Banking System Report

The banking system program is designed to manage customer accounts, allowing users to perform various operations such as account creation, deletion, modification, and financial transactions like deposits, withdrawals, and transfers. The system is implemented in C programming language.

1-Login

Prompts the user for a username and password, verifying the credentials against a file (users.txt).

If the user name is found and its corresponding correct password, the main menu is displayed; otherwise an error message is displayed and the user is prompted to choose whether to try to login again or to quit the program.

A sample for correct entry:

```
1.LOGIN
2.QUIT
1
Please enter your username : amr
Please enter your password : 123
User found . How can I help you ?
1.ADD
2.DELETE
3.MODIFY
4.SEARCH
5.ADVANCED SEARCH
6.WITHDRAW
7.DEPOSIT
8.TRANSFER
9.REPORT
10.PRINT
11.QUIT
```

A sample for invalid entry:

```
Please enter your username : am
Please enter your password : 243
Invalid username or password .
1.LOGIN
2.QUIT
```

2-Load:

Reads account information from a file (accounts.txt) and populates the customer array of structures.

3-Menu

The program offers the following menu options:

```
User found . How can I help you ?
1.ADD
2.DELETE
3.MODIFY
4.SEARCH
5.ADVANCED SEARCH
6.WITHDRAW
7.DEPOSIT
8.TRANSFER
9.REPORT
10.PRINT
11.QUIT
```

Whether the user want to delete,add,search for or modify an account as well as doing any fainancial transactions as:deposit or withdraw or to transfer money to another account.The user can also get a report of the last five transactions of the desired account using the account number.

4-Add

Allows you to add a new customer account.

You will be prompted to enter details such as account number, name, email, and mobile number.

The program checks for valid inputs, For example if an account number is already in use an error message is displayed and for the email,name,account number and mobile number, there are particular programs to check them as: checkemail,checkacc,checkmobile,checkname.those check for valid entries and not any absurd text, otherwise an error message is displayed

Sample for a successful addition.

```
1
Please enter the new account number : 1234567899
Please enter the name of the user : Amr Khaled
Please enter your email : amr@gmail.com
Please enter the mobile number : 01012289404
1.Save modification
0.Discard changes
1
Account is added successfully !
```

Sample for an invalid name entry:

```
1
Please enter the new account number : 2222444422
Please enter the name of the user : 01012289494
Invalid name .
```

Sample for an invalid email entry:

```
1
Please enter the new account number : 2244224422
Please enter the name of the user : John Doe
Please enter your email : john.mike
Invalid email .
```

Sample for invalid mobile number entry:

```
Please enter the new account number : 2244224422
Please enter the name of the user : John Doe
Please enter your email : john@gmail.com
Please enter the mobile number : 0101228941l4
Invalid mobile number .
```

Sample for account number already in use:

```
Please enter the new account number : 2222222222
This account number is already used .
```

5-delete

Allows you to delete an existing customer account by Entering the account number desired to be deleted.

You can only delete an account with a balance of 0.0.

Algorithm used: we shifted the accounts one step upward starting from the account that needs to be deleted and then reduce the number of customers by one.

Sample for successful deletion:

```
1.ADD
2.DELETE
3.MODIFY
4.SEARCH
5.ADVANCED SEARCH
6.WITHDRAW
7.DEPOSIT
8.TRANSFER
9.REPORT
10.PRINT
11.QUIT
2
Please enter account number : 0123456789
1.Save modification .
0.Discard changes .
1
Succesful deletion .
```

Sample for unsuccessful deletion:

```
2
Please enter account number : 9700000000
Balance is not 0.0 . Deletion couldn't be done .
```

6-Modify:

 Enables you to modify customer information, where user Enter the account number he wants to modify.

Choose the data to modify: Name, Mobile Number, or Email Address, then enter the new date.

Sample for modification of name:

```
3
Please enter the account number : 9700000000
Please choose the data you want to modify :
1.NAME
2.MOBILE NUMBER
3.EMAIL ADDRES
1
Please enter new name : 0213114
Invalid name .
Please enter new name : Ahmed Sameh
1.Save modification .
0.Discard changes .
1
The new modified name is : Ahmed Sameh for this account number : 9700000000
```

Sample for modification of mobile number:

```
3
Please enter the account number : 9700000000
Please choose the data you want to modify :
1.NAME
2.MOBILE NUMBER
3.EMAIL ADDRES
2
Please enter new phone number : 01286683353
1.Save modification .
0.Discard changes .
1
The new modified mobile number is : 01286683353 for this account number : 9700000000
```

7-Search:

Search for an account by entering the account number, then all the information belonging to this user is printed, otherwise an error message is displayed.

```
1.ADD
2.DELETE
3.MODIFY
4.SEARCH
5.ADVANCED SEARCH
6.WITHDRAW
7.DEPOSIT
8.TRANSFER
9.REPORT
10.PRINT
11.QUIT
4
please enter account Number : 9700000000
Account Number : 9700000000
Name : Michael Jones
Email : m.jones@gmail.com
Number : 01009700000
Balance : 9829.20 EGP
Date : December 2007
```

```
1.ADD
2.DELETE
3.MODIFY
4.SEARCH
5.ADVANCED SEARCH
6.WITHDRAW
7.DEPOSIT
8.TRANSFER
9.REPORT
10.PRINT
11.QUIT
4
please enter account Number : 5
Account not found .
1 ADD
```

8-Advanced Search:

Search for accounts based on customer names.

The user is required to enter the name desired whether it's a first or last name and all the information belonging to the name entered will be printed, if no matches found an error message is displayed.

Sample for found users:

```
5
Please enter the name required to be searched : Ahmed
Account Number : 9780135102
Name : Omar Ahmed
Email : omar@outlook.com
Number : 01122553164
Balance : 32010.73 EGP
Date : December 2015
Account Number : 9780135103
Name : Ahmed Ali
Email : omar@outtlook.com
Number : 01122553164
Balance : 0.00 EGP
Date : December 2015
Account Number : 7777777777
Name : Amr Ahmed
Email : ahmed@yahoo.com
Number : 01012289404
Balance : 1000.00 EGP
Date : December 2023
```

Sample of the error message:

```
Please enter the new account number : 2244224422
Please enter the name of the user : John Doe
Please enter your email : john@gmail.com
Please enter the mobile number : 01012289414
Invalid mobile number .
```

9-Withdraw

Perform a withdrawal from an account, where we have to check that this account carries enough money, account number is valid and if not displays an error message.

Sample for successful transaction:

```
6
Please enter your account number : 9780135123
Please enter the amount to be withdrawn : 100
1.Save modification
0.Discard changes
1
Successful transaction !
New balance is : 100.00
```

Sample for unsuccessful transaction:

```
6
Please enter your account number : 9780135289
Please enter the amount to be withdrawn : 200
1.Save modification
0.Discard changes
1
unsuccessful transaction
```

10-Deposit:

Perform a deposit to an account, where account have to exist.

Sample for successful transaction

```
7
Please enter account number : 9780135289
Please enter amount of money to be deposited : 100
1.Save modification
0.Discard changes
1
Successful transaction !
New balance is : 100.00
```

Sample for non-exsisting acoount:

```
7
Please enter account number : 9780135234
Invalid account number .
```

11-Transfer

Transfer money between two accounts,where we validated that the sender have to have enough money and both accounts have to exsist.

sample for successful transaction

```
8
Please enter the account number of the sender : 9780135102
Please enter the account number of the receiver : 9780135167
Please enter the amount of you want to transfer : 100
1.Save modification
0.Discard changes
1
Successful transfer !
```

sample for invalid account number:

```
8
Please enter the account number of the sender : 9780135167
Please enter the account number of the receiver : 97801352456
Invalid receiver account .
```

12-Report:

Generate a report with the last five transaction done by the account number entered by user.

```
Please enter the account number : 9780135102
5344.00 are deposited. The updated balance is 36404.23
10000.00 are deposited. The updated balance is 46004.23
100.00 are withdrew. The updated balance is 45904.23
1012.00 are transfered to the account. The updated balance is 40973.23
67.00 are transfered from the account. The updated balance is 40973.23
```

13-Print

Program that Prints the customer records sorted by Name, Balance, or Date.

Sample for sort by name:

```
How would you like the data sorted ?
1.NAME based
2.BALANCE based
3.DATE based
1
Account Number : 9700000008
Name : Adam Mark
Email : ad.mark@gmail.com
Number : 0100970008
Balance : 350.00 EGP
Date : October 2015

Account Number : 9700000006
Name : Daniel Graves
Email : dgrave@outlook.com
Number : 01009700006
```

Sample for sort by balance:

```
How would you like the data sorted ?
1.NAME based
2.BALANCE based
3.DATE based
2
Account Number : 9700000001
Name : John Roberto
Email : j.roberto@outlook.com
Number : 01009700001
Balance : 100.00 EGP
Date : December 2008

Account Number : 9700000002
Name : Timothy Korman
Email : t.korman@gmail.com
Number : 01009700002
```

Sample for sort by date:


```
Account Number : 9700000000
Name : Michael Jones
Email : m.jones@gmail.com
Number : 01009700000
Balance : 1000.00 EGP
Date : December 2007

Account Number : 9700000003
Name : Michael Robert
Email : michael@yahoo.com
Number : 01009700003
Balance : 300.00 EGP
Date : November 2008

Account Number : 9700000001
Name : John Roberto
Email : j.roberto@outlook.com
```

14-Quit

Exit the program.

15-Save

If the user chooses to save the modifications, function save will be called to change the information inside the file "accounts.txt", else if user discarded the changes nothing in the information will be changed or saved and process won't be completed

Main Algorithms Used

1. **Search Algorithm:**

   - Linear search is used to find an account based on the account number.

2. **Sort Algorithms:**

   - Three sorting algorithms are implemented for different sorting options:

     - Bubble Sort for sorting by balance.

     - Bubble Sort for sorting by name.

     - Bubble Sort for sorting by date.

Other Functions Used

isvalid function:

Takes a string as input and checks if it's a valid floating-point number.

Uses strtod function to attempt to convert the string to a double. If the conversion is successful and the end pointer is at the end of the string, it's considered a valid number.

isvalid_2 function:

Validates a one-character string to determine if it represents a valid transaction type.

savevalid function:

Checks the validity of a one-character string to determine if it represents the user's choice to save or discard changes.

checkname function:

Takes a name as input, corrects capitalization, and removes leading/trailing spaces.

checkacc function:

Validates the account number to ensure it has exactly 10 digits.

checknumber function:

Validates a phone number to ensure it has exactly 11 digits.

checkemail function:

Validates an email address using a simple pattern matching approach and checking character '@'.

convert function:

Converts a numeric month value to its corresponding string representation (e.g., 1 to "January").