Topic:

ATM Machine Connected to Bank.

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Abstract:

Today, in the world, handling finance is made easy by the technological improvements and inventions. The improvement has come in all sorts of stuffs as well in finance, if it is either privacy, safety or management, these all are made easy and handle quite well by user friendly machine. All these machine require some codes to process data and do the tasks for their users.
One of these machine is ATM(Auto Teller Machine), which helps people to access their accounts, easily. User can deposit ,withdraw or check their balance in their account. The functionality in ATM would require an Account in the Bank and a Debit Card with its Card number and pin. ATMs, nowadays, are more popular. Instead of, standing in hefty and long Queues, every personnel in the world prefer the choice of ATMs.

Working:

The project start with ATM , Bank and Quit, available as option to choose from. The ATM option is for the customer and user of the ATM machine. While the Bank section is assumed to be only for the bank employees, who can use it and manipulate account settings for the user and make appropriates changes.
When ATM option is selected, we have simulated a design, as to one of the many customers enter their card in the machine. After that the machine asks for the pin code of the user.If the pin code is incorrect it offers two more extra tries, if the pin again are wrong in the successive tries it then closes the ATM and print user a message, that too many tries were executed, try again later. And If the pin code is inputted correctly then user will be allowed to use the ATM on his account. In ATM menu user sees 6 option available: inquire balance, deposit ,withdraw,Account Details, change pin code and quit ATM. User can use these choices to check the current balance, withdraw or deposit from/to account. They can check their detail and also change their pin code for ATM.

Selecting the Bank choice , ask for a pin to access the Bank menu. Assumed, Only the bank and its several employees have the pin code for it. After the success of correct pin, Bank menu appears which has 5 option available: Create Account, Set limit, display account details, Create debit card for account and Quit. The bank employee can use it to create new accounts, set specific amount of limit on withdrawal, display account details for customers using Account number, and creating debit card for those customer who do not possess one.

Note: In reality, Both the ATM and Bank will be on different machine but still connected the same way we have simulated.

Code workflow:

First the program opens and read the account details from file then it calls the topmenu function. In which if choice 1 is selected the customer selection function is called to simulate a customer inputting hi debit card in ATM. Then the Check pin function is called which asks user to input pin. It compare it with the account pin, if it does not match, two more tries are provided and if fails after that the function prints message and return 0. and we get to the Top menu back. If the pin is input correct them we have access to Different option. If 1 press the account balance is printed. In deposit and credit amount is input which is added or subtracted from balance. The change pin function asks user to change account pin by entering current pin first to verify and then new pin to change. In detail menu simply detail are printed through account display function.

If instead bank choice is selected the bank check pin function is called which asks employee to enter the bank pin, if input pin wrong then it returns 0 and we get back to topmenu. If input pin is correct we get accessed to creating account which makes a new class object calls get value function on it after that it is written to file after that the total account count is increases and the data in *b(stores all account at runtime) is updated through refresh function. If Set limit choice is selected , it asks for account number on which the limit is to be change. Then employee enters limit and through set limit function it gets assigned. If display account detail option is selected it asks user to input account number then calls matching account function on that input, and if there is match its details are displayed through display function of Account class. If creating debit card option is selected it first check if the person has debit card or not. If he does not have debit card then it creates it for him.

Algorithm:

Structure.h

In structure file we have composed the structures used in this project. We have one structure name Personal info and another Account info, both these structure are used in the Account class(discussed later) to store personal and account data in one unit.
In personal info structure we have the name, phone number , address and NIC number of the person. While in the account structure, we have the name of bank where the account is, the banks branch code and the Account number of person.
Each of the member of these structure are character arrays of appropriate size.
Note: String are avoided here due to complication and obstruction cause by it while being written to file (fully explained later).

Bank.h and Bank.cpp
This file contain the abstract class Bank with Debit, credit, get_balance , get and set limit pure virtual function. The cpp file is empty. It has data member as withdrawal limit for account, starting deposit amount for account a flag which ensure first transaction.This class is also inherited by account class(discussed later). the main function of this class is, if the software is to be modified for another bank with different set of rules and regulation or any extra functionality , they can do the modification here and override it in the Account class. Right now it has the default functionalities written to it like deposit,withdrawal etc.

Card.h and Car.cpp
The Card class one of the important class. This class' object(has-a relation) is contained in account class(discussed later) where it access the account information , detail and combines with it to work on ATM. This class has two data member Card number and pin code. It has constructor which initialize both the data member to "None", used when the person create account but not the debit card. There is set_function for both data member,combined. We also have input_pin function which

is used in creating Debit card from Bank section. Create_card_no function is used to generate the Debit Card number for user. There also setter and getter function for pin code used in changing or setting different pin code and/or matching them with user inputted one. Also the card class has Account class as a friend which means Account has also connection with Card class.

Account.h and Account.cpp
The main class around which the whole projects stands is the Account class. It has 2 structure Personal info and Account info(discussed above) and balance as well Card class object(discussed above) as data member. It inherits from the Bank class(discussed above).
It has constructor which initialize each of data member inside of structure with None and the balance to zero. Also there is set values function which assign each values with the values provided to the function. The set function is also overloaded and the data for debit card is included in it. One is for when just account is created. Another, when account and associated Debit card is created at same time.Then we have the Credit and Debit function which deposit or withdraw amount from balance. After that we have the display function which display all the account details. We also have a get values function which is called when creating account at runtime. it asks user to input data for their account.We have create_card function which is used to call the Card class input pin function, so that we abide by rules of encapsulation. Then we have get_balance function which return the balance. After that we have a check_pin function which is used to give access to user, based on pin enter, if correct pin enter then allow else not allow them if the pin is incorrect. Then we have setLimit and get limit which are overrode to set the account limits or return it for checking or other purpose. We have then get function for Acc_num only, one for the personal info structure. After that we have change pin function which changes the user current pin to new one. We also have get function for returning card_number.

Global_variable.h and Global_variable.cpp
In this class we have variable that are global to the whole project. We have declared them with "extern" which means their scope extends to the file, in which this file is included. They are initialized in the cpp file. The AccsizeInfile variable holds how many account are currently there and also used in writing and reading accounts from file easily. The data read from file is stored in *b. Also when account is created data is written to file and the *b is updated as well.

Functions.h and function.cpp
This is also one of the important part of the project.
We have first account matching function which is used to find account using account number. Then we have Disp ATM menu function which prints the display the ATM menu. After that we have ATM response function which response to user choice inputted in Topmenu function(discussed below), like withdrawal ,deposit etc choice and calls appropriate function to perform that task. We also have bank Menu and Bank response similar to the ATM menu and ATM response. They just had different functionalities and choices. We also have function that prints all account details. Refresh file function which is used for updating the count on number of accounts and refreshing the *b which stores all the account it is usually called after an account is created and written to file. Customer selection function function is used for simulating behaviour of selecting different user entering the Debit card into ATM. After that we have the topMenu function where the whole project starts, it prints the first menu asking for options ATM or Bank or Quit. Then when one of them is chosen the flows goes from there into different section(discussed above).

Main.cpp

In main function we have first written some Accounts to file, then commented it. After starting the program. We have first read the total account from files. There is also exception handling on the reading from file if any error occurs it will print it. Also when the read is success the Topmenu function is called which then proceeds the whole project forward discussed in workflow(above).

Why not string instead of char array?
We have omitted the use of string in classes because when the string are written to file. There construction is so that they are accessed by pointer having an address. That address is also stored with the string contents like it data length etc, So writing is fine. But when the string are read back from the file the address is read from file too and that is used to access them. But a problem occurs if the data is stored to file and the program is closed and rerun again the address that is read for that string from file now is out of bounds and has garbage in it. So accessing that causes Memory violation. So in order to avoid we have used character array which are written as 1 byte character and are fine with reading or writing, there are no pointer involved. Still the string are used as formal parameter because they are easy to input and output, in member function, but they are converted to Char array when they were stored in data members of the class, through c_str().