

C++ Assignment: The Banking Application

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Deliverable 1: Minimum Requirements

- Ability to open/close accounts
- Give warning when not sufficient funds when withdrawing
- Ability to transfer between chequing and savings account
- Manager/customer Obtain account balances
- Give warning message to client on his/her “chequing” account will drop below the threshold of \$1,000 – prior to him/her executing the operation. If s/he decides to go ahead despite the warning message, a charge of \$2.00 is levied on the client for each such transaction. This levy is applied only once, when there is a crossover from above to below the threshold.
- Client is able to open multiple accounts
- The bank manager can display the account details of any given customer, or all customers, and obtain aggregate data on the funds in the bank, etc., categorised appropriately.
- Funds in the account transcend the duration of a particular user session with the bank.
- Maintenance person can login and turn on and off execution trace
- Execution trace printed to external file

Deliverable 2: Enhancement Requirements

- Implemented a login system
 - The system automatically knows what type of account (manager, customer, maintainer) from your account login ID

Deliverable 3: System code and executable

In the Debug folder open the “vleeambank.exe” to run the executable.

This application is for Windows 8.1

Please check the README before running and details regarding compiling

Deliverable 4: Scenarios

Scenarios (keep scrolling for screenshots):

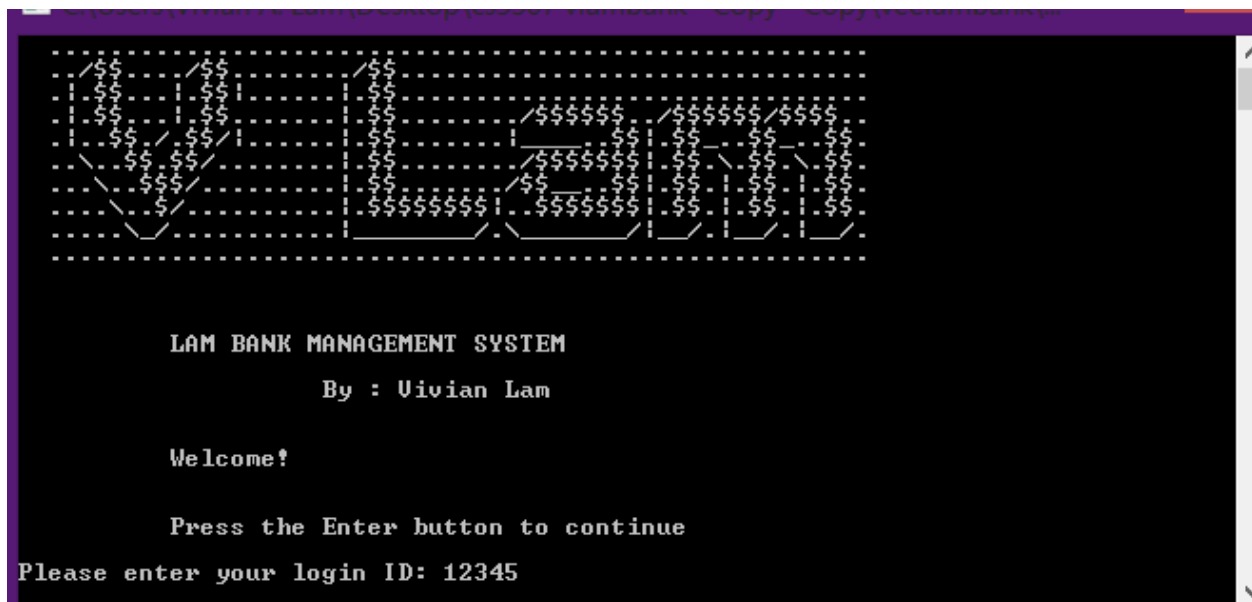
1. Client deposits funds
 - Client logs into the ATM.
 - Selects his/her Deposit account.
 - Checks the balance.
 - Deposits CAD 20.
 - System deposits the funds.
 - System displays the resultant balance.
2. Manager creates an account
 - Manager logins
 - Manager selects create an account
 - Enter in details
 - System creates a new account
 - System displays the new account data
3. Maintenance operator turns on execution trace and views the traced files
 - Maintenance operator logs in
 - Selects execution trace to be on
 - Print out execution trace
 - View the .txt file (note that it will only show the trace for this scenario because that's when execution trace was turned on)
4. Manager deletes an account
 - Manager logs in
 - Manager selects delete an account
 - Enters in the account to be deleted
 - System deletes the account
 - System shows that the account no longer exists
5. Customer transfers funds
 - Customer logs in
 - Customer selects transfer funds
 - Customer selects which account to transfer from
 - Customer selects amount
 - System transfer funds
 - System displays the new account data

2. Client deposits funds

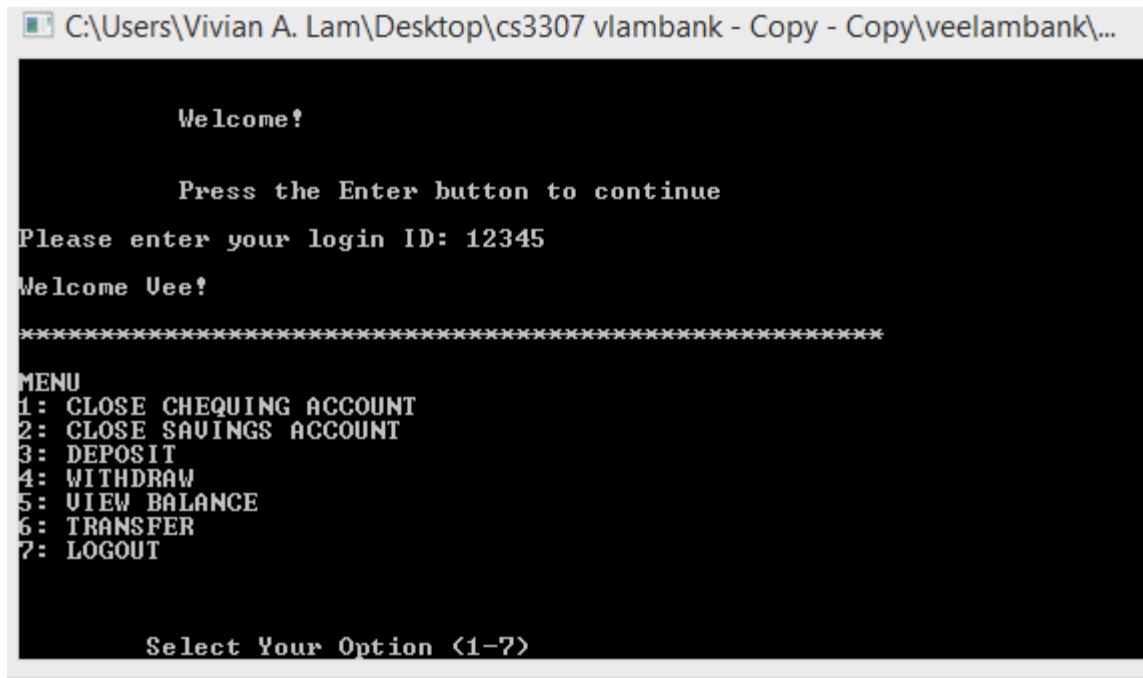
Upon loading



Client logs into the ATM.



Selects his/her Deposit account.



A screenshot of a Windows command prompt window. The title bar shows the file path: C:\Users\Vivian A. Lam\Desktop\cs3307 vlambank - Copy - Copy\veelambank\... The window contains the following text:

```
Welcome!

Press the Enter button to continue

Please enter your login ID: 12345

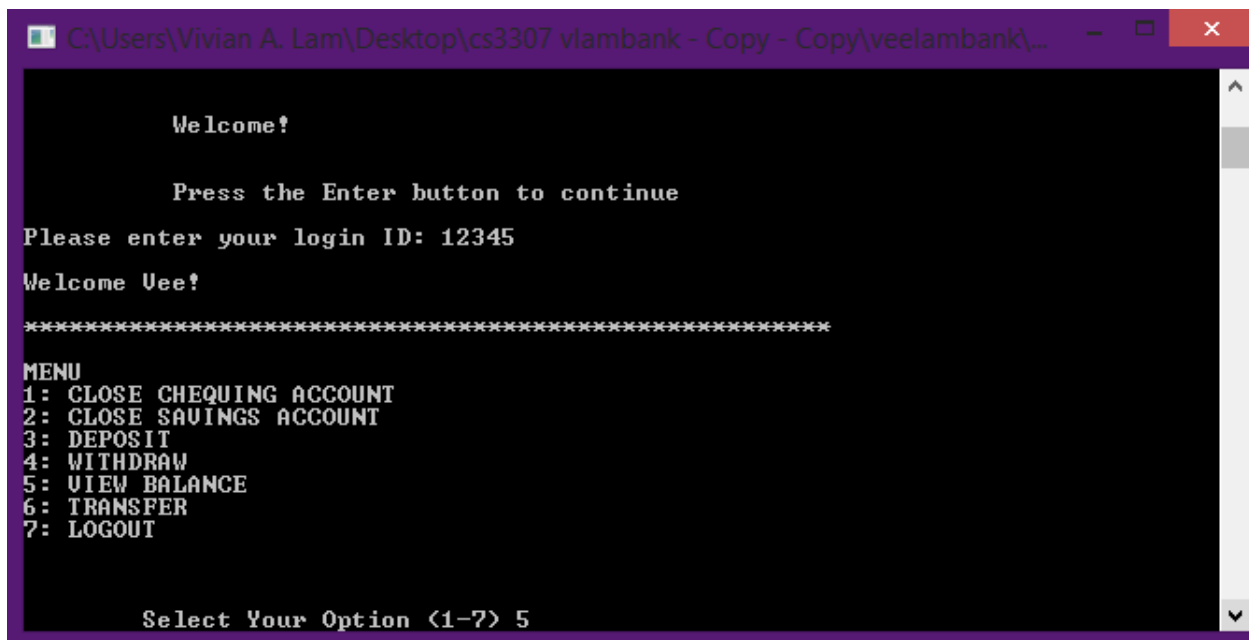
Welcome Uee!

*****

MENU
1: CLOSE CHEQUING ACCOUNT
2: CLOSE SAVINGS ACCOUNT
3: DEPOSIT
4: WITHDRAW
5: VIEW BALANCE
6: TRANSFER
7: LOGOUT

Select Your Option <1-7>
```

Checks the balance.



A screenshot of a Windows command prompt window, similar to the one above. The title bar shows the same file path. The window contains the following text:

```
Welcome!

Press the Enter button to continue

Please enter your login ID: 12345

Welcome Uee!

*****

MENU
1: CLOSE CHEQUING ACCOUNT
2: CLOSE SAVINGS ACCOUNT
3: DEPOSIT
4: WITHDRAW
5: VIEW BALANCE
6: TRANSFER
7: LOGOUT

Select Your Option <1-7> 5
```



```
C:\Users\Vivian A. Lam\Desktop\cs3307 vlambank - Copy - Copy\veelambank\...
6: TRANSFER
7: LOGOUT

      Select Your Option <1-7> 5

Chequings Account: $635.10
Savings Account:   $1000.80

*****

MENU
1: CLOSE CHEQUING ACCOUNT
2: CLOSE SAVINGS ACCOUNT
3: DEPOSIT
4: WITHDRAW
5: VIEW BALANCE
6: TRANSFER
7: LOGOUT

      Select Your Option <1-7>
```

Deposits CAD 20.

```
C:\Users\Vivian A. Lam\Desktop\cs3307 vlambank - Copy - Copy\veelambank\...
6: TRANSFER
7: LOGOUT

      Select Your Option <1-7> 5

Chequings Account: $635.10
Savings Account:   $1000.80

*****

MENU
1: CLOSE CHEQUING ACCOUNT
2: CLOSE SAVINGS ACCOUNT
3: DEPOSIT
4: WITHDRAW
5: VIEW BALANCE
6: TRANSFER
7: LOGOUT

      Select Your Option <1-7> 3
```

```
C:\Users\Vivian A. Lam\Desktop\cs3307 vlambank - Copy - Copy\veelambank\...
Select Your Option <1-7> 5
Chequings Account: $635.10
Savings Account:  $1000.80
*****
MENU
1: CLOSE CHEQUING ACCOUNT
2: CLOSE SAVINGS ACCOUNT
3: DEPOSIT
4: WITHDRAW
5: VIEW BALANCE
6: TRANSFER
7: LOGOUT

Select Your Option <1-7> 3
Which account would you like to deposit in?
1: CHEQUING ACCOUNT
2: SAVINGS ACCOUNT
3: CANCEL
```

```
C:\Users\Vivian A. Lam\Desktop\cs3307 vlambank - Copy - Copy\veelambank\...
Select Your Option <1-7> 5
Chequings Account: $635.10
Savings Account:  $1000.80
*****
MENU
1: CLOSE CHEQUING ACCOUNT
2: CLOSE SAVINGS ACCOUNT
3: DEPOSIT
4: WITHDRAW
5: VIEW BALANCE
6: TRANSFER
7: LOGOUT

Select Your Option <1-7> 3
Which account would you like to deposit in?
1: CHEQUING ACCOUNT
2: SAVINGS ACCOUNT
3: CANCEL
```

```
C:\Users\Vivian A. Lam\Desktop\cs3307 vlambank - Copy - Copy\veelambank\...  
Savings Account:    $1000.80  
*****  
MENU  
1: CLOSE CHEQUING ACCOUNT  
2: CLOSE SAVINGS ACCOUNT  
3: DEPOSIT  
4: WITHDRAW  
5: VIEW BALANCE  
6: TRANSFER  
7: LOGOUT  
  
    Select Your Option <1-7> 3  
Which account would you like to deposit in?  
1: CHEQUING ACCOUNT  
2: SAVINGS ACCOUNT  
3: CANCEL  
How much would you like to deposit?
```

```
C:\Users\Vivian A. Lam\Desktop\cs3307 vlambank - Copy - Copy\veelambank\...  
Savings Account:    $1000.80  
*****  
MENU  
1: CLOSE CHEQUING ACCOUNT  
2: CLOSE SAVINGS ACCOUNT  
3: DEPOSIT  
4: WITHDRAW  
5: VIEW BALANCE  
6: TRANSFER  
7: LOGOUT  
  
    Select Your Option <1-7> 3  
Which account would you like to deposit in?  
1: CHEQUING ACCOUNT  
2: SAVINGS ACCOUNT  
3: CANCEL  
How much would you like to deposit?  
20
```

System deposits the funds.

```

C:\Users\Vivian A. Lam\Desktop\cs3307 vlambank - Copy - Copy\veelambank\...
Which account would you like to deposit in?
1: CHEQUING ACCOUNT
2: SAVINGS ACCOUNT
3: CANCEL
How much would you like to deposit?
20
Deposited $20.00 into Chequing Account
*****
MENU
1: CLOSE CHEQUING ACCOUNT
2: CLOSE SAVINGS ACCOUNT
3: DEPOSIT
4: WITHDRAW
5: VIEW BALANCE
6: TRANSFER
7: LOGOUT

Select Your Option <1-7>

```

System displays the resultant balance. (select VIEW BALANCE from the menu)

```

C:\Users\Vivian A. Lam\Desktop\cs3307 vlambank - Copy - Copy\veelambank\...
6: TRANSFER
7: LOGOUT

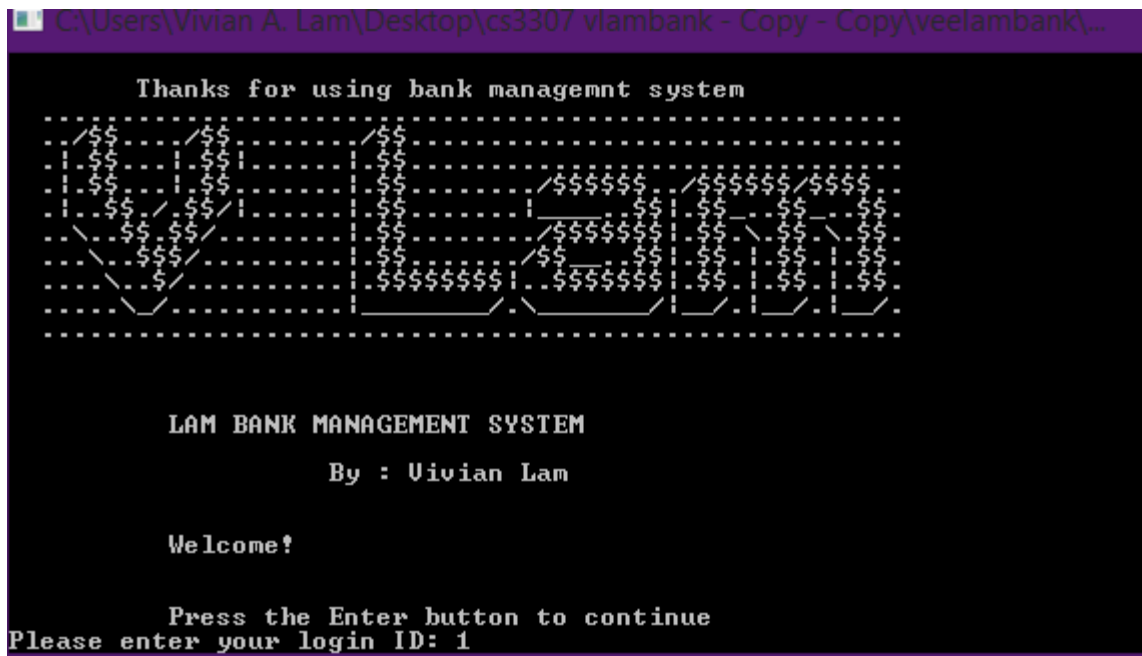
Select Your Option <1-7> 5
Chequings Account: $655.10
Savings Account:   $1000.80
*****
MENU
1: CLOSE CHEQUING ACCOUNT
2: CLOSE SAVINGS ACCOUNT
3: DEPOSIT
4: WITHDRAW
5: VIEW BALANCE
6: TRANSFER
7: LOGOUT

Select Your Option <1-7>

```

2. Manager creates an account

Manager logins



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```
C:\Users\Vivian A. Lam\Desktop\cs3307 vlambank - Copy - Copy\veelambank\...

LAM BANK MANAGEMENT SYSTEM

By : Vivian Lam

Welcome!

Press the Enter button to continue
Please enter your login ID: 1
Welcome Manager!

*****

MENU
1: CREATE AN ACCOUNT
2: DELETE AN ACCOUNT
3: DISPLAY AN ACCOUNT'S DETAILS
4: DISPLAY ALL ACCOUNTS
5: LOGOUT

Select Your Option <1-5>
```

```
C:\Users\Vivian A. Lam\Desktop\cs3307 vlambank - Copy - Copy\veelambank\...

LAM BANK MANAGEMENT SYSTEM

By : Vivian Lam

Welcome!

Press the Enter button to continue
Please enter your login ID: 1
Welcome Manager!

*****

MENU
1: CREATE AN ACCOUNT
2: DELETE AN ACCOUNT
3: DISPLAY AN ACCOUNT'S DETAILS
4: DISPLAY ALL ACCOUNTS
5: LOGOUT

Select Your Option <1-5> 1
```

Enter in details: first and last name (in this example: Jonathan; Joestar. The account number is auto generated)

```

*****
MENU
1: CREATE AN ACCOUNT
2: DELETE AN ACCOUNT
3: DISPLAY AN ACCOUNT'S DETAILS
4: DISPLAY ALL ACCOUNTS
5: LOGOUT

      Select Your Option <1-5> 1
Please enter the first name of the new Customer.
To cancel, enter 0.
Jonathan
Please enter the last name of the new Customer.
To cancel, enter 0.
Joestar
Account #12346 for user Jonathan Joestar was successfully created.
*****

```

System creates a new account

System displays the new account data (select option 3 from main menu and then enter in the right account number. Below I have accidentally entered a non-existent account number, followed by the correct account number)

```

MENU
1: CREATE AN ACCOUNT
2: DELETE AN ACCOUNT
3: DISPLAY AN ACCOUNT'S DETAILS
4: DISPLAY ALL ACCOUNTS
5: LOGOUT

      Select Your Option <1-5> 3
Please enter an account to view.
To cancel, enter 0.
123456
Account 123456 could not be found.
Please enter an account to view.
To cancel, enter 0.
12346
*****
Account Number:      12346
Name:                Joestar, Jonathan
Savings Account:     $0.00
Chequing Account:    $0.00
Dept:                $0.00
*****

```

3. Maintenance operator turns on execution trace and views the traced files

Maintenance operator logs in

[illegible]

```

.....

      LAM BANK MANAGEMENT SYSTEM

            By : Vivian Lam

Welcome!

      Press the Enter button to continue
Please enter your login ID: 0

Welcome Maintenaner!

*****---What would you like to do?---*****
1: TURN EXECUTION TRACE ON/OFF
2: PRINT EXECUTION TRACE
3: CLEAR EXECUTION TRACE LOG
4: LOGOUT

      Select Your Option <1-4>

```

Selects execution trace to be on (select option 1 from main menu, then select 1 again to turn it on)


```

Welcome Maintenaner!

*****---What would you like to do?---*****
1: TURN EXECUTION TRACE ON/OFF
2: PRINT EXECUTION TRACE
3: CLEAR EXECUTION TRACE LOG
4: LOGOUT

      Select Your Option <1-4> 1
Execution tracing is OFF. Do you want to switch it ON?
1: Yes
2: No
1
Execution tracing is ON.

```

Print out execution trace (option 2 from main menu)

```

C:\Users\Vivian A. Lam\Desktop\cs3307 vlambank - Copy - Copy\veelambank\...

Welcome Maintenaner!

*****---What would you like to do?---*****
1: TURN EXECUTION TRACE ON/OFF
2: PRINT EXECUTION TRACE
3: CLEAR EXECUTION TRACE LOG
4: LOGOUT

      Select Your Option <1-4> 1
Execution tracing is OFF. Do you want to switch it ON?
1: Yes
2: No
1
Execution tracing is ON.

*****---What would you like to do?---*****
1: TURN EXECUTION TRACE ON/OFF
2: PRINT EXECUTION TRACE
3: CLEAR EXECUTION TRACE LOG
4: LOGOUT

      Select Your Option <1-4> 2

```

Note that it also shows on screen

```

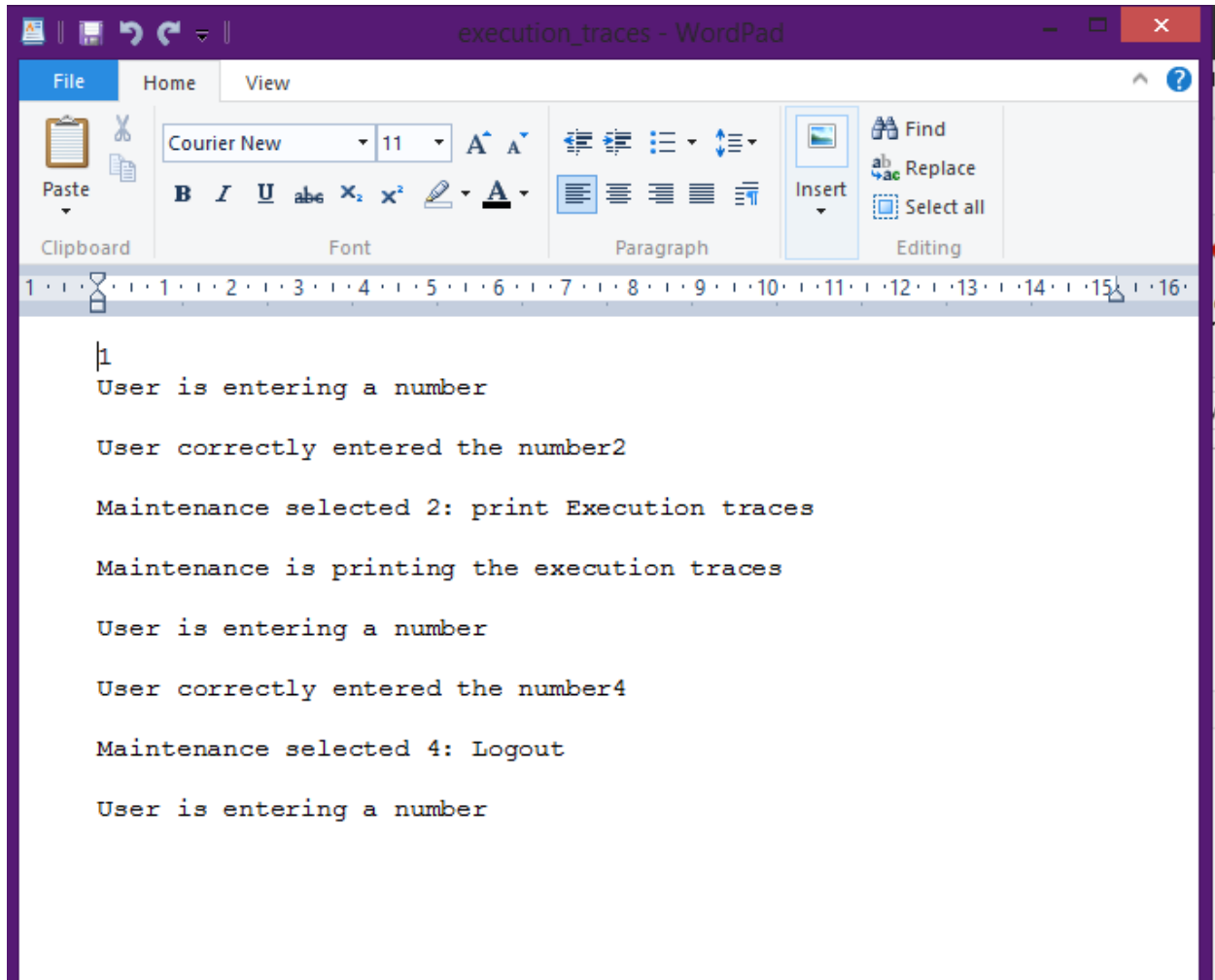
C:\Users\Vivian A. Lam\Desktop\cs3307 vlambank - Copy - Copy\veelambank\...

*****---What would you like to do?---*****
1: TURN EXECUTION TRACE ON/OFF
2: PRINT EXECUTION TRACE
3: CLEAR EXECUTION TRACE LOG
4: LOGOUT

      Select Your Option <1-4> 2
User is enterng a number
User correctly entered the number2
Maintenance selected 2: print Execution traces
Maintenance is printing the execution traces

```

View the .txt file (note that it will only show the trace for this scenario because that's when execution trace was turned on)



```
1
User is entering a number

User correctly entered the number2

Maintenance selected 2: print Execution traces

Maintenance is printing the execution traces

User is entering a number

User correctly entered the number4

Maintenance selected 4: Logout

User is entering a number
```

4. Manager deletes an account

Manager logs in

```

C:\Users\Vivian A. Lam\Desktop\cs3307 vlambank - Copy - Copy\veelambank\...

Thanks for using bank managemnt system

LAM BANK MANAGEMENT SYSTEM
By : Uivian Lam

Welcome!

Press the Enter button to continue
Please enter your login ID: 1

```

Manager selects delete an account

```

C:\Users\Vivian A. Lam\Desktop\cs3307 vlambank - Copy - Copy\veelambank\...

LAM BANK MANAGEMENT SYSTEM
By : Uivian Lam

Welcome!

Press the Enter button to continue
Please enter your login ID: 1

Welcome Manager!

*****

MENU
1: CREATE AN ACCOUNT
2: DELETE AN ACCOUNT
3: DISPLAY AN ACCOUNT'S DETAILS
4: DISPLAY ALL ACCOUNTS
5: LOGOUT

Select Your Option <1-5> 2

```

Enters in the account to be deleted (and enters 1 to confirm)

```

C:\Users\Vivian A. Lam\Desktop\cs3307 vlambank - Copy - Copy\veelambank\...
Press the Enter button to continue
Please enter your login ID: 1
Welcome Manager!
*****

MENU
1: CREATE AN ACCOUNT
2: DELETE AN ACCOUNT
3: DISPLAY AN ACCOUNT'S DETAILS
4: DISPLAY ALL ACCOUNTS
5: LOGOUT

Select Your Option <1-5> 2
Please enter an account number to delete.
To cancel, enter 0.
12346
Are you sure you want to delete account #12346 owned by Joestar, Jonathan?
1: Yes
2: No
1

```

System deletes the account

```

Select Your Option <1-5> 2
Please enter an account number to delete.
To cancel, enter 0.
12346
Are you sure you want to delete account #12346 owned by Joestar, Jonathan?
1: Yes
2: No
1
Account #12346 successfully removed.
*****

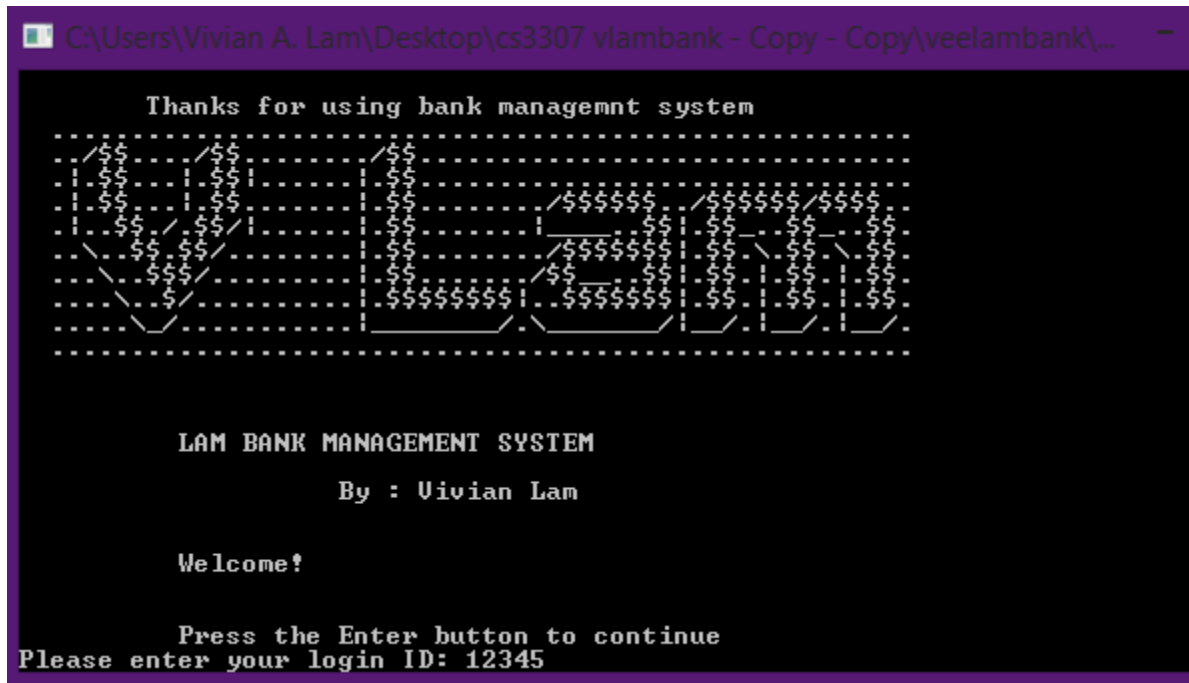
MENU

```

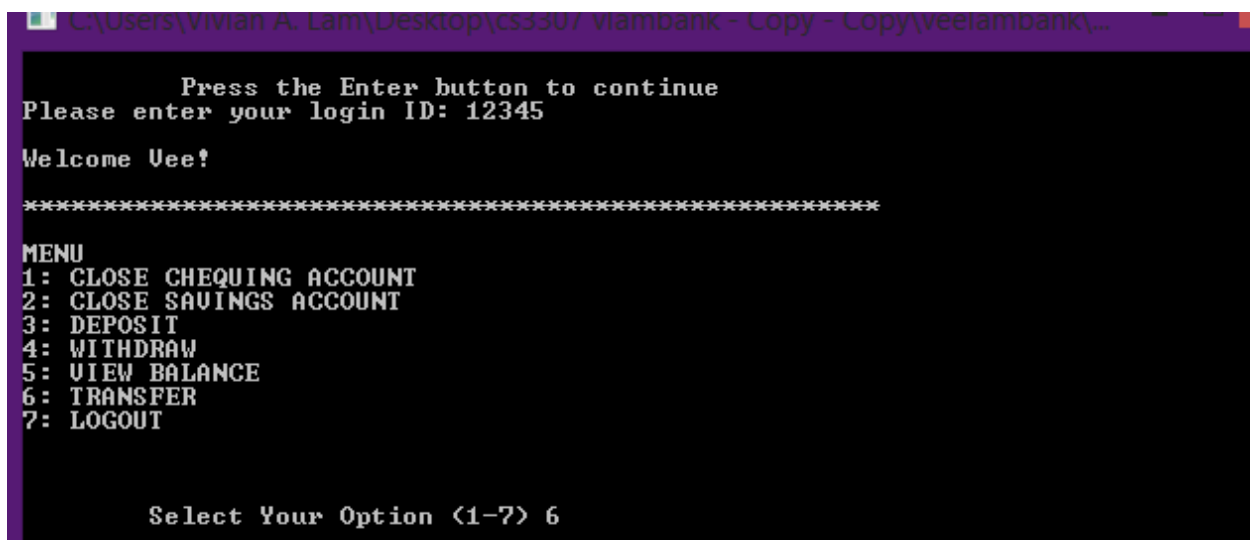
System shows that the account no longer exists

5. Customer transfers funds

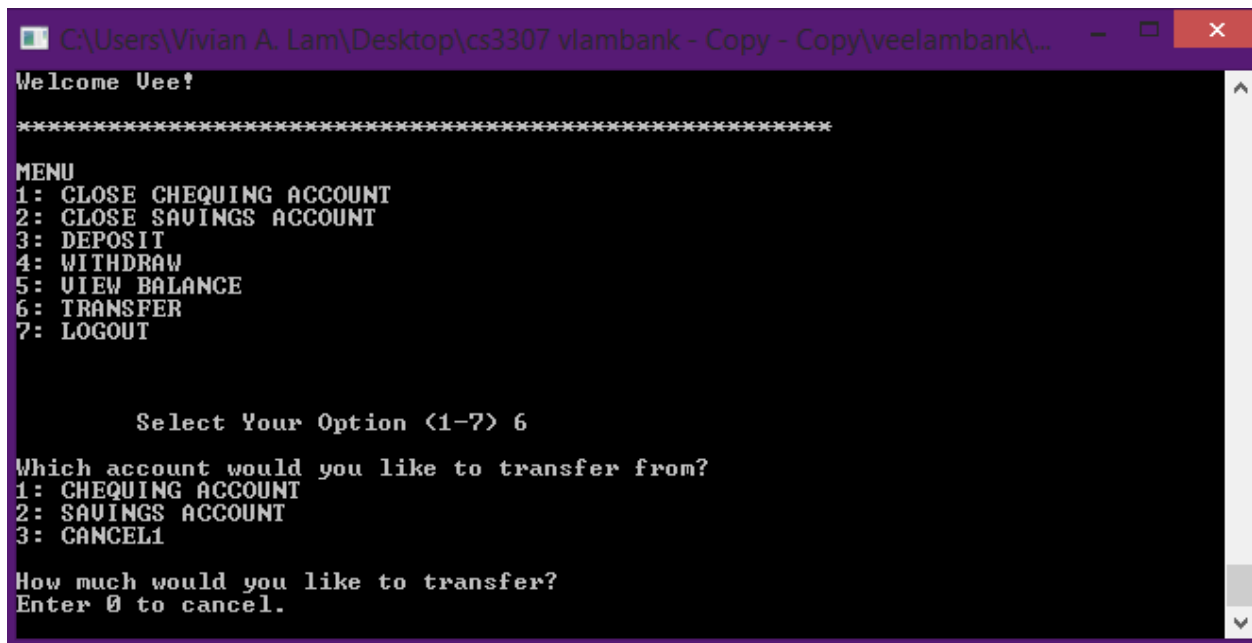
Customer logs in



Customer selects transfer funds



Customer selects which account to transfer from



```
C:\Users\Vivian A. Lam\Desktop\cs3307 vlambank - Copy - Copy\veelambank\...
Welcome Vee!

*****

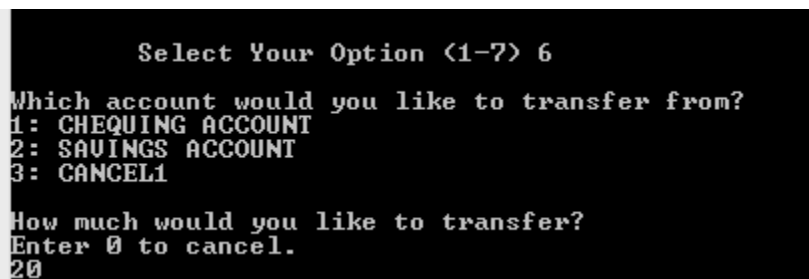
MENU
1: CLOSE CHEQUING ACCOUNT
2: CLOSE SAVINGS ACCOUNT
3: DEPOSIT
4: WITHDRAW
5: VIEW BALANCE
6: TRANSFER
7: LOGOUT

      Select Your Option <1-7> 6

Which account would you like to transfer from?
1: CHEQUING ACCOUNT
2: SAVINGS ACCOUNT
3: CANCEL
1

How much would you like to transfer?
Enter 0 to cancel.
```

Customer selects amount



```
      Select Your Option <1-7> 6

Which account would you like to transfer from?
1: CHEQUING ACCOUNT
2: SAVINGS ACCOUNT
3: CANCEL
1

How much would you like to transfer?
Enter 0 to cancel.
20
```

System transfer funds and applies warning if appropriate

```

C:\Users\Vivian A. Lam\Desktop\cs3307\viambank - Copy - Copy\veelambank\...
2: CLOSE SAVINGS ACCOUNT
3: DEPOSIT
4: WITHDRAW
5: VIEW BALANCE
6: TRANSFER
7: LOGOUT

      Select Your Option <1-7> 6

Which account would you like to transfer from?
1: CHEQUING ACCOUNT
2: SAVINGS ACCOUNT
3: CANCEL
Enter 0 to cancel.
20
Because this transaction will bring your chequing account's balance below $1000.00, a $2.00 fee will applied. Do you wish to continue?
1: Yes
2: No

```

System displays the new account data

```

C:\Users\Vivian A. Lam\Desktop\cs3307\viambank - Copy - Copy\veelambank\...
Because this transaction will bring your chequing account's balance below $1000.00, a $2.00 fee will applied. Do you wish to continue?
1: Yes
2: No
1
Successfully transferred $20.00 from your chequing account to your savings account.
Your chequing balance is $633.10
Your savings balance is $1020.80

*****

```

Deliverable 5: Implementation of the enhanced requirements

Implemented login by having the program read text files (ones for customers and ones for manager/maintenance staff). If the ID numbered entered does not exist in any of the text files, the system will detect it as an invalid login. If the number does exist in the system, then it will be read and the corresponding customer and their details will be loaded. Customers is a vector array and each attribute of them is written to the file, accessed by a pointer. Sstream and iostream make this possible

Deliverable 6: What I learned

- Header files help keep the program neat. I should use them more.
- Pointers can reference anything, from a data structure to a variable etc.
- Function declaration helps the compiler and program know what types to accept, especially if the actual function is defined somewhere else later.
- The double colon “::” before a function ensures that resolution occurs from the global namespace instead of local namespace.
- I already knew about function prototypes from C, so I got more practice using them.
- C++ syntax