Software Development 2 | 2022

Assignment 2

Lecturer: Ann-Marie Cosgrave

Date of Issue: 14th March 2022

Due Date: 25th April 2022

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Introduction to the assignment

The program I was tasked to do was a Credit Union style account system where a clients account details could be stored, their name, second name, account number, amount of money on their account and overdraft limit.

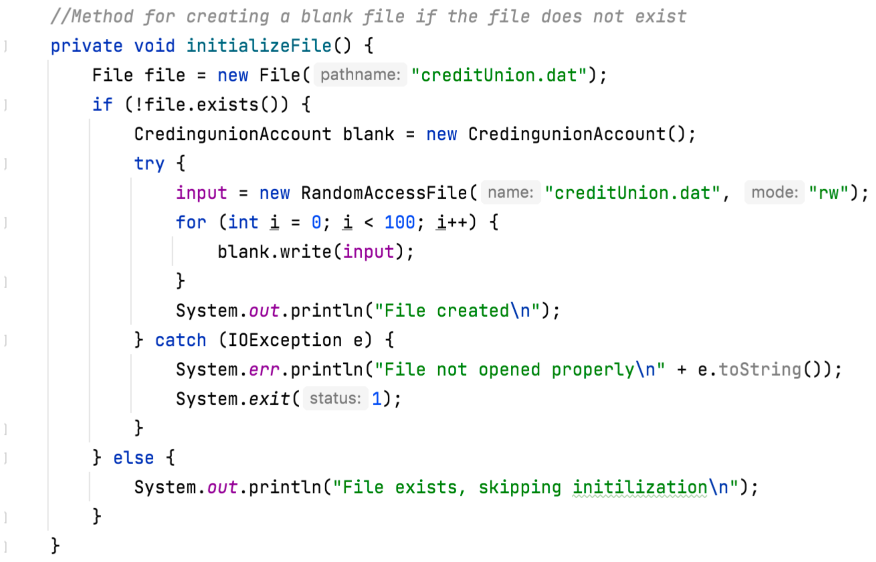
The account details are stored on a random access file that could be read and written to at any time.

In the program once you have someones account loaded into the program you can add more money to them or you can withdraw, you can only withdrawal the amount they have if overdraft limit was not set up, pretty much like a real account.

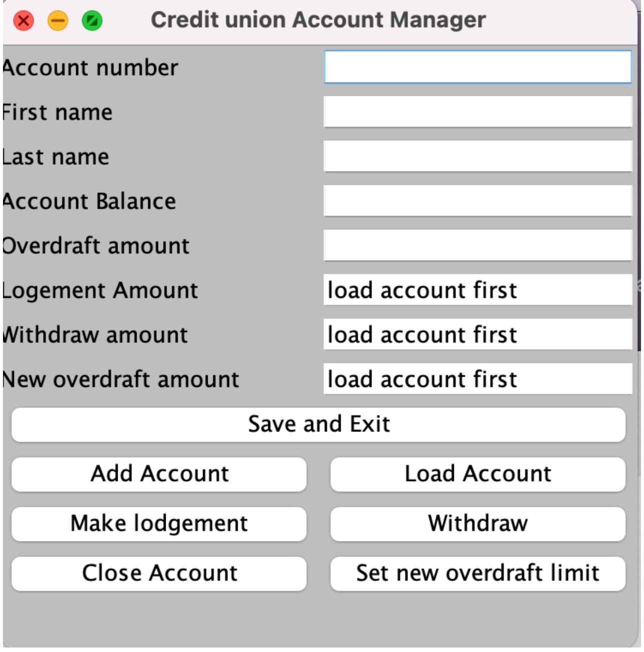
Im gonna run you through the whole program the front end and the back end and demonstrate how it works.

Start of the program

Ones you run the main method a GUI will show up like this, it will also create a blank file so we can store the account details. If you don’t have a file already on the computer it will create a new file.



```
//Method for creating a blank file if the file does not exist
private void initializeFile() {
    File file = new File( pathname: "creditUnion.dat");
    if (!file.exists()) {
        CredingunionAccount blank = new CredingunionAccount();
        try {
            input = new RandomAccessFile( name: "creditUnion.dat",  mode: "rw");
            for (int i = 0; i < 100; i++) {
                blank.write(input);
            }
            System.out.println("File created\n");
        } catch (IOException e) {
            System.err.println("File not opened properly\n" + e.toString());
            System.exit( status: 1);
        }
    } else {
        System.out.println("File exists, skipping initilization\n");
    }
}
```


Credit union Account Manager

Account number	
First name	
Last name	
Account Balance	
Overdraft amount	
Logement Amount	load account first
Withdraw amount	load account first
New overdraft amount	load account first

We must create a blank file first before we start storing the details, its like setting up a piece of paper before you start writing on it!

You can see an Account number field to type in the persons account number

First name field for the first name

Last name field for the last name

Account balance field for setting up Credit union account balance

Overdraft amount field for setting up how much a person can go into negative balance

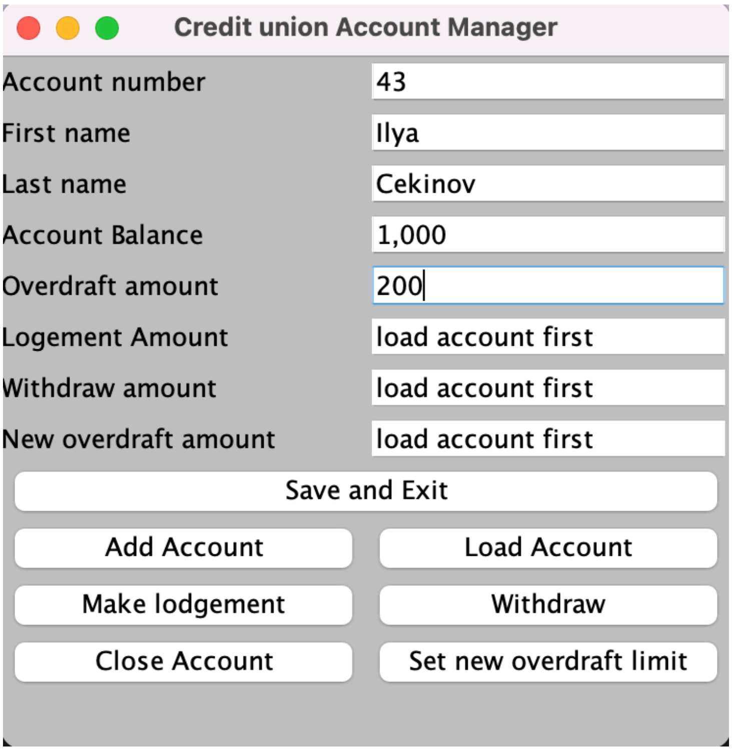
There are also lodgement amount, withdraw amount and new overdraft amount field but they are currently set not edible till you load an account, I will run you step by step of how it all works.

Creating an account for a user

Ones we have the program running we are ready to set up an account

The account numbers could not be the same, or an error will be given that the account exists already

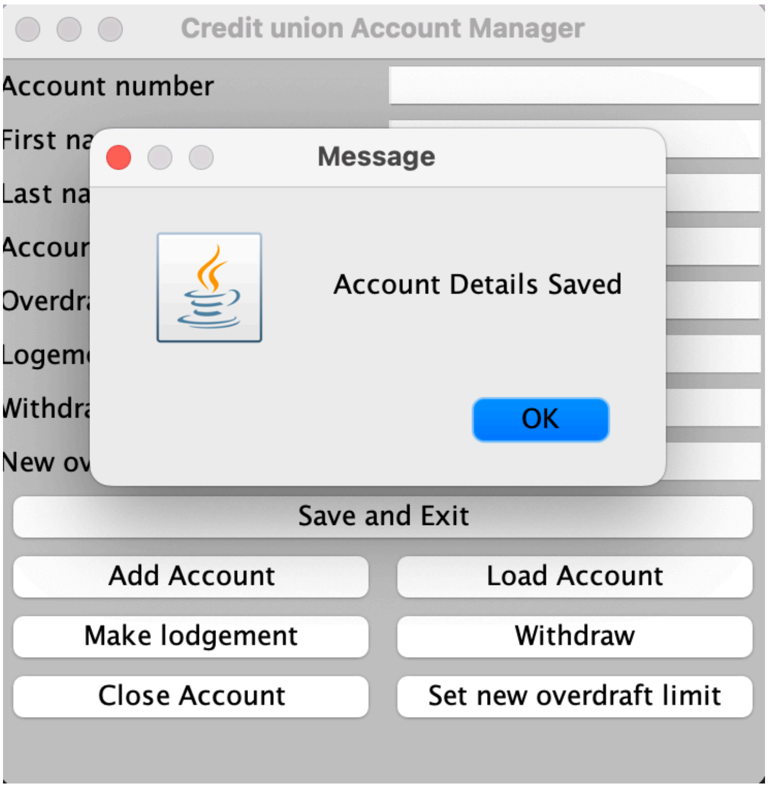
And we must use valid integer numbers for the account between 1 and 100



Credit union Account Manager

Account number	43
First name	Ilya
Last name	Cekinov
Account Balance	1,000
Overdraft amount	200
Logement Amount	load account first
Withdraw amount	load account first
New overdraft amount	load account first

Ones we have all the details written in we click Add Account button.



Credit union Account Manager

Account number

First na

Last na

Accour

Overdr

Logem

Withdr

New ov

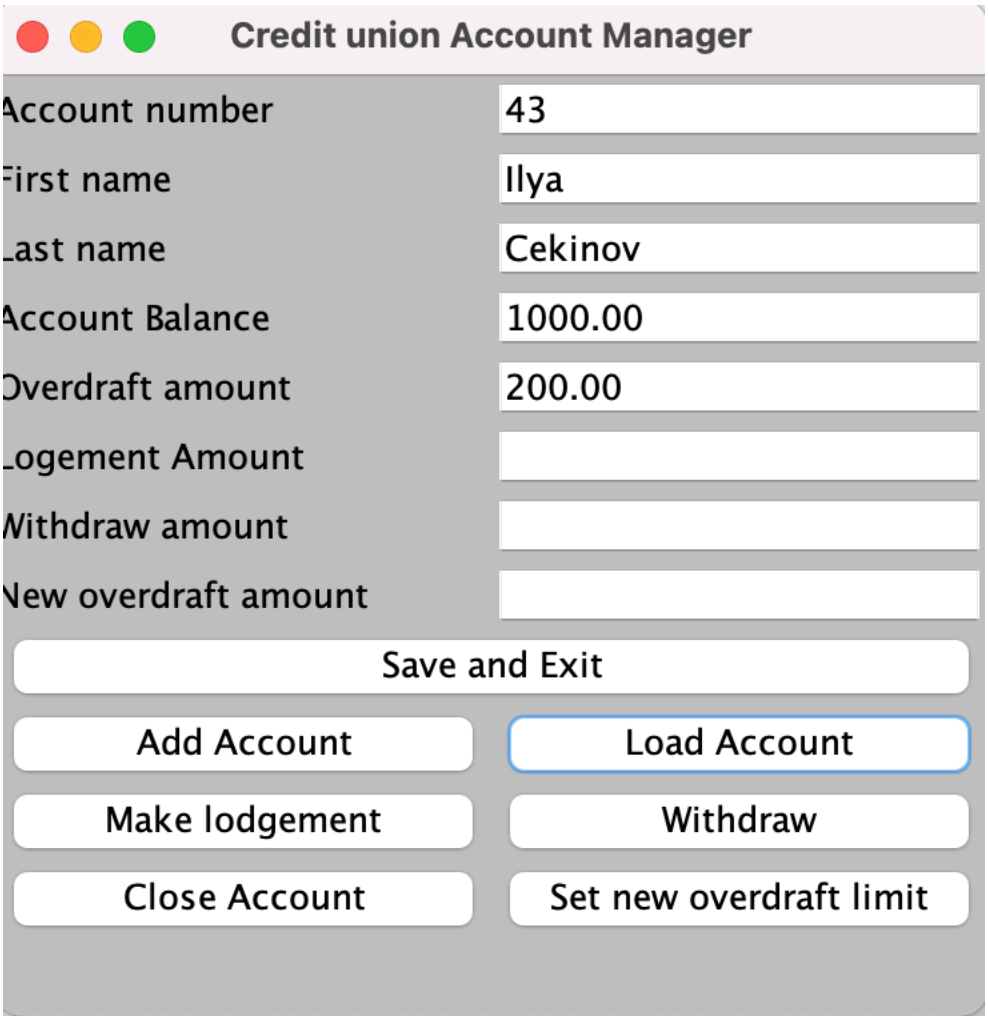
Message

Account Details Saved

We clicked Add Account button and a pop up showed up saying Account details saved, now the fields have reset to empty, and we have written the details to a file.

Loading user Account

Ones we have successfully saved a user account we need to load it to work on a specific account. Let's load a previous account I have created.



Credit union Account Manager

Account number	43
First name	Ilya
Last name	Cekinov
Account Balance	1000.00
Overdraft amount	200.00
Logement Amount	
Withdraw amount	
New overdraft amount	

I typed in 43 in the account field and clicked the Load Account button and the account details showed up.

You can also notice that the locked 3 fields have been unlocked for editing.

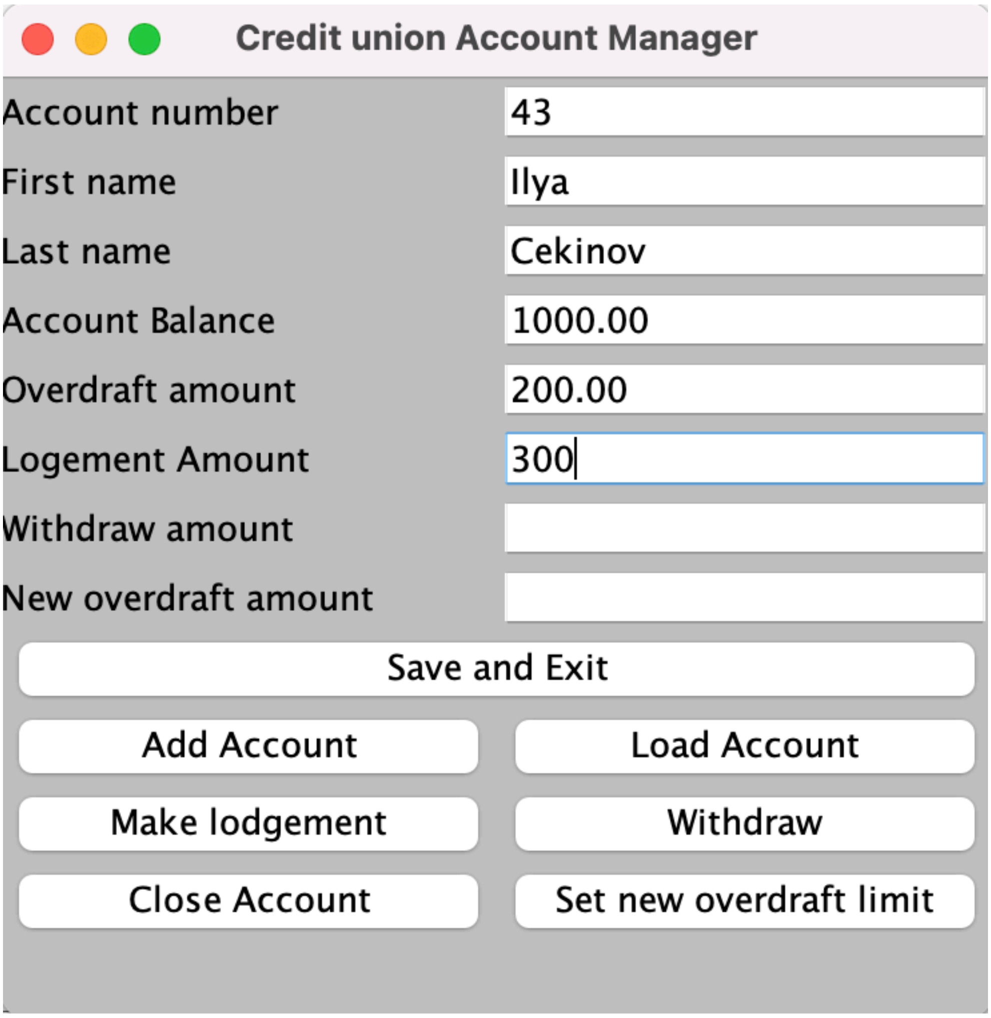
We can see that the account currently has 1000 euros in the account and an overdraft limit of 200 euros. Let's mess around with the account and I will show you how we add money and take out and how the overdraft limit works.

This is the code below for LoadAccount method.

```
private Boolean loadAccount() {
    DecimalFormat twoDigits = new DecimalFormat("0.00");
    try {
        int accountNumber =
Integer.parseInt(accountField.getText());

        if (accountNumber < 1 || accountNumber > 100) {
            JOptionPane.showMessageDialog(this, "Account does
not exist");
            return false;
        } else {
            input.seek((accountNumber - 1) *
CredingunionAccount.size());
            data.read(input);


accountField.setText(String.valueOf(data.getAccount()));
            firstNameField.setText(data.getFirstName());
            lastNameField.setText(data.getLastName());
            balanceField.setText(String.valueOf(
                    twoDigits.format(data.getBalance())));
            overdraftField.setText(String.valueOf(

twoDigits.format(data.getOverdraftLimit())));
        }
        if (data.getAccount() == 0) {
            JOptionPane.showMessageDialog(this, "Account does
not exist");
            accountField.setText("");
            return false;
        }
    }//end try statement
    catch (EOFException eof) {
        closeFile();
    } catch (IOException e) {
        System.err.println("Error during read from file\n " +
e.toString());
        System.exit(1);
    }
    return true;
}
```

Adding money to Account

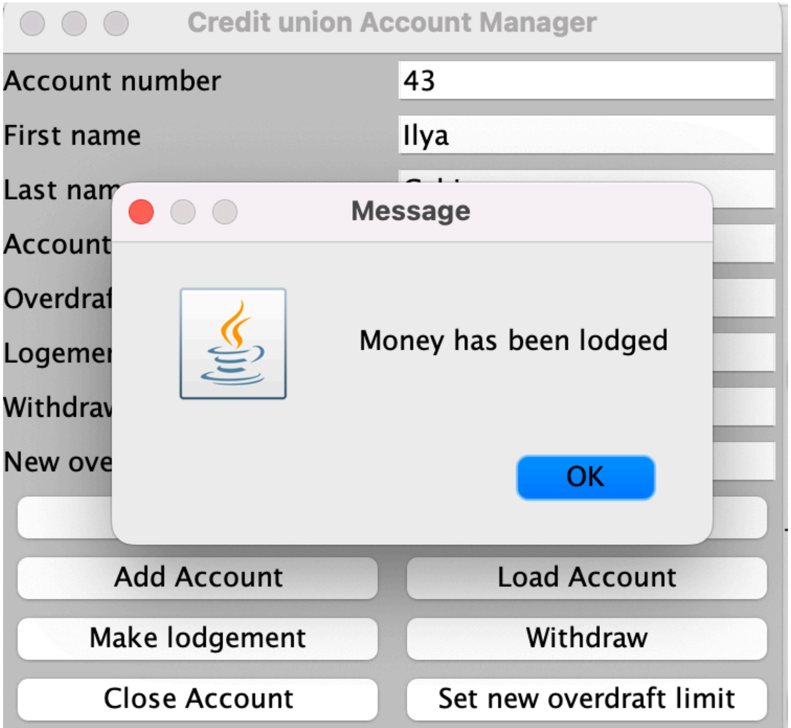
On the screenshot below I have typed in make a lodgement of 300 euros



Credit union Account Manager

Account number	43
First name	Ilya
Last name	Cekinov
Account Balance	1000.00
Overdraft amount	200.00
Logement Amount	300
Withdraw amount	
New overdraft amount	

You can type in any amount you would like I just went with 300 for demonstration purpose. Once we chose a value we click make lodgement.



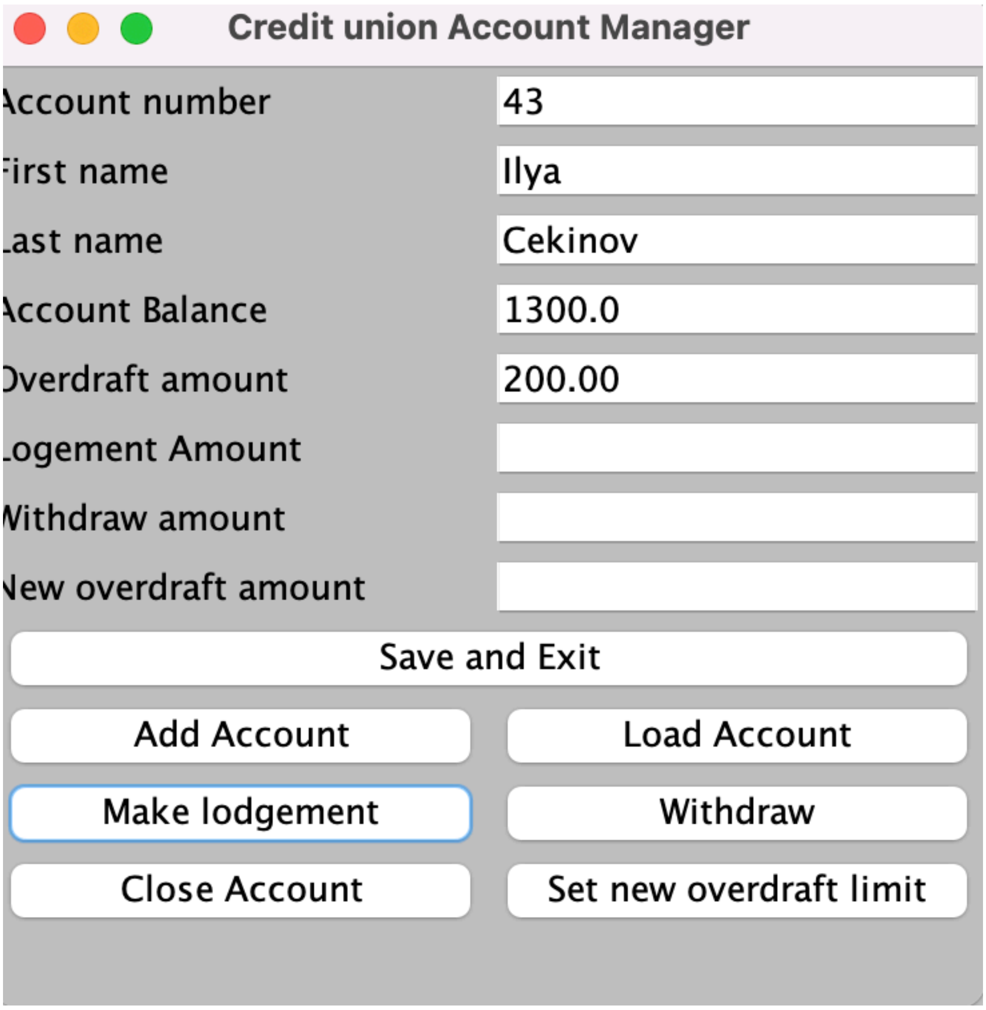
Credit union Account Manager

Account number	43
First name	Ilya
Last nam	
Account	
Overdraf	
Logemen	
Withdrav	
New ove	

Message

Money has been lodged

A pop up will show up that money has been lodged once we click OK the new balance should show up.



Credit union Account Manager

Account number	43
First name	Ilya
Last name	Cekinov
Account Balance	1300.0
Overdraft amount	200.00
Logement Amount	
Withdraw amount	
New overdraft amount	

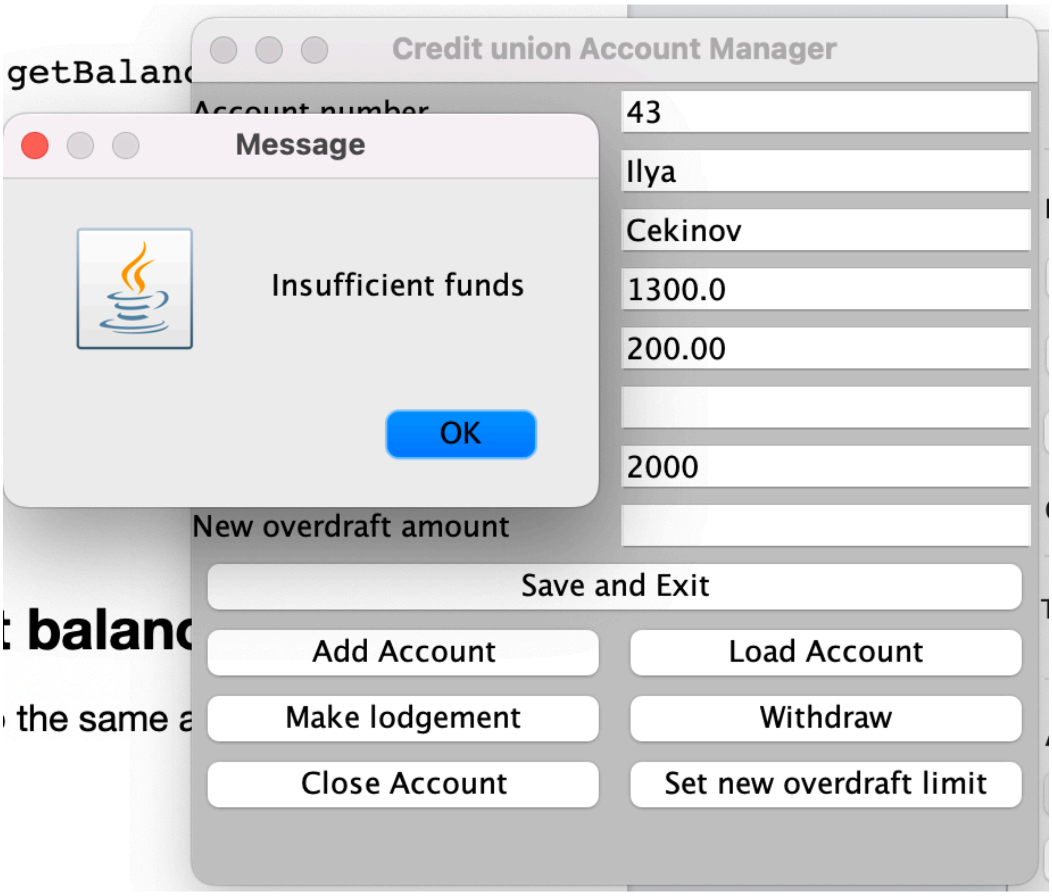
As you can see a new balance of 1300 euros is displayed

This is the makeLogement method below.

```
private void makeLogement() {
    try {
        int accountNumber =
Integer.parseInt(accountField.getText());
        Double lodgementAmount =
Double.parseDouble(logementField.getText());

        data.setBalance(data.getBalance() + lodgementAmount);

        output.seek((long) (accountNumber - 1) *
CredingunionAccount.size());
        data.write(output);
        JOptionPane.showMessageDialog(this, "Money has been
lodged");

balanceField.setText(String.valueOf(data.getBalance()));
        logementField.setText("");
    }//end try
    catch (NumberFormatException nfe) {
        System.err.println("You must enter an integer account
number");
    } catch (IOException io) {
        System.err.println("error during write to file\n" +
io.toString());
    }
}
```

Withdrawal from Account balance

Now lets try to take money out from the account we do the same as lodgement only this time in the withdrawal field, I have an account balance of 1300 and an overdraft limit of 200 euros if we try to take out an amount bigger than the 2 combined we will get an error like this.



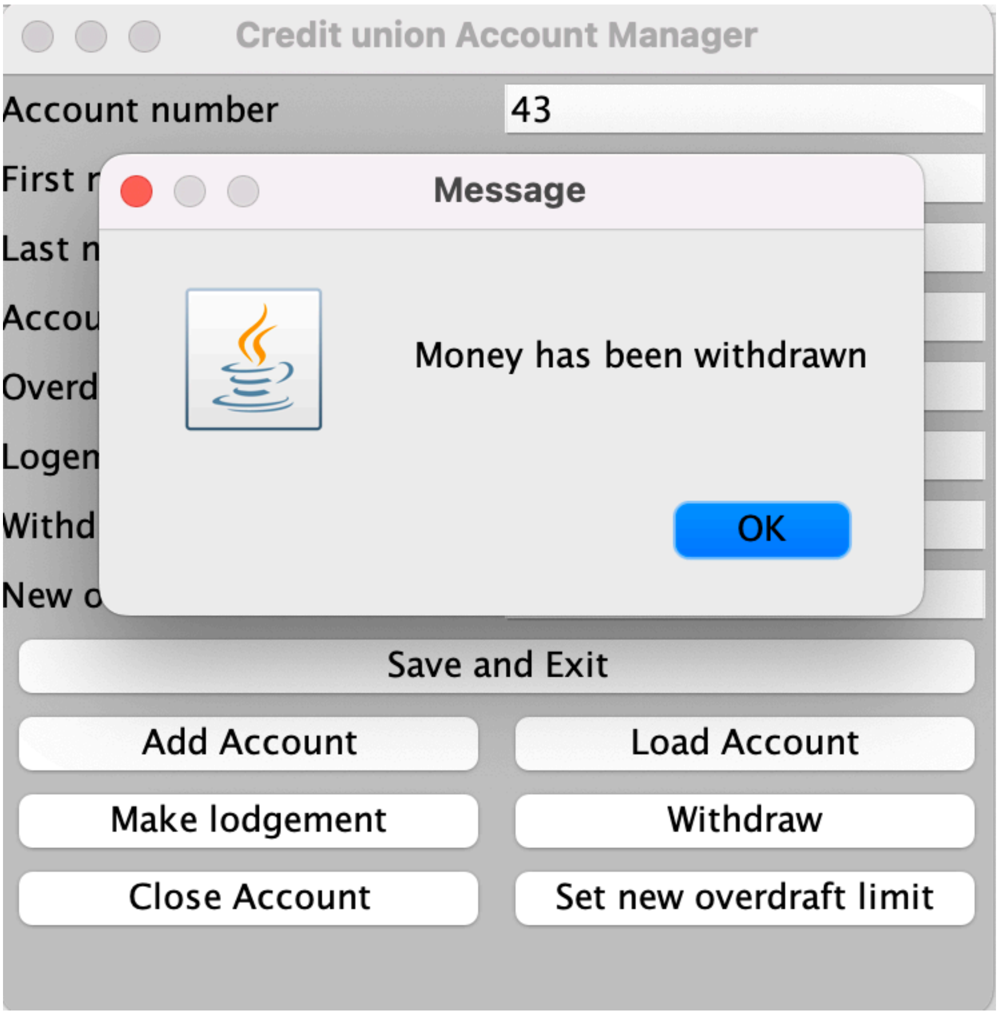
Message

Insufficient funds

43
Ilya
Cekinov
1300.0
200.00

2000
New overdraft amount

Now lets try to take out all the money out not including the overdraft

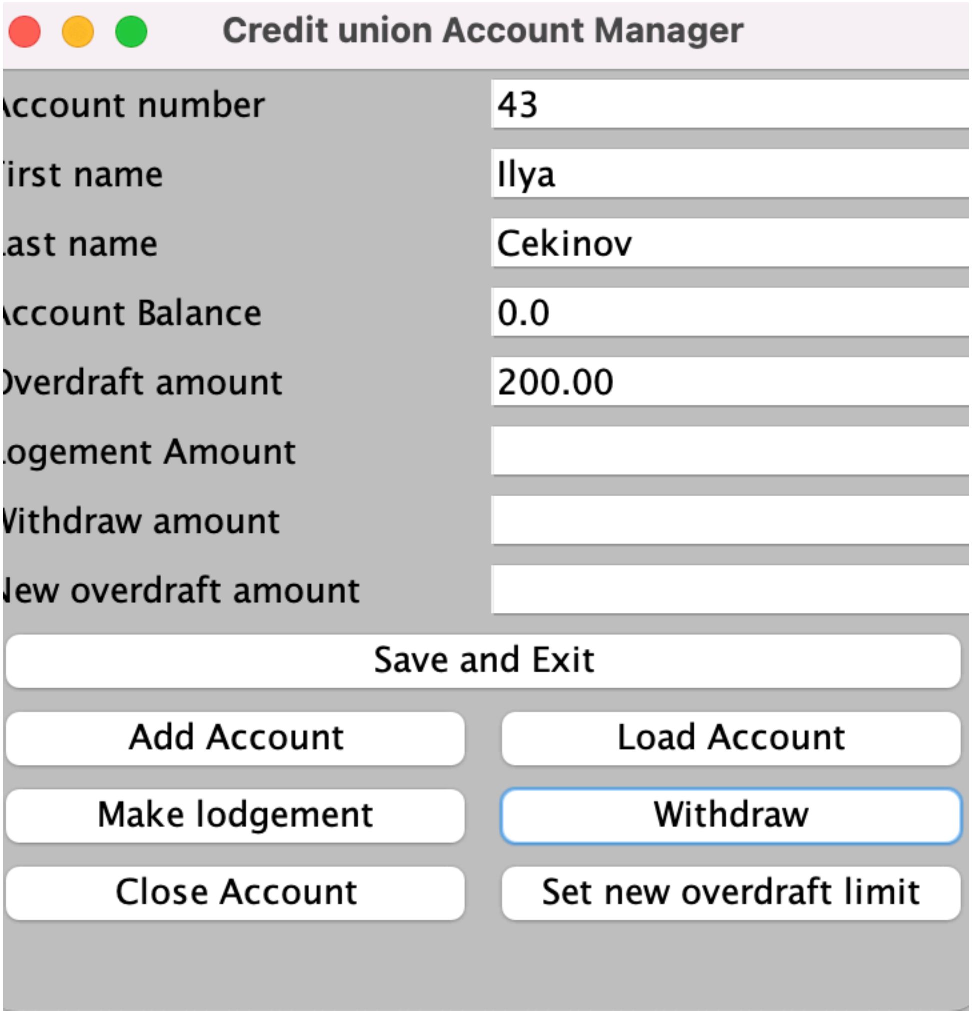


Credit union Account Manager

Account number 43

Message

Money has been withdrawn

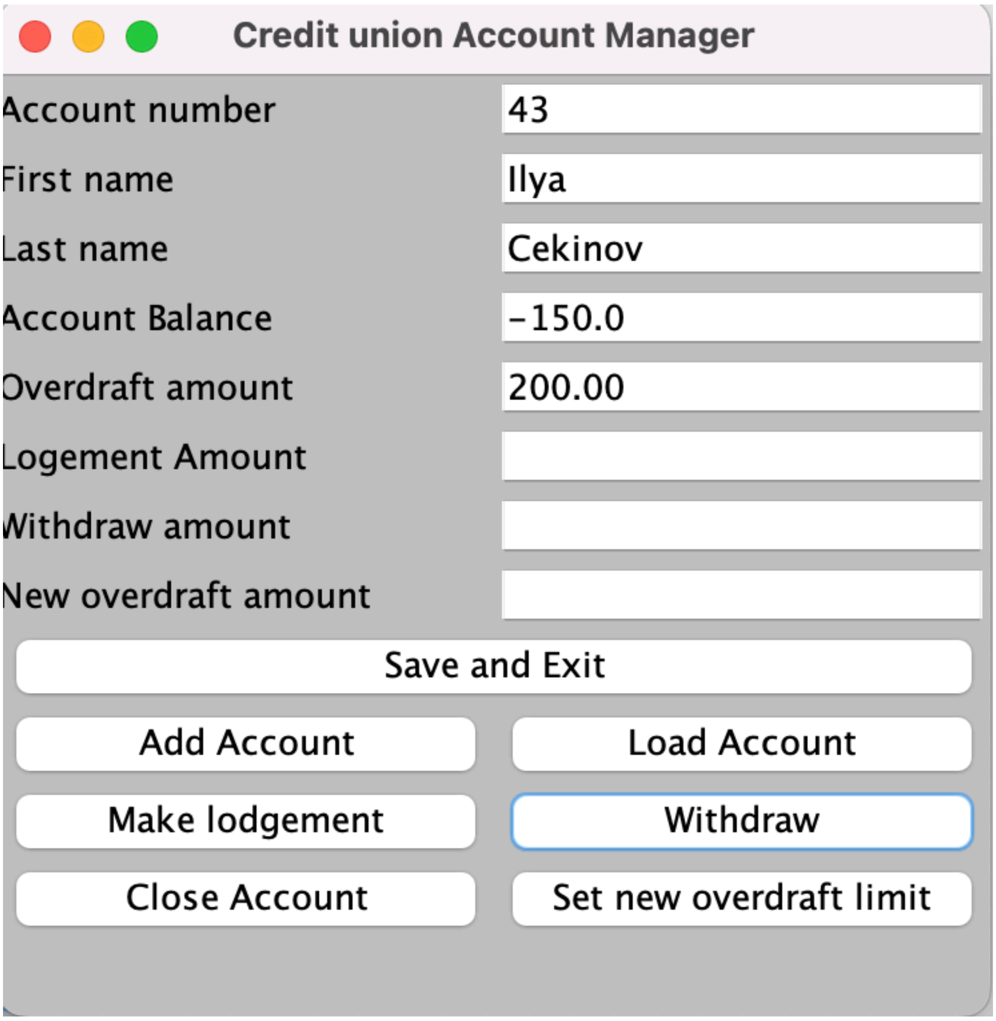


Credit union Account Manager

ccount number	43
irst name	Ilya
ast name	Cekinov
ccount Balance	0.0
verdraft amount	200.00
ogement Amount	
ithdraw amount	
ew overdraft amount	

As you can see our new balance is at 0, but we still have an overdraft of 200 euros

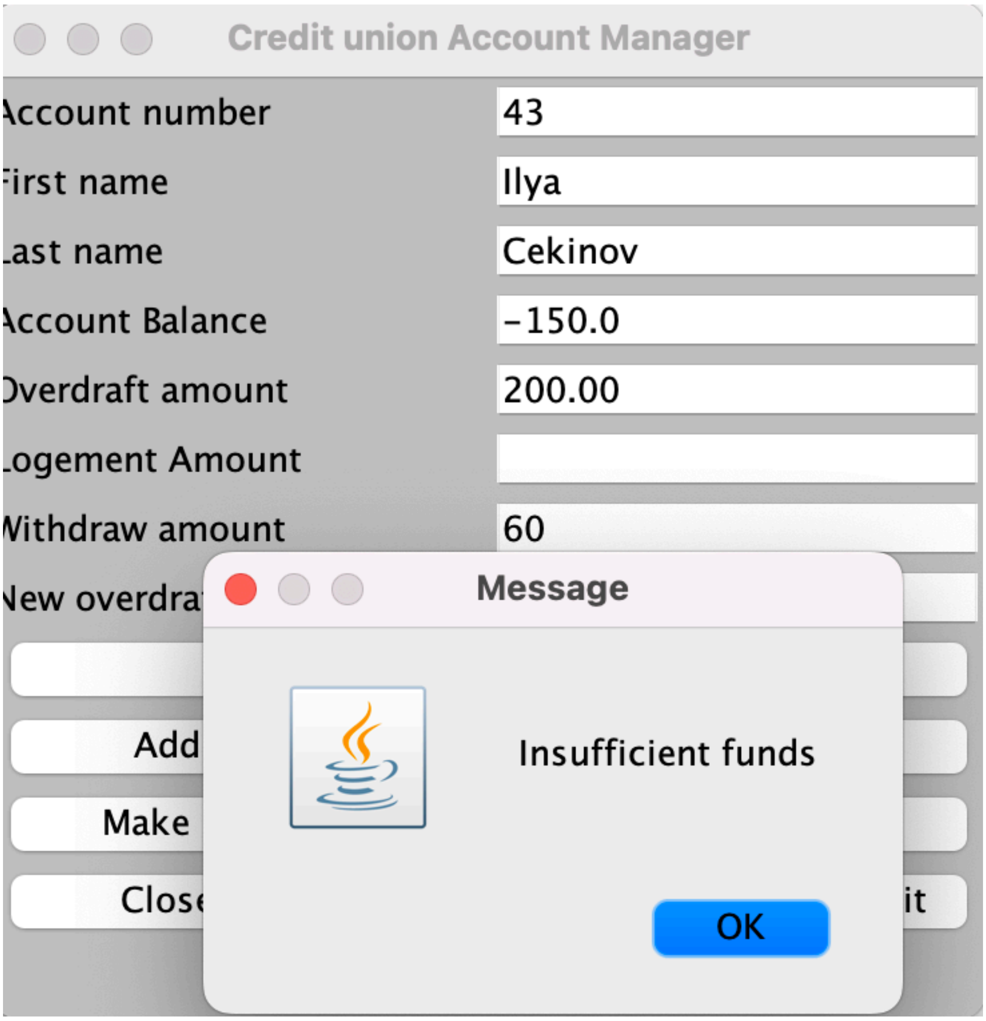
let's try to take out more money.



Account number	43
First name	Ilya
Last name	Cekinov
Account Balance	-150.0
Overdraft amount	200.00
Logement Amount	
Withdraw amount	
New overdraft amount	

I took out another 150 out from the account now our current balance is at -150

We still have a limit of 50 euros left lets try to take out more than we can out



Credit union Account Manager

Account number	43
First name	Ilya
Last name	Cekinov
Account Balance	-150.0
Overdraft amount	200.00
Logement Amount	
Withdraw amount	60
New overdra	

Message

Insufficient funds

We get an insufficient funds message if we try to take out another 60 euros, but we can always increase the overdraft amount.

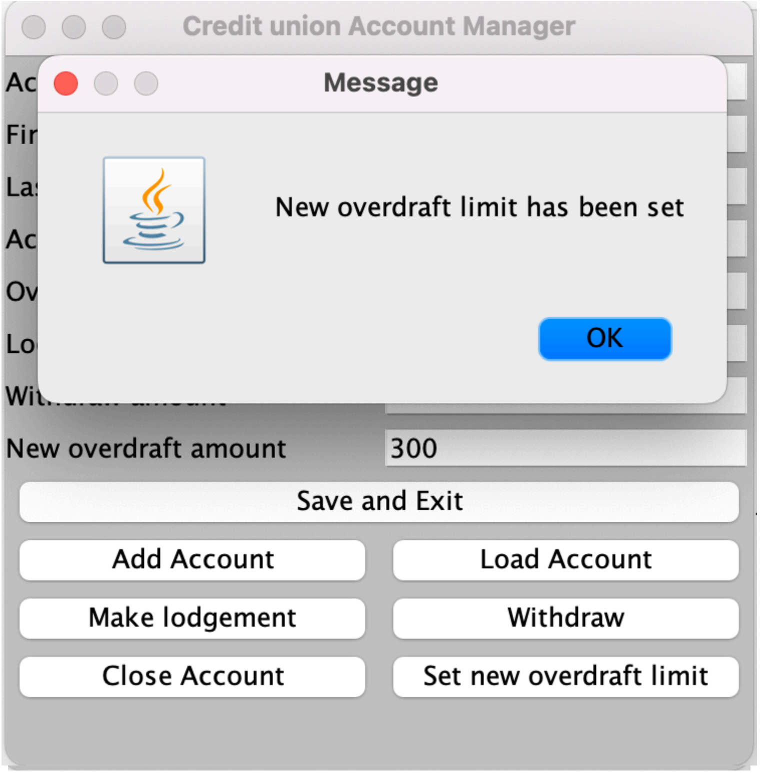
This is the makeWithdrawal method

```
private void makeWithdrawal() {
    try {
        int accountNumber = 
Integer.parseInt(accountField.getText());
        Double withdrawalAmount = 
Double.parseDouble(withdrawalField.getText());

        if (withdrawalAmount > data.getBalance() + 
data.getOverdraftLimit()) {
            JOptionPane.showMessageDialog(this, "Insufficient 
funds");
            return;
        }
        data.setBalance(data.getBalance() - 
withdrawalAmount);
```

```
        output.seek((long) (accountNumber - 1) *
CredingunionAccount.size());
        data.write(output);

        JOptionPane.showMessageDialog(this, "Money has been
withdrawn");

balanceField.setText(String.valueOf(data.getBalance()));
        withdrawalField.setText("");
    }//end try
    catch (NumberFormatException nfe) {
        System.err.println("You must enter an integer account
number");
    } catch (IOException io) {
        System.err.println("error during write to file\n" +
io.toString());
    }
}
```

Setting New overdraft

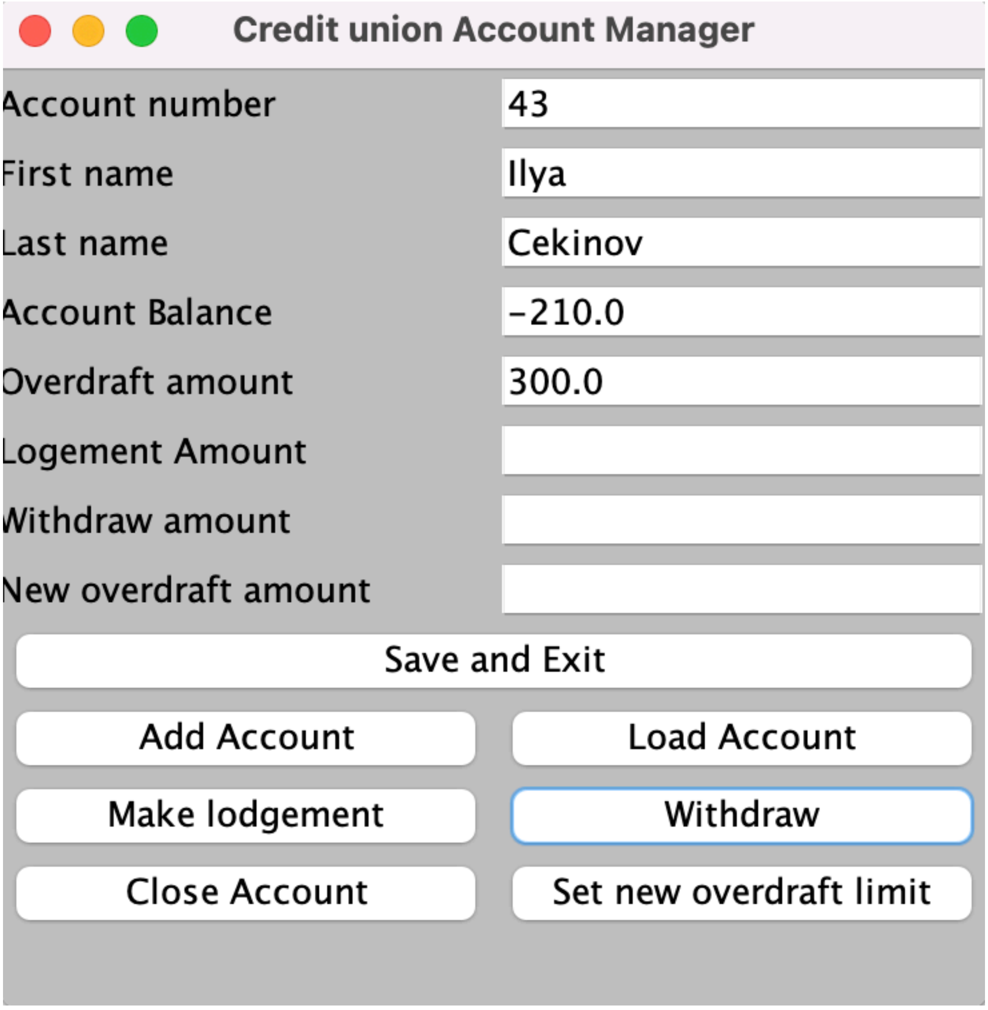
In the examples above we tried to take out 60 euros when we had only 50 left in overdraft fees, let's add a bigger overdraft amount and try again.



New overdraft limit has been set

New overdraft amount 300

I have added another 100 euro overdraft amount, lets try to take out the 60 we wanted to take out earlier.



Credit union Account Manager

Account number 43

First name Ilya

Last name Cekinov

Account Balance -210.0

Overdraft amount 300.0

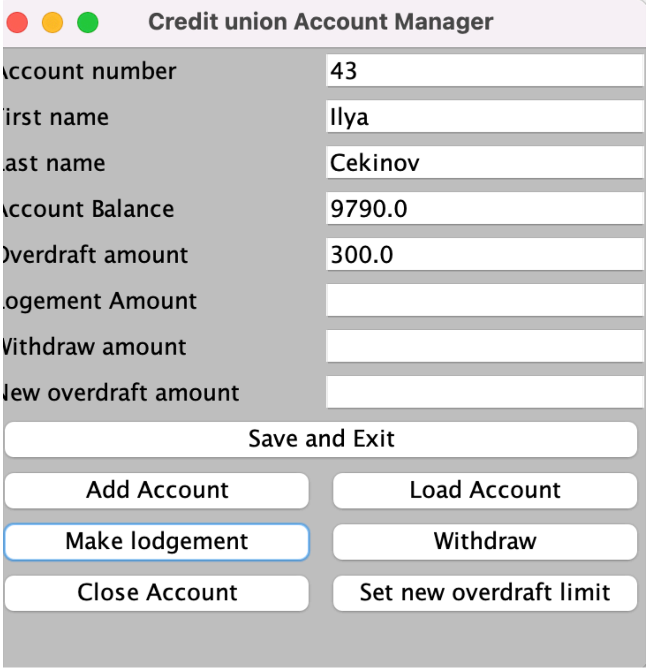
Logement Amount

Withdraw amount

New overdraft amount

Our current balance went down even lower after we took out another 60.

Now let's try to add a big new balance like we won the lottery. And bring back the account to positive numbers. Ill use 10,000 as an example



Credit union Account Manager

ccount number 43

irst name Ilya

ast name Cekinov

ccount Balance 9790.0

verdraft amount 300.0

ogement Amount

ithdraw amount

ew overdraft amount

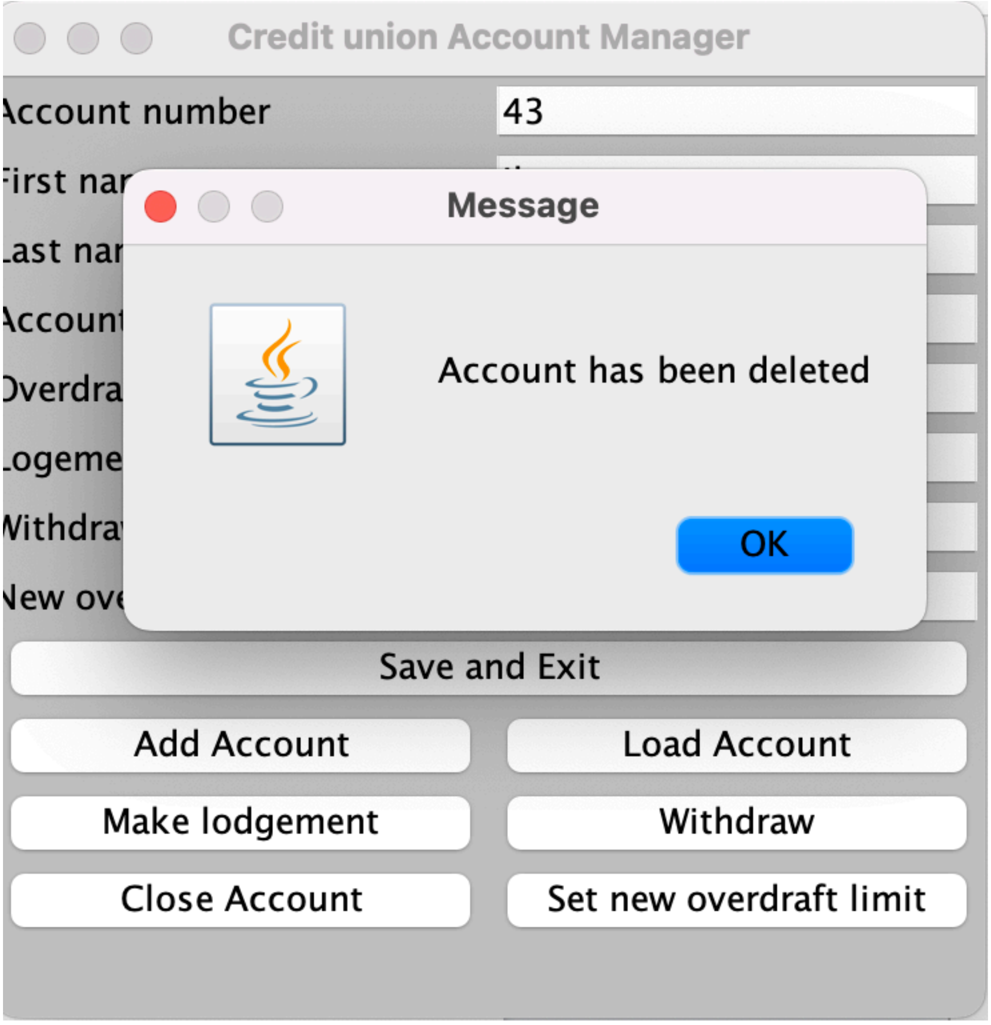
Once we added another 10,000 our balance went up only after we payed of our overdraft.

Below is the setNewOverfraft method

```
private void setNewOverdraft() {
    try {
        int accountNumber =
Integer.parseInt(accountField.getText());
        Double overdraftAmount =
Double.parseDouble(newOverdraftField.getText());

        data.setOverdraftLimit(overdraftAmount);

        output.seek((long) (accountNumber - 1) *
CredingunionAccount.size());
        data.write(output);

        JOptionPane.showMessageDialog(this, "New overdraft
limit has been set");

overdraftField.setText(String.valueOf(data.getOverdraftLimit(
)));
        newOverdraftField.setText("");
    }//end try
    catch (NumberFormatException nfe) {
        System.err.println("You must enter an integer account
number");
    } catch (IOException io) {
        System.err.println("error during write to file\n" +
io.toString());
    }
}
```

Deleting Account

Now that the person moved on to a different bank and wants to close the account We can just click delete account and all the information will be wiped.

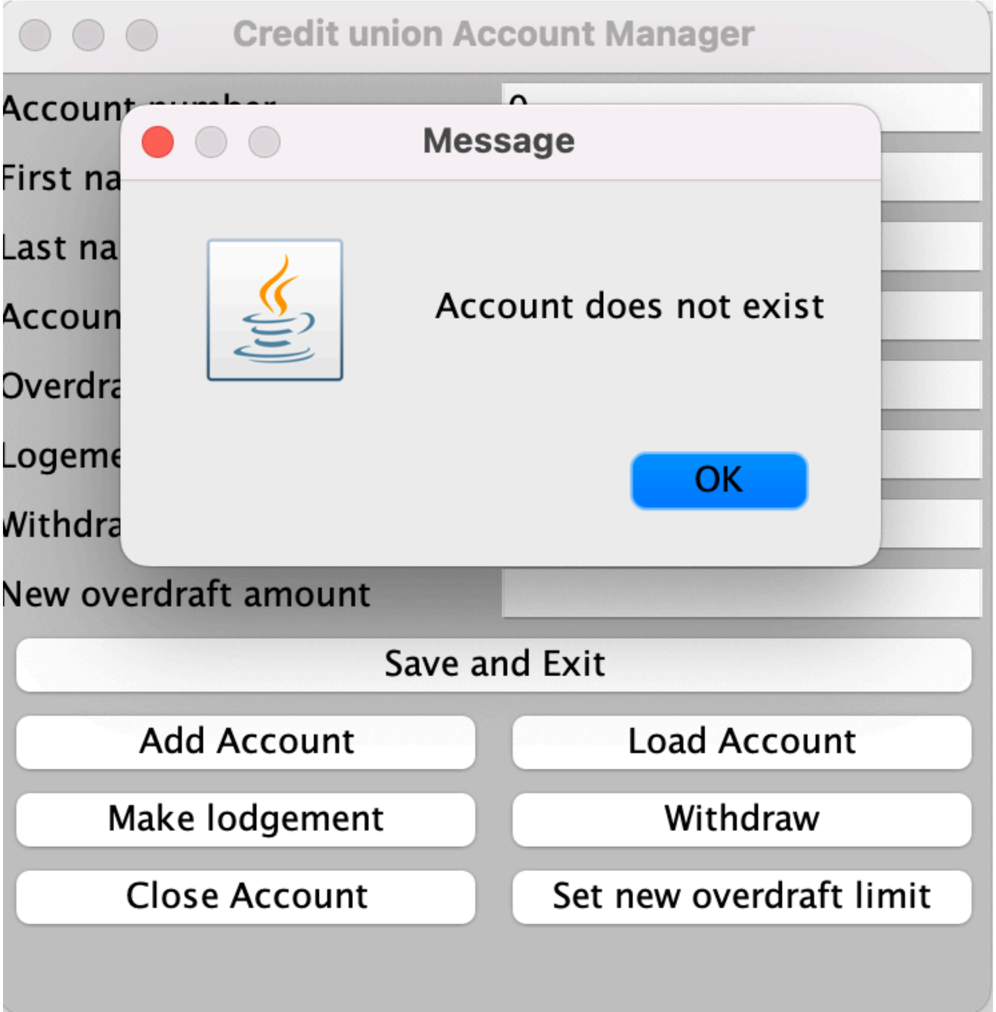


Account number 43

Message

Account has been deleted

If we try to load the account 43 up we get a pop up that this account does not exist



Message

Account does not exist

Below is the deleteAccount method.

```
private void deleteAccount() {
    try {

        int accountNumber =
Integer.parseInt(accountField.getText());

        data.setAccount(0);
        data.setFirstName(null);
        data.setLastName(null);
        data.setBalance(0);
        data.setOverdraftLimit(0);

        output.seek((long) (accountNumber - 1) *
CredingunionAccount.size());
        data.write(output);

        JOptionPane.showMessageDialog(this, "Account has been
deleted");
        accountField.setText("");
        firstNameField.setText("");
        lastNameField.setText("");
        balanceField.setText("");
        overdraftField.setText("");
    }//end try
    catch (NumberFormatException nfe) {
        System.err.println("You must enter an integer account
number");
    } catch (IOException io) {
        System.err.println("error during write to file\n" +
io.toString());
    }
}
```