



**An-Najah National University**

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FACULTY OF ENGINEERING AND INFORMATION  
TECHNOLOGY

Computer Engineering Department

**Software Graduation Project**

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*Cash Core*

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## *Abstract*

In the evolving world of finance, banks face challenges with outdated systems and high costs. 'Cash Core' offers a modern software solution to improve efficiency, security, and accessibility, enabling convenient banking from home and revolutionizing the user experience.

Therefore, this project involves creating a mobile application that will be used by customers. Through this application, users can create their own bank accounts, which can be savings, current, or deposit accounts, with a password chosen by the customer and can be changed. This account can be used for specific banking transactions or making purchases through the bank, as well as checking the current balance and transaction history. Additionally, the application allows users to view and interact with advertisements posted by the bank's employees. The application also utilizes a recommendation system to display products that align with the current account balance. Furthermore, it allows users to schedule bank visits or engage in real-time conversations with the bank in emergency situations. For emergency communications, an artificial intelligence-based response system is used, expediting the processing of customer inquiries and immediate problem resolution without the need for a human employee to respond to customer queries. The application also provides a guide to the bank's information and regulations, as well as the locations of bank branches on a map to facilitate customer access to branches when needed.

Moreover, the system will provide users with the necessary paper documentation for these transactions, which users can download as PDF files for printing and future reference.

In addition, the project will include a dedicated electronic portal for bank employees who interact with customers. Each employee will have their own account within this electronic portal, created when they are hired and log in. This allows them to organize customer visit schedules, add customers, activate, or deactivate accounts, make modifications to them, and manage banking transactions, including printing transaction invoices. Furthermore, employees can use their portal accounts to post bank-related advertisements, such as monthly or annual prize draws, to reach users who can interact with these ads within the application and participate in the draws if they wish.

The portal will also facilitate communication, where each employee can add a colleague from the bank and communicate with them through direct messages, or it can be in the form of group chats containing bank employees. Additionally, there will be a supervisor for the employees within the bank system with special permissions not available to regular employees. This individual will oversee the advertisements posted by specific employees and monitor their performance in completing their tasks.

The "Cash Core" project will be developed using React and React Native for the user interface, along with Node.js, we will use SQLite and DB at the backend. This modern technology stack will enable us to create a user-centric banking solution that enhances efficiency and accessibility, providing features like transaction recommendations and powered emergency communication to revolutionize the banking experience.

To enhance security, Cash Core sends alert messages to users upon logging into their accounts. Additionally, it provides confirmation messages when users perform specific actions, such as paying a bill. Moreover, it sends notifications to both the sender and the

recipient when transferring funds between users within the system. This proactive approach contributes to increased security and user awareness within the platform.

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# CHAPTER 1

## INTRODUCTION

In the context of the technological advancement we are experiencing, the use of internet sites and smart mobile applications has become indispensable in people's lives. These platforms offer a variety of life services that save time and effort for users.

This particular application aims to meet the needs of bank customers and provide them with suitable services. It will serve as an advanced version of the traditional methods used by banks to monitor and manage customer accounts and to facilitate the banking procedures carried out by bank subscribers. Throughout the software development lifecycle, the software product underwent design, development, and testing phases. A graphical user interface (GUI) for the application was created using custom technical components, which were used to implement its functions. The software testing process was successfully completed.

### 1.1 Motivation

Bank customers are the primary target group for the application, which facilitates the process of opening an account in the bank, paying bills due by the customer, withdrawing, or depositing money, or transferring funds to another account. It also makes it easier to book visits to bank branches without getting caught up in time-consuming queues or the effort of physically going to the bank.

Additionally, the application simplifies the process of communicating with the bank and asking questions that the customer may have without the need to visit the bank.

The site also targets bank employees, as it eases their work and facilitates communication among employees for work-related inquiries. The primary motivation for the application's concept is that the process of account creation and communication in banks is still primitive.

This application is the first practical idea to simplify the process through a mobile app and a complete system for bank employees, which is what the bank aspires to offer.

## **1.2 Objective and Aims**

The goal of this project is to create a platform that lets bank customers do most of their banking from home. It aims to make it easier to access certain services and provides a complete system to help employees work more efficiently.

Additionally, our goal is to solve various challenges faced by the people involved in this project. All these efforts are dedicated to serving the community and making their lives easier.

Furthermore, this initiative helps improve our community and tries to use technology in managing daily and banking tasks to reduce the time and effort spent on these matters.

# **CHAPTER 2**

## **CONSTRAINS AND EARLIER WORK**

### **2.1 Constraints**

When we started this project, we faced various problems and challenges. One of the main issues was building a strong base and really understanding the basic concepts. We also had difficulty with new programming languages that we were not familiar with, as we had no experience in developing smartphone apps before.

Additionally, we struggled with large software programs that were hard to install on devices. Time was another big challenge, as we needed to organize our schedule to make sure we had enough time for the project. Finding educational resources was tough too, since most training materials were focused on other programming languages like Flutter and Java. This meant we had to spend more time on research and solving problems. To overcome these hurdles, we looked for help from experts and knowledgeable individuals to find the right solutions.

## **2.2 Earlier Work**

Some apps are like the one we made, like the Arabi-mobile app that helps customers manage their accounts and do their banking. But in our app, the main idea was used in a bigger and more detailed way. The people in charge want to make an app that makes this process easier and lets customers talk to the bank in emergencies. It also keeps them connected with all the customers' complaints and questions.

# **CHAPTER 3**

## **LITERATURE REVIEW**

The 'Cash Core' project represents a big shift from how banks usually operate, tackling common issues faced by traditional financial institutions. It introduces a mobile app designed to transform banking, making things better for both customers and bank staff.

Traditional banks often struggle with old systems and high costs. 'Cash Core' deals with these problems by using modern technologies, signaling a move towards a more up-to-date banking system.

Accessibility is a constant problem for regular banks, requiring people to visit in person for simple transactions. 'Cash Core' solves this by providing a user-friendly mobile app, allowing customers to do various banking tasks easily from their homes.

Communication problems, especially in emergencies, are another issue. 'Cash Core' focuses on being proactive in communication, making it more efficient to respond to customer questions and ensuring a secure and user-friendly platform.

Additionally, the project benefits bank employees with a dedicated online portal, making tasks and internal communication smoother and improving overall work efficiency.

To sum up, the 'Cash Core' project aims to change the banking experience by addressing common issues faced by traditional banks. By using technology and making banking more accessible, it aims to create a platform that is efficient and easy to use, marking a significant step forward in modern banking.

# CHAPTER 4

## METHODOLOGY

### 4.1 Non-Functional Requirements

- **Adaptive User Interface Design**

Adapting to different screens is crucial for the 'Cash Core' app, ensuring a smooth experience on various devices. Using responsive design, it adjusts fonts, buttons, and layouts for different screens. Whether on smartphones or tablets, the app maintains a consistent and easy-to-use design. Extensive testing ensures users can navigate effortlessly, regardless of their device or screen size, enhancing accessibility for a wide user base.

- **Security**

To enhance security in the 'Cash Core' application, a system of confirmation messages has been implemented at critical stages, such as the login process and fund transfers to another account. Following a successful login, users receive a confirmation message on their mobile device, providing details about the time and specifics of the account access. In the event of fund transfers to another account, an instant confirmation message is sent to both the user and the recipient. Additionally, when paying a bill, a confirmation notification is sent to the user's registered email, ensuring transparency, and keeping users informed about all transactions on their account. These measures contribute to achieving the highest level of security and building user trust in the 'Cash Core' application.

- **Ease-of-use**

The Cash Core app is designed for simplicity and ease of use. Whether you are a bank customer or employee, the menus are clear, and the features are well-organized for an easy experience. Account creation is hassle-free with easy-to-use forms. The goal is to facilitate banking tasks for everyone, while keeping the process simple and accessible at any time and place.

#### **Use-ability**

The 'Cash Core' app is super user-friendly. Whether you are a customer or employee, we have made everything simple to use. Creating an account is easy with straightforward forms. The aim is to make banking tasks a breeze for everyone.

## **4.2 Design**

Starting to plan the design early is important when creating an app from scratch. A graphical user interface (GUI) is essential to understanding how a program works. When working on designing any application, it is necessary to think about some basic things. This involves looking at similar apps in the App Store and creating a design that matches what users expect. This careful approach ensures that the design not only looks good, but also functions well and is easy for users to understand.

### **4.2.1 Create an account and Log in**

Bank employees can create and share posts on behalf of Cash Core, with the employee's name not visible in the post. Users can engage with these posts by liking them, leaving comments, or viewing comments from colleagues. To identify the employee who shared a specific post, one can obtain this information through the supervisor. Supervisors hold the details regarding the employee responsible for publishing a post, ensuring a straightforward process for content attribution within the system.

### **4.2.2. Advertisements and Interaction**

Bank employees can generate and share posts representing Cash Core without their individual names being displayed. These posts are accessible to users, allowing them to interact by liking, commenting, or viewing comments from their colleagues. If there is a need to identify the specific employee responsible for a particular post, this information is available through the supervisor. Supervisors hold the key to reveal the name of the employee who published a post, streamlining the process and maintaining a level of control over content attribution within the system.

### **4.2.3 Marketing and Displaying Products**

The bank showcases a variety of products on its website. Employees can add pictures and descriptions for each product on the website, and these are then displayed on the app for users to see. Users can express their liking for products, and they also have the option to filter products based on the desired price range. On the main storefront, users can easily view the most liked products, as well as products that fit within their available budget. Additionally, users can track products they are personally interested in. All these features are conveniently accessible from the store's main screen.

#### **4.2.4 Book and View Visits**

Users can book a visit to the bank at their preferred time through the application, aiming to alleviate congestion in the banks and organize the arrival process. The bank restricts having more than 5 visits within 20 minutes to avoid any crisis. Employees can see these reservations, display them on a specific date, and have the option to delete a visit after it has been completed.

#### **4.2.5 Withdrawal and Deposit**

Users can withdraw or deposit a specific amount of money by visiting the bank. The employee inputs the account number and prints a receipt as proof of the transaction for the user.

#### **4.2.6 Transfers and Bill Transactions**

To simplify the process of going to the bank, users can pay bills and transfer money to other users within the system through the application, anytime and anywhere. Users can view all transactions by entering their account ID, specific to their account only, without accessing other users' information.

#### **4.2.7 Invoicing**

When users engage in any transaction, either by physically visiting the bank or through the app, a receipt is generated. Users can view all their invoices on their phones, and employees can print any invoice for a user at any time upon the user's request.

#### **4.2.8 Notifications and Alerts**

Users receive a notification when an employee posts on behalf of the bank. This notification remains unseen until the user checks the application, where they can view a list of their notifications.

#### **4.2.9 Maps and Route**

The application and the website both feature maps that enable users and employees to locate the bank. Users can pinpoint their current location, identify all branch locations on the map, and with a simple button press, navigate to the nearest branch. For employees, they can specify their location (which branch they are in) and view all branch locations on the map.

#### **4.2.10 Currency Conversion**

Since the global economy is based on the dollar, users can check the dollar value through the app anytime they want, every day. With this information, users can easily convert between the dollar and any other currency.

#### **4.2.11 Profile Editing**

Through the app and the website, users and employees can easily modify their personal information if there are any changes, such as updating a phone number. This allows for the flexibility to adjust various personal details as needed.

#### **4.2.12 Score and Rewards**

Every user within the system has a personal score that grows with their activity on the app. The more transactions and interactions a user performs, the higher their score. To incentivize users to boost their scores and enhance app engagement, the platform announces monthly or yearly rewards. This involves a draw among the top 3 users, randomly selecting a winner and promoting a sense of excitement and participation.

#### **4.2.13 Emergency Chat**

Users can use the emergency chat to quickly inquire about urgent matters, such as information about branches or details of their latest transactions. For instance, if a user booked a visit and forgot the details, they can attach the question along with keywords they are searching for, and an automated response will provide the necessary information. This chat feature also allows users to file complaints. These complaints are directed to the employees, who can view and analyze them, track the percentage of resolved complaints, and identify recurring issues. This helps in providing better services to users.

#### **4.2.14 Real-Time Communication**

The website facilitates both group and individual chats among employees, fostering increased social interaction and the exchange of work experiences among colleagues.

**Additionally, the dedicated website for employees offers the following features.**

#### **4.2.15 Login and Registration**

The site includes a user-friendly login and registration system. New employees can easily register by providing essential details such as their name, identification number, profile picture, email, password, and other necessary information. Subsequently, they can log into the system using their email and password credentials.

#### **4.2.16 Real-Time Chat**

The website's chat functionality enables seamless communication among employees. It supports the creation of both group chats, allowing multiple individuals to participate in discussions, and private one-on-one chats with specific colleagues.

#### **4.2.17 Supervisor and Their Permissions**

The supervisor possesses all the regular employee permissions, with additional privileges. They have the authority to access information about all employees, including the annual employment rates and the percentage of complaints raised by users in the emergency chat. Furthermore, supervisors have the ability to view the overall employment statistics for each year.

In addition to these responsibilities, supervisors are responsible for conducting draws for rewards. Unlike regular employees, the supervisor has visibility into which specific employee posted a given message, rather than just the bank's alias.

These additional permissions empower the supervisor to oversee the broader employee landscape and ensure efficient management of user interactions and rewards distribution.

## 4.3 Database Management

### 4.3.1 Server-side

For our project, we chose MySQL as our database system due to its widespread use and user-friendly nature in software development. MySQL's popularity and ease of integration make it a fitting option. To connect our database with the application, we used Node.js. Acting as a bridge, Node.js ensures smooth communication and data exchange between the application and MySQL, ensuring an optimal user experience.

### 4.3.2 Client Side

#### 4.3.2.1 React Native

We use React Native, an open-source UI framework developed by Meta Platforms, to build the client-side of the application. This framework allows developers to create applications for various platforms like Android, iOS, and more. React Native's unified codebase approach enhances code reusability, enabling developers to write code once and deploy it across multiple platforms. It also provides a set of APIs that streamline development and facilitate the creation of intuitive user interfaces.

#### 4.3.2.2 React JS

React JS, an open-source JavaScript library developed by Facebook, is employed for building user interfaces across different platforms, including web and mobile. Similar to React Native, React JS uses a unified codebase for creating user interface components, enhancing code reusability. It simplifies the development process with a unified set of APIs, resulting in intuitive and responsive user interfaces.

## 4.4 Development Tools

*Android Studio:* Android Studio is the official integrated development environment (IDE) for Android application development. It combines a powerful code editor with developer tools tailored for creating Android applications. Android Studio provides custom-designed tools to enhance productivity, simplifying the development process.

*Visual Studio Code:* Visual Studio Code, a lightweight source code editor for various platforms, serves as a desktop-based local development environment. It streamlines source code editing and facilitates efficient development with its user-friendly features.

# CHAPTER 5

## RESULTS

### 5.1 The User Application

#### 5.1.1 Welcome Page and Application Services

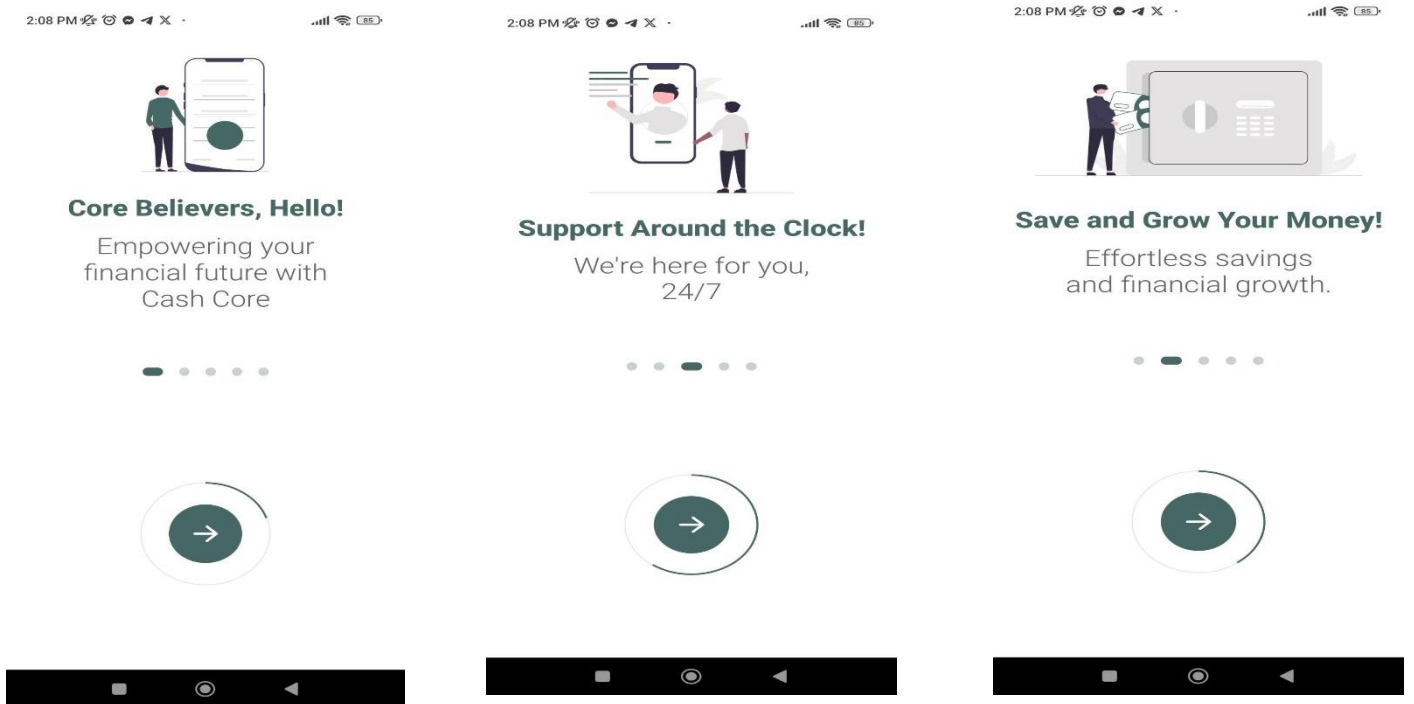


Figure 5.1 Welcome Pages

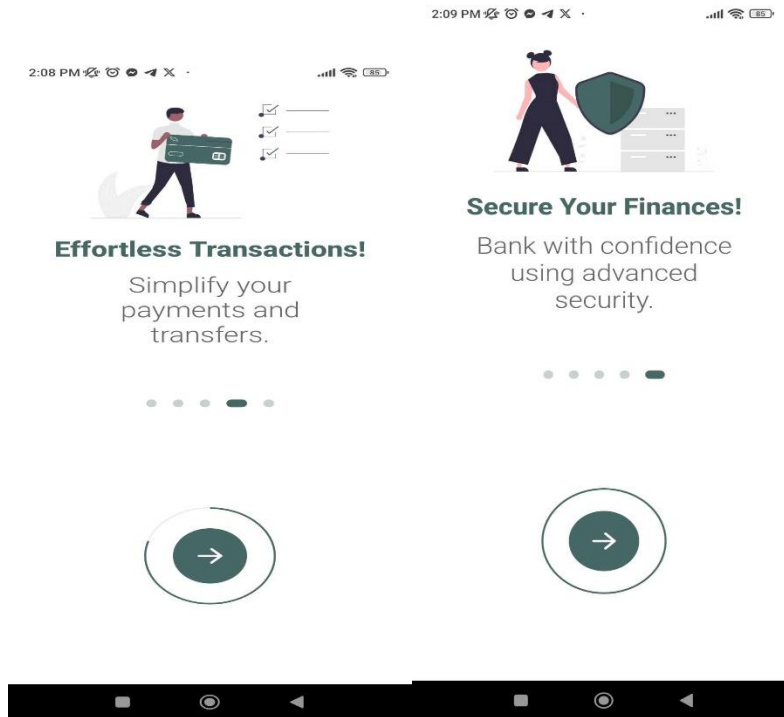


Figure 5.2 Welcome Pages

The previous interface had five sections that users could navigate using a button at the bottom. This interface is like a welcome screen that users see when they first download the app. It introduces users to different services through images, displaying how they can benefit from the app and promoting its features.

## 5.1.2 Login and Sign up Pages

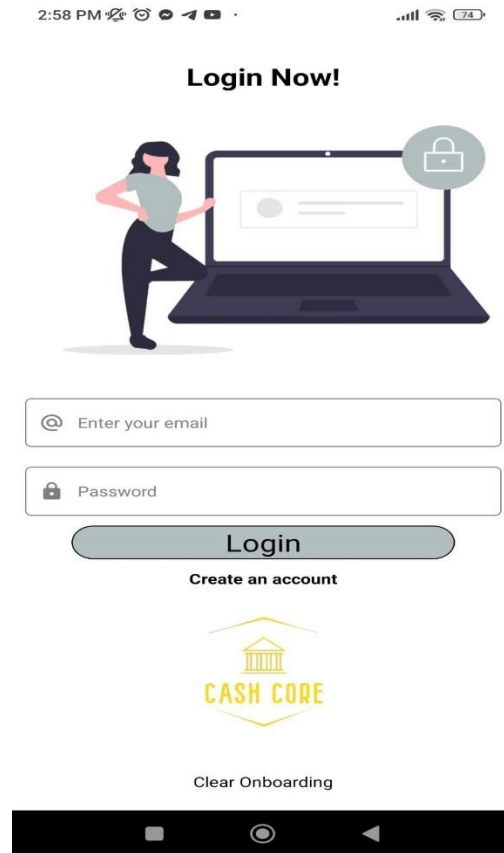


Figure 5.3 Log in Page

This interface allows users to log in to their existing accounts if they already have one on the app. Alternatively, users can create a new account if they do not have one yet, as will be further explained in the next interface.

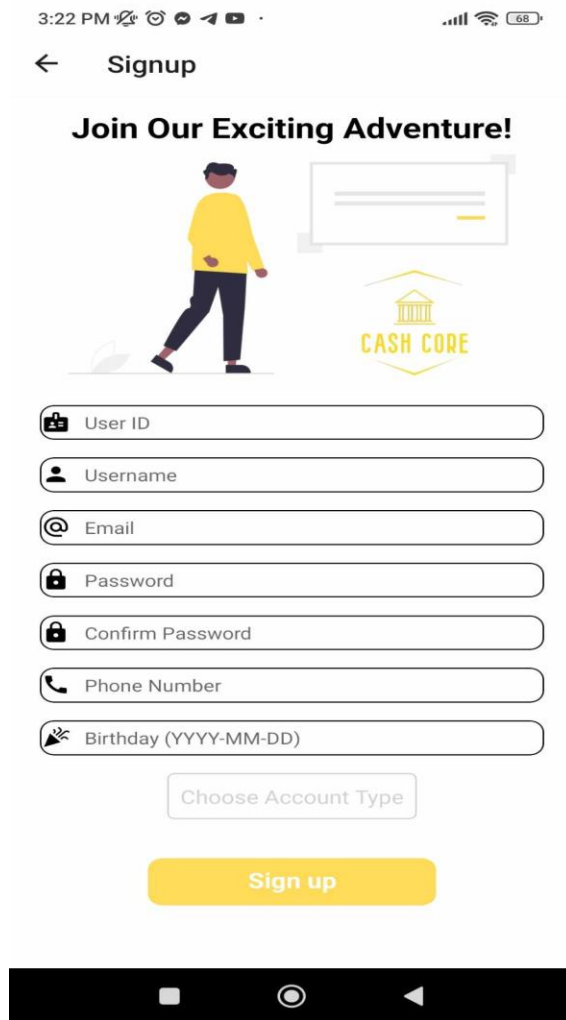


Figure 5.4 Sign Up Page

When the user clicks on 'Create Account' in the previous screen, a new page appears for setting up the account. Here is what each field means and the rules to follow:

1. User ID: A unique 9-digit number assigned by the app.
2. User Name: The user's name, with a capital letter for each word and a space between them.
3. Email: The user's email address, following the regular email format. The email must be unique unless it is intended for creating another type of account for the same person.
4. Password: Create a password with a minimum of 8 characters, including at least one uppercase letter, one number, and one special character.
5. Confirm Password: Retype the same password for confirmation.
6. Phone Number: Enter a 10-digit mobile phone number.
7. Date of Birth: Users need to be at least 18 years old. If younger, the account creation will not proceed.
8. Account Type: Users can choose between Savings, Deposit, or Current for the desired account type."

If there is an error, the application will display a message stating, "Please fill out all required fields correctly." Be sure to review and correct any information necessary to set up a successful account, as shown in the following figure (phone number is not completed).

The screenshot shows a mobile application interface for a 'Signup' screen. At the top, the status bar displays the time as 3:56 PM, signal strength, Wi-Fi, and battery level at 64%. The app's header includes a back arrow and the title 'Signup'. Below the header is a promotional banner with the text 'Join Our Exciting Adventure!' and an illustration of a person in a yellow shirt walking towards a computer monitor. The 'CASH CORE' logo, featuring a classical building icon, is positioned below the banner. The main form consists of seven input fields: a phone number field containing '407417279', a name field with 'Adnan Ennab', an email field with 'adnanennab29@gmail.com', two password fields (both masked with dots), a phone number field with '059575568', and a date of birth field with '2001-04-09'. Below the form is a 'Deposit Account' button, a red error message 'Please fill in all required fields correctly.', and a prominent yellow 'Sign up' button. The bottom of the screen shows the standard Android navigation bar.

Figure 5.5 Fill in Fields

Regular expressions (regex) were utilized to ensure that the entered information adheres to specific rules. This assists in the validation and confirmation of the accuracy of the data provided throughout the account creation process.

If all the information is entered correctly, a confirmation module appears on the screen, indicating that the account has been successfully created. Additionally, a 'Back to Login' button is provided for users to return to the login page as following.

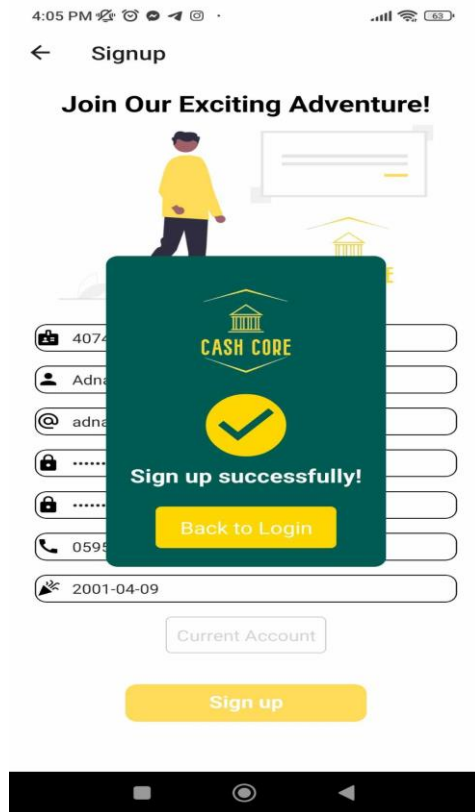


Figure 5.6 Sign Up Successfully

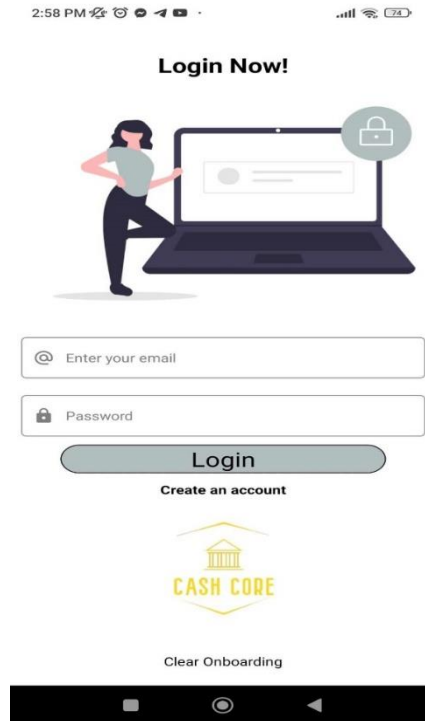


Figure 5.7 Login Page 2

This interface allows users to access their personal accounts and includes two fields for entering their email and password. When this information is entered, the system checks whether both are identical in the database and whether this account has been activated by the user and the bank send a confirmation message to the user for the security after login. The account is activated by going to the bank and depositing a small amount of money, and the employee activates the account at the same moment (via the website), as will be explained later.

If a user creates an account but does not activate it, a message in the form of a module will appear, indicating the necessity to visit the bank and deposit a small amount of money as shown in the figure below. This step is required for the user to access the features of the bank's application

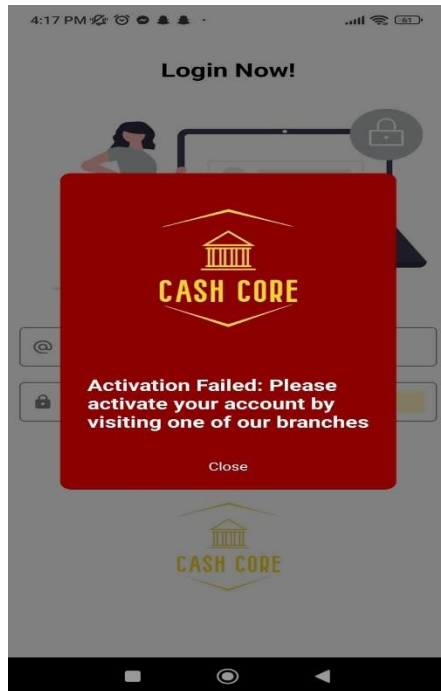


Figure 5.8 Activation Failed

If the user enters an incorrect email or password, an alert message will appear, indicating that either the email, password, or both have been entered incorrectly as shown on the following:

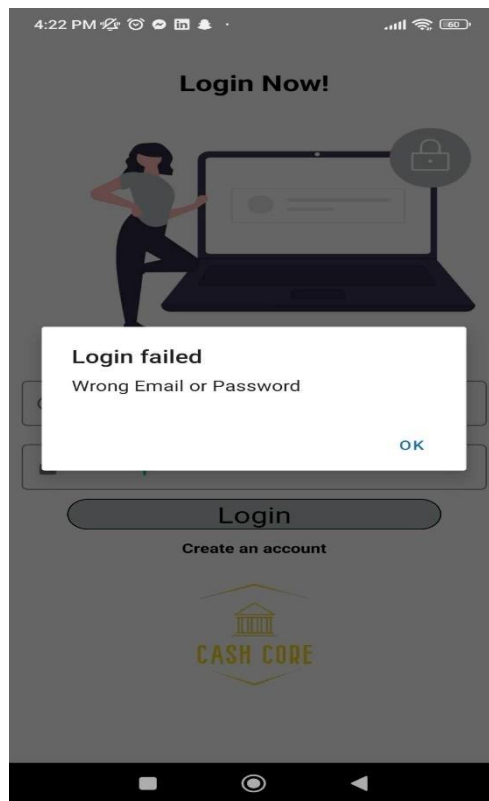


Figure 5.9 Wrong Password

Finally, upon entering the correct email and password with an activated account, a user module appears as a welcome message for 3 seconds, followed by accessing the main interface as following:

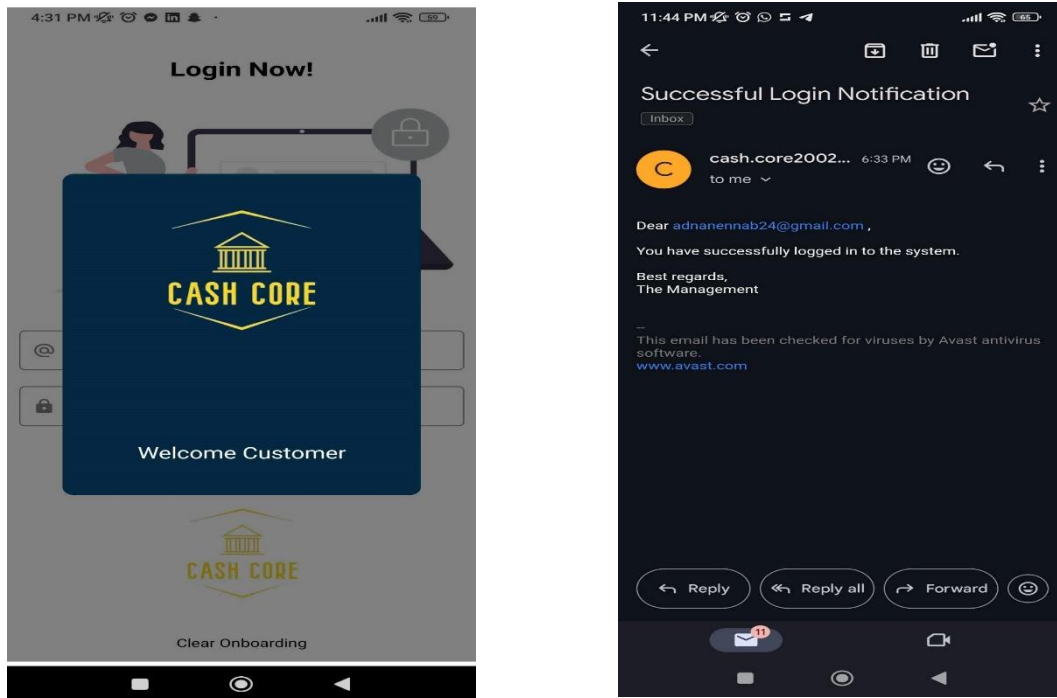


Figure 5.10 Login Email

### 5.1.3 Post Content Page

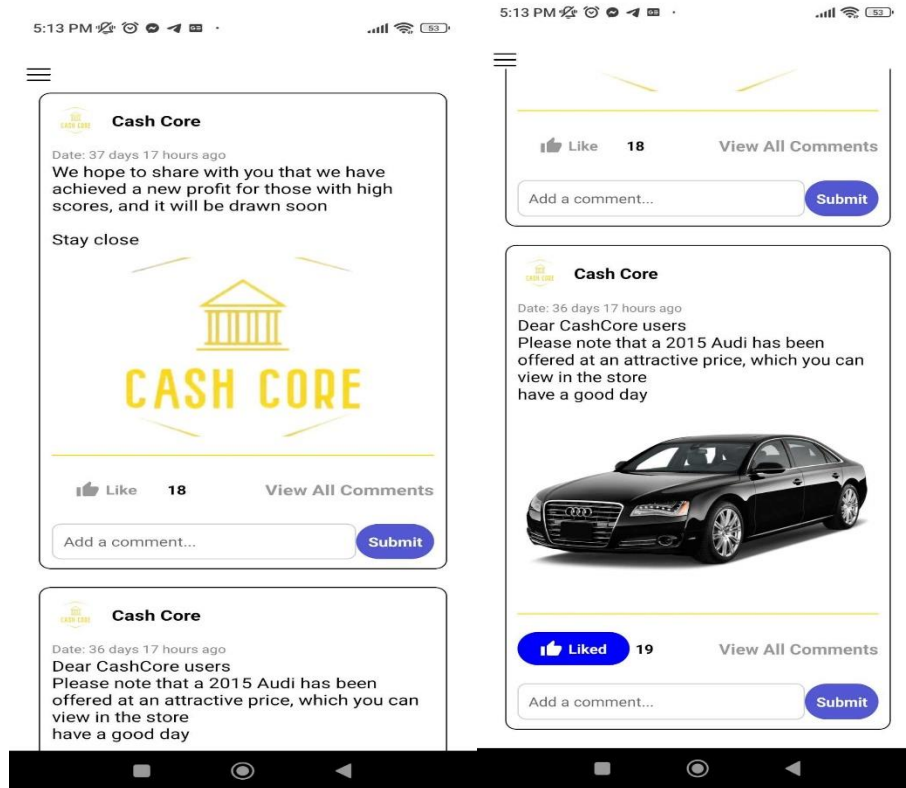


Figure 5.11 Post Page

Through this interface, users can view posts published and shared by employees. These posts appear under the bank's name (Cash Core) for users. Users do not see the name of the employee who posted the content. Users can add or remove likes from a post, and each post displays the number of likes it has received from other users.

"From this interface, users can also access comments made by all users on a particular post, as illustrated in the image below."



Figure 5.12 Posts Comments

### 5.1.4 Market Page

Following that, if the user taps on three horizontal lines in the top-left corner, a menu appears displaying various contents that the user can access and view as shown on the following:

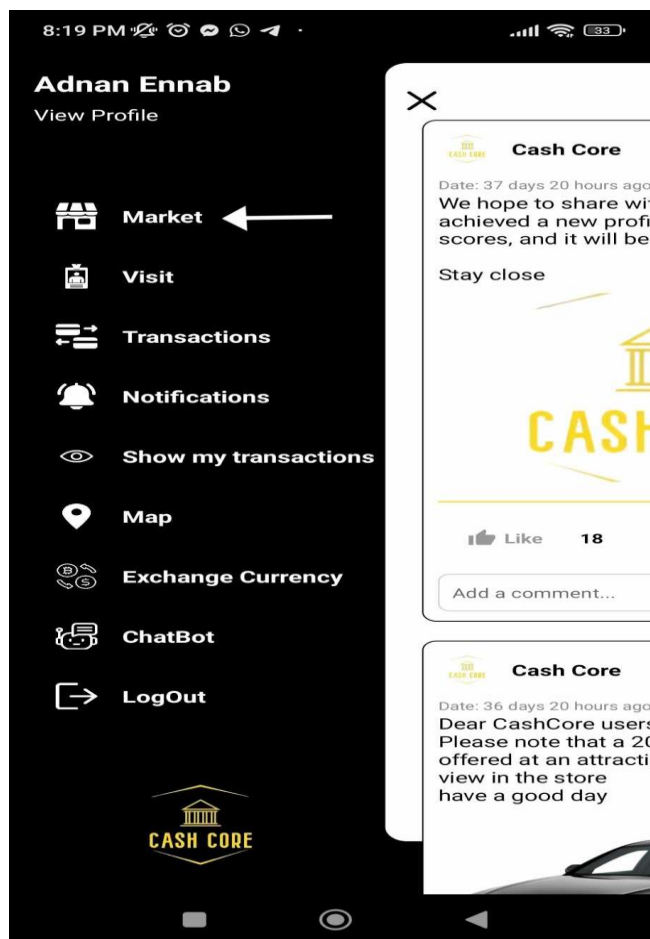


Figure 5.13 Market Tab

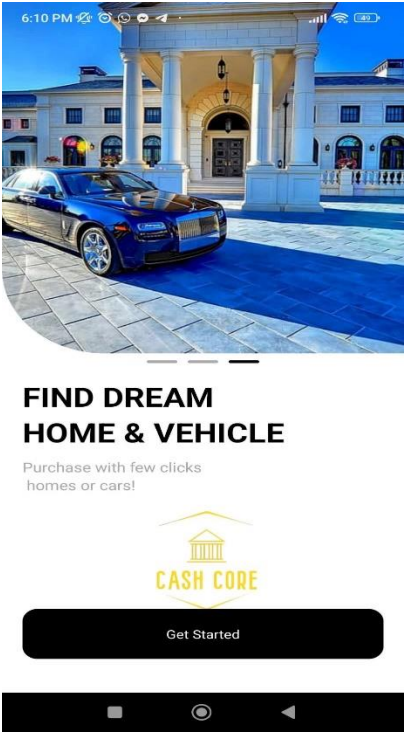


Figure 5.14 Market Page

When you tap on the 'Market' option, it opens a screen indicating the bank's market, which includes all the items for sale. It is worth noting that the market showcases houses and cars available for purchase and will transfer to the following page:

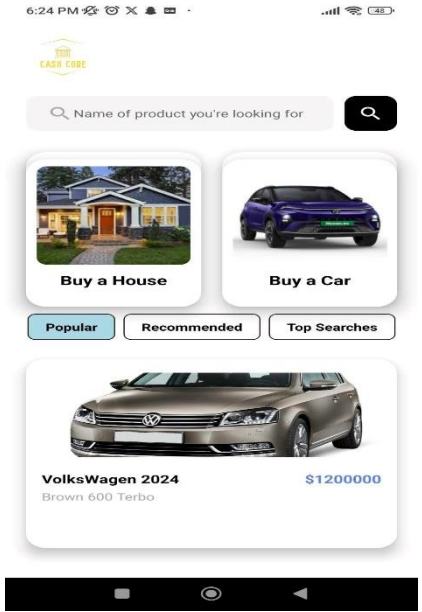


Figure 5.15 Market Home

This page includes several features. Firstly, it contains a field where the user can input the name of the item they are searching for. After entering the item's name, the user can press the search icon and the results will be displayed this will be useful It will also be shown in the future

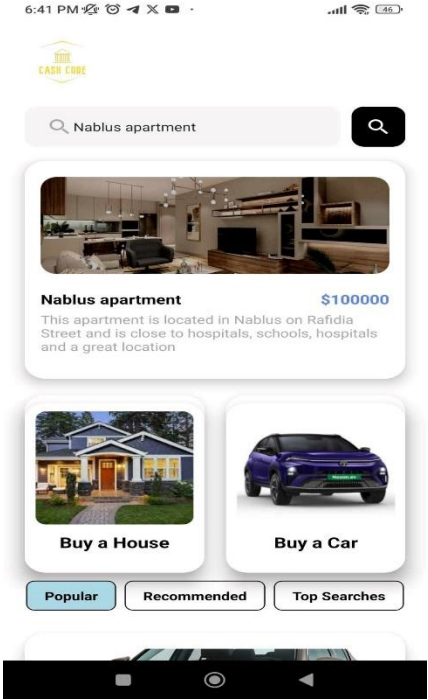


Figure 5.16 Product Search

Clicking on the item opens a page with all the details, including the description and the bank-added amount as following:

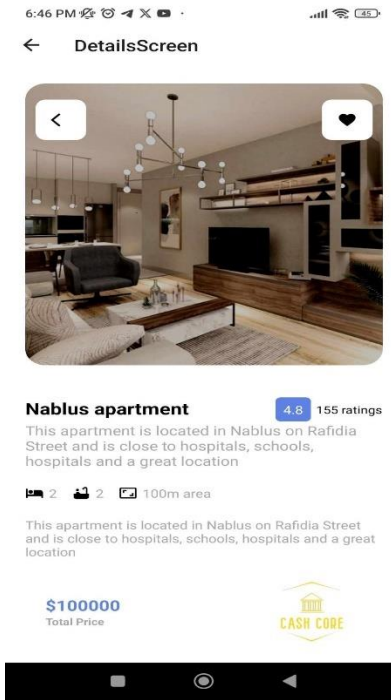


Figure 5.17 Home Details

Users can also like the item as following, and adding a like will be significant, as we will see later

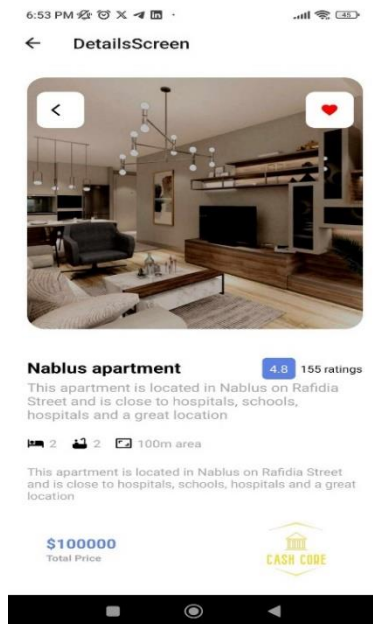


Figure 5.18 Home Details Like

Go back to the main page of the market and click on buy a car:

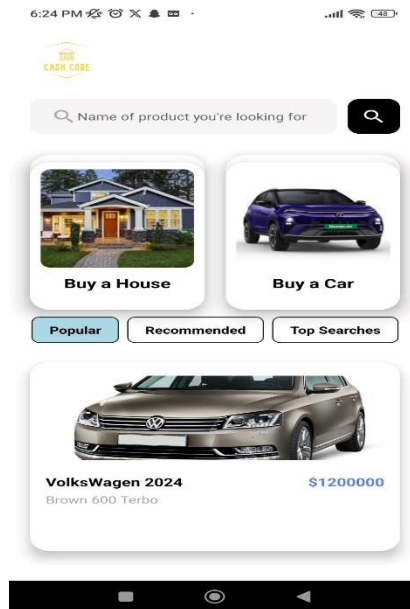


Figure 5.19 Market Home 2

A new interface opens, showcasing all the cars available and presented by the bank:

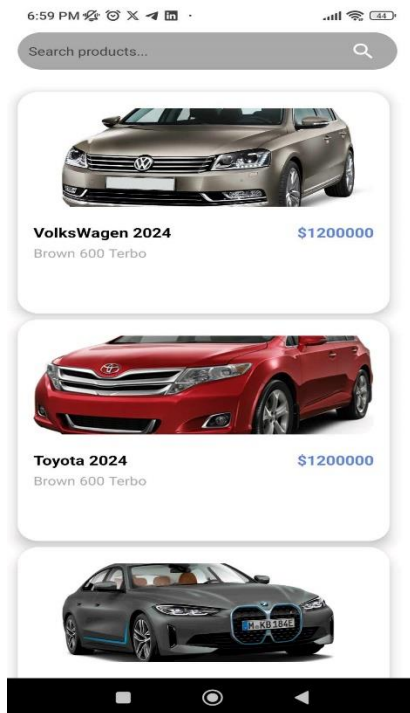


Figure 5.20 Market Cars

Through this interface, users can also filter cars based on the price they enter. For example, if a user enters 100,000, the system will fetch all cars priced at 100,000 or less as following:

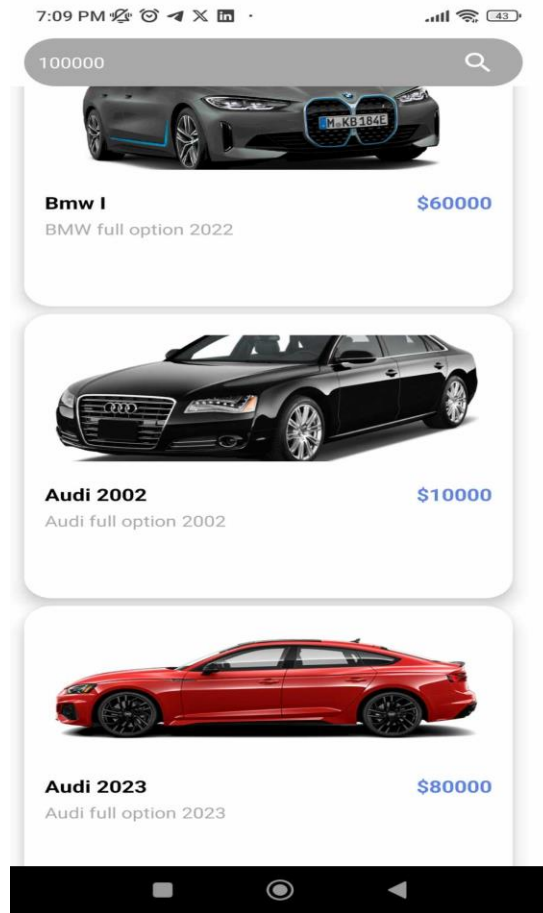


Figure 5.21 Filtering Cars

As previously mentioned, you can enter and view the additional contents and specifications of the car.

Returning to the main market page, there are three categories: Popular, Recommended, and Top Search.

1.Popular: By clicking on it, the top 3 items displayed by the bank with the most user likes are shown. Users can scroll to view all items.

2.Recommended: It displays the top 3 items from the bank with prices equal to or less than the money in the user's account.

3. Top Search: It shows the top 5 items the user searched for. Each item accumulates points based on user preferences. For instance, searching for 'Audi 2023' might earn 2 points for that car, while other cars get 1 point each. Homes receive no points. Similarly, searching for 'Nablus apartment' might earn 2 points for that specific apartment and 1 point for other homes. Cars will not receive any points. Based on these points, the system displays the top 5 items that have the most points in the user's account. This system varies for each user.

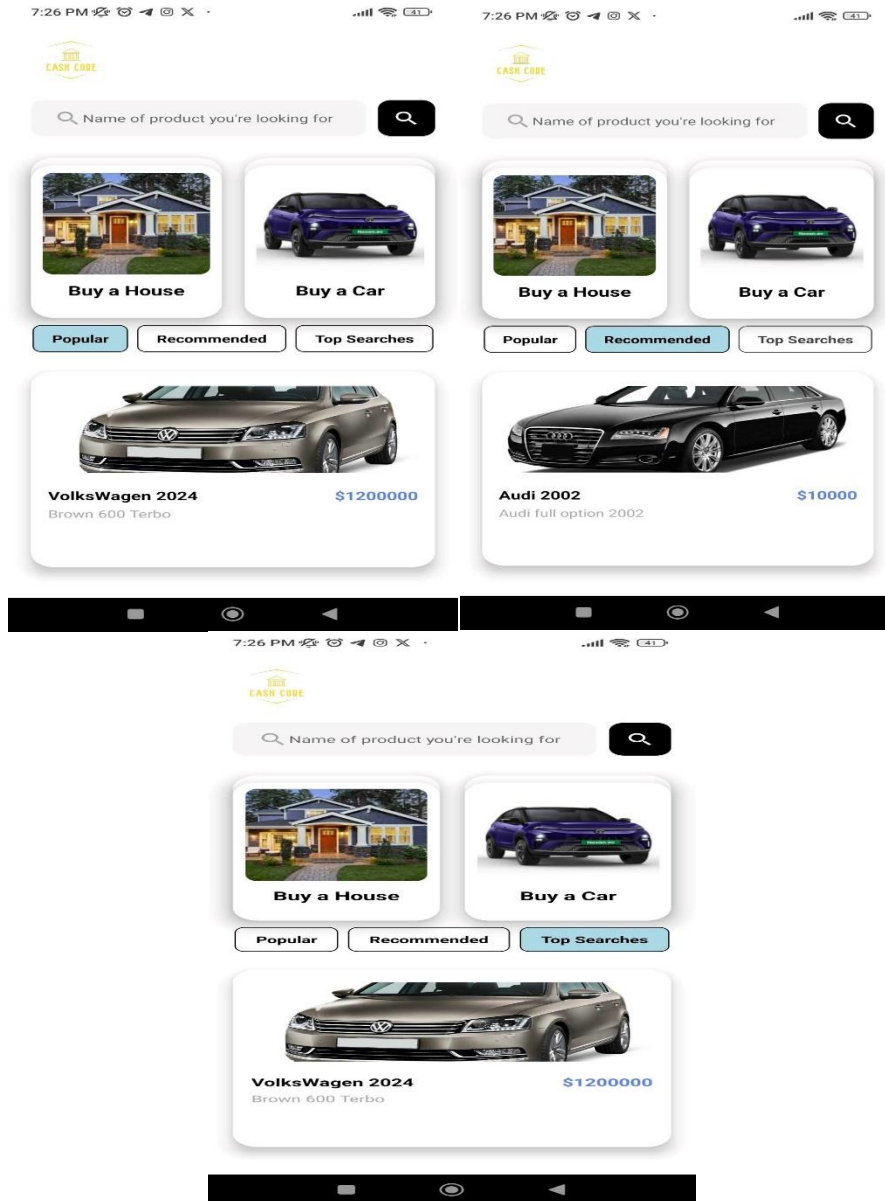


Figure 5.22 Market Buttons

### 5.1.5 Visit page

Returning to the main screen and selecting the 'Visit' option allows the user to schedule a visit to the bank as following

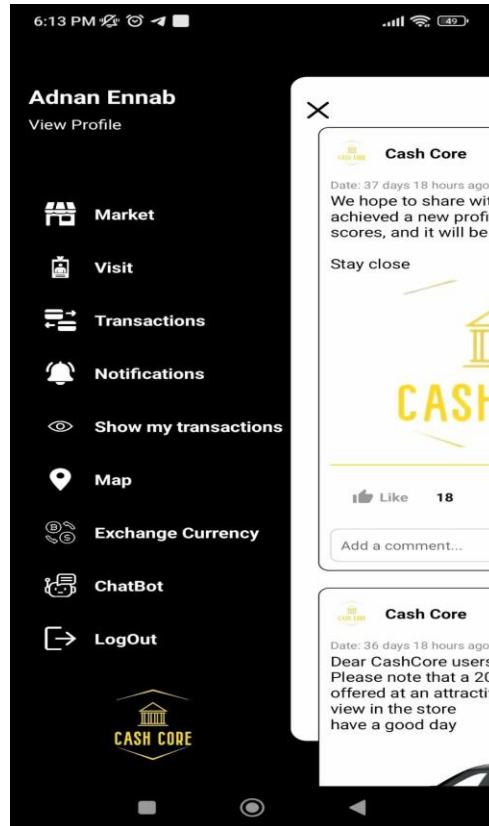


Figure 5.23 Visit Tab

When you click the Visit button, the following interface will open:

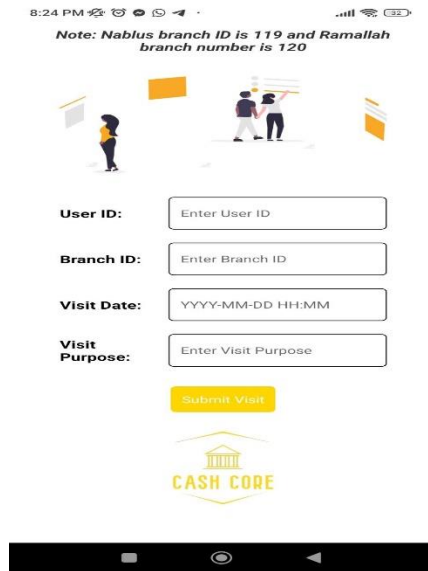


Figure 5.24 Visit Page

Anyone, not limited to specific individuals, can use this interface. For instance, a business agent could use it to schedule a visit for their manager. When booking a visit, the user enters the ID number, selects the branch, specifies the date, ensuring a minimum 20-minute gap between consecutive visits for different users. Finally, the purpose of the visit is provided as following:

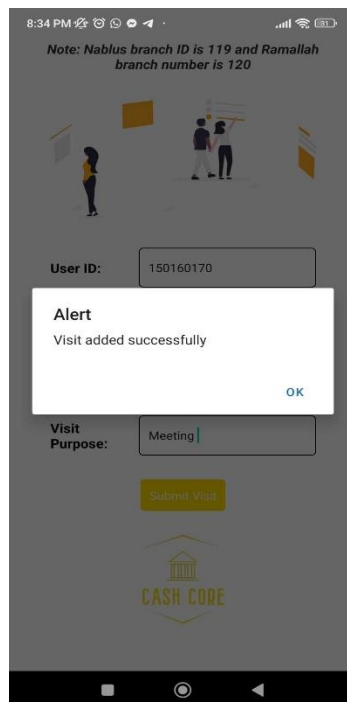


Figure 5.25 Visit Successfully

If a visit is scheduled within less than 20 minutes, an alert appears, prompting the user to schedule another visit with at least a 20-minute gap as following:

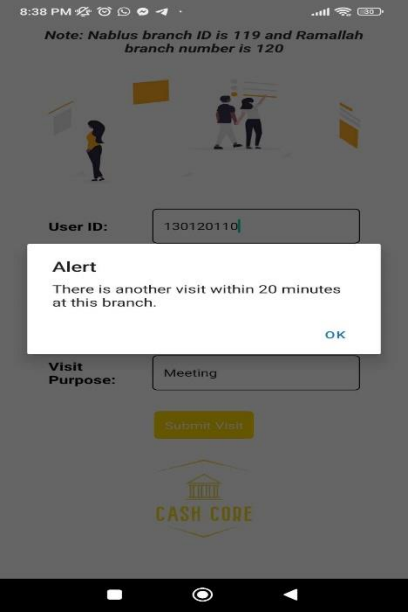


Figure 5.26 Visit Time Failed

### 5.1.6 Transaction Page

Returning to the main screen and selecting the 'Transactions' option enables the user to transfer money to another user within the system or pay bills such as water or electricity bills.

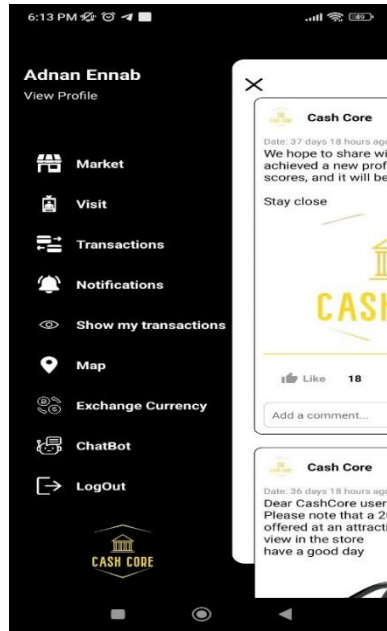


Figure 5.27 Transactions Tab

When you click the Transactions button, the following interface will open:

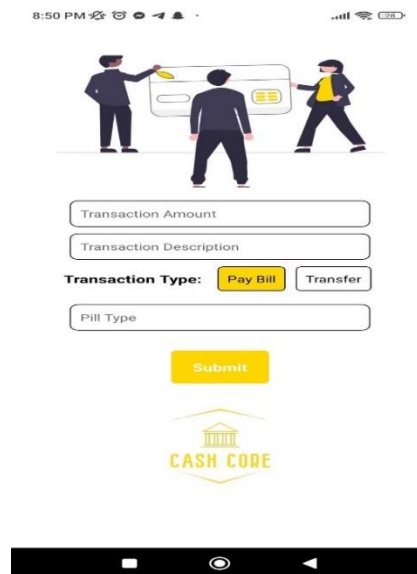


Figure 5.28 Transaction Page

Using this interface, you can easily send money to another user in the system. This makes exchanging money simple and could help you earn points for potential rewards later. When making a transfer, just enter the amount, add a brief description, choose the transfer type (to another person or bill payment), and select the recipient's account number and the result will be like this:

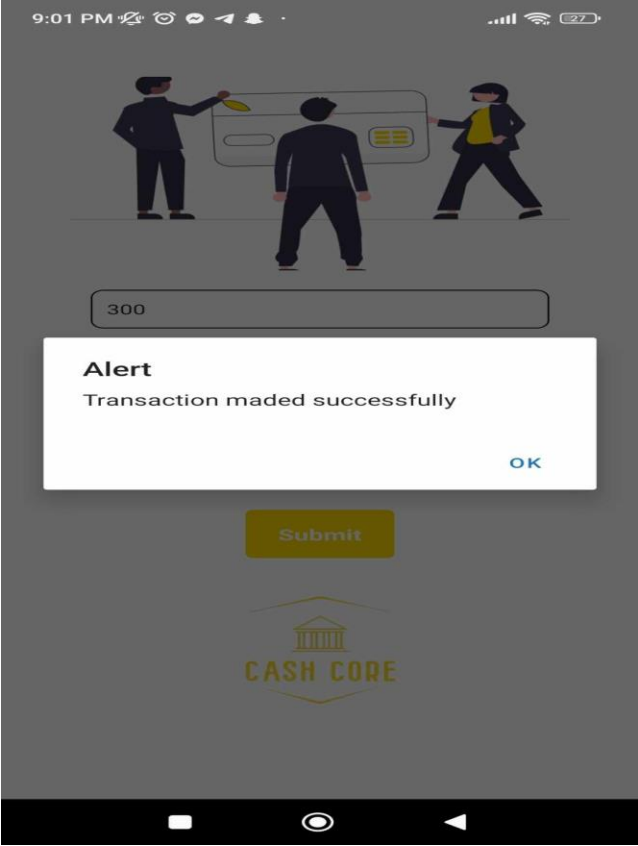


Figure 5.29 Transfer Success

For added security, an email is sent to both the sender and the recipient to confirm the transaction. The email includes complete details of the transaction as following:

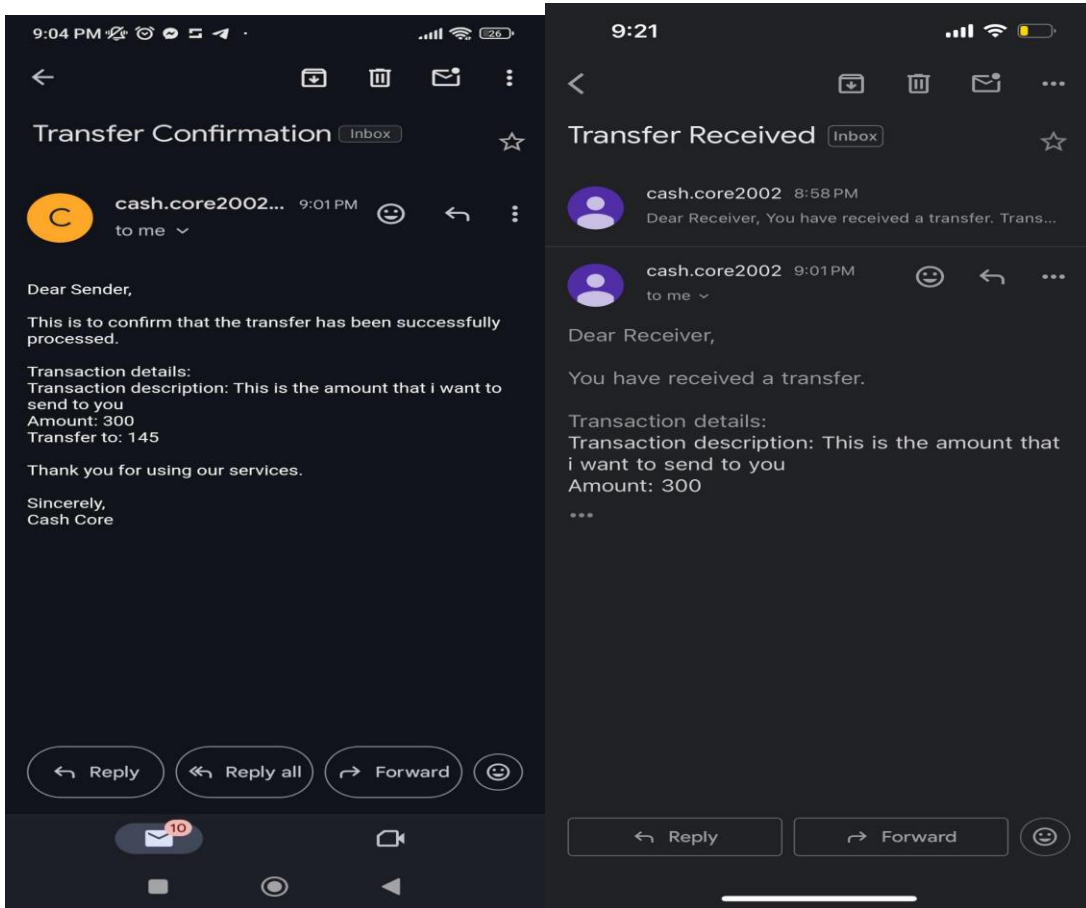


Figure 5.30 Transfer Email

Secondly, this interface can be used to pay bills. Like the previous process, you input the amount, add any additional notes related to the bill, select the transaction type as 'Bill Payment,' and finally, specify the type of bill (electricity, water, etc.). as the following:

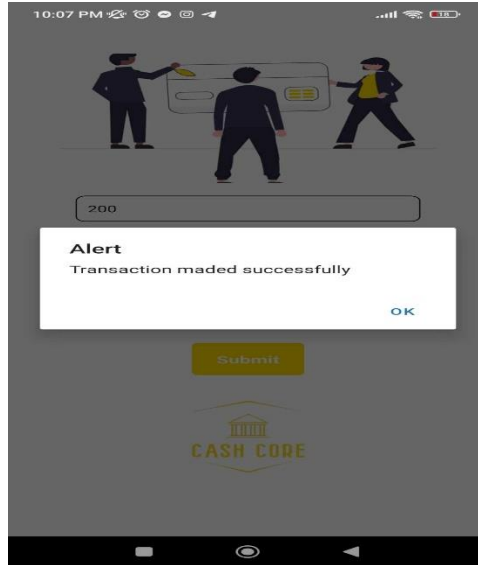


Figure 5.31 Bill Successfully

Additionally, an email is sent to the person who paid the bill for confirmation.

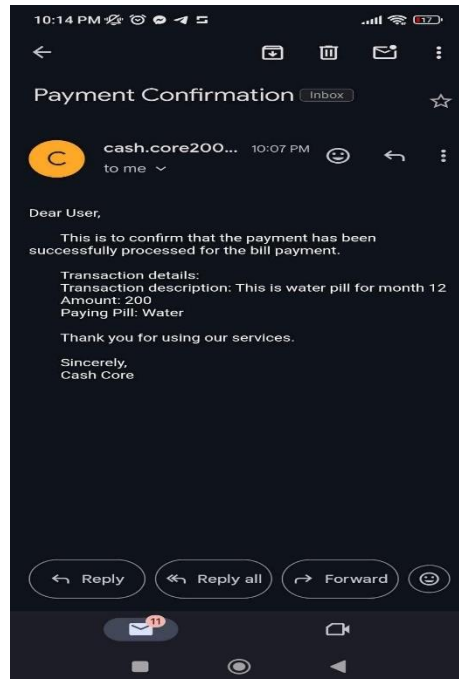


Figure 5.32 Bill Email Confirmation

### 5.1.7 Notification Interface

When returning to the main page, there is an option for notifications. Clicking on it allows the user to view all notifications received as shown:

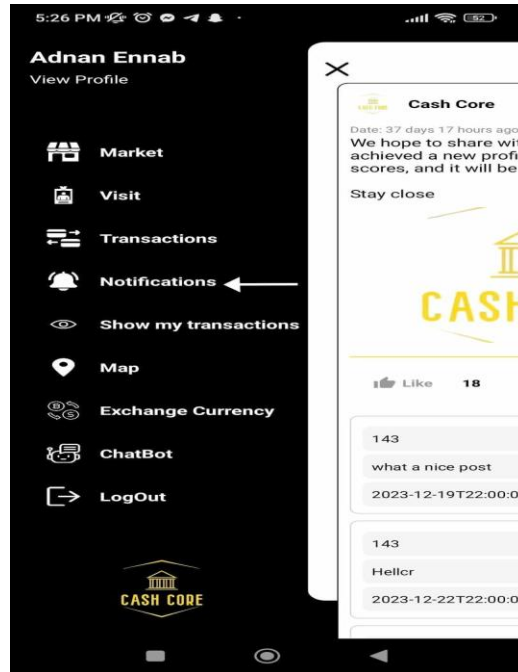


Figure 5.33 Notifications Tab

When you click on Notifications, you can see all the messages. If a message is in red, it means you have not seen it. Once you close the notifications, it is considered seen. If you open it again, the message appears in white, showing that you have already viewed it as shown:

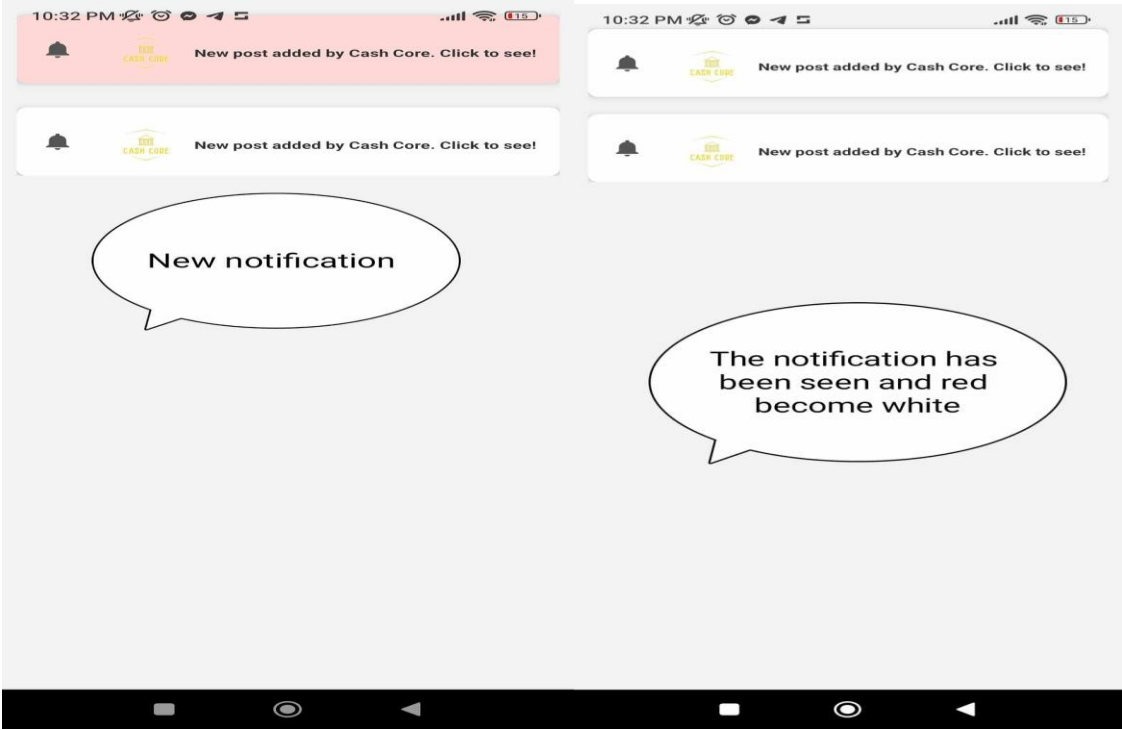


Figure 5.34 Notifications Page

You can click on a notification to enter and view the post and its contents as following:

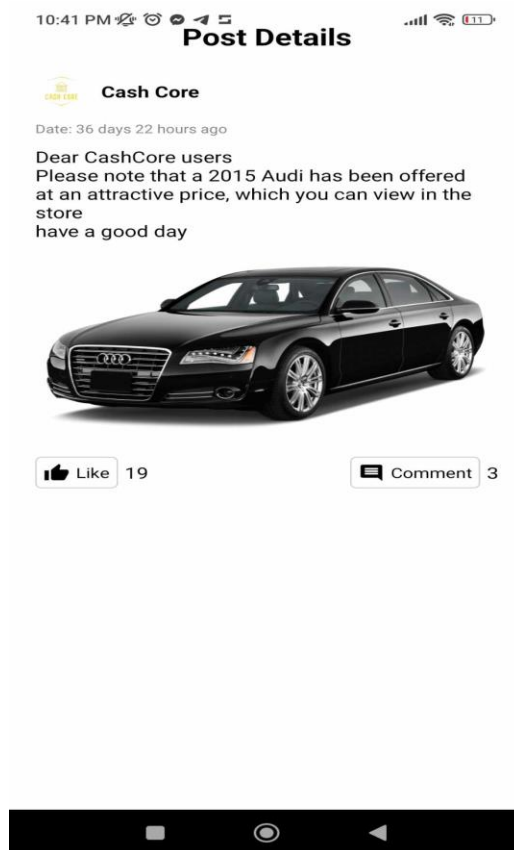


Figure 5.35 Notification Details

### 5.1.8 Show My Transaction

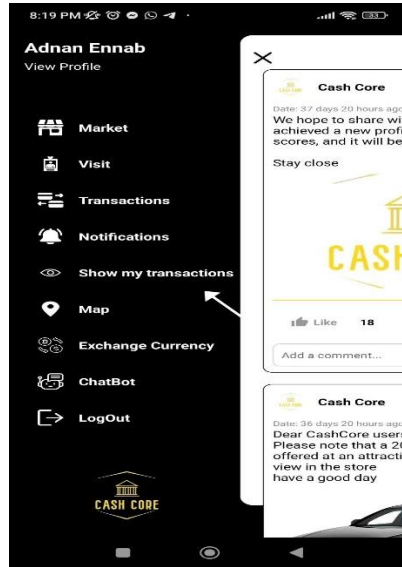


Figure 5.36 Show my Transaction Tab

When you press this button, an interface opens, allowing you to inquire about the user's transactions, their values, and whether they are bills or transfers. Simply enter the account number in the field and click on 'Fetch My Transactions' to display these transactions.

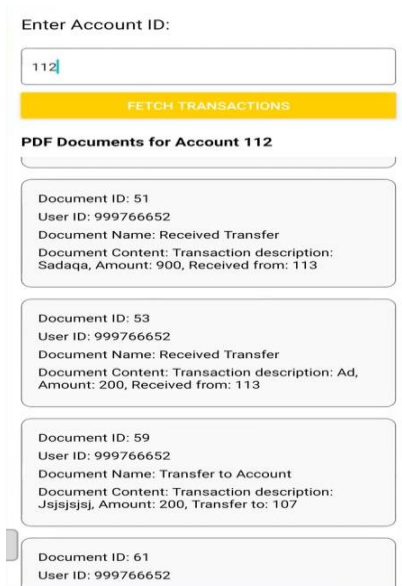


Figure 5.37 Show My Transaction Details

### 5.1.9 Map Page

When returning to the main page and clicking on the map, you can access one of the bank branches and find the route to the nearest branch from your current location.

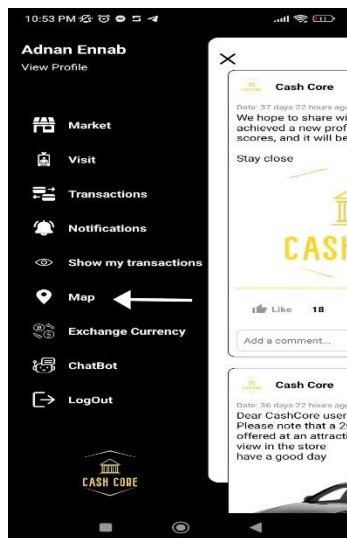


Figure 5.38 Map Tab

After that, the map interface will open, which includes three buttons. The first button is used to determine the user's current location, the second places points on the map representing the locations of banks, and the third button helps in finding the way to the nearest branch. The External API was used to do this as shown:

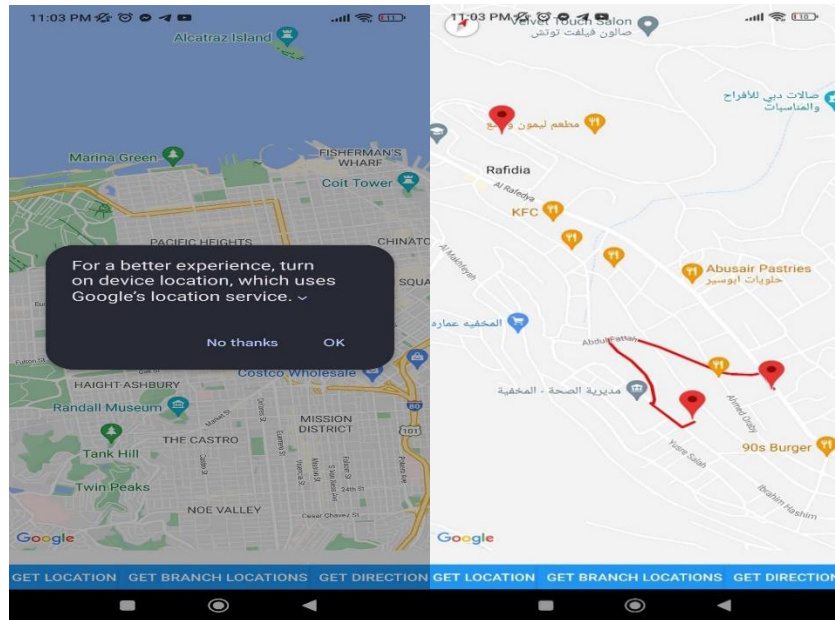


Figure 5.39 Map Page

### 5.1.10 Exchange Currency

Returning to the main page and clicking on 'Currency Exchange' opens an interface that allows currency conversion.

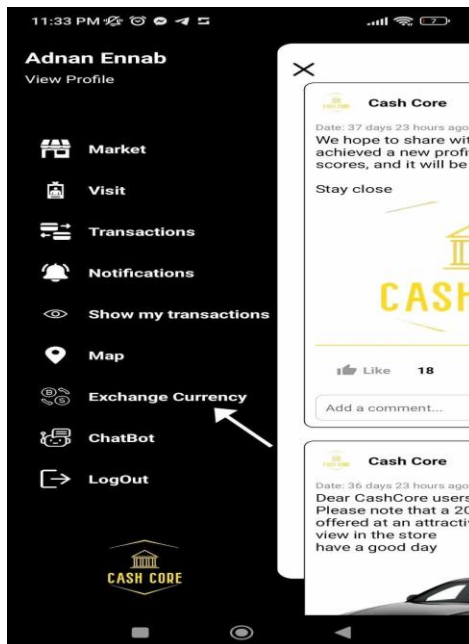


Figure 5.40 Exchange Tab

Through this interface, you can inquire about the value of the dollar and perform currency conversion from dollars to any other currency as shown:

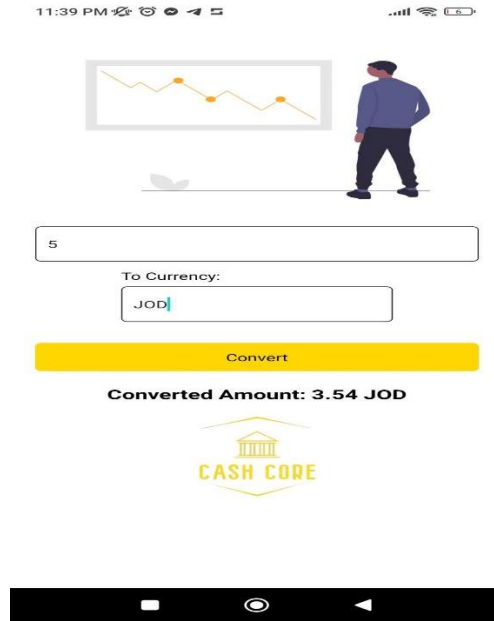


Figure 5.41 Exchange Page

### 5.1.11 View Profile

From the main page, you can also click on 'View Profile,' enabling the user to see some of their profile information.

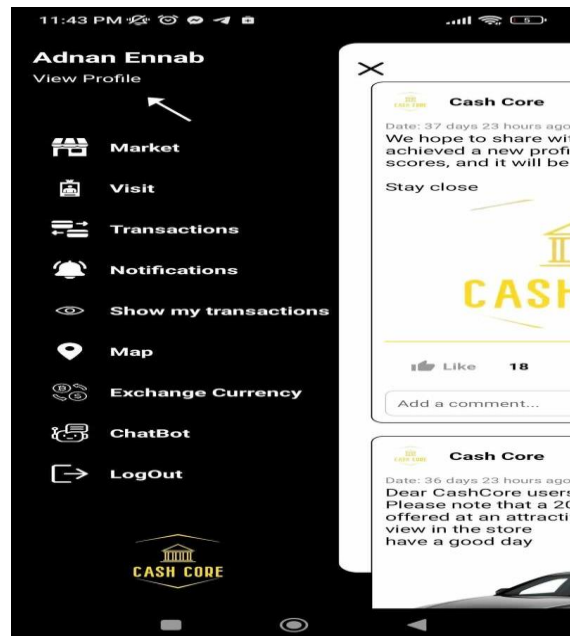


Figure 5.42 View Tab

After entering this interface, you can edit your password, email, or phone number, provided that the email is not already in use by another user as following:

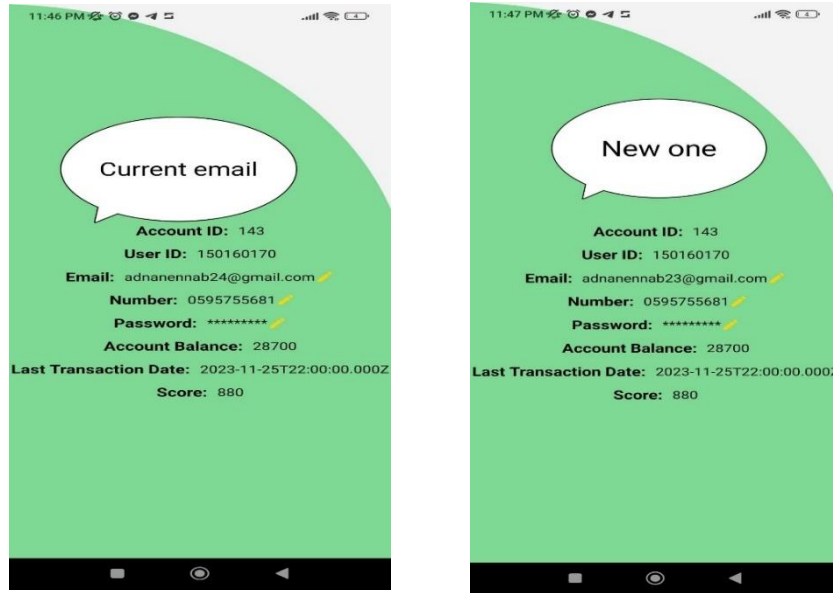


Figure 5.43 View Page

### 5.1.12 ChatBot Page

By returning to the home page and clicking on the chatbot, the user can inquire about information to obtain it quickly or submit complaints as following:

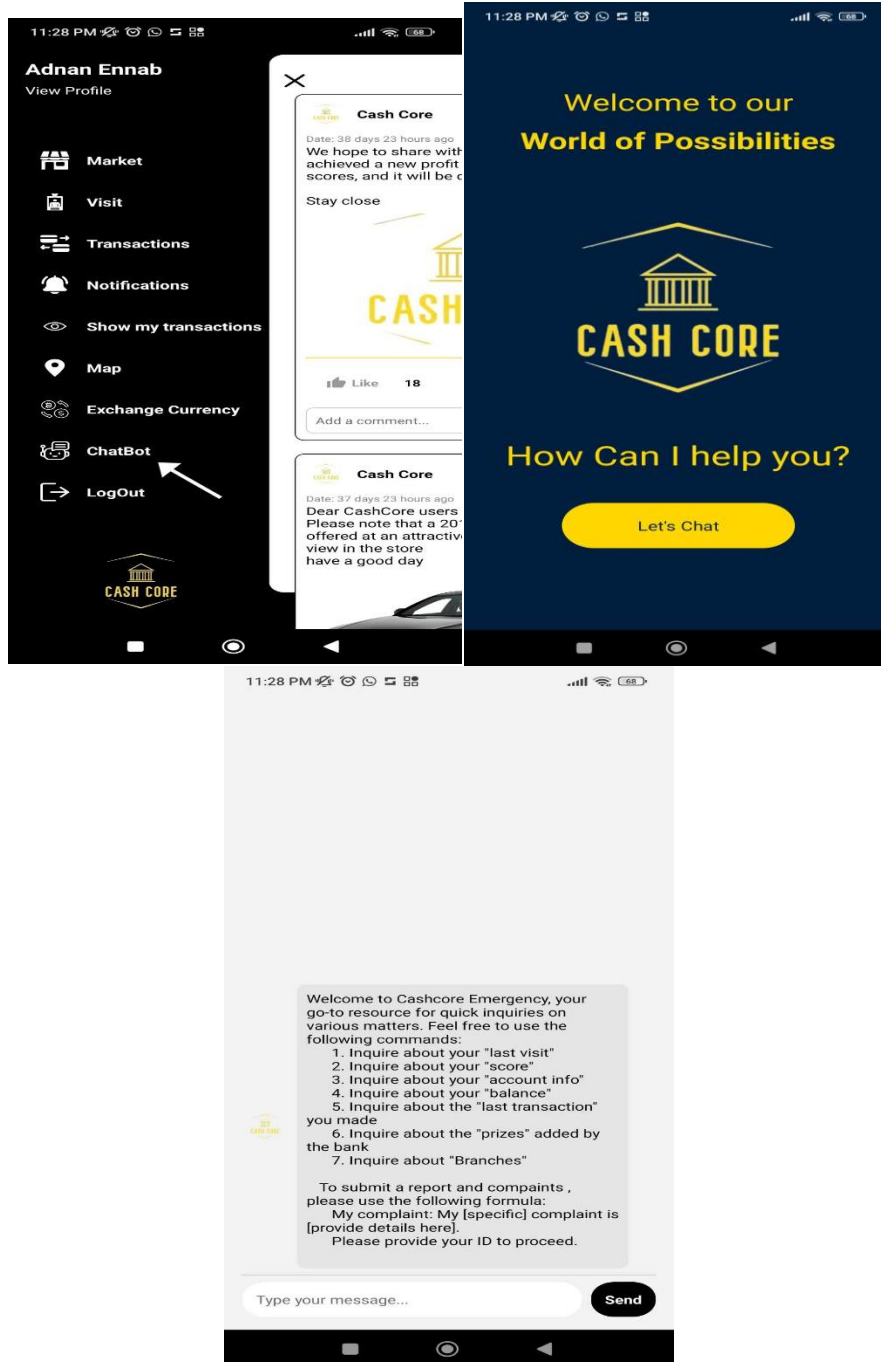


Figure 5.44 ChatBot Tab

The user interface provides a seamless experience for individuals to easily inquire about their booked visits, retrieve forgotten dates and details, check recent activities, inquire about their current grades, access their account balance, stay informed of prizes announced by the bank, and many, many more queries that emergency chat can answer. The simplified design aims to facilitate quick and easy access to basic information for users, ensuring smooth and effective

interaction with the system, as this response is automated by the system and varies from one user to another as shown below:

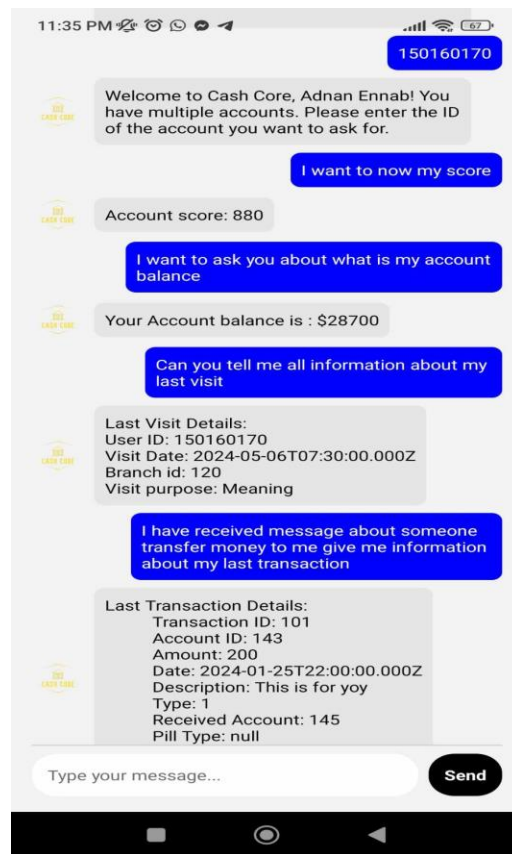


Figure 5.45 ChatBot Page

Through this emergency chat, complaints can be submitted to the bank, which are displayed to the employees so that they can see them and see the percentage of complaints about each topic in order to work on fixing the faults and maintaining communication between them and the users, which is as follows:

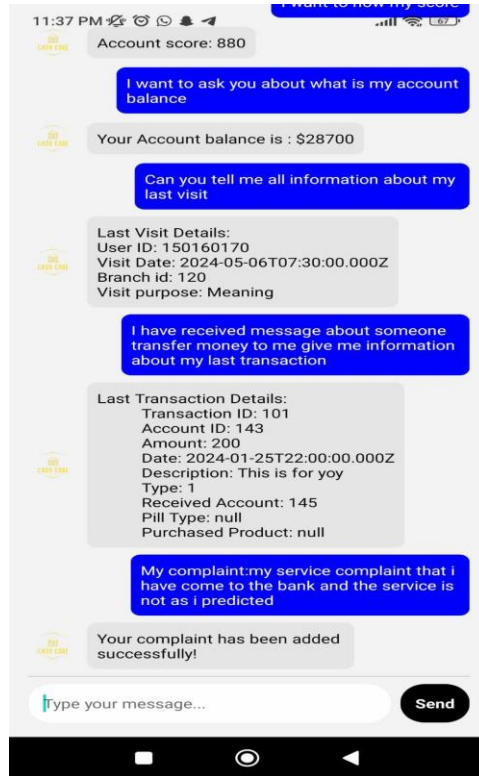


Figure 5.46 ChatBot Complaint

### 5.1.13 Logout Tab

When pressed on the main page, the 'Logout' button logs out of the account and returns to the login interface as following:

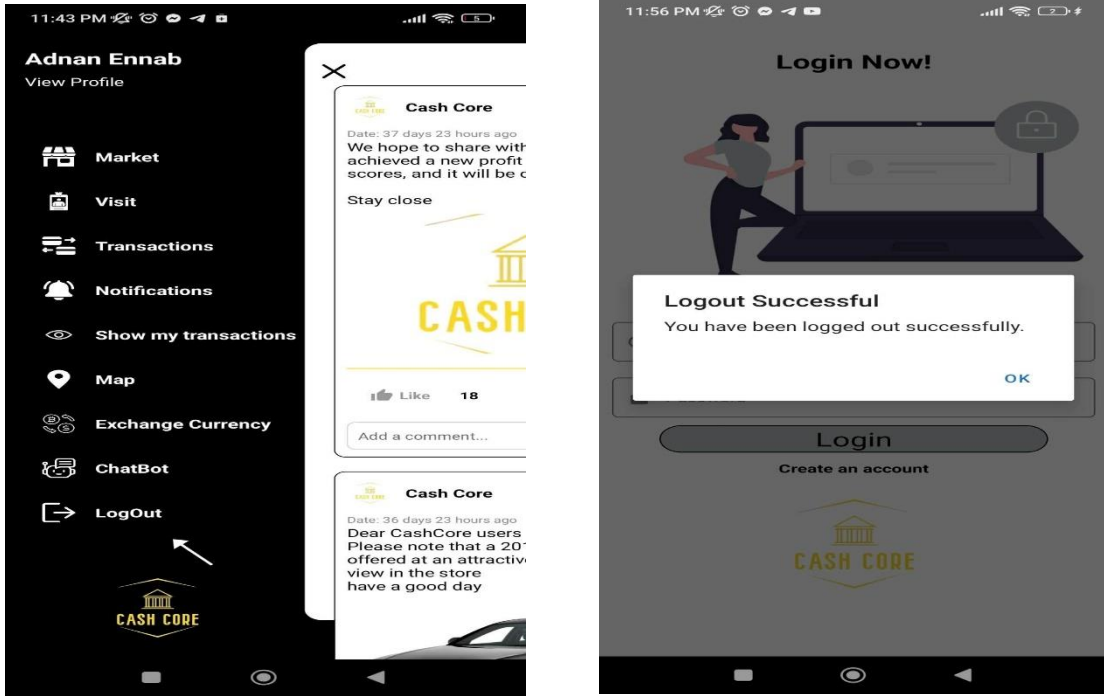


Figure 5.47 Logout Tab

## 5.2.1 Employee Login and Sign-Up Page

The login page contains two input fields for entering your email and password, as well as an input field "Log in" button. It is worth noting that each user of the system has a unique email. When the employee logs in, an email is sent to him confirming the success of the login process as a form of security notification, in case The employee does not have an account, he can click the "Sign up" button to go to the account creation page.

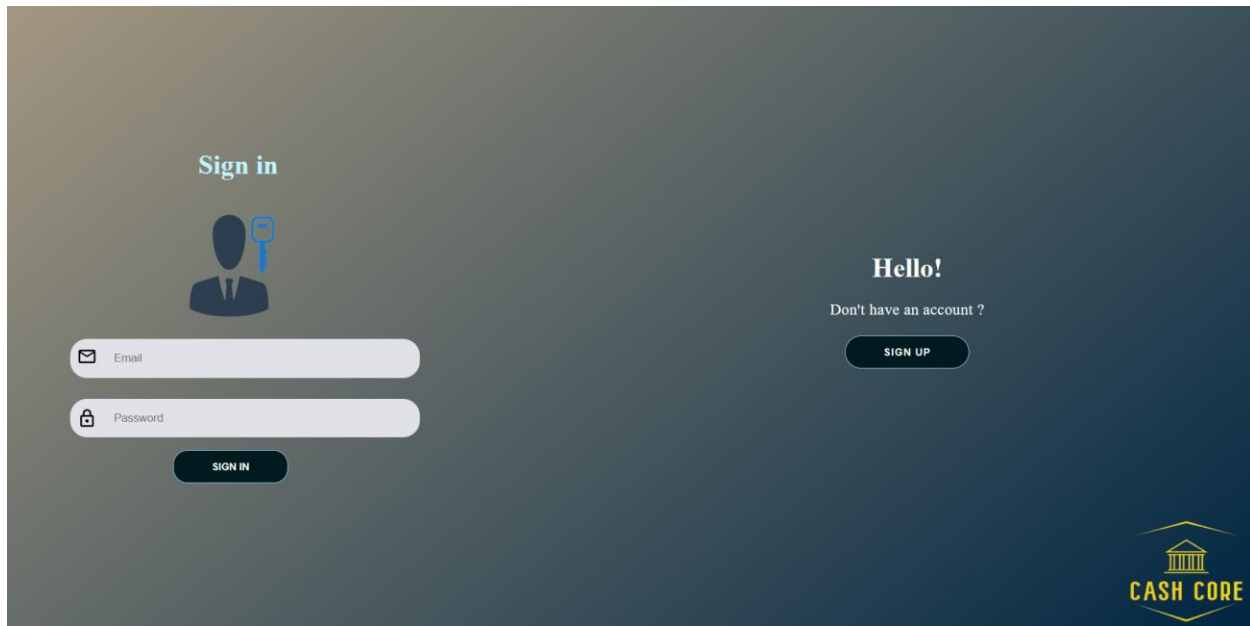


Figure 5.48 Employee Login

The employee can go to the registration page when he is appointed as an employee in the bank and has not registered in the system before. they You need to enter your ID number, name, email, password, and phone number. When you click "Register". They will be successfully registered in

the system, provided that the email is unique and the password is strong. It is worth noting that all fields are required. In addition to. The page also contains a “Sign In” button for employees who already have an existing account.

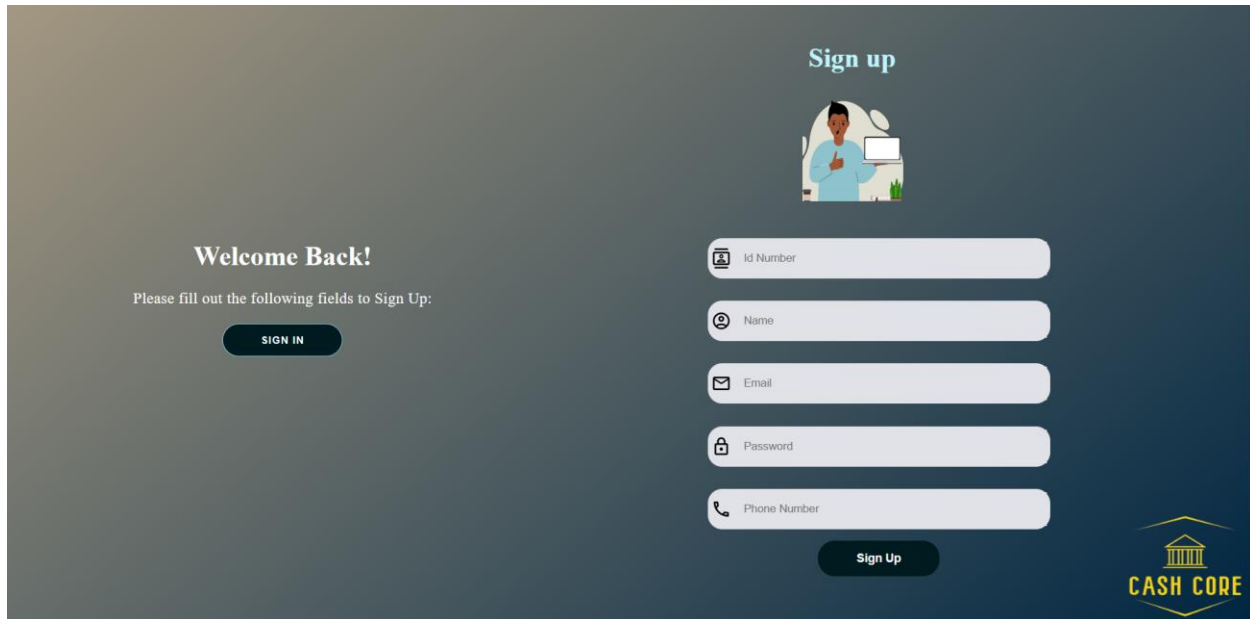


Figure 5.49 Sign Up Page

After logging in, the account holder may be either an employee or a supervisor. Of course, the Supervisor has more powers than the employee.

## 5.2.2 Supervisor

He has the highest authority in the bank. He can view his personal file and employment statistics in the bank by year, view and delete all information related to the bank's accounts, and schedule visits according to specific dates. He can also view all the bank's advertisements, including the employee who posted this advertisement. He can also publish products that users can purchase through the bank. He can also communicate with other employees or with a specific employee. He can view the movements of a specific account and deposit or withdraw from it when an employee visits the branch. It can also view all customer complaints and calculate their percentage. It can also add prize draws. It can see the locations of branches on the map, and it can also see and print the invoices for each customer.

### 5.2.2.1 Main Page in Supervisor Account

On this page, the supervisor can see the percentage of employees appointed by the bank by year. He can access this page through the option (statistics) from the sidebar.

From the navbar, there is a welcome message with the employee's name, or through it, he can log out of his account.

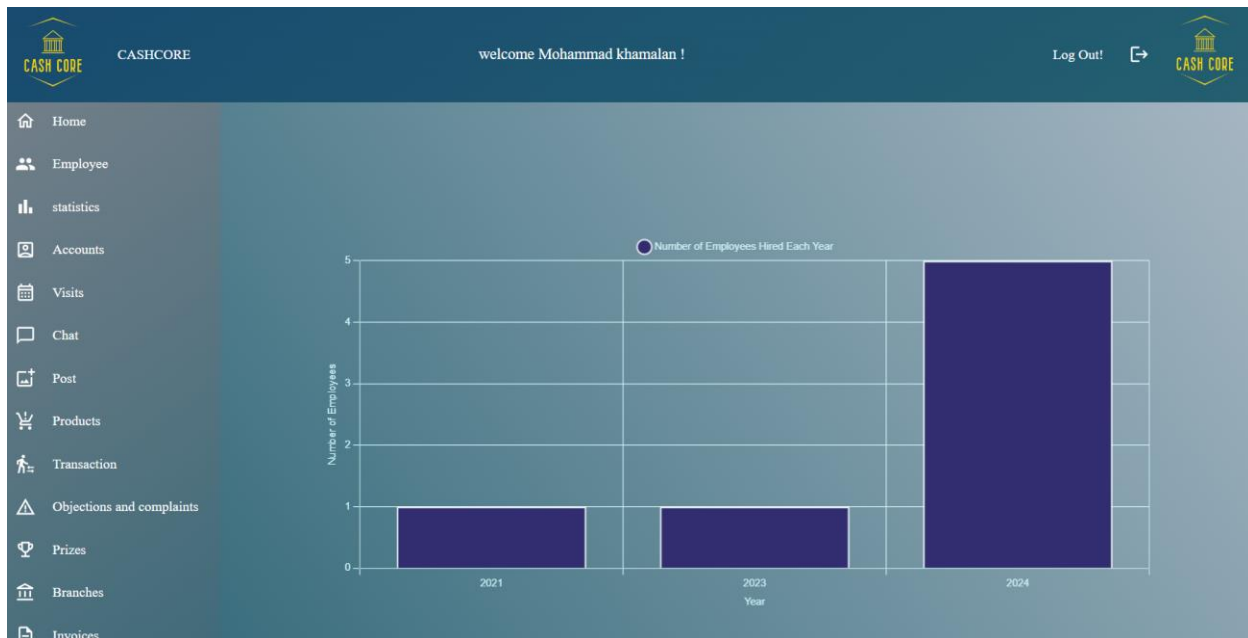


Figure 5.50 Statistics Page

After an employee or supervisor logs in, this email is sent to their personal email address to inform them that there has been a login to their account at this time.

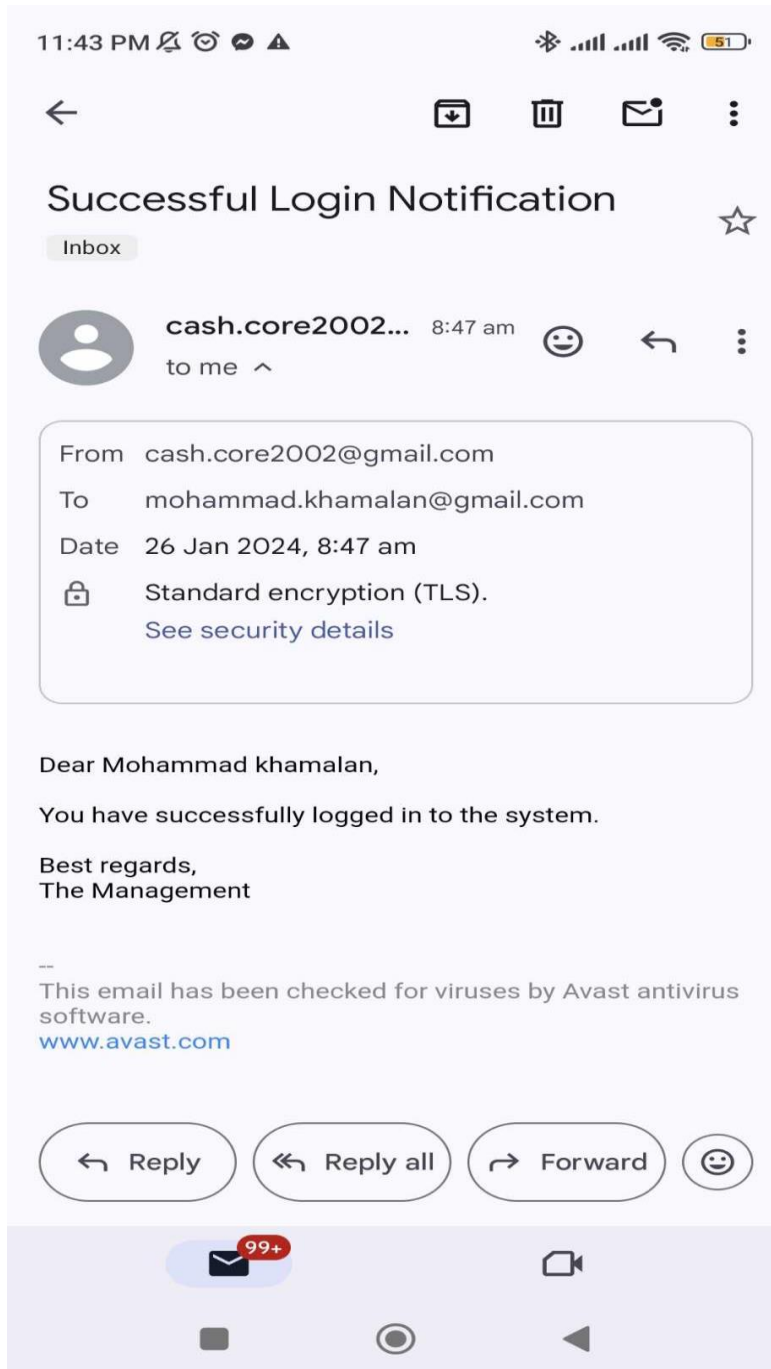


Figure 5.51 Employee Login Email

### 5.2.3 Home Page

Through this page, the employee can view their account information including the identity number, name, phone number, email, and password, and they can also edit this information.

He can access this page through the option (Home) from the sidebar.

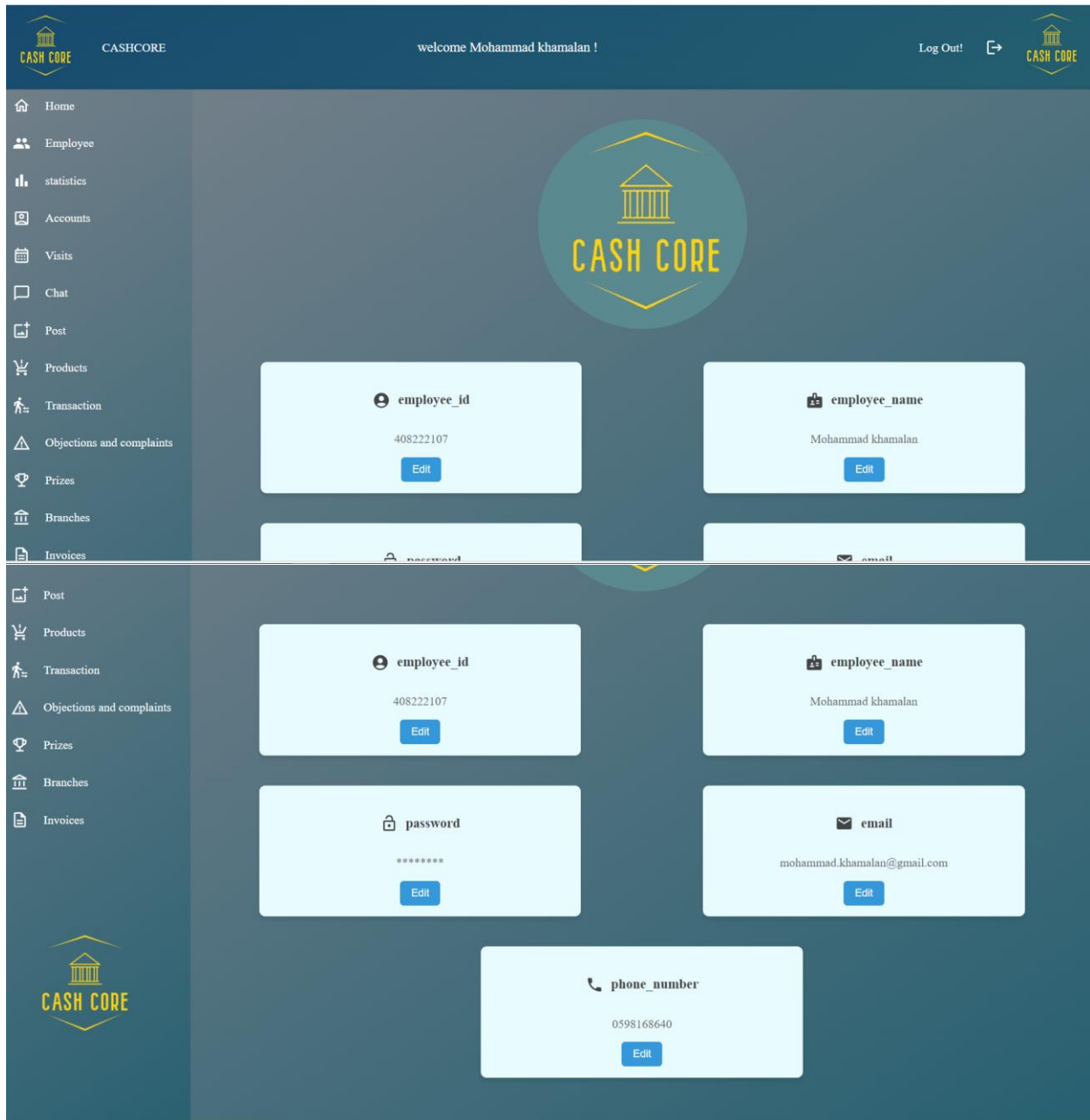


Figure 5.52 Main Page

## 5.2.4 Employee Page

Through this page, the supervisor can view all employees assigned to the bank and their information, or delete them if they leave the bank or resign.

He can access this page through the option (Employee) from the sidebar.

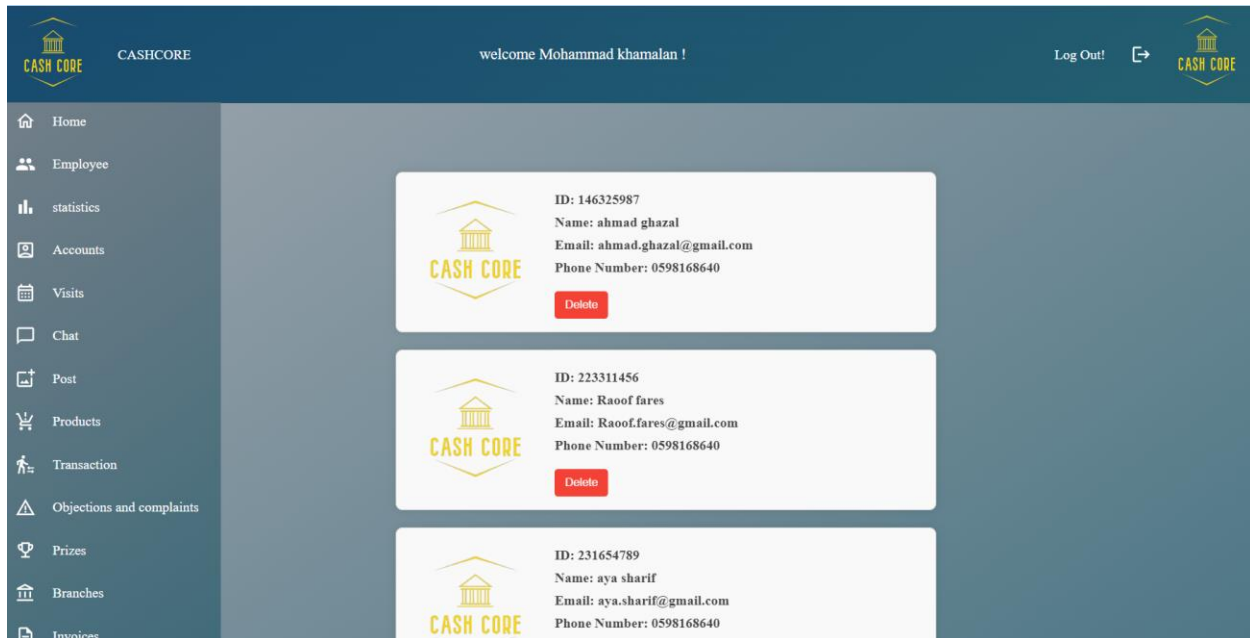
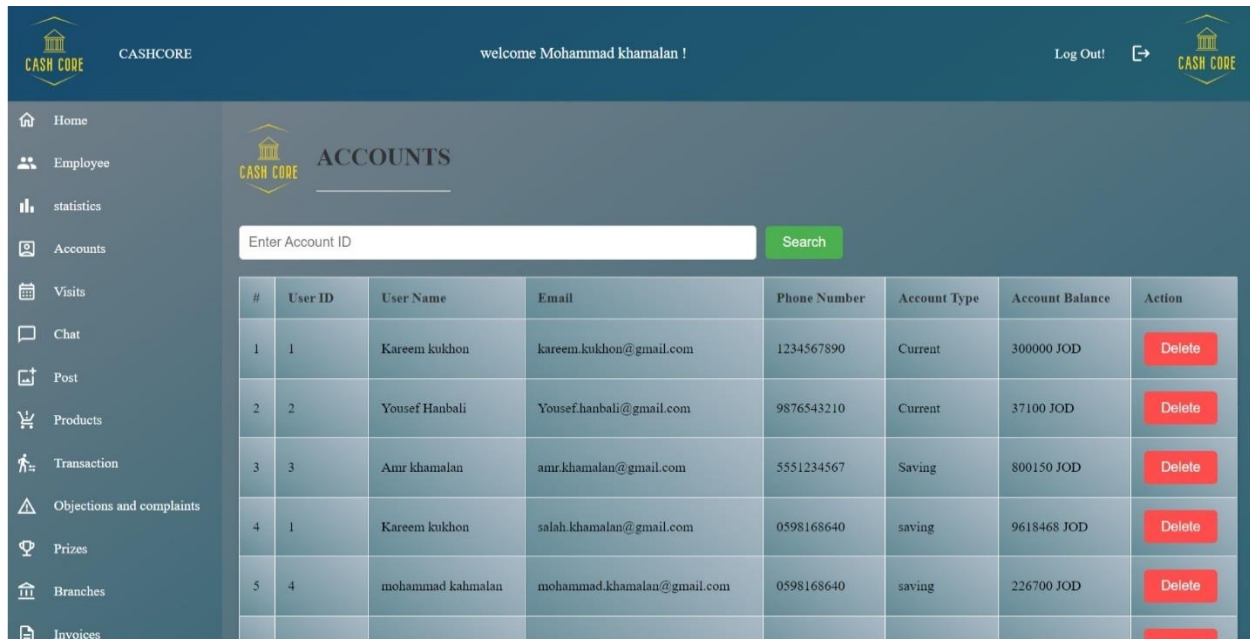


Figure 5.53 Employee's Page

## 5.2.5 Accounts

Through this page, the employee can view all accounts and search for a specific account number, and they can also delete an account from here.



#	User ID	User Name	Email	Phone Number	Account Type	Account Balance	Action
1	1	Kareem kukhon	kareem.kukhon@gmail.com	1234567890	Current	300000 JOD	Delete
2	2	Yousef Hanbali	Yousef.hanbali@gmail.com	9876543210	Current	37100 JOD	Delete
3	3	Amr khamalan	amr.khamalan@gmail.com	5551234567	Saving	800150 JOD	Delete
4	1	Kareem kukhon	salih.khamalan@gmail.com	0598168640	saving	9618468 JOD	Delete
5	4	mohammad khamalan	mohammad.khamalan@gmail.com	0598168640	saving	226700 JOD	Delete

Figure 5.54 Accounts Page

## 5.2.6 Visits

The employee can view all visit dates and, in any branch, booked by the customer through this page and filter them according to a specific date. Once the visit is complete, they can delete it using the Mark Done button.

The screenshot displays the 'All Visits' page within the CASH CORE application. The page features a dark blue header with the CASH CORE logo on the left, the text 'CASHCORE' in the center, and a welcome message 'welcome Mohammad khamalan !' on the right. A 'Log Out!' button is also present. A sidebar on the left contains navigation icons for Home, Employee, statistics, Accounts, Visits, Chat, Post, Products, Transaction, Objections and complaints, Prizes, Branches, and Invoices. The main content area is titled 'All Visits' and includes a date filter 'mm/dd/yyyy'. Below the filter is a table with the following data:

Visit Count	User ID	User Name	User Email	Branch Name	Visit Date	Visit Purpose	Action
1	2	Yousef Hanbali	Yousef.hanbali@gmail.com	Ein sarah branch	2023-12-17T09:08:30.000Z	Asking	Mark as Done
2	3	Amr khamalan	amr.khamalan@gmail.com	Quds branch	2023-12-17T09:49:51.000Z	Asking	Mark as Done
3	999766652	samer hanbali	adnanennab24@gmail.com	Ein sarah branch	2024-01-30T06:30:00.000Z	Asking	Mark as Done
4	1	Kareem kukhon	kareem.kukhon@gmail.com	Ein sarah branch	2024-01-30T06:50:40.000Z	Asking	Mark as Done

Figure 5.55 Visits Page

## 5.2.7 Chat

Through this page, an employee can create a new conversation and add the employees they want to talk to. They can communicate for work purposes or for leisure, or send files. The employee who created this conversation can also delete the conversation.

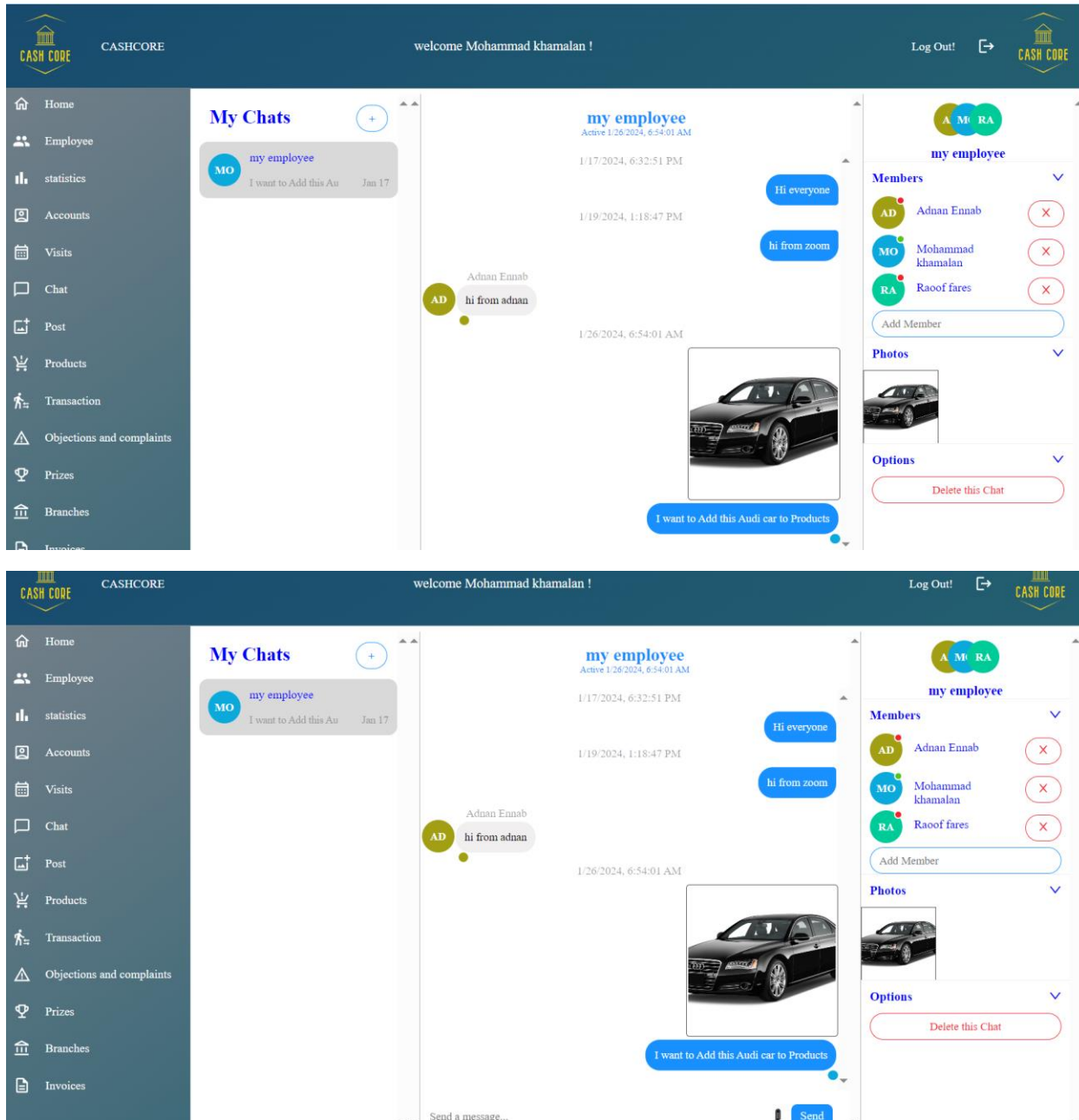


Figure 5.56 Chat Page

## 5.2.8 Posts Page

Through this page, the employee can post an announcement about a draw or any bank-specific announcement that they want to inform the customers about.

This page can be accessed through the 'post' option from the sidebar.

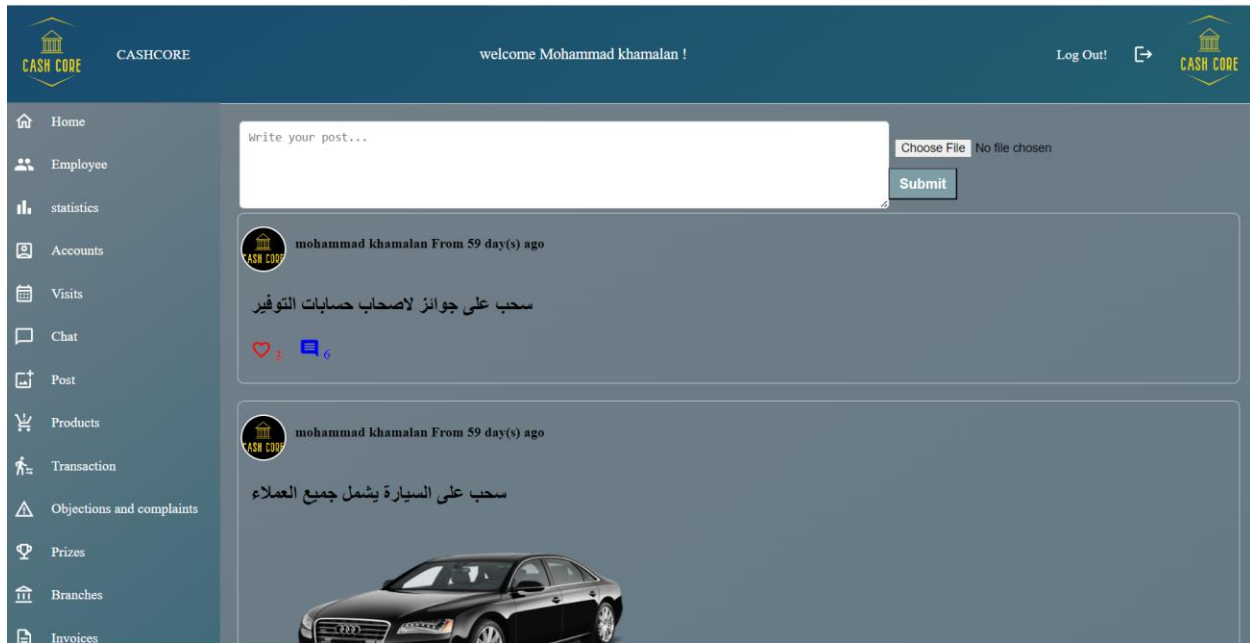


Figure 5.57 Posts Page

In addition, it is possible to see customer comments or the number of likes the announcement received from customers who engaged with it through the mobile application, as shown in the image below:

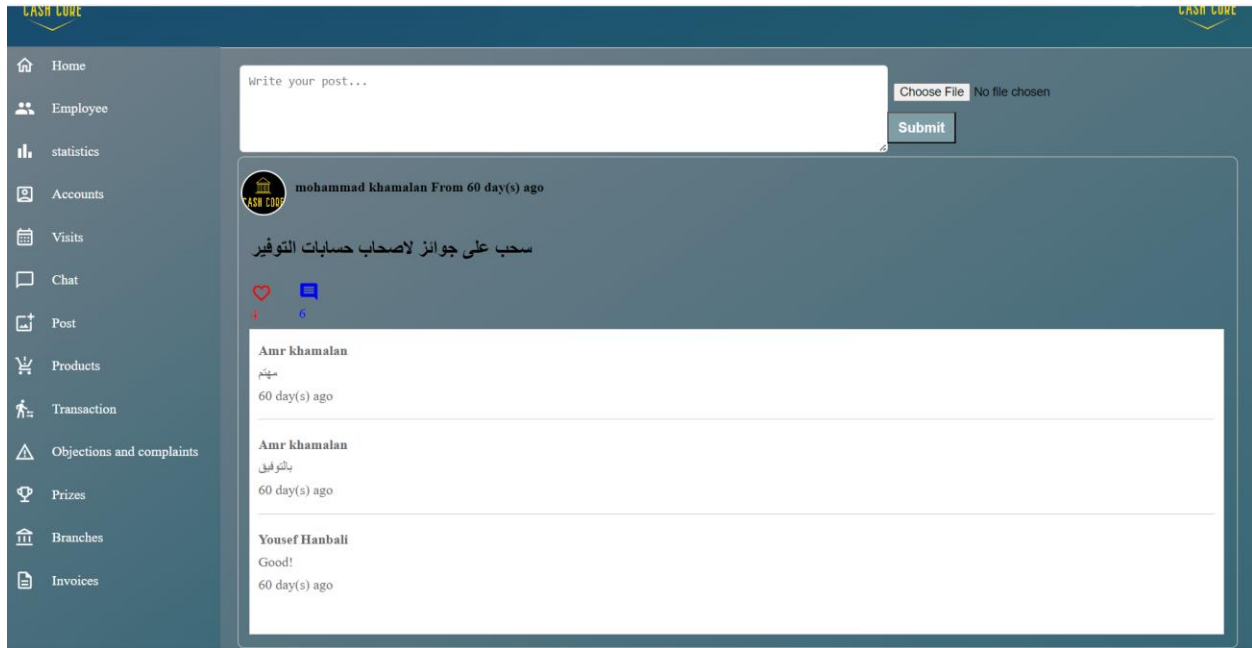


Figure 5.58 Employees Comments Page

## Products page

Through this page, the employee can publish any product that the bank wants to offer to customers if they wish to purchase it. This includes the product's price, category, description, and an image of the product. The employee can also view all the products that the bank has published. This page can be accessed through the 'product' option in the sidebar.

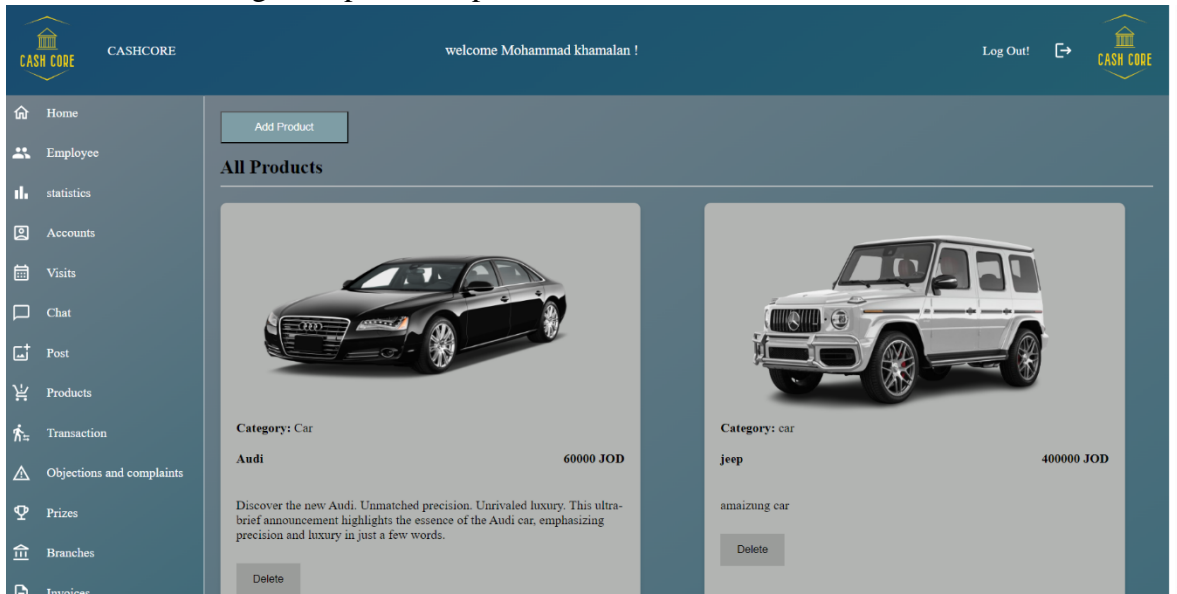


Figure 5.59 Products Page

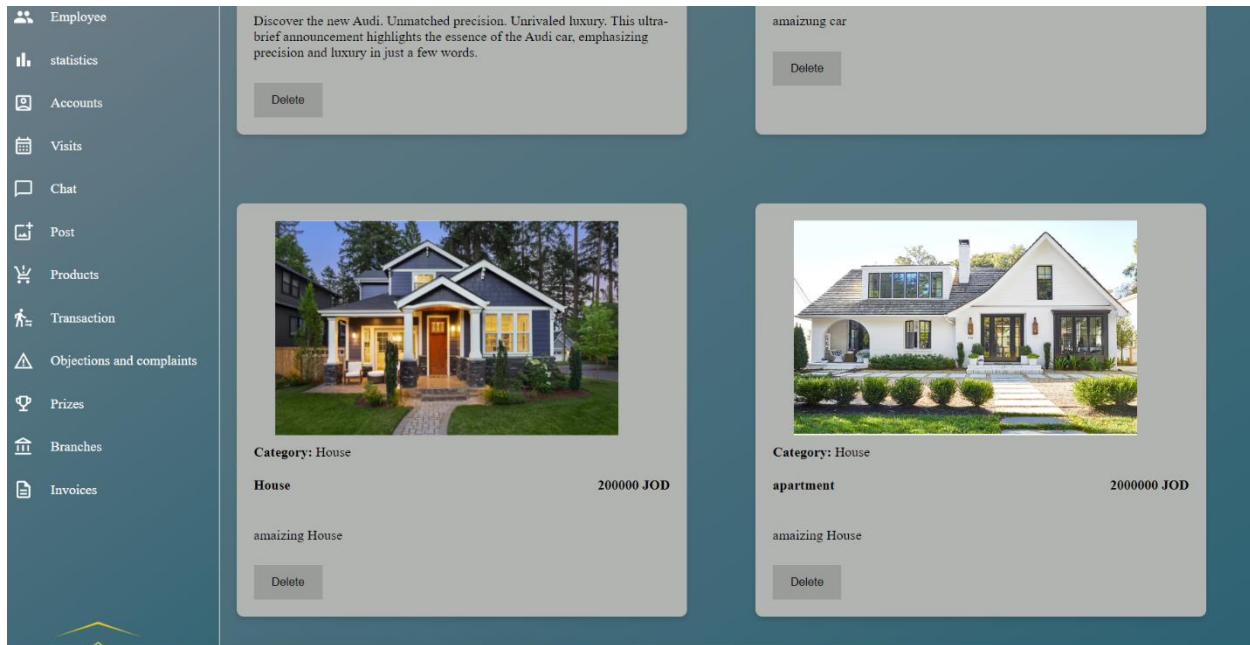


Figure 5.60 Products Page

In case of adding a product, the employee can publish this product by clicking on the 'Add Product' button and filling in the product information including the product image, its price, name, category, and description.

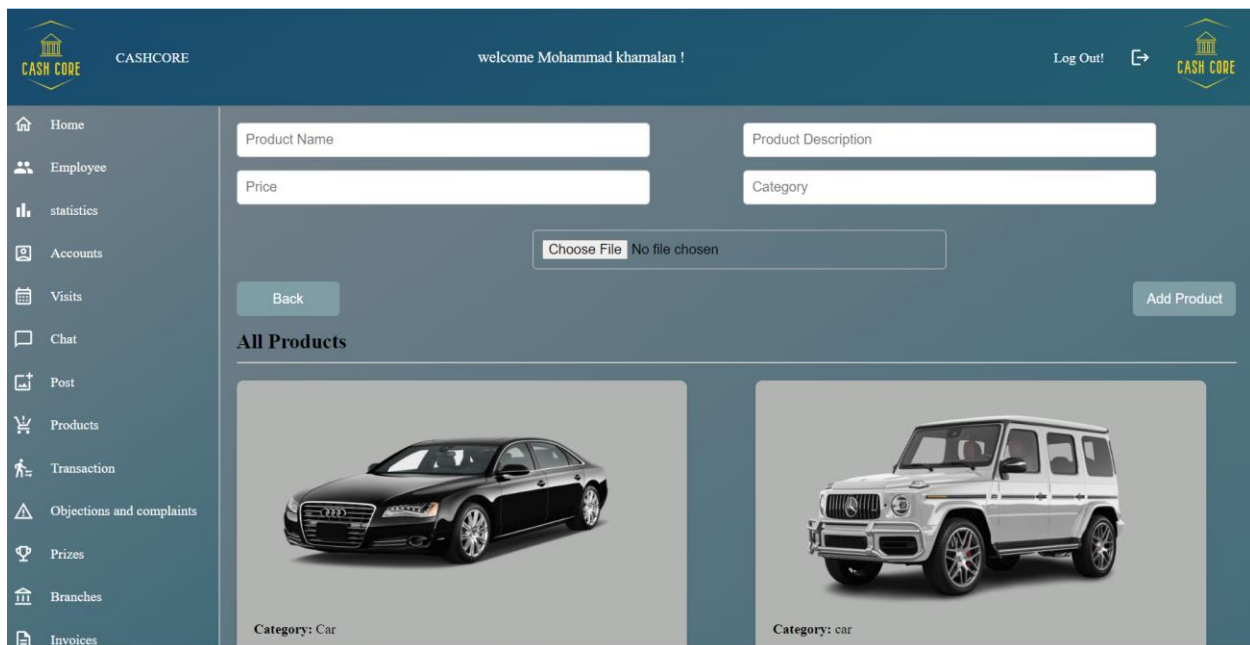


Figure 5.61 Products Page

## 5.2.9 Transaction

Through this page, the employee can search for a specific customer's account by entering the account number and see the transactions made on the account, including withdrawals or deposits of money in the balance.

The screenshot displays the 'Account Transaction' page in the CASHCORE system. The page header includes the CASHCORE logo, the user name 'welcome Mohammad khamalan!', and a 'Log Out!' button. A sidebar on the left contains navigation options: Home, Employee, statistics, Accounts, Visits, Chat, Post, Products, Transaction, Objections and complaints, Prizes, Branches, and Invoices.

The main content area is titled 'Account Transaction' and features a search bar labeled 'Enter Account ID' with a 'Search Account' button. Below the search bar, there are three instructional text boxes:

- By entering an Account ID, you can view all interactions related to this account in the table below.
- when enter account id and click to search it , the information about this account is render, The Deposit button allows you to perform a deposit transaction for the selected account.
- when enter account id and click to search it , the information about this account is render, The Withdraw button enables you to execute a withdrawal transaction for the chosen account.

The second screenshot shows the same page after a search for account ID '106'. The search bar contains '106' and the 'Search Account' button is highlighted. Below the search bar, a table displays the transaction history for account 106:

Interaction ID	User ID	Account ID	Interaction Date	Interaction Type	Amount
7	1	106	2023-12-28T22:00:00.000Z	Withdrawal	100050 \$
8	1	106	2023-12-28T22:00:00.000Z	Withdrawal	100050 \$
9	1	106	2023-12-28T22:00:00.000Z	Withdrawal	100050 \$
10	1	106	2023-12-28T22:00:00.000Z	Deposit	12350 \$
75	1	106	2023-12-29T22:00:00.000Z	Deposit	20000 \$
80	1	106	2023-12-29T22:00:00.000Z	Deposit	55555 \$
81	1	106	2023-12-29T22:00:00.000Z	Deposit	6666 \$
82	1	106	2023-12-29T22:00:00.000Z	Deposit	40 \$
83	1	106	2023-12-29T22:00:00.000Z	Withdrawal	40 \$
86	1	106	2023-12-29T22:00:00.000Z	Deposit	223434 \$

Figure 5.62 Employees Transactions Page

If a customer comes to the branch to withdraw or deposit money, this is done by the employee by pressing the search button and entering the amount of money that the customer wishes to withdraw or deposit, so that his balance is updated immediately.

The screenshot displays a banking application interface. On the left is a dark blue sidebar with navigation icons and labels: 'Transaction', 'Objections and complaints', 'Prizes', 'Branches', and 'Invoices'. Below these is the 'CASH CORE' logo. The main area features a table of transactions and a summary panel at the bottom.

86	1	106	2023-12-29T22:00:00.000Z	Deposit	223434 \$
87	1	106	2023-12-29T22:00:00.000Z	Withdrawal	223434 \$
88	1	106	2023-12-29T22:00:00.000Z	Withdrawal	223434 \$
91	1	106	2023-12-30T22:00:00.000Z	Deposit	20 \$
92	1	106	2023-12-30T22:00:00.000Z	Deposit	20 \$
93	1	106	2023-12-30T22:00:00.000Z	Withdrawal	20 \$
97	1	106	2024-01-02T22:00:00.000Z	Deposit	2222 \$
98	1	106	2024-01-04T22:00:00.000Z	Deposit	11111 \$
99	1	106	2024-01-04T22:00:00.000Z	Withdrawal	11111 \$
100	1	106	2024-01-19T22:00:00.000Z	Deposit	18181991 \$
101	1	106	2024-01-19T22:00:00.000Z	Withdrawal	18181991 \$

Account ID: 106  
 Email: salah.khamalan@gmail.com  
 Phone Number: 0598168640  
 Account Balance: 9618468  
 Birthdate: 9/1/2002

Enter Amount  Close Withdraw Deposit

Figure 5.63 Deposit – Withdrawal Page

### 5.2.10 Objections

Through this page, the supervisor can view the objections and complaints submitted by customers, the time of this complaint, and which account made that complaint via the mobile application, and know the percentage of each complaint out of the total complaints.

This page can be accessed through the “Objections and complaints” option in the sidebar.



Figure 5.64 Objections Page

### 5.2.11 Prizes

Through this page, the supervisor can conduct a draw for valuable prizes, with the winner being chosen by a random draw. The draw is held among the top three accounts with the highest scores, and then a random person is selected to win the prize.

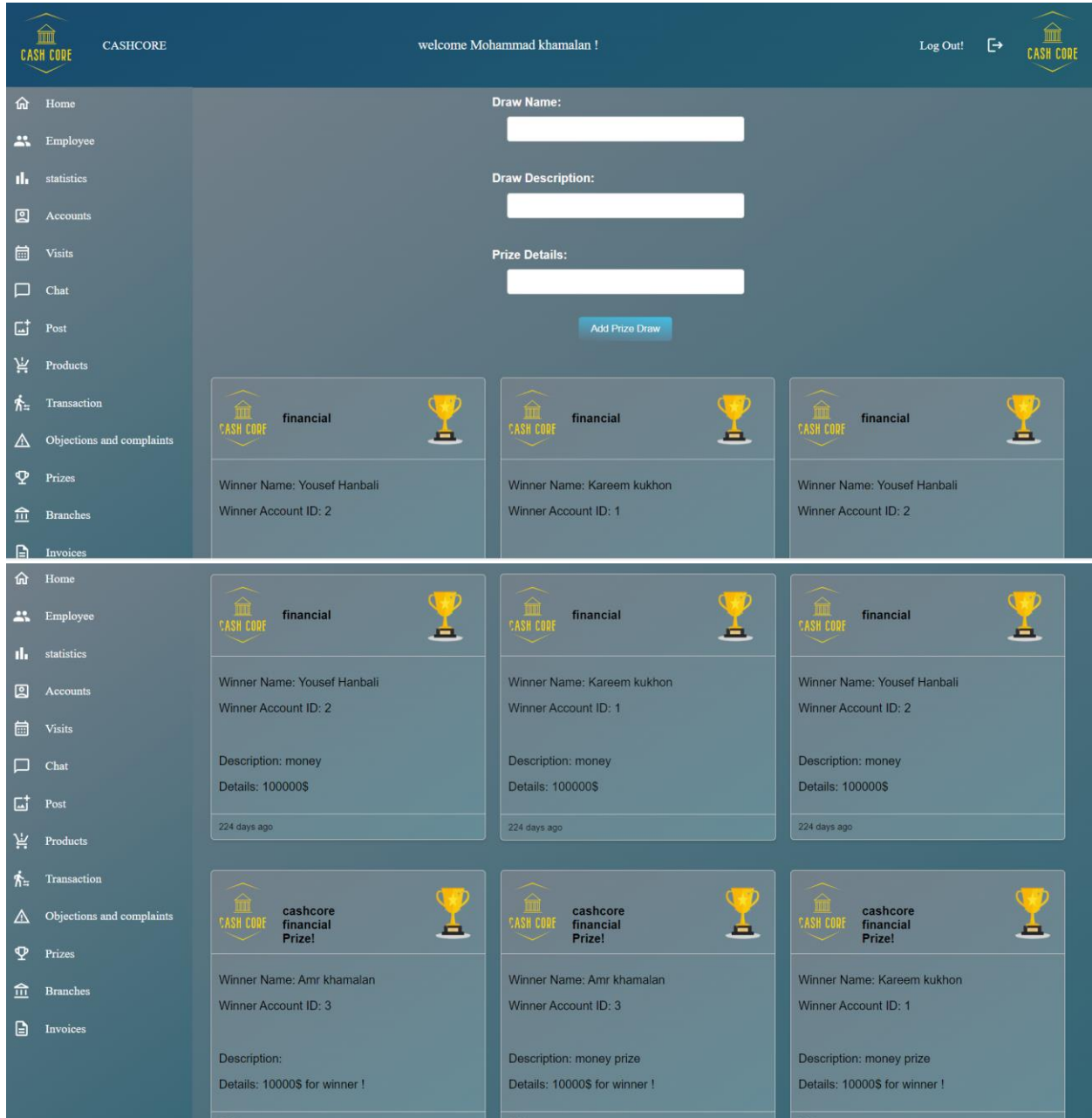


Figure 5.65 Prizes Page

When the supervisor adds a prize, they enter the name of the prize, its value, and a description. After that, they click on the 'Add prize Draw' button. This page can be accessed by clicking on the 'prizes' option in the sidebar.

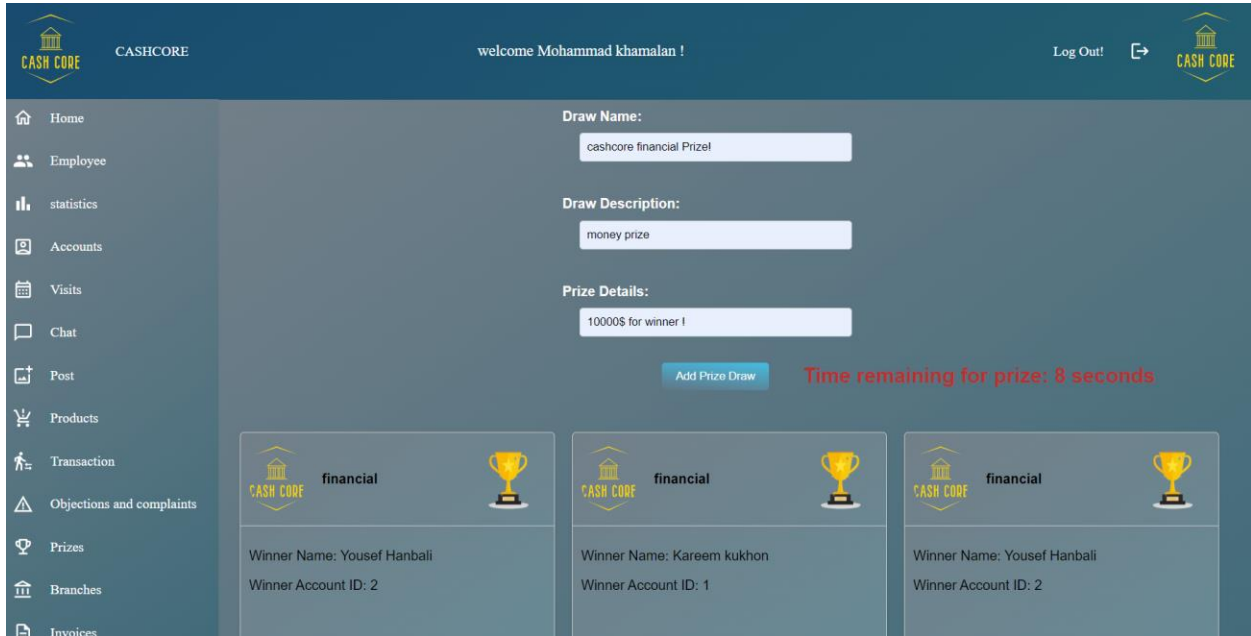


Figure 5.66 Prizes Count Page

### 5.2.12 Branches

Through this page, the employee can view the locations of the bank's branches on the map by clicking the 'Branches' button. They can also see their current location (which branch they are in) by clicking the 'Get my location' button. This page can be accessed through the 'Branches' option in the sidebar.

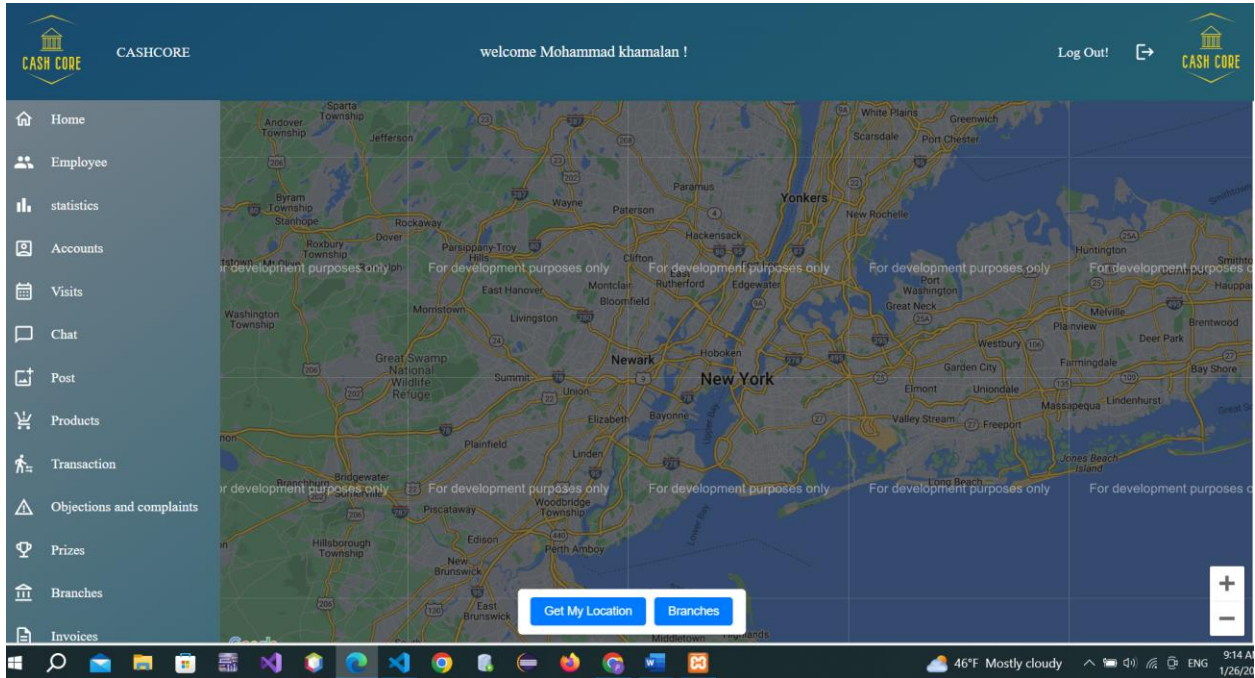


Figure 5.67 Branches Page

### 5.2.13 Invoices

Through this page, the employee can view the transactions of a specific user, including withdrawals, deposits, bill payments, or money transfers from one account to another, by searching for them and clicking the 'Get invoices' button. The employee can also print the invoice and download it in PDF format.

This page can be accessed through the 'invoices' option in the sidebar.

The screenshot displays the 'Invoice Management' interface in the CASHCORE system. The top navigation bar includes the CASHCORE logo, the user name 'welcome Mohammad khamalan!', and a 'Log Out!' button. The left sidebar lists various system options, with 'Invoices' selected. The main content area features a search input field labeled 'Enter User ID' and a 'Get Invoices' button. A text box explains that entering a User ID allows viewing related invoices in a table below. An illustration shows hands exchanging a document. A second text box notes that clicking 'Get Invoices' renders the table, and the 'Print' button allows for a PDF copy of the selected invoice.

Document ID	User ID	Name	Document Name	Document Content	Account ID	Action
20	1	Kareem kukhon	Deposit money	Deposit of amount 100000 by John Doe	1	<a href="#">Print</a>
21	1	Kareem kukhon	Withdraw money	Withdrawal of amount 100000 by John Doe	1	<a href="#">Print</a>
23	1	Kareem kukhon	Deposit money	Deposit of amount 20000 by John Doe	106	<a href="#">Print</a>
24	1	Kareem kukhon	Deposit money	Deposit of amount 1000 by John Doe	1	<a href="#">Print</a>
25	1	Kareem kukhon	Withdraw money	Withdrawal of amount 1000 by John Doe	1	<a href="#">Print</a>
26	1	Kareem kukhon	Withdraw money	Withdrawal of amount 1000 by John Doe	1	<a href="#">Print</a>
27	1	Kareem kukhon	Deposit money	Deposit of amount 1000 by John Doe	1	<a href="#">Print</a>
28	1	Kareem kukhon	Deposit money	Deposit of amount 55555 by John Doe	106	<a href="#">Print</a>

Figure 5.68 Invoices Page

When the employee presses the “print” button, the invoice is downloaded to the device as in the picture below:

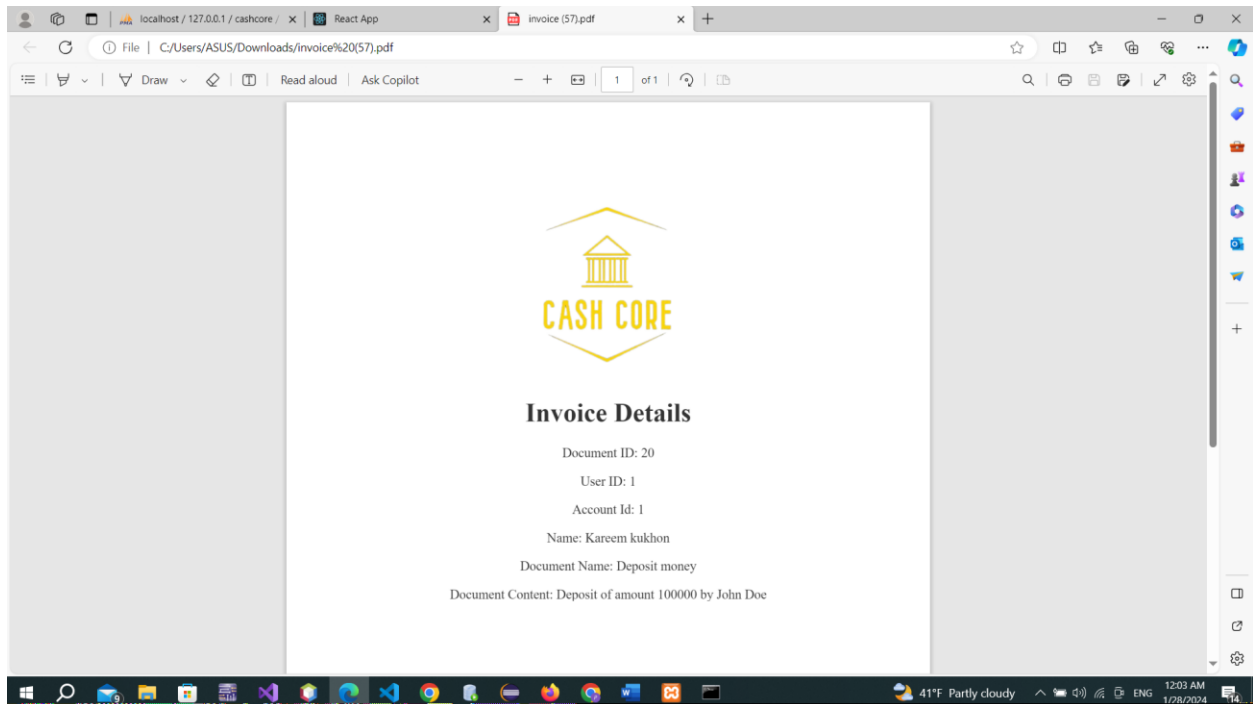


Figure 5.69 PDF Print

### 5.2.14 Employee Account

When logging in, if the employee is not a supervisor but a regular bank employee, the homepage appears but with fewer permissions than a supervisor. They can only access and edit their personal account information, or view and delete customer accounts and their transactions. They can also perform withdrawals and deposits for customers who come to the customer desk in one of the branches and print their invoices for transactions they have made, such as paying bills, transferring money to another account, withdrawing, or depositing. They can view the appointments at all branches and their dates or filter them by a specific date. They can also communicate with their colleagues or the supervisor through the chat page or post announcements and products that the bank wants to display. They can also show the locations of the branches on the map, as was the case with the supervisor.

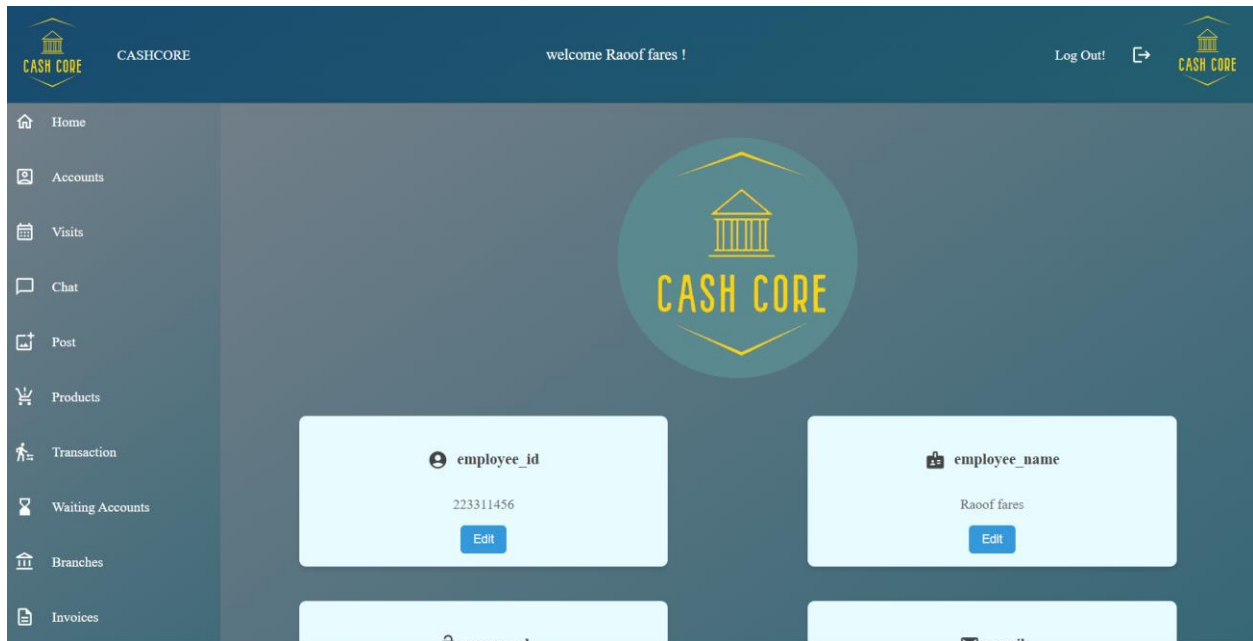


Figure 5.70 Main Page for Employee

### 5.2.15 Waiting Account

Through this page, the employee can accept or delete the account. When a customer creates an account through the mobile application, they are not officially approved. Rather, the customer must visit a branch to activate it by presenting his signature to the employee and opening the account with a specific amount. This allows the employee to activate the account as an official account. If the customer decides not to open the account and informs the bank about this, the employee can delete the account.

This page can be accessed by clicking on the “Booking Account” button in the sidebar.

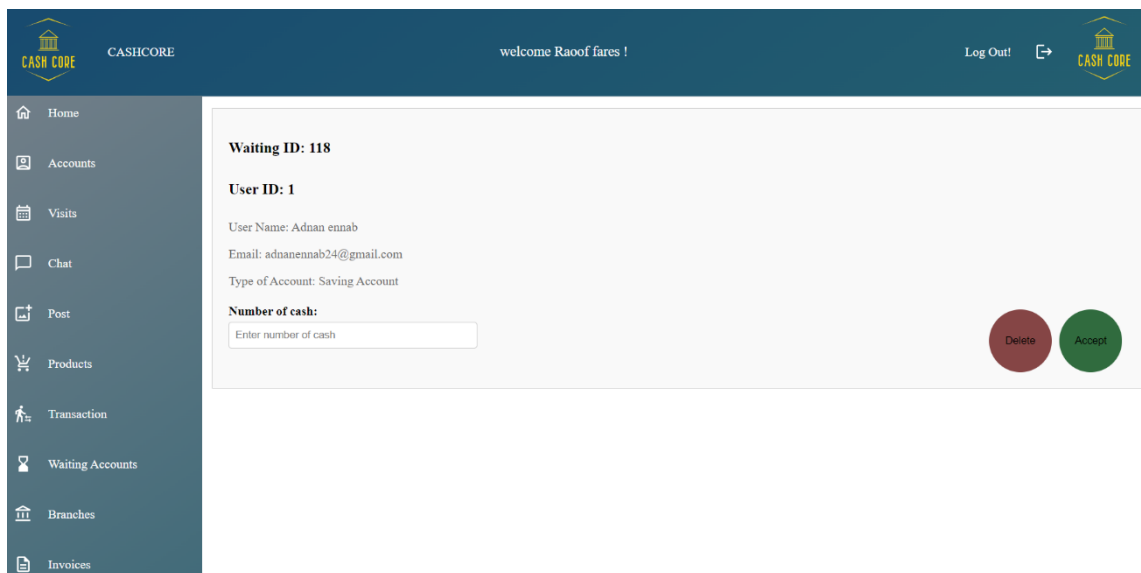


Figure 5.71 Waiting Page

### 5.2.16 Posts Page

In the posts page, when an employee at Cashcore Bank publishes an announcement, it appears as if the bank "Cashcore" made the announcement. The employee cannot see which employee published this announcement. Only the supervisor can see which employee posted it.

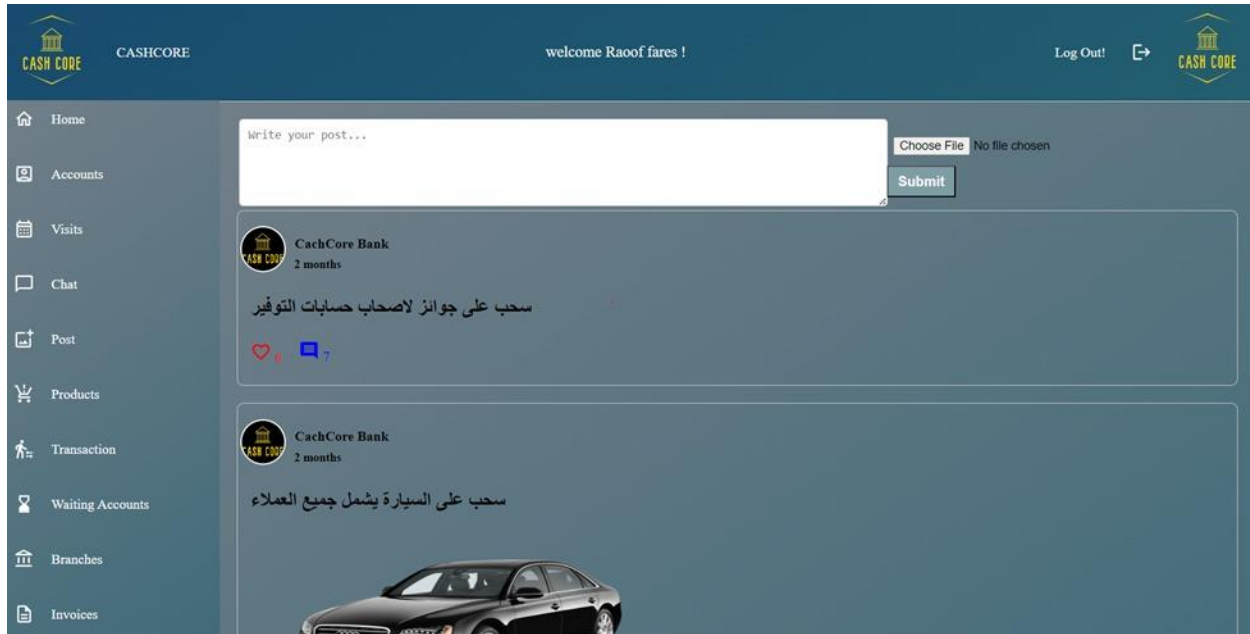


Figure 5.72 Employee posts Page

## CHAPTER 6

### RESULTS AND DISCUSSION

The pressing demand for a user-centric application is paramount in the current technological era. Our banking application was meticulously crafted to tackle the myriad challenges faced by traditional banks, presenting an avenue for time and effort savings. Users can now efficiently schedule visits, settle bills, perform currency conversions, and receive digital receipts, granting them access to their financial transactions irrespective of their location. The establishment of an interactive environment within the bank, uniting users, and employees, is a distinctive feature lacking in the current banking landscape, with most interactions limited to traditional methods such as physical visits or phone calls. This encourages social interaction among employees, especially those from different departments, thereby enriching the overall performance of the company.

Furthermore, our project surpasses conventional banking practices by introducing innovative solutions. Features like real-time chat, a score and rewards system, emergency chat, and

supervisory functionalities inject a layer of efficiency and creativity into the banking experience. The real-time chat facilitates seamless communication between users and employees, fostering collaboration. The score and rewards system serves as a motivational tool, driving user engagement and interaction with the application, resulting in a vibrant and active user base. The emergency chat feature offers users prompt solutions to urgent matters and a platform to submit complaints, thereby enhancing customer support. Additionally, the supervisor's elevated permissions provide oversight and management capabilities, ensuring a well-organized operation and effective handling of user interactions.

## **CHAPTER 7**

### **CONCLUSIONS**

In conclusion, our innovative banking application is a revolutionary solution that not only simplifies traditional banking processes but also introduces a range of additional features to enhance the overall banking experience.

One of the standout features is the convenient booking system for bank visits, enabling users to schedule appointments from the comfort of their homes, reducing wait times and optimizing the visitation process. The bill payment and money transfer functionalities empower users to manage their transactions seamlessly, providing a quick and secure way to handle financial tasks.

The application's map and route feature ensures users and employees can easily locate the bank and its branches, promoting accessibility. The currency conversion tool adds another layer of convenience, allowing users to check and convert currency values effortlessly.

Furthermore, the application provides a user-friendly interface for employees to post on behalf of the bank, fostering communication and engagement. The supervisor's enhanced permissions offer a comprehensive overview, allowing efficient management and oversight.

In essence, our banking application is a comprehensive solution that combines practicality, accessibility, and collaboration, making it a key player in the evolution of modern banking.

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