#include<iostream>

#include<fstream>

#include<cstring>

#include<string.h>

#include<algorithm>

#include<ctime>

#include<stdlib.h>

using namespace std;

// File Structure:

// Bank\_Accounts File (Sequential File with Details of all acounts)

// Every Bank Account will have its own transaction file which will maintain the transactions of

// That particular bank account.

// To access these transaction files we will use a hash code

// the hash code is a 12 digit code generated using account holder credentials like:

// 1. Aadhar Number

// 2. NAME

// 3. Email

// Name convention used for transaction files is "hashcode"+"transactions.data"

// Example the Bank has 3 accounts

// Bank\_Accounts.data:

// person1-info / person2-info / person3-info

// AccountNumber == HashCode Generated using person details

// 3 Separate files will be created named

// AccountNumberPerson1transaction.data / AccountNumberPerson2transaction.data / AccountNumberPerson3transaction.data

// These files will have info of every transaction made by that account holder form opening

// the account till the account is deleted. This will help in keeping record of all transactions

// the time stamp will help user in authenticating the transaction

// Class Bank

// Will contain accounts of all people

class Bank{

// Struct account details will store personal info of customer as well as the pin

struct Account\_Details{

string account\_number;

string account\_holder\_name;

string account\_holder\_email;

string address;

string gender;

int age;

int pin;

long long int aadhar\_number;

}acc;

// Struct Account\_Transactions will store data related to transactions along with the pin

struct Account\_Transactions{

int balance;

int withdrawn;

int deposited;

string time\_stamp;

int pin;

}trans;

// Stores the total number of accounts in the bank

int total\_accounts;

public:

Bank(){

// initialize total\_accounts to 0

total\_accounts = 0;

}

string hash\_key(long long int, string, string);

string time\_stamps();

void withdraw();

void deposit();

void add\_new\_account();

void delete\_account();

void modify\_account\_details();

void search\_account();

};

// Return time stamp at which a transaction has occured such as witdrawal and deposit

string Bank::time\_stamps(){

// Header file <ctime> required

time\_t now = time(0);

tm \*current\_time = localtime(&now);

// tm\_year returns years from 1900 so we add 1900 to years

int year = 1900 + current\_time->tm\_year;

// Months are 0 based indexed so we add 1

int month = 1 + current\_time->tm\_mon;

int day = current\_time->tm\_mday;

int hours = current\_time->tm\_hour;

int mins = current\_time->tm\_min;

int sec = current\_time->tm\_sec;

return to\_string(year)+"/"+to\_string(month)+"/"+to\_string(day)+" "+to\_string(hours)+":"+to\_string(mins)+":"+to\_string(sec);

}

// Modify details of a account

// All details cannot be modified

// Only Age, Gender, Address fields can be changed

void Bank::modify\_account\_details(){

string acc\_number, gender, address;

int pin;

int option, flag\_1 = 1, flag\_2=0, age;

int a\_flag=0, g\_flag=0, ad\_flag = 0;

cout<<"Enter the Account Number: ";

cin>>acc\_number;

cout<<"Enter your pin: ";

cin>>pin;

int counter = 0;

// Take input for required changes

while(true){

cout<<"Menu: "<<endl;

cout<<"1. Age"<<endl;

cout<<"2. Gender"<<endl;

cout<<"3. Address"<<endl;

cout<<"Enter your choice: ";

cin>>option;

switch(option){

case 1:{

cout<<"Enter Age: ";

cin>>age;

a\_flag = 1;

break;

}

case 2:{

cout<<"Enter Gender: ";

cin>>gender;

g\_flag = 1;

break;

}

case 3:{

cout<<"Enter Address: ";

cin>>address;

ad\_flag = 1;

break;

}

default:{

cout<<"Invalid Option!"<<endl;

break;

}

}

cout<<"Do you want to modify any other field? ";

cin>>flag\_1;

if(!flag\_1){

break;

}

}

fstream file;

// open file in input mode

file.open("Bank\_Accounts.data", ios::in|ios::binary);

while(file.read((char \*)&acc, sizeof(acc))){

if(acc\_number == acc.account\_number){

// if account number matches check the pin and if pin matches

// Proceed with the changes

// Else break

if (acc.pin == pin){

file.close();

cout<<counter;

// Open file in write mode

file.open("Bank\_Accounts.data", ios::out|ios::binary);

// file pointer should point record to be updated;

file.seekp(sizeof(acc)\*(counter), ios::beg);

cout<<"Account Found"<<endl;

cout<<"Changes Successfully applied!"<<endl;

// Whichever flag is set thse records will be changed

if(a\_flag)

acc.age=age;

if(g\_flag)

acc.gender=gender;

if(ad\_flag)

acc.address=address;

file.write((char \*)&acc, sizeof(acc));

file.close();

flag\_2=1;

break;

}

else{

cout<<"Wrong PIN!"<<endl;

file.close();

break;

}

}

counter++;

}

if(!flag\_2){

cout<<"Account not found!"<<endl;

}

cout<<endl;

}

// Withdraw amount

void Bank::withdraw(){

string account\_number;

int balance, withdraw\_amount, pin;

// input account number and pin

cout<<"Enter your Bank Account Number: ";

cin>>account\_number;

cout<<"Enter your pin: ";

cin>>pin;

fstream file;

// Open transaction file and check for the pin

// If pin does not match break and exit elese continue

// Update transaction in transaction file

string file\_name = account\_number+"transactions.data";

file.open(file\_name, ios::in|ios::binary);

if(file){

while(file.read((char \*)&trans, sizeof(trans))){

if(trans.pin != pin){

cout<<"Wrong PIN!"<<endl;

file.close();

return;

}

balance = trans.balance;

}

file.close();

cout<<"Your current balance is: "<<balance<<endl;

cout<<"Enter the amount of money you would like to withdraw: ";

cin>>withdraw\_amount;

// if withdral isgreater than balance break and print invalid transaction

if(withdraw\_amount > balance){

cout<<"Transaction not possible due to insufficient balance!"<<endl;

}

else{

file.open(file\_name, ios::app|ios::binary);

balance = balance - withdraw\_amount;

trans.balance = balance;

trans.deposited = 0;

trans.withdrawn = withdraw\_amount;

trans.time\_stamp = time\_stamps();

file.seekp(0, ios::end);

file.write((char \*)&trans, sizeof(trans));

file.close();

cout<<"Withdrawal Successful..."<<endl;

cout<<"Current balance: "<<trans.balance<<endl;

}

}

else{

cout<<"No such Account Exists!";

}

}

void Bank::deposit(){

string account\_number;

int balance, deposit\_amount, pin;

// input account number and pin

cout<<"Enter your Bank Account Number: ";

cin>>account\_number;

cout<<"Enter your pin: ";

cin>>pin;

// Open transaction file and check for the pin

// If pin does not match break and exit elese continue

// Update transaction in transaction file

fstream file;

string file\_name = account\_number+"transactions.data";

file.open(file\_name, ios::in|ios::binary);

if(file){

while(file.read((char \*)&trans, sizeof(trans))){

if(trans.pin != pin){

cout<<"Wrong PIN!"<<endl;

file.close();

return;

}

balance = trans.balance;

}

file.close();

file.open(file\_name, ios::app|ios::binary);

cout<<"Your current balance is: "<<balance<<endl;

cout<<"Enter the amount of money you would like to deposit: ";

cin>>deposit\_amount;

balance = balance + deposit\_amount;

trans.balance = balance;

trans.deposited = deposit\_amount;

trans.withdrawn = 0;

trans.time\_stamp = time\_stamps();

file.seekp(0, ios::end);

file.write((char \*)&trans, sizeof(trans));

cout<<"Money Sucessfully Deposited...."<<endl;

cout<<"Current Account Balance: "<<balance<<endl;

cout<<endl;

file.close();

}

else{

cout<<"No such Account Exists!";

}

}

void Bank::add\_new\_account(){

cout<<endl;

cout<<"New account is being created..."<<endl;

cout<<"Enter Bank Account Holder Name: ";

cin>>acc.account\_holder\_name;

cout<<"Enter the MailID of the Account Holder: ";

cin>>acc.account\_holder\_email;

while (true){

cout<<"Enter Aadhar Number of the Account Holder: ";

cin>>acc.aadhar\_number;

if(to\_string(acc.aadhar\_number).length() == 12){

break;

}

}

cout<<"Enter the Age of the Account Holder: ";

cin>>acc.age;

cout<<"Enter the Address of the Account Holder: ";

cin>>acc.address;

cout<<"Enter the gender of the Account Holder: ";

cin>>acc.gender;

acc.account\_number = hash\_key(acc.aadhar\_number, acc.account\_holder\_name, acc.account\_holder\_email);

fstream file;

file.open(acc.account\_number+"transactions.data", ios::in|ios::out|ios::binary);

if(file){

cout<<"Account already exists!"<<endl;

file.close();

return;

}

file.close();

cout<<"Your Bank Account Number is: "<<acc.account\_number<<endl;

cout<<"Enter the pin you want to set: ";

cin>>trans.pin;

acc.pin = trans.pin;

cout<<"Enter the Amount you want to deposit into your account: ";

cin>>trans.balance;

trans.deposited = 0;

trans.withdrawn = 0;

trans.time\_stamp = time\_stamps();

string transaction\_file\_name = acc.account\_number + "transactions.data";

ofstream out;

out.open("Bank\_Accounts.data", ios::app|ios::binary);

out.seekp(0, ios::end);

out.write((char \*)&acc, sizeof(acc));

out.close();

out.open(transaction\_file\_name, ios::app|ios::binary);

out.seekp(0, ios::end);

out.write((char \*)&trans, sizeof(trans));

out.close();

cout<<"Bank Account successfully created..."<<endl;

total\_accounts++;

}

// Hash Function

string Bank::hash\_key(long long int number, string str1, string str2){

long long int hash\_1 = 0;

int multiplier = 227;

// transform both the strings to lowercase

transform(str1.begin(), str1.end(), str1.begin(), ::tolower);

transform(str2.begin(), str2.end(), str2.begin(), ::tolower);

// concat the strings

string word = str1 + str2;

// Use formula hash = hash\*multiplier + word[char]

// word[char] will directly get typecasted as integer

for(int i=0; i<word.length(); i++){

hash\_1 = (hash\_1 \* multiplier) + word[i];

}

// Multiply the hash value by aadhar nuber

// Take mod of hash

long long int hash\_2 = number \* hash\_1;

hash\_2 = hash\_2 % 100000000000;

// we now convert the hash to string

string hash\_3 = to\_string(hash\_2);

// now every alternate number in hash code will get replaced by a char in word

for(int i = 0; i<word.length(); i=i+2){

if(hash\_3.length()>i){

hash\_3[i] = word[i];

}

}

// After these operations if the hash length is not 12

// Either slice the hash or add more chars depending on its length

if(hash\_3.length()>12){

hash\_3 = hash\_3.substr(0, 11);

}

else if(hash\_3.length()<12){

string num = to\_string(number);

int i = 0;

while(hash\_3.length()<12){

hash\_3 = hash\_3 + num[i];

i++;

}

}

return hash\_3;

}

void Bank::delete\_account(){

string account\_number;

cout<<"Enter your Bank Account Number: ";

cin>>account\_number;

int flag=0;

ifstream file1;

ofstream file2;

file1.open("Bank\_Accounts.data", ios::in | ios::binary);

file2.open("New\_Bank\_Accounts.data", ios::out | ios::binary);

while(file1.read((char \*)&acc, sizeof(acc))){

if(acc.account\_number != account\_number){

file2.write((char \*)&acc, sizeof(acc));

}

else{

flag = 1;

}

}

file1.close();

file2.close();

string transaction\_file\_name = account\_number + "transactions.data";

char char\_arr[300];

remove("Bank\_Accounts.data");

rename("New\_Bank\_Accounts.data", "Bank\_Accounts.data");

strcpy(char\_arr, transaction\_file\_name.c\_str());

remove(char\_arr);

if (flag){

cout<<"Record successfully deleted!"<<endl;

total\_accounts--;

}

else{

cout<<"Account with provided credentials not found!"<<endl;

}

}

// Search will display the personal records and will also have an option to

// See the transactions of the account holder

void Bank::search\_account(){

string account\_number;

// Input pn and account number

cout<<"Enter your Bank Account Number: ";

cin>>account\_number;

int flag=0, t\_details = 0, current\_balance = 0;

int pin;

cout<<"Enter ypur pin: ";

cin>>pin;

ifstream in\_1, in\_2;

in\_1.open("Bank\_Accounts.data", ios::in|ios::binary);

while(in\_1.read((char \*)&acc, sizeof(acc))){

// if account number and the pin both match the record show the data

// Personal data will be followed by transaction data

if(account\_number == acc.account\_number && acc.pin == pin){

cout<<"Account Found: "<<endl;

cout<<"Account Details are as following: "<<endl;

cout<<"Account Number: "<<acc.account\_number<<endl;

cout<<"Account Holder Name: "<<acc.account\_holder\_name<<endl;

cout<<"Account Holder Email: "<<acc.account\_holder\_email<<endl;

cout<<"Account Holder Gender: "<<acc.gender<<endl;

cout<<"Account Holder Age: "<<acc.age<<endl;

cout<<"Account Holder Address: "<<acc.address<<endl;

cout<<"Account Holder Aadhar Number: "<<acc.aadhar\_number<<endl;

cout<<"Do you want to look at the transaction details? (Yes:1 | No:0)";

cin>>t\_details;

if(t\_details){

cout<<"Displaying Transaction details: "<<endl;

string trans\_file = account\_number+"transactions.data";

in\_2.open(trans\_file, ios::in|ios::binary);

while(in\_2.read((char \*)&trans, sizeof(trans))){

cout<<endl;

current\_balance = trans.balance;

cout<<"Balance: "<<trans.balance<<endl;

cout<<"Deposited: "<<trans.deposited<<endl;

cout<<"Withdrawn: "<<trans.withdrawn<<endl;

cout<<"Time-Stamp: "<<trans.time\_stamp;

cout<<endl;

}

cout<<"Your current Balance is: "<<current\_balance<<endl;

}

else{

cout<<"Details are as above"<<endl;

}

flag = 1;

}

}

// If record is not found display essage

if(!flag){

cout<<"No account was found! or you entered wrong pin...."<<endl;

}

// close both the files

in\_1.close();

in\_2.close();

}

int main(){

Bank bank;

int option, flag = 1;

while(true){

cout<<"Menu:"<<endl;

cout<<"1. Create New Account"<<endl;

cout<<"2. Delete Account"<<endl;

cout<<"3. Search Account"<<endl;

cout<<"4. Deposit Money"<<endl;

cout<<"5. Withdraw Money"<<endl;

cout<<"6. Change Account Details"<<endl;

cout<<"7. Exit"<<endl;

cout<<"Enter your choice: ";

cin>>option;

switch(option){

case 1:{

bank.add\_new\_account();

break;

}

case 2:{

bank.delete\_account();

break;

}

case 3:{

bank.search\_account();

break;

}

case 4:{

bank.deposit();

break;

}

case 5:{

bank.withdraw();

break;

}

case 6:{

bank.modify\_account\_details();

break;

}

case 7:{

flag=0;

break;

}

default:{

cout<<"Invalid Option!"<<endl;

break;

}

}

if(!flag){

break;

}

}

}