TRIBHUWAN UNIVERSITY

INSTITUTE OF ENGINEERING

THAPATHALI CAMPUS

PROJECT REPORT ON BANKING SYSTEM

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DECLARATION

We hereby declare that the report of the project entitled "**Banking System**" which is being submitted to the **Department of Electronics and Computer Engineering, IOE, Thapathali Campus**, as a part of the project work for first semester of **Bachelor's Degree in Electronics, Communication and Information Engineering**, is a bonafide report of the work carried out by us. The materials contained in this report have not been submitted to any University or Institution for the award of any degree and we are the only author of this complete work and no sources other than the listed here have been used in this work.

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Date: May, 2024

CERTIFICATE OF APPROVAL

The undersigned certify that they have read and recommended to the **Department of Electronics and Computer Engineering, IOE, Thapathali Campus**, project work report entitled “**Banking System**” submitted by **Abishek Sitaula, Aditya Shrestha, Amrit Tamang, Chhantalal Giri** in fulfillment of project work assigned for the first semester of **Bachelor’s Degree in Electronics, Communication, and Information Engineering**. The project was carried out under special supervision and within the time frame prescribed by the syllabus

We found the students to be hardworking, skilled, and ready to undertake any related work to their field of study and hence we recommend the award of partial fulfillment of the bachelor's degree in Electronics, Communication, and Information Engineering.

May, 2024

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ABSTRACT

The aim of our project is to create a console-based application developed in C that performs basic banking operations. The user can perform operations such as account creation, viewing account details, depositing and withdrawing balance, transferring balance among other users, and deleting an existing account.

On running the program, users will be asked to authenticate themselves. This can be done by either signing up for a new account or logging in to an existing account. After the user is successfully logged in to the system, the user will be provided a menu-based interface offering a range of options for the user to select. Users can perform the above-mentioned operations by selecting the options on the menu.

This project optimizes basic programming concepts such as user input validation, file handling, and menu-driven interfaces for a learner to create a basic banking system. Through this project, a learner can gain certain experience in software development.

Keywords: Authentication, File handling, Input validation, Menu-driven program

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List of Abbreviation

ATM	Automated Teller Machine
BBC	British Broadcasting Corporation
CLI	Command Line Interface
GCC	GNU Compiler Collections
GNU	GNU’s Not Unix
GUI	Graphical User Interface
IDE	Integrated Development Environment
OTP	One-Time Password
PIN	Personal Identification Number
VS	Visual Studio

1. INTRODUCTION

1.1 Background Information

This project was solely built using the C Programming Language. C provided us with many features such as file handling, control structures, arrays and such that were the building block of our project. Our project asks users to log into the system after which the user can proceed with the task provided on the menu-based interface. We aim to make the interface as neat and user-friendly as possible.

1.2 Motivation

When we were provided with this task, we were looking for an interesting project we could do in C. We also wanted to do our project on something practical and something we came across regularly. After some brainstorming and research, we finally settled on the Bank management system.

Banks play an irreplaceable role in all of our life. The modern banking systems and the likes of ATMs have made our lives extremely comfortable. We can deposit, withdraw, and transfer funds from anywhere at any time we want. When we started thinking if we could make a simple version of a banking system using C, it became more and more doable.

1.3 Objectives

When we started this project, we set certain goals that we wanted to achieve such as:

i. To understand the core concept of file handling, control structure, arrays, and structures in C and make optimum use of them.

ii. To design a user-friendly menu-based interface that works properly with no bugs and errors.

iii. To learn how to manage a project work among a team.

All of the objective set were successfully fulfilled by the time of completion of this project.

1.4 Scope and Application

We aim to create a banking system where users can deposit, withdraw, and transfer funds through a menu-based interface. Like any other banking system, we will have users set up their account with a username and password for themselves so they can only log in to their account and their money and details remain secured in the database.

With this banking concept, a user can safely deposit his funds in his bank account and retrieve it back at any moment. This will simplify their lives by cutting off the hassle of going to the bank for every simple task. Users can go to the nearest ATM where they can have access to withdraw, deposit, or transfer cash into other users’ accounts.

2. LITERATURE REVIEW

Before the days of ATMs, people had to go to the bank themselves to proceed with the deposition and withdrawal of any amount of money. But the introduction of ATMs has made this quite easier for everyone. In 1960, Luther Simjian invented the world's first automated deposit machine. But it would only let the user deposit money, cheques, and coins. No withdrawal system was introduced. [1]

In 1966, a device named "Computer Loan Machine" was introduced in Japan which supplied cash as a 3-month loan at 5% p.a. on inserting a credit card. However, this machine wasn't very popular. [2]

On June 27, 1967 , an engineering team led by John Shepherd-Barron of the printing firm De La Rue is credited for inventing the world's first ATM. The machine was put into use by Barclays Bank, Enfield, in the United Kingdom. Transactions were initiated by inserting paper cheques issued by a teller or cashier, marked with carbon-14 for machine readability and security, which in a later model were matched with a four-digit personal identification number (PIN). [3]

ATMs have been more progressive and improved a lot over time. Many ATMs started implementing One-time Password (OTP) for users to access the ATM through their smartphones. [4].

2.1 Drawbacks and Limitations

Although the Banking system has numerous advantages, it has some drawbacks like glitches, connectivity issues, and compatibility issues with older mobile devices. In some cases, security is the main concern.

Despite ATMs being extremely convenient to everyone and one of the most useful boons of science, it isn't perfect. Even though every detail belonging to the user is very well encrypted, the physical body of ATMs is still vulnerable to physical attacks. There have been increasing cases of these machines being ram-raided and attacked by burglars. [5]

Thieves have also been successful in digging a tunnel under the ATM and stealing cash by breaking into the machine from under it. [6] Since these machines are open to the public, this also enables fraudsters to come up with various ways to trick you and steal your money. [7]

3. SYSTEM ARCHITECTURE AND METHODOLOGY

3.1 Block Diagram

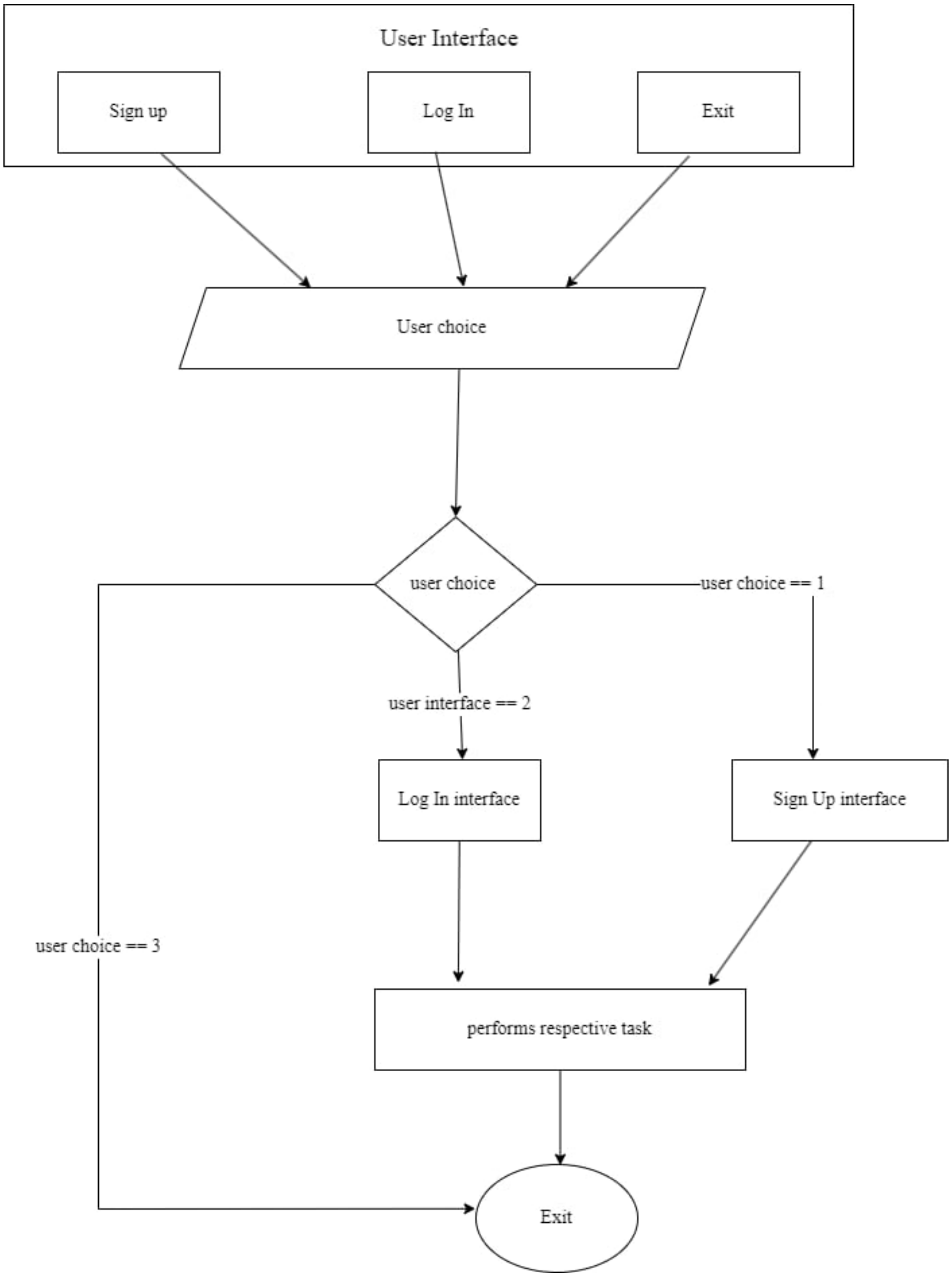


Figure 3-1 block diagram of program

3.2 Parts of Program

3.2.1 User Interface

When the program runs the first thing that the user interacts with is a menu-driven interface which lets user choose among various options for the user to work such as sign up, log in, log in as admin, and exit.

3.2.2 Sign-Up

If the user chooses the sign-up option, there will be a sign-up page that takes input from the user about their details and the user will be provided with a 4-digit PIN. All of this information is stored in a file.

3.2.3 Log-in

In log-in case, the user enters their username and password. If the username and password match the information stored in the sign-in file, the user gets logged in and the banking system interface opens which further includes options for balance inquiry, transfer, deposit, exit, etc.

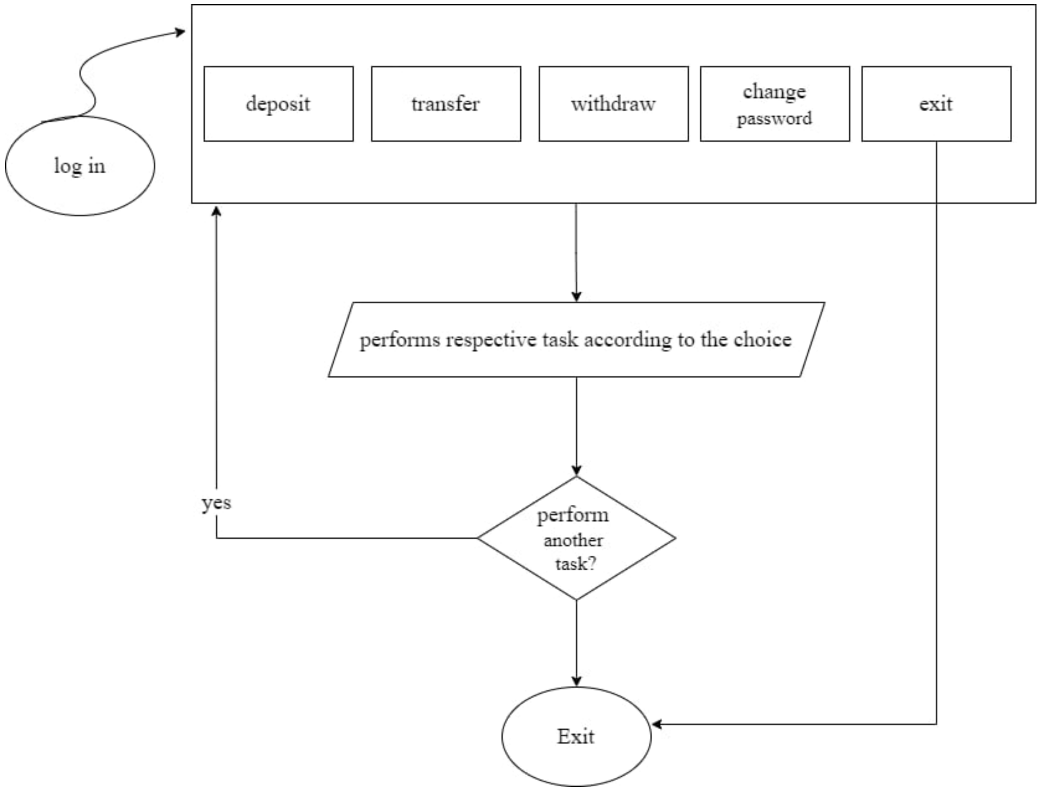


Figure 3-2 block diagram of login page

3.2.4 Exit

This will simply exit the program.

3.3 Tools and Environment

During the development of the whole project, different tools were used which are listed as follows:

i. **VS Code Editor**: It is a code editor that provides an environment to write, and edit programs with the features of code snippets, debugging, terminal functionality and it supports many programming languages. It is one of the most used code editors developed by Microsoft and was thoroughly used throughout this project.

ii. **GCC**: GCC is a compiler used for compiling C and C++ programs and it stands for GNU Compiler Collections

iii. **GitHub**: GitHub is a developer platform that allows developers to create, store, manage, and share their code. We made optimum use of GitHub to pass the code among other team members.

3.4 Methodology

Our main task in this project was to gather various inputs from users and sort those data properly in our local storage so that we could fetch it again in various parts of the program. For that, the tools in C that we used include header files, various functions (both predefined and user-defined), control structures, arrays and structures, and file handling.

3.4.1 Header file

A C header file is a text file that contains pieces of code written in the C programming language. The name of a header file, by convention, ends with the .h extension. It is inserted inside a program by coding the #include preprocessor directive. Each of the header files lets us use certain functions associated with them.

The header files we used in this project are:

- stdio.h
- windows.h
- stdlib.h
- string.h

3.4.3 Functions

Function plays a pivotal role in any project. A function is a block of code that only runs when it is called. They are of two types: Pre-defined functions and user-defined functions.

Pre-defined functions are functions that are pre-built in C and we can simply import them through header files. On the other hand, User-defined functions are the functions that users can create themselves, which may take some arguments and may display or return an appropriate result.

In this project, we used various pre-defined functions as well as created various functions that would be commonly used again and again in our code. The use of function reduces the repetition of codes and makes our program more efficient and human-readable.

3.4.4 Control Structures

Control structures analyze certain variables and choose a direction in which the program is to be executed. They are fundamentally classified into Branching and Looping structures.

3.4.3.1 Branching

Branching statement controls the flow of execution of the program. Branching statements can be either Conditional or Unconditional.

Conditional Branching is when our program executes a block of statements only when a certain condition is met. Conditional Branching Statements include if statement, if-else statement, nested if-else statement, and switch statement.

Unconditional Branching is used when we want to jump into a certain line or part of the code regardless of any condition. Commonly used Unconditional Branching Statements include goto statement, break statement, and continue statement.

3.4.3.2 Looping

Looping fundamentally means repetition. In programming, looping includes a block of code that is repeated over and over until a certain condition is met. Looping is very useful in C to avoid the repetition of codes. Looping can be Entry Controlled or Exit Controlled loop.

In Entry Controlled Loop, the test expression is checked at the beginning of the code. Only if the test condition is met true, the code is further executed. Once the code is done the test condition is checked again. This process repeats until the condition is met false.

In Exit Controlled Loop, the program first lets a block of code be executed and at the end of the block, a test expression is checked. Only if the test expression is false, our program continue. If not, the block of code is repeated again and again.

3.4.4 Structures and Arrays

Arrays are used to store multiple values of the same data types in a single variable, instead of declaring multiple variables. They are very useful when we have to ask the user to input a large amount of data of the same data types and we need to access it again in some part of the program.

Structures are used to store multiple variables of different data types. Different related variables which can be of different data types are grouped in one place with the help of structure. We can easily access these variables again in any part of the program.

In our project, we have used structures along with arrays to save every detail of a user like their username, password, balance, and statement history in a single structure.

3.4.5 File Handling

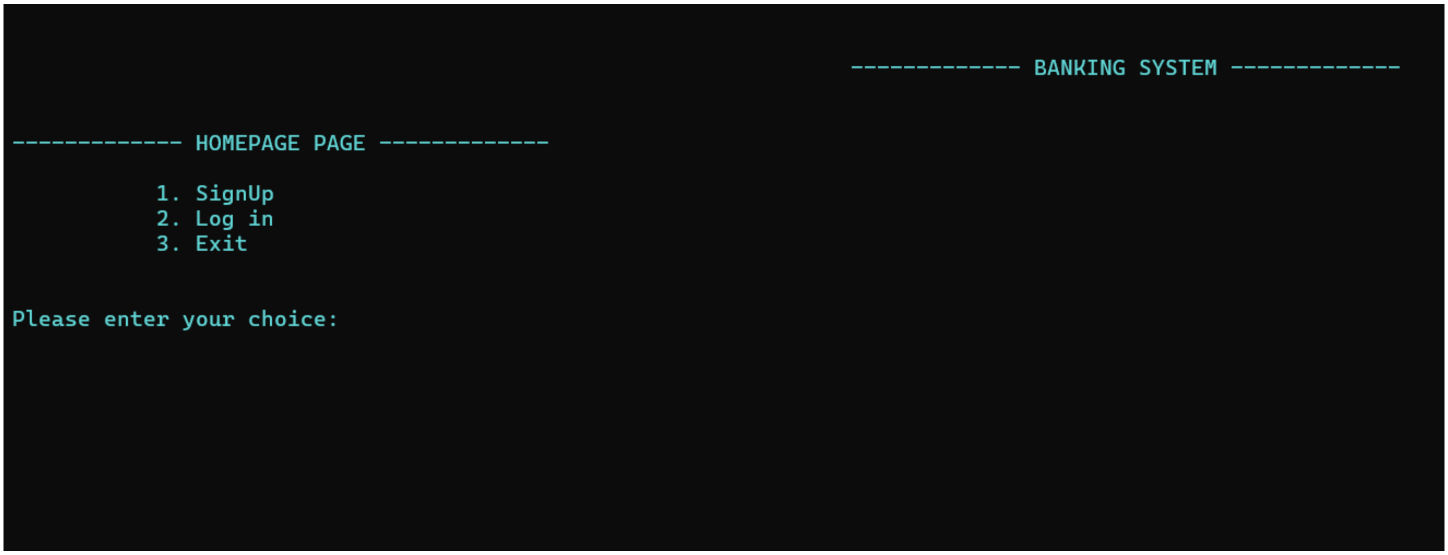
File Handling in C is the process in which we create, open, read, write, and close operations on a file. Most of the functions used in file handling are easily accessed by the header file stdio.h. These functions includes fopen(), fscanf(), fprintf(), fwrite(), fclose().

In our project, we have made use of file handling to take the details entered by the user and store them in a separate file so that even when the user closes the program, their details are saved and their record doesn’t get deleted.

4. RESULTS AND ANALYSIS

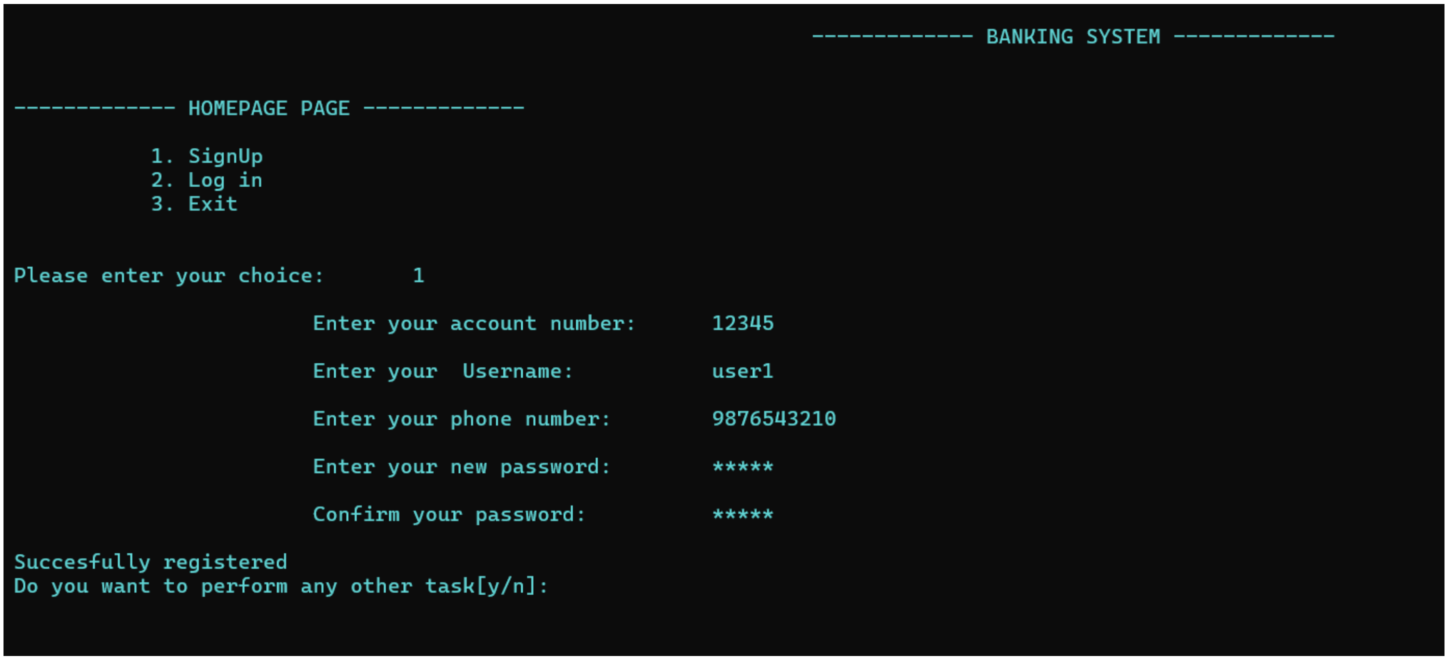
The program was successfully made and after thorough debugging, it was made free of errors and bugs. The details entered by users were successfully stored into a file as a structure and was later fetched in various instances of the program without any problem.

4.1 Outputs



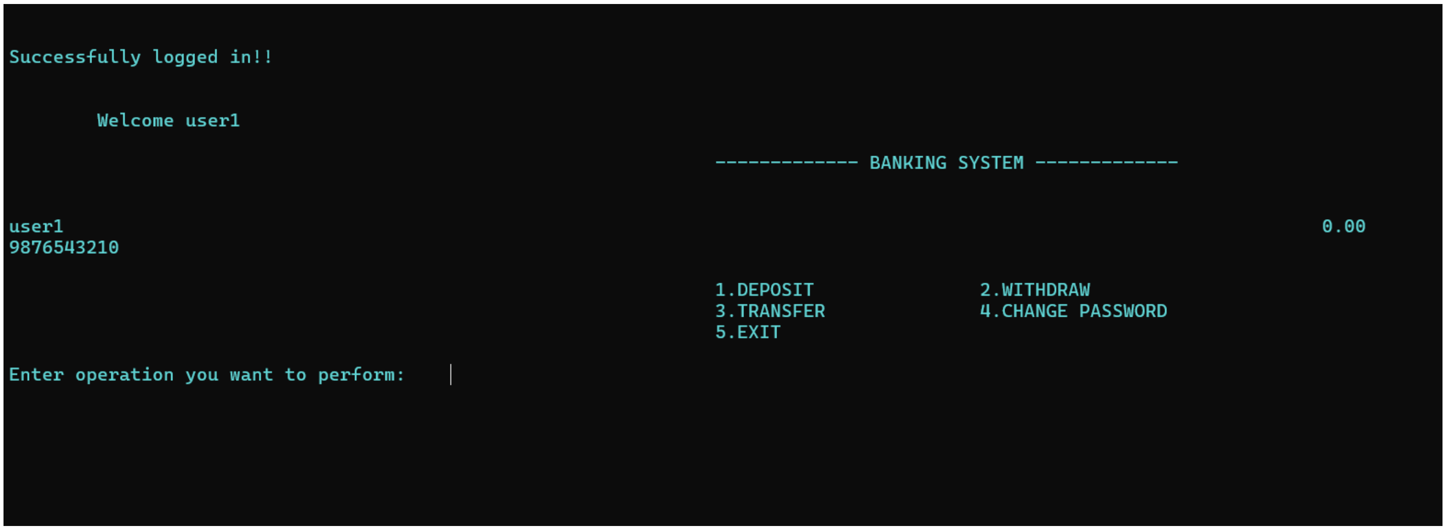
```
                                                                ------------- BANKING SYSTEM -------------


------------- HOMEPAGE PAGE -------------

           1. SignUp
           2. Log in
           3. Exit


Please enter your choice:
```

Figure 4-1 main menu



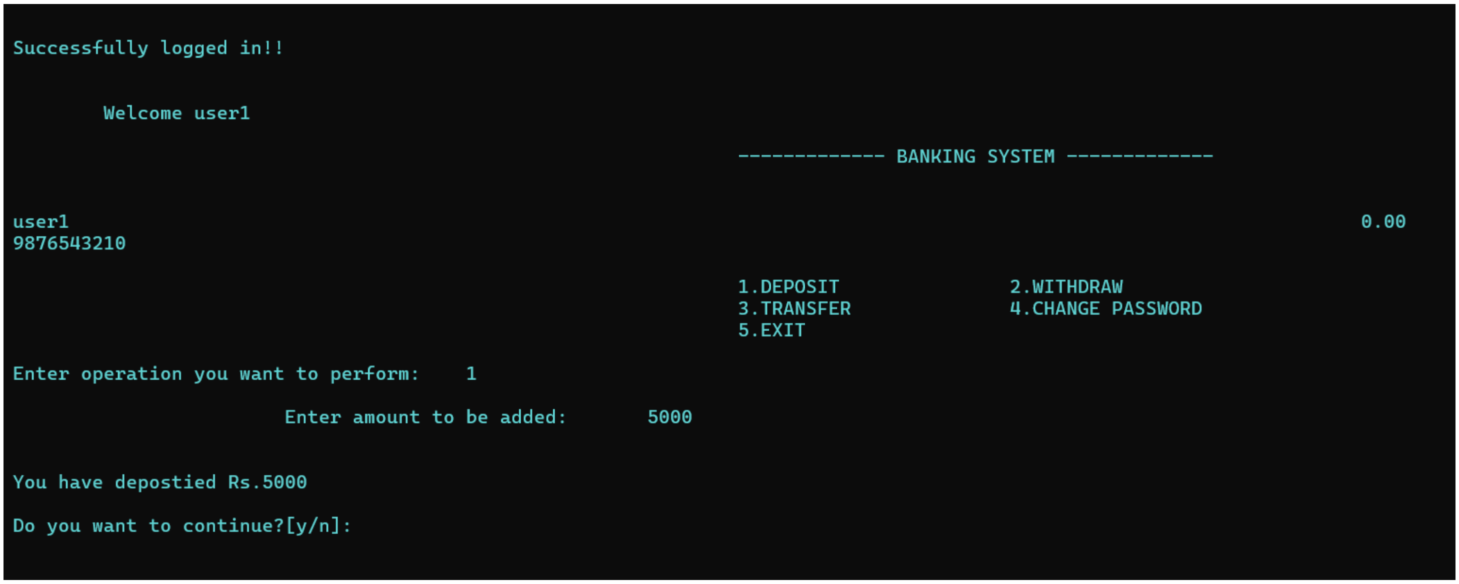
```
                                                                       ------------- BANKING SYSTEM -------------


------------- HOMEPAGE PAGE -------------

           1. SignUp
           2. Log in
           3. Exit


Please enter your choice:       1

                        Enter your account number:      12345

                        Enter your  Username:           user1

                        Enter your phone number:        9876543210

                        Enter your new password:        *****

                        Confirm your password:          *****

Succesfully registered
Do you want to perform any other task[y/n]:
```

Figure 4-2 Signing up as user



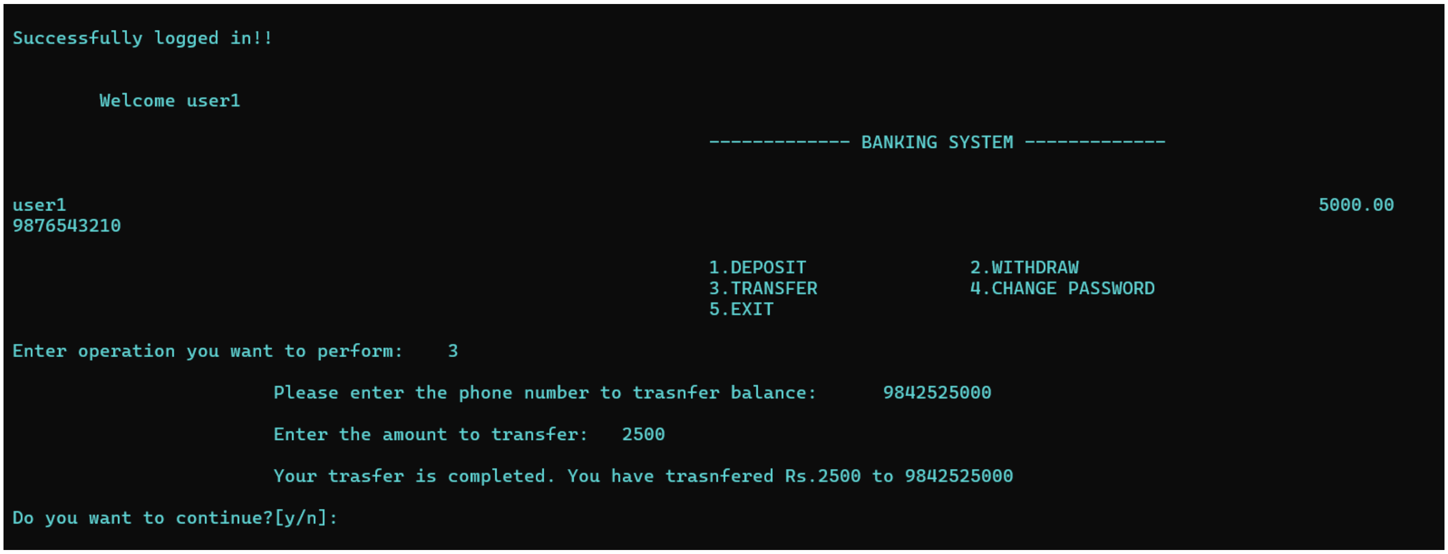
```
Successfully logged in!!


        Welcome user1

                                                                ------------- BANKING SYSTEM -------------


user1                                                                                                         0.00
9876543210


                                                                1.DEPOSIT               2.WITHDRAW
                                                                3.TRANSFER              4.CHANGE PASSWORD
                                                                5.EXIT


Enter operation you want to perform:    |
```

Figure 4-3 Main interface after log-in



```
Successfully logged in!!

        Welcome user1
                                                                ------------- BANKING SYSTEM -------------

user1                                                                                                                  0.00
9876543210

                                                                1.DEPOSIT               2.WITHDRAW
                                                                3.TRANSFER              4.CHANGE PASSWORD
                                                                5.EXIT

Enter operation you want to perform:    1

                        Enter amount to be added:       5000

You have depostied Rs.5000

Do you want to continue?[y/n]:
```

Figure 4-4 Deposition of money



```
Successfully logged in!!

        Welcome user1
                                                                ------------- BANKING SYSTEM -------------

user1                                                                                                                   5000.00
9876543210

                                                                1.DEPOSIT               2.WITHDRAW
                                                                3.TRANSFER              4.CHANGE PASSWORD
                                                                5.EXIT

Enter operation you want to perform:    3

                        Please enter the phone number to trasnfer balance:      9842525000

                        Enter the amount to transfer:   2500

                        Your trasfer is completed. You have trasnfered Rs.2500 to 9842525000

Do you want to continue?[y/n]:
```

Figure 4-5 Transfer of money

5. CONCLUSION

To summarize, we attempted to build a banking system which would allow us to create a local baking system within our own personal computer. User would be able to register themselves as a user and reuse the same account keeping track of their money. User can perform task such as depositing, withdrawing and transferring money among other users.

Everything in this project was done in C without involvement of any other programming languages. Almost every tool we used was part of our curriculum. Although we were fairly inexperienced on working on a larger project involving a team, we handled the situation well and were able to sort it out.

Creating a banking system using C was never an easy task. C, although is high level programming language capable of very fast compilation, there were still many limitations in our program.

5.1 Limitations

i. **Can only work on local PC:** The details of user are stored in the local folder of the computer where the program is running. Thus, it cannot be accessed by another PC. The banking system is entirely local making users unable to perform transactions from their own computers.

ii. **Lack of advanced features:** Since the entire program is being run on the terminal of C, we can only provide users with CUI. The user can only type through keyboard making it a bit hard to perform tasks.

iii. **Lack of proper security:** The details of user are stored in raw binary files making it easy to be deleted or modified by anyone. Deletion of the files would mean all the data about the users being lost.

6. APPENDICES

6.1 Gantt chart

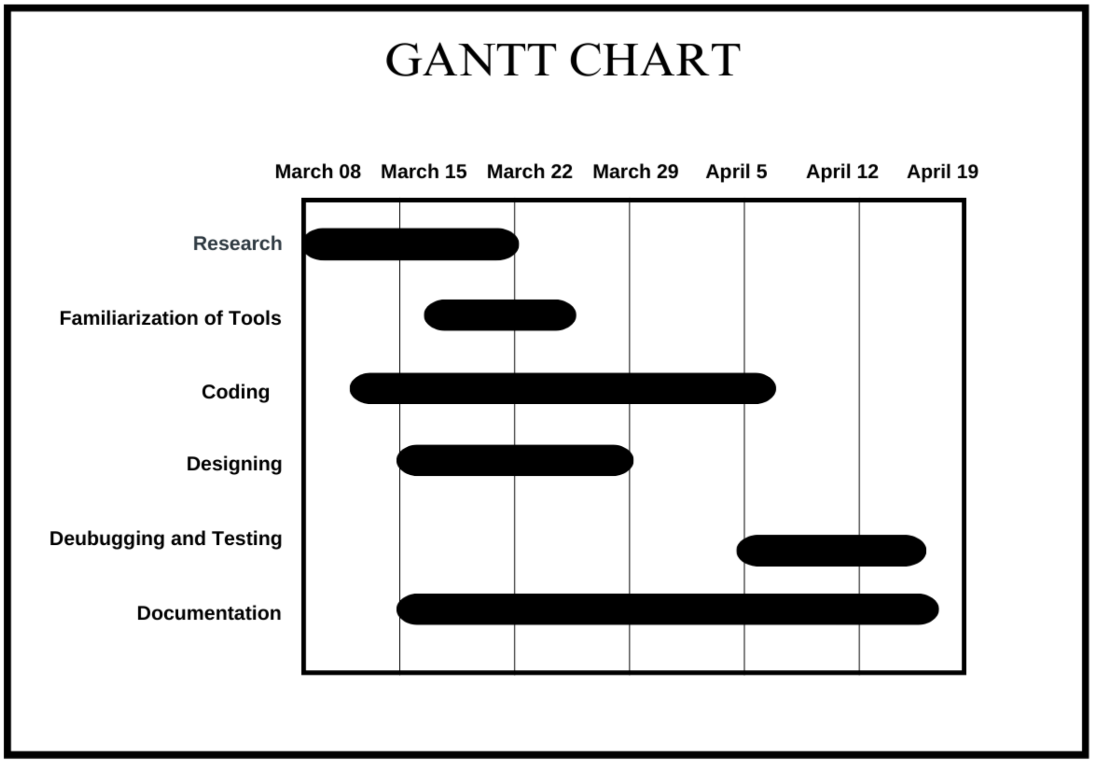


Figure 6-1 Gantt Chart with period timeline

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[1] "Machine Accepts Bank Deposits", *The New York Times*, 12 April 1961

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[6] "Thieves dig 100ft tunnel to steal cash in Levenshulme". *BBC*. 14 January 2012. Archived from the original on 14 January 2012

[7] "Card stuck in ATM? Don't land in fraudsters' trap" *The Times of India*. 20 April 2023