject to a wide range of regulatory requirements, such as anti-money laundering laws and data protection regulations. A needs analysis would involve identifying the relevant regulatory requirements and ensuring that the system is designed to comply with them.

4. Technical requirements: The technical requirements of the system would be assessed, including hardware and software requirements, compatibility with existing systems, and scalability. This would involve identifying the technical resources needed to develop and maintain the system.

5. Security and privacy requirements: Security and privacy are critical for any banking system. A needs analysis would involve identifying the security and privacy requirements of the system and ensuring that the system is designed to meet them.

Overall, a needs analysis for a banking system in an MERN project would identify the requirements and expectations of stakeholders, including customers, bank employees, and regulatory authorities. The results of the needs analysis would be used to inform the design and development of the system, to ensure that it meets the needs of its users and complies with relevant regulations.

# 2.2 ROLE AND RESPONSIBLITY

In an MERN (MongoDB, Express, React, Node.js) project, the banking system has several roles and responsibilities that are critical to ensuring the smooth and efficient operation of the system. Here are some of the key roles and responsibilities of a banking system in an MERN project:

1. Managing financial transactions: The banking system is responsible for managing various financial transactions, including deposits, withdrawals, transfers, and bill payments. The system should be designed to handle these transactions efficiently and securely, ensuring that customer accounts are accurately updated.

2. Providing customer service: The banking system is responsible for providing high-quality customer service to customers. This includes responding to customer inquiries and complaints, resolving issues, and providing guidance and support.

3. Ensuring security and privacy: The banking system has a critical role in ensuring the security and privacy of customer data. This includes implementing robust security measures to protect against unauthorized access, data breaches, and other security threats. The system should also ensure the privacy of customer information by implementing appropriate data protection measures.

4. Compliance with regulations: The banking system has a responsibility to comply with all relevant laws and regulations governing the financial industry. This includes anti-money laundering laws, data protection laws, and banking industry standards.

5. Managing customer accounts: The banking system is responsible for managing customer accounts, including updating customer information, tracking transactions, monitoring account balances, and handling other account-related tasks.

6. Providing financial services: The banking system should provide a range of financial services, such as account opening, fund transfers, bill payments, loan applications, and other services that customers may require. The system should be designed to handle various types of financial transactions, including those involving multiple currencies and countries.

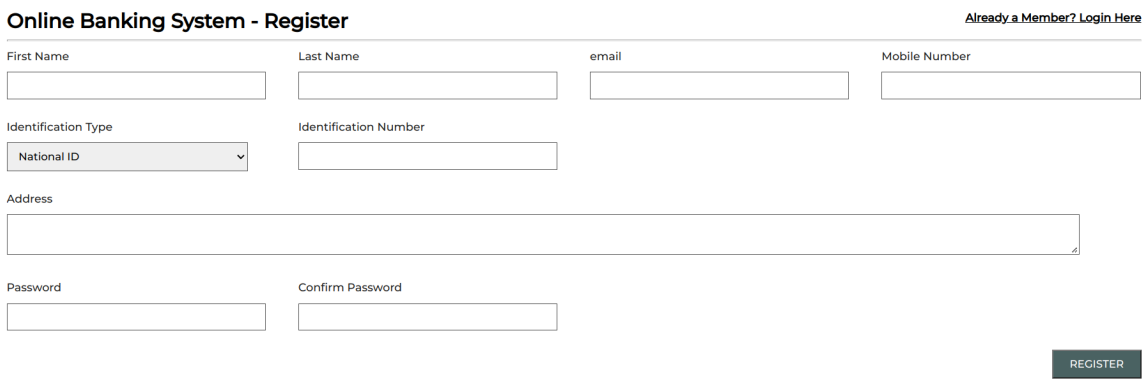
7. Maintaining system performance: The banking system is responsible for maintaining the performance of the system, including ensuring system uptime and availability, monitoring system performance, and optimizing system resources.

Overall, the role and responsibility of a banking system in an MERN project is to provide a secure, reliable, and efficient platform for customers to perform financial transactions and for bank employees to manage accounts efficiently.

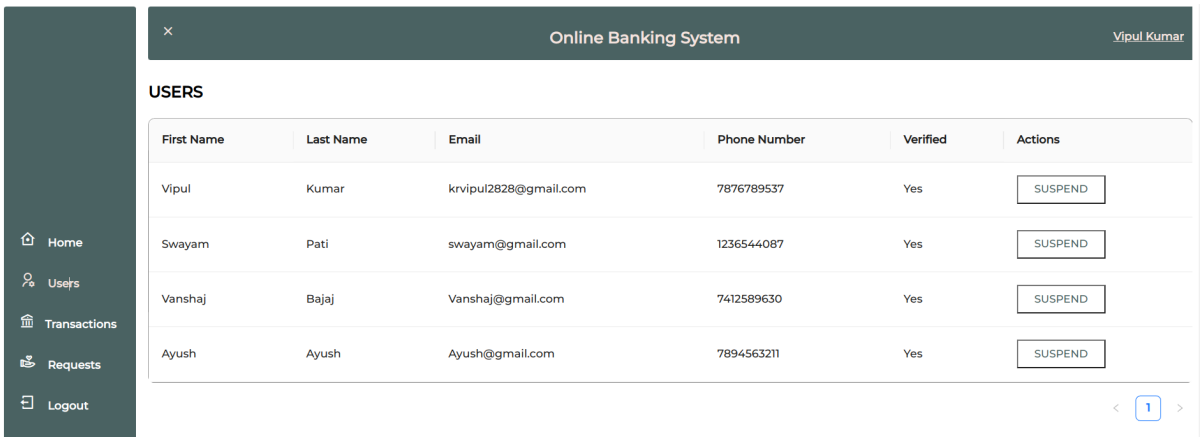
# 2.3 User Manual

A user manual for a banking system typically includes information about how to use the system to perform various financial transactions such as opening and managing accounts, making deposits and withdrawals, transferring funds, paying bills, and accessing online banking services. It may also provide guidance on security features, such as setting up passwords and protecting personal and financial information. The manual may include step-by-step instructions and screenshots to help users navigate the system.

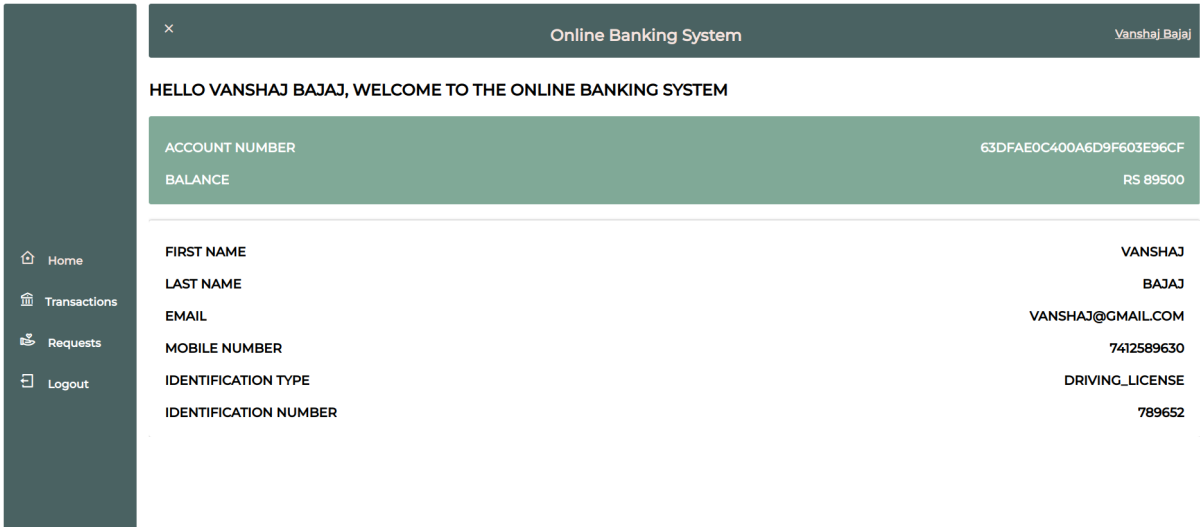
1. Register page: User can register himself and Admin will activate their account.



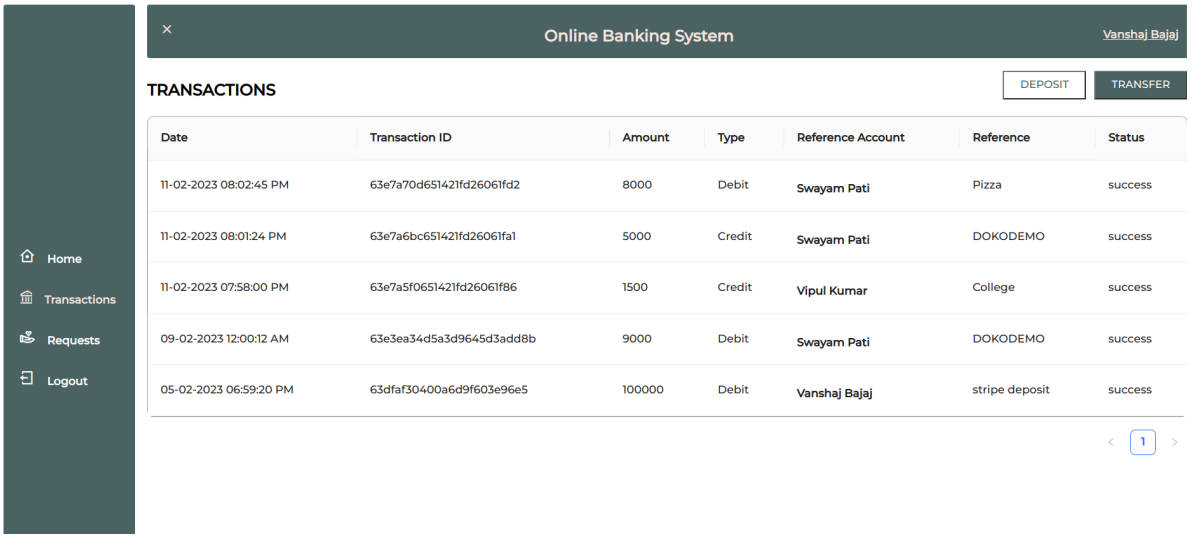

2. Admin can also suspend their account for any bad inputs.



# 3. User Interface




# 4. User transaction details



**4.1**: User can deposit money using cards which is provided by stripe.

### Cards by brand

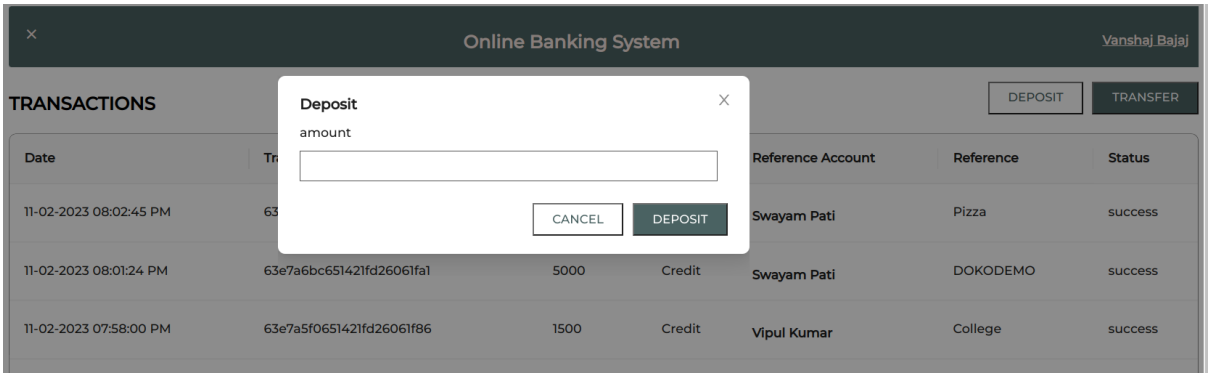
To simulate a successful payment, use test cards from the following list. The billing country for each test card is set to the United States. If you need to create test card payments using cards for other billing countries, use international test cards.

Card numbers | PaymentMethods | Tokens

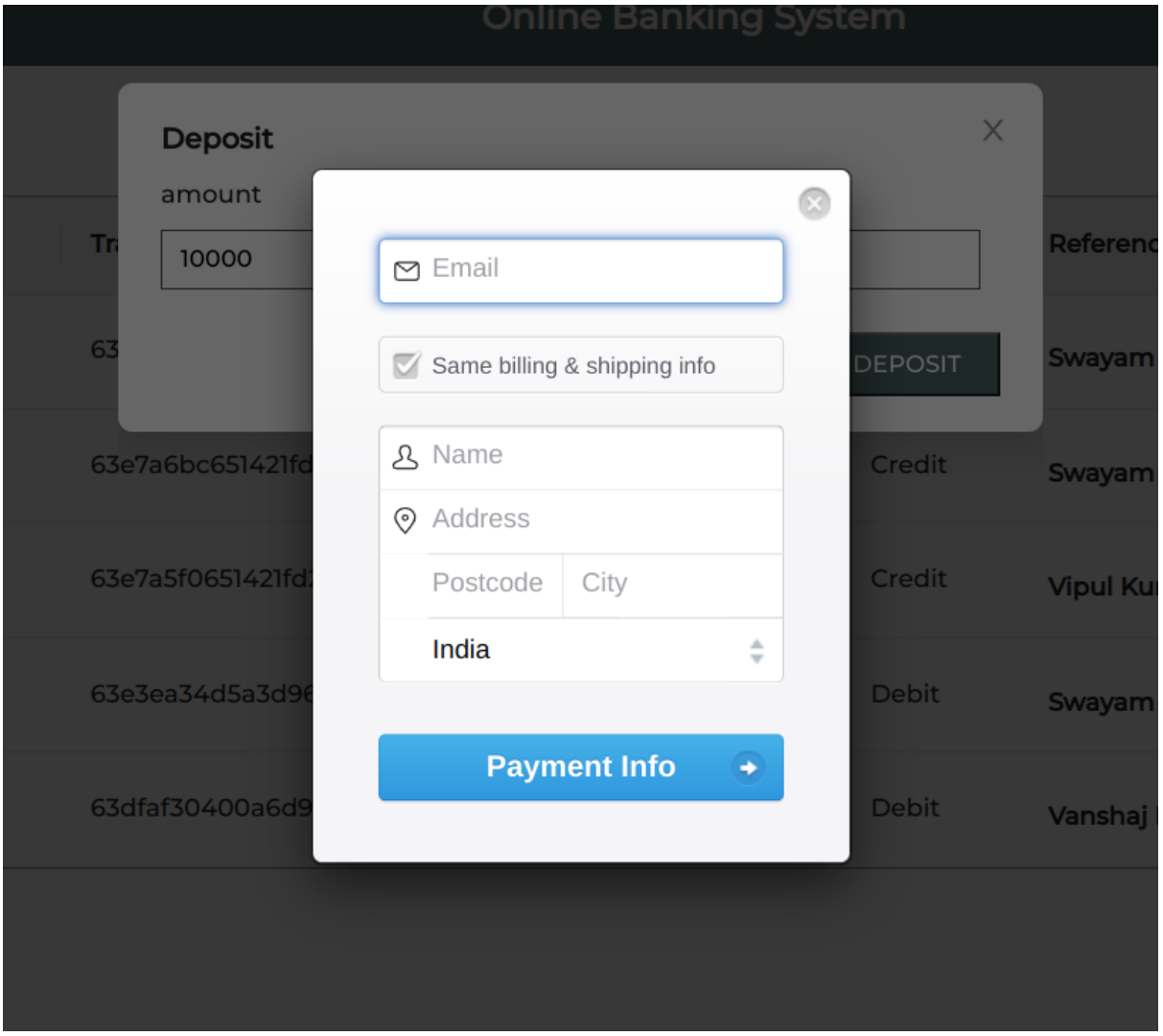
| BRAND | NUMBER | CVC | DATE |
|---|---|---|---|
| Filter... | | | |
| Visa | 4242 4242 4242 4242 | Any 3 digits | Any future date |
| Visa (debit) | 4000 0566 5566 5556 | Any 3 digits | Any future date |
| Mastercard | 5555 5555 5555 4444 | Any 3 digits | Any future date |
| Mastercard (2-series) | 2223 0031 2200 3222 | Any 3 digits | Any future date |
| Mastercard (debit) | 5200 8282 8282 8210 | Any 3 digits | Any future date |
| Mastercard (prepaid) | 5105 1051 0510 5100 | Any 3 digits | Any future date |

Steps for deposit Amount:

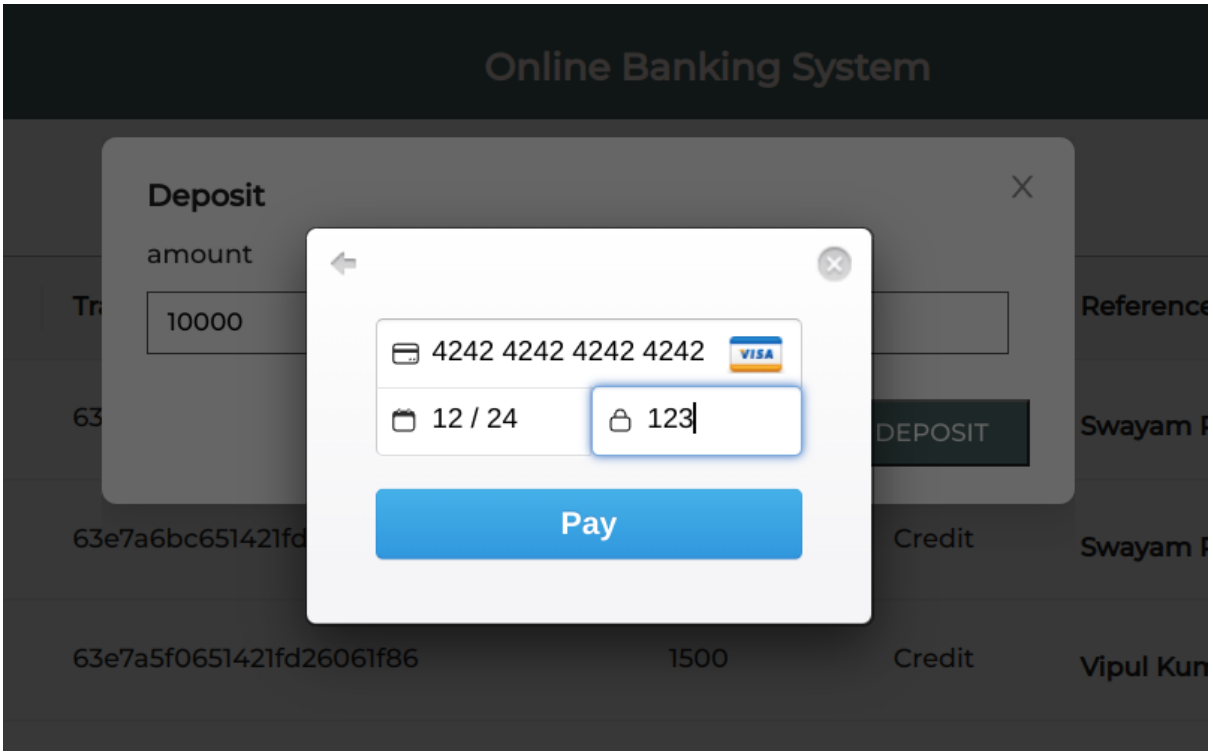
1. After clicking on deposite button enter the amount here

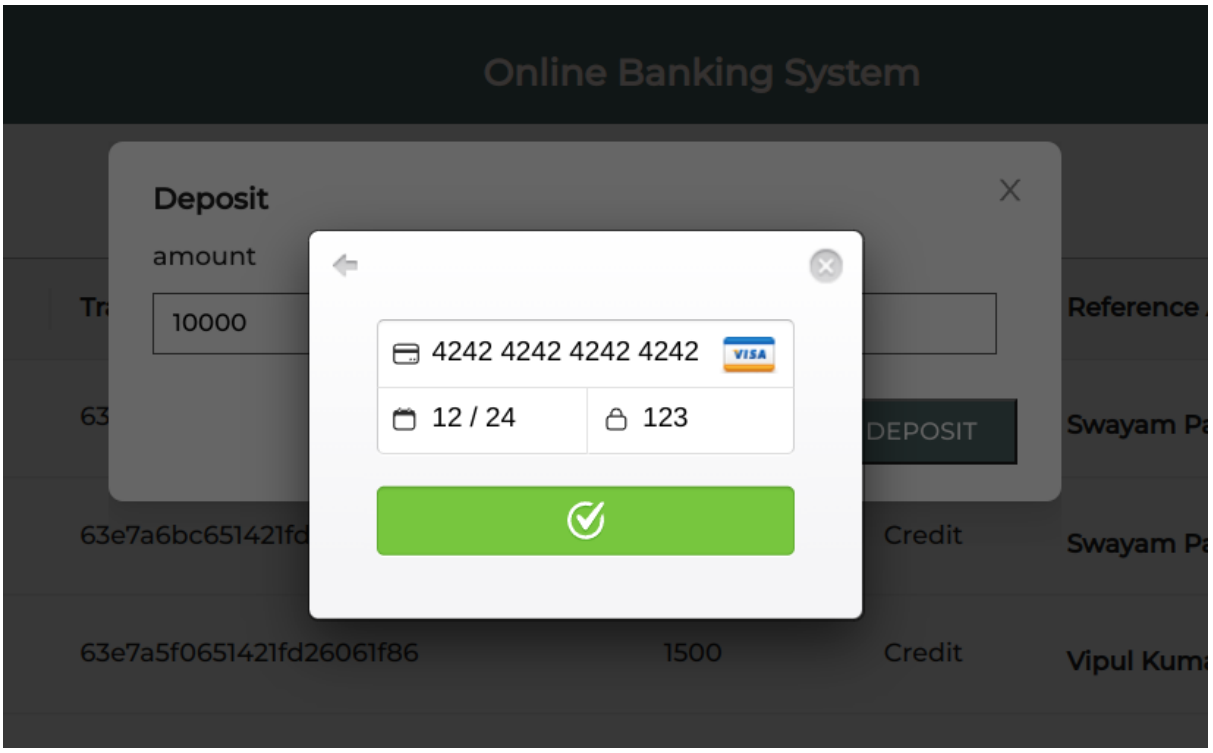


2.After that fill the address

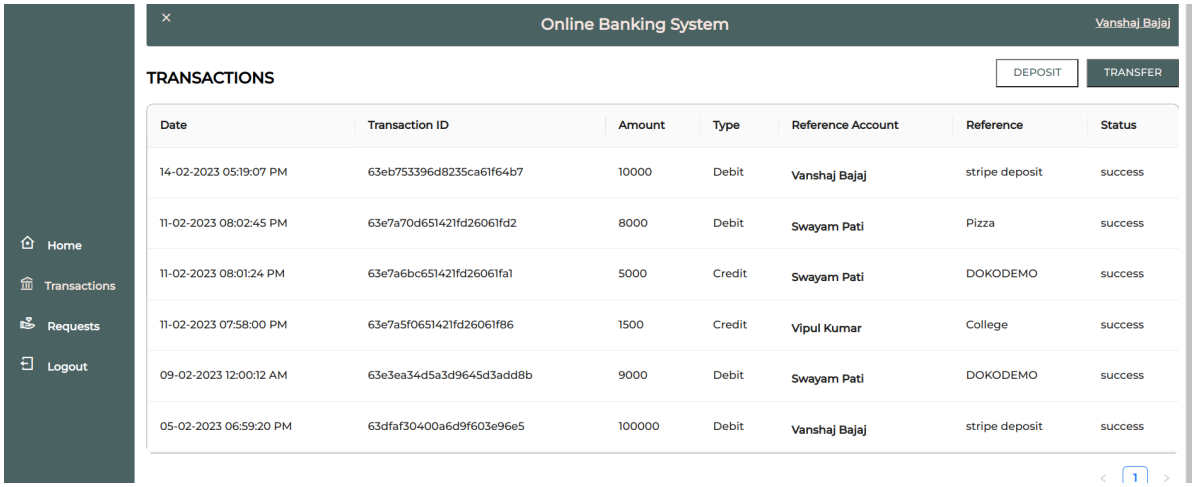


3. Next, Enter cards details from stripe



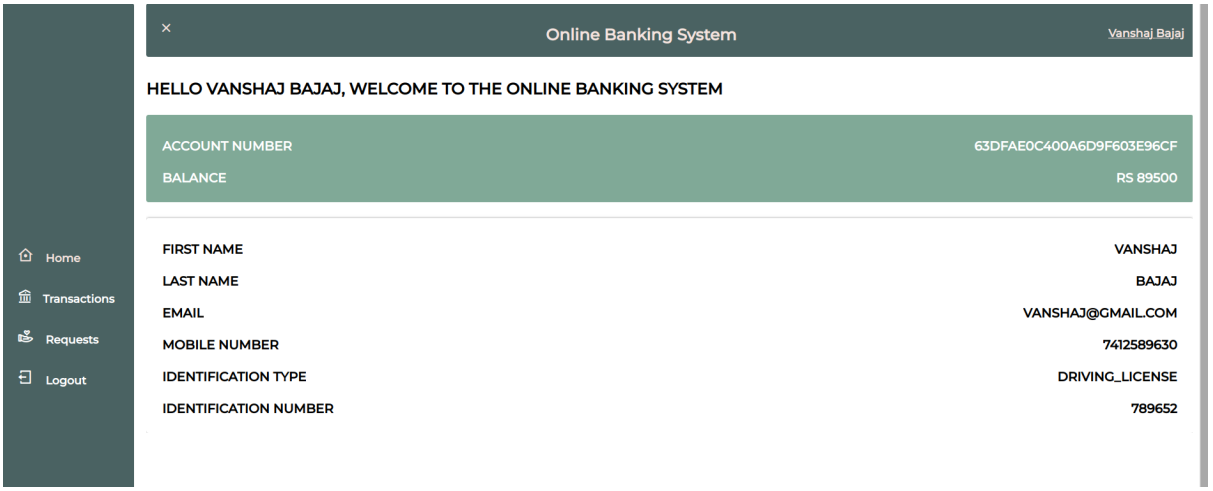



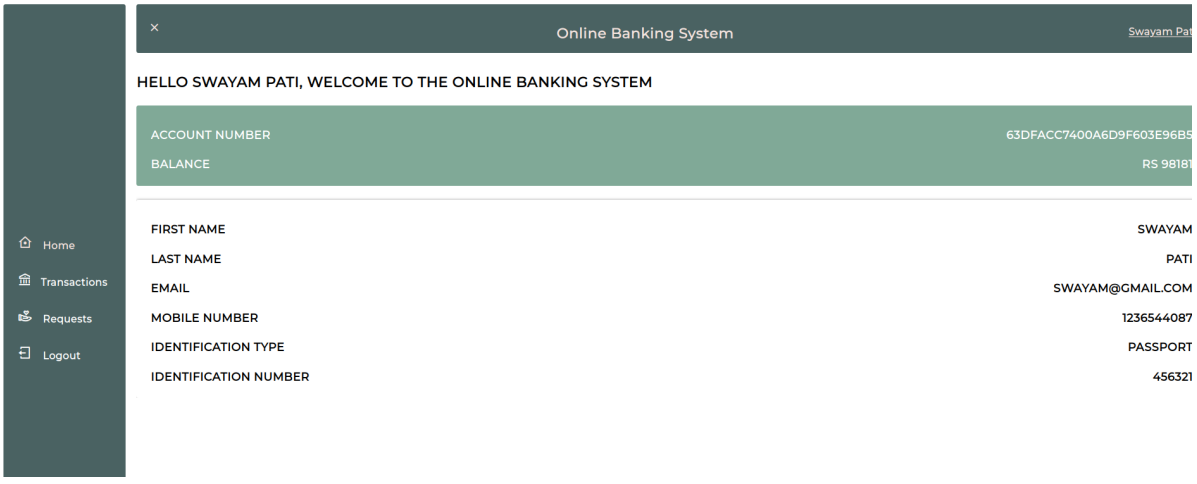
5. Amount will be successfully deposit to your account you can see and verify the date 14 Feb 2023



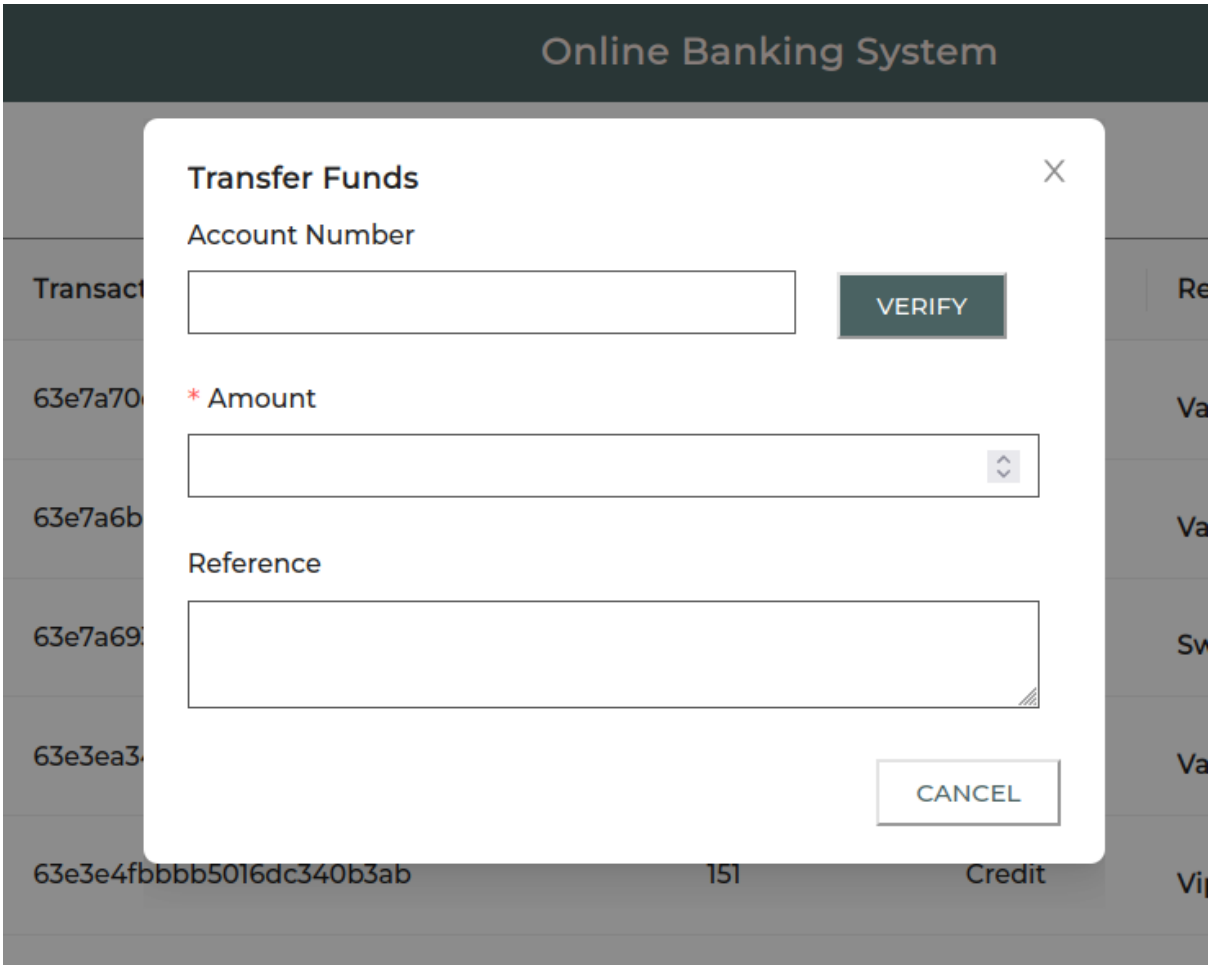

| Date | Transaction ID | Amount | Type | Reference Account | Reference | Status |
|---|---|---|---|---|---|---|
| 14-02-2023 05:19:07 PM | 63eb753396d8235ca61f64b7 | 10000 | Debit | Vanshaj Bajaj | stripe deposit | success |
| 11-02-2023 08:02:45 PM | 63e7a70d651421fd26061fd2 | 8000 | Debit | Swayam Pati | Pizza | success |
| 11-02-2023 08:01:24 PM | 63e7a6bc651421fd26061fa1 | 5000 | Credit | Swayam Pati | DOKODEMO | success |
| 11-02-2023 07:58:00 PM | 63e7a5f0651421fd26061f86 | 1500 | Credit | Vipul Kumar | College | success |
| 09-02-2023 12:00:12 AM | 63e3ea34d5a3d9645d3add8b | 9000 | Debit | Swayam Pati | DOKODEMO | success |
| 05-02-2023 06:59:20 PM | 63dfaf30400a6d9f603e96e5 | 100000 | Debit | Vanshaj Bajaj | stripe deposit | success |

6.User can transfer the amount to one account to another account. Two accounts are listed here one is of Vanshaj another is of Swayam

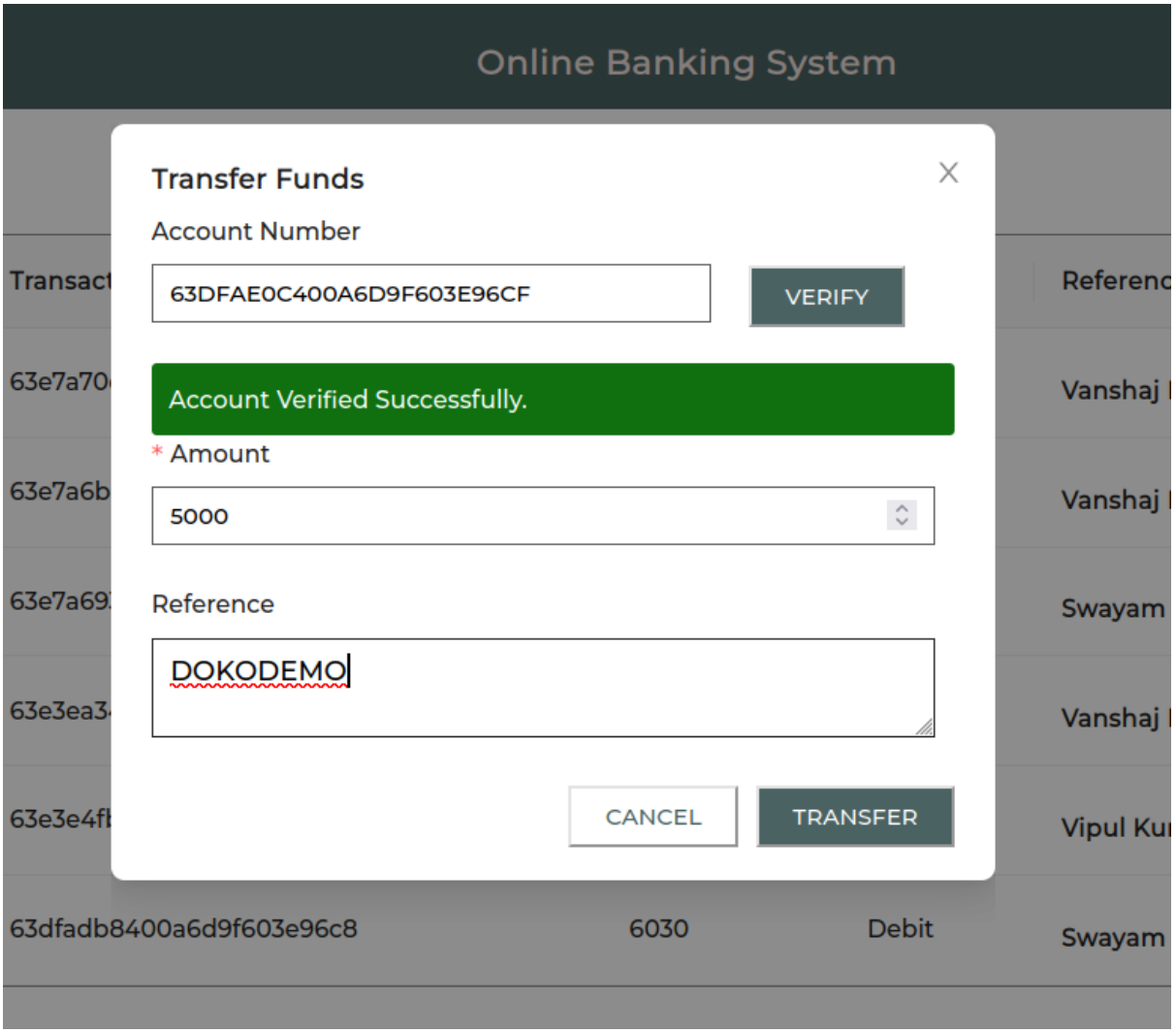


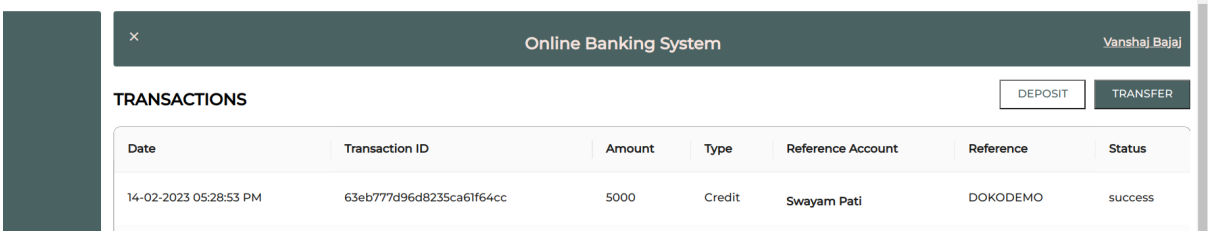
7. Now, Transfer the amount from Swayam's account to Vanshaj's account

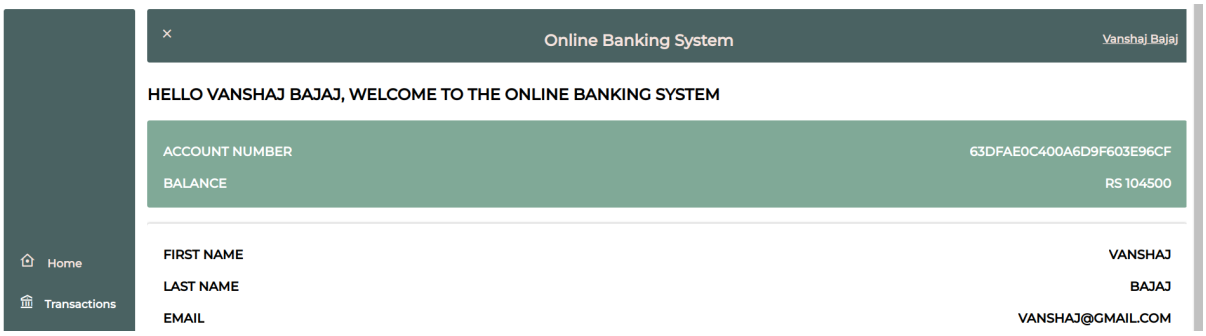



Copy the Vanshaj account no. and verify it first then enter the amount and write any reference and hit transfer button to send.



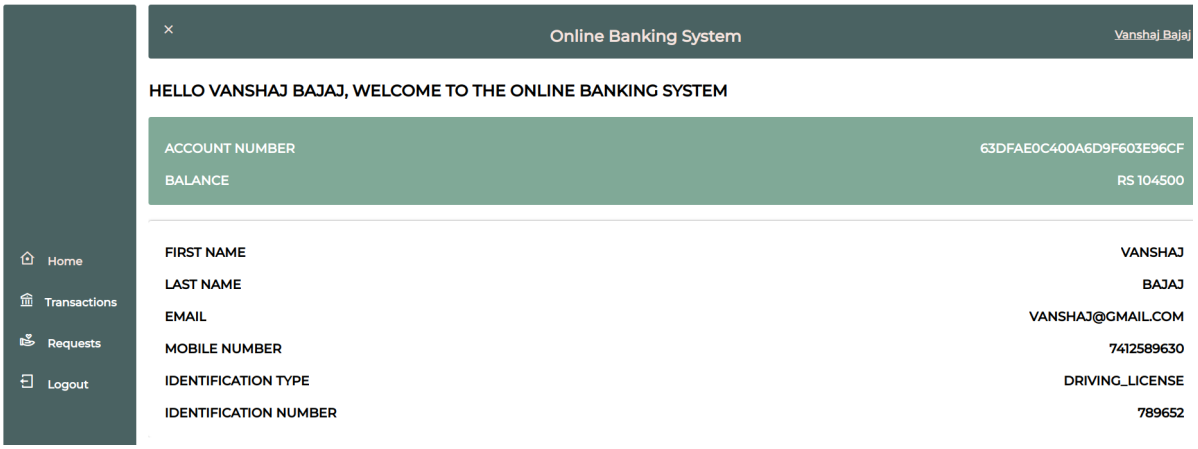

Now, look at the vanshaj transaction you will find credited amount 5000 in his account.

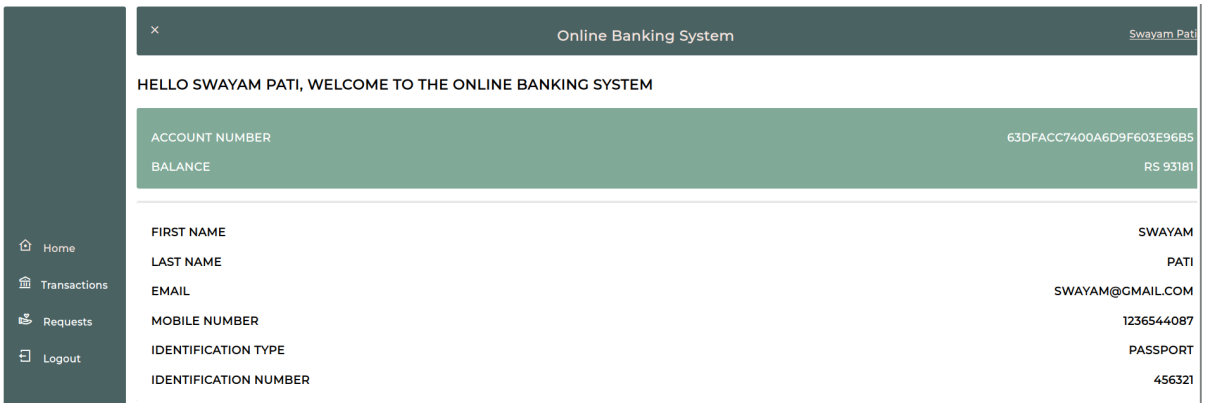




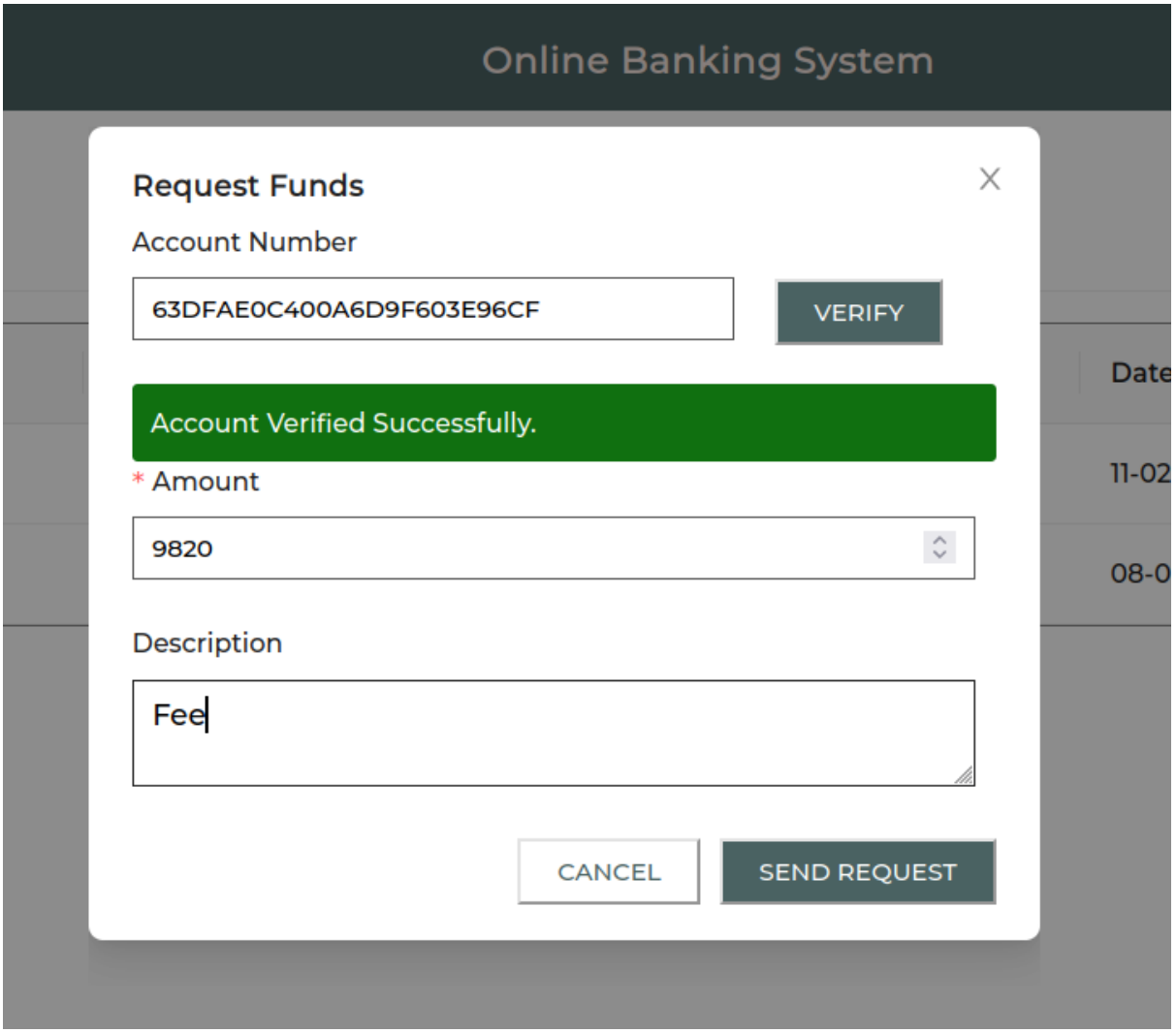

8. Users can request fund from another user, let's see an example. Here swayam will request fund to vanshaj and he will accept and amount will be credited to swayam amount.

8.1 Initial Balance to their account.

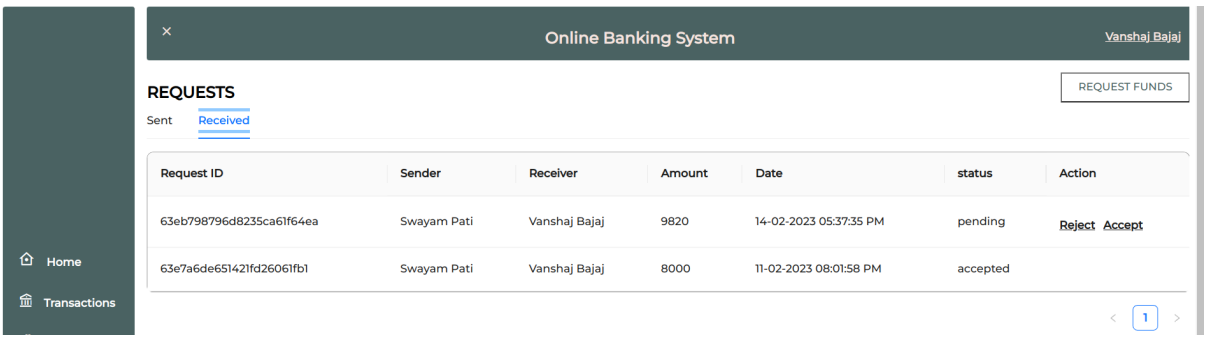


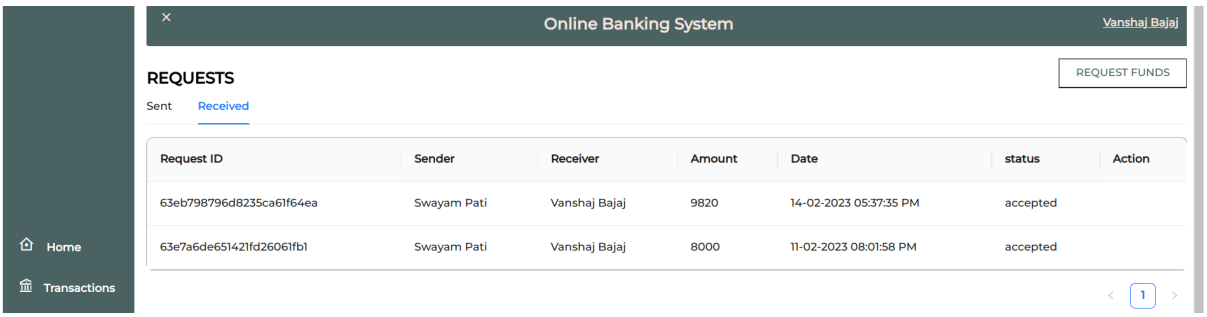



Now make request :

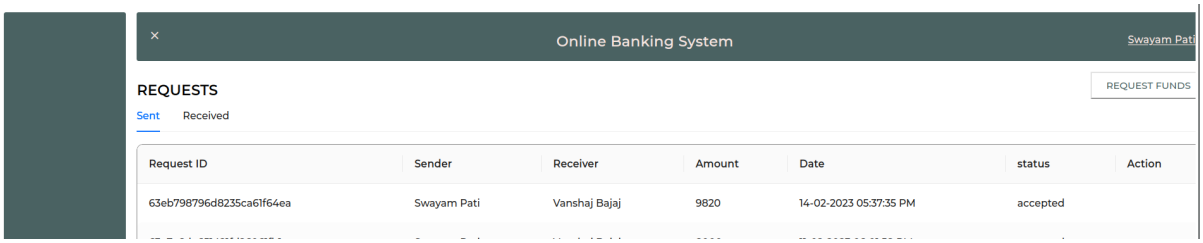


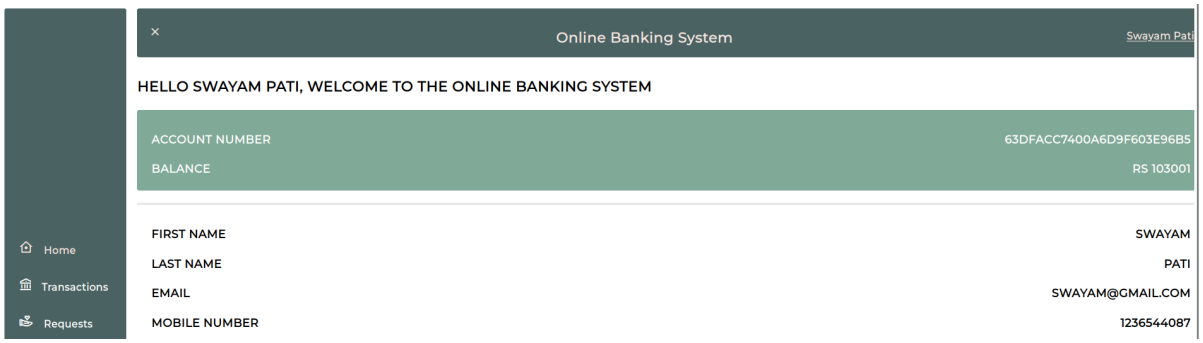

After sending the request, it will reflect on Vanshaj account where he will accept it and the amount will auto deposit to Swayam's account.






Request accepted by Vanshaj now and the amount will be added to swayam account.



# FUTURE SCOPE

The future scope of a banking system in an MERN (MongoDB, Express, React, Node.js) project is vast, with many possibilities for innovation and growth. Here are some of the potential future developments for a banking system in an MERN project:

1. Integration with emerging technologies: With the rapid advancement of technologies such as artificial intelligence, machine learning, and blockchain, there is potential for a banking system to integrate with these technologies to enhance the system's capabilities. For example, a banking system could use AI to provide personalized financial advice to customers or use blockchain technology to enhance the security and efficiency of financial transactions.

2. Expansion of digital services: As more customers adopt digital banking services, the future scope of a banking system in an MERN project is to expand the range of digital services offered. This could include expanding the range of financial products and services available, improving user experience through the development of mobile banking apps, and integrating with third-party services to provide more comprehensive financial management tools.

3. Improved security and privacy: With the increasing prevalence of cyber threats and data breaches, the future scope of a banking system in an MERN project is to focus on improving security and privacy measures. This could include implementing advanced authentication and encryption technologies, enhancing data protection measures, and using advanced fraud detection tools to prevent and mitigate financial crime.

4. Enhanced data analytics: The future scope of a banking system in an MERN project is to use advanced data analytics tools to gain

deeper insights into customer behavior, preferences, and trends. This data could be used to develop more effective marketing and customer retention strategies, as well as to improve the performance and efficiency of the banking system itself.

5. Increased collaboration: With the rise of open banking and API-based banking systems, there is potential for banking systems in MERN projects to collaborate with other financial institutions and third-party service providers. This could lead to the development of new products and services that are more tailored to customer needs and preferences.

Overall, the future scope of a banking system in an MERN project is vast, with many opportunities for innovation and growth. By embracing emerging technologies, expanding digital services, improving security and privacy measures, enhancing data analytics, and increasing collaboration, a banking system can remain relevant and competitive in an ever-evolving financial landscape.

# CONCLUSION

To conclude, a banking system in an MERN project is a complex and essential component of the financial services industry that provides customers with a reliable, secure, and efficient platform for performing financial transactions. The feasibility study of a banking system in an MERN project shows that it is a viable investment with numerous benefits for financial institutions and their customers.

The future scope of a banking system in an MERN project is vast, with many opportunities for innovation and growth. The integration of emerging technologies, expansion of digital services, improved security and privacy measures, enhanced data analytics, and increased collaboration are all potential developments that can further enhance the capabilities of a banking system in an MERN project.

A well-designed banking system in an MERN project can provide a competitive edge to financial institutions by improving customer service, offering new financial products and services, and streamlining financial transactions. The banking system in an MERN project has a range of roles and responsibilities, including managing financial transactions, ensuring security and privacy, complying with regulations, and providing financial services.

Overall, a banking system in an MERN project is a valuable investment that can provide significant benefits to financial institutions and their customers. By continually improving and innovating, a banking system in an MERN project can remain relevant and competitive in an ever-evolving financial landscape.