

Bank Project

This document will contain any expectations and requirements for the project in a more condensed and easier-to-read format.

Project Overview

This project aims to implement a banking system that simulates the management of different bank accounts (Checking, Saving, Credit) and interactions between customers. The system will allow users to inquire about balances, deposit and withdraw money, transfer funds, and make payments between accounts. Bank managers will have enhanced access to all accounts for inquiries. Additionally, the system will log all transactions and handle user interaction through a console interface.

Functional Requirements

Account Management

The system must implement the following classes to manage various types of accounts:

1. **Account (abstract):**
 - Fields: `accountNumber`, `balance`, `owner`
 - Methods: `inquireBalance()`, `deposit()`, `withdraw()`, `transfer()`
2. **Checking** (inherits from Account):
 - Fields: Inherits from Account, `overdraftLimit`
 - Methods: Inherits from Account, any specific behaviors for Checking account.
3. **Saving** (inherits from Account):
 - Fields: Inherits from Account, `interestRate`
 - Methods: Inherits from Account, any specific behaviors for Saving account.
4. **Credit** (inherits from Account):
 - Fields: `creditLimit`, `principle`
 - Methods: Inquire balance, payment toward principle, check if limit exceeded.
5. **Person:**
 - Fields: `name`, `address`
 - Methods: View accounts, interact with accounts (e.g., pay another person).
6. **Customer** (inherits from Person):
 - Fields: Inherits from Person, `accounts`, `customerId`
 - Methods: Actions specific to a customer like inquiring, depositing, and withdrawing money.
7. **RunBank:**

- Main class handling user interaction and system operation.

Transaction

The system must be able to handle:

- **Inquire about a balance:** Provide account details and balance.
- **Deposit money:** Add money to a chosen account.
- **Withdraw money:** Remove money from a chosen account.
- **Transfer money:** Move money between two accounts owned by the same or different customers.
- **Pay someone:** Transfer money from one customer's account to another customer's account.
- **Log transactions:** Log every action (inquire, deposit, withdraw, transfer) into a file.

File Handling

Read files: Read initial account information from a file and store it in an appropriate data structure.

Write updated bank users sheet: After all transactions, save the updated information back to a file.

User Interactions

Individual Customer Actions:

- Inquire about personal account balances.
- Make deposits, withdrawals, and transfers.
- Pay another customer.

Bank Manager Actions:

- Inquire about any account by name or account number.
- Access all accounts.

Exit the Program: Allow the user to type "EXIT" to leave the program. Before exiting, ensure the new state of all accounts is written to the file.

Transaction Log

Maintain a log of all transactions in a file. The log should persist between sessions (i.e., new transactions should be appended, not overwritten).

Error Handling

Handle exceptions for:

- Invalid inputs (e.g., wrong account number, non-existent person).
- Exceeding credit limit.
- Invalid transactions (e.g., overdraft, negative deposits).

Documentation

Javadoc: Provide detailed documentation for all classes, methods, and fields using Javadoc.

Lab Report:

- Document all design decisions, assumptions, and system architecture.
- Include screenshots of the system running under different conditions (successful transactions, failed transactions).

Nonfunctional requirements

Usability: Provide a clear, simple user interface through the console, and offer informative responses to every user action (e.g., "Deposit of \$XX successful").

Reliability: Ensure that all account data is correctly saved and transactions are logged consistently without corruption.

Assumptions

No minimum payments or interest on credit accounts.

Credit accounts only handle payments toward the principal (negative balance).

Log retention: Transactions are appended to the log file across sessions.

Valid data input: The input files contain valid and well-formatted data.

Sample code Interactions

Deposit to account

Welcome to Bank!

Are you:

1. A Customer
2. A Bank Manager

Type 'EXIT' to quit.

> 1

Please enter your name:

> Donald Duck

What would you like to do?

1. Inquire balance
2. Deposit money
3. Withdraw money
4. Transfer money
5. Pay someone

> 2

Which account would you like to deposit into?

1. Checking-12346
2. Savings-11112

> 1

Enter the amount to deposit:

> 50

Deposit of \$50 successful.

Your new balance for Checking-12346: \$125

Transfer Money From your accounts

Welcome to Bank!

Are you:

1. A Customer
2. A Bank Manager

Type 'EXIT' to quit.

> 1

Please enter your name:

> Donald Duck

What would you like to do?

1. Inquire balance
2. Deposit money
3. Withdraw money
4. Transfer money
5. Pay someone

> 4

Which account would you like to transfer from?

1. Checking-12346
2. Savings-11112

> 1

Which account would you like to transfer to?

1. Checking-12346
2. Savings-11112

> 2

Enter the amount to transfer:

> 25

Transfer of \$25 from Checking-12346 to Savings-11112 successful.

Your new balance for Checking-12346: \$100

Your new balance for Savings-11112: \$80

Transfer Money to another person

Welcome to Bank!

Are you:

1. A Customer
2. A Bank Manager

Type 'EXIT' to quit.

> 1

Please enter your name:

> Donald Duck

What would you like to do?

1. Inquire balance
2. Deposit money
3. Withdraw money
4. Transfer money
5. Pay someone

> 4

How would you transfer?

1. To another of your accounts
2. To another person's account

> 2

Who would you like to pay?

> Donald Duck

Which account would you like to transfer from?

1. Checking-12346
2. Savings-11112

> 1

Enter the amount to transfer:

> 25

Transfer of \$25 from Checking-12346 to Donald Duck was successful.

Your new balance for Checking-12346: \$100

Pay someone using credit

Welcome to Bank!

Are you:

1. A Customer
2. A Bank Manager

Type 'EXIT' to quit.

> 1

Please enter your name:

> Mickey Mouse

What would you like to do?

1. Inquire balance
2. Deposit money
3. Withdraw money
4. Transfer money
5. Pay someone

> 5

Who would you like to pay?

> Donald Duck

Which of your accounts will you use to pay?

1. Checking-12345
2. Credit-54321

> 2

Enter the amount to pay:

> 30

Payment of \$30 from Credit-54321 to Donald Duck successful.

Your new credit balance for Credit-54321: -\$40 (remaining credit: \$60)

Donald Duck's new balance for Checking-12346: \$155

Bank Manager Inquiring About Accounts by Name and Type

Welcome to Bank!

Are you:

1. A Customer
2. A Bank Manager

Type 'EXIT' to quit.

> 2

What would you like to do?

- A. Inquire account by name
- B. Inquire account by type/number

> A

Whose account would you like to inquire about?

> Mickey Mouse

Mickey Mouse's Accounts:

1. Checking-12345: Balance \$100
2. Savings-11113: Balance \$500
3. Credit-54321: Balance -\$40

What would you like to do next?

- A. Inquire account by name
- B. Inquire account by type/number

> B

What is the account type?

1. Checking
2. Savings
3. Credit

> 1

What is the account number?

> 12345

Mickey Mouse's Checking Account-12345 has a balance of \$100.

Withdraw Money From Checking

Welcome to Bank!

Are you:

1. A Customer
2. A Bank Manager

Type 'EXIT' to quit.

> 1

Please enter your name:

> Minnie Mouse

What would you like to do?

1. Inquire balance
2. Deposit money
3. Withdraw money
4. Transfer money
5. Pay someone

> 3

Which account would you like to withdraw from?

1. Checking-56789
2. Savings-98765

> 1

Enter the amount to withdraw:

> 40

Withdrawal of \$40 successful.

Your new balance for Checking-56789: \$60

Invalid Input

Welcome to Bank!

Are you:

1. A Customer
2. A Bank Manager

Type 'EXIT' to quit.

> 1

Please enter your name:

> Goofy

What would you like to do?

1. Inquire balance
2. Deposit money
3. Withdraw money
4. Transfer money
5. Pay someone

> 3

Which account would you like to withdraw from?

1. Checking-33333
2. Savings-44444

> 1

Enter the amount to withdraw:

> 200

Error: Insufficient funds. Your current balance for Checking-33333 is \$50.

Please enter an amount less than or equal to \$50.

Enter the amount to withdraw:

> 40

Withdrawal of \$40 successful.

Your new balance for Checking-33333: \$10

Bank Manager Inquiring by Account Number

Welcome to Bank!

Are you:

1. A Customer
2. A Bank Manager

Type 'EXIT' to quit.

> 2

What would you like to do?

- A. Inquire account by name
- B. Inquire account by type/number

> B

What is the account type?

1. Checking
2. Savings
3. Credit

> 2

What is the account number?

> 77777

Donald Duck's Savings Account-77777 has a balance of \$300.

What would you like to do next?

- A. Inquire account by name
- B. Inquire account by type/number

> A

Whose account would you like to inquire about?

> Goofy

Goofy's Accounts:

1. Checking-33333: Balance \$10
2. Savings-44444: Balance \$1000

Exiting program

Welcome to Bank!

Are you:

1. A Customer
2. A Bank Manager

Type 'EXIT' to quit.

> 1

Please enter your name:

> Daisy Duck

What would you like to do?

1. Inquire balance
2. Deposit money
3. Withdraw money
4. Transfer money
5. Pay someone

> 1

Your balance for Savings-22222: \$250

What would you like to do next?

1. Inquire balance
2. Deposit money
3. Withdraw money
4. Transfer money
5. Pay someone

Type 'EXIT' to quit.

> EXIT

Thank you for using the Bank System! Exiting...

Passing Credit Limit

Welcome to Bank!

Are you:

1. A Customer
2. A Bank Manager

Type 'EXIT' to quit.

> 1

Please enter your name:

> Mickey Mouse

What would you like to do?

1. Inquire balance
2. Deposit money
3. Withdraw money
4. Transfer money
5. Pay someone

> 5

Who would you like to pay?

> Donald Duck

Which of your accounts will you use to pay?

1. Checking-12345
2. Credit-54321

> 2

Enter the amount to pay:

> 150

Error: Payment exceeds your credit limit. Your remaining credit balance is \$60.

Enter a new amount to pay:

> 50

Payment of \$50 from Credit-54321 to Donald Duck successful.

Your new credit balance for Credit-54321: -\$50 (remaining credit: \$50)

Paying someone with insufficient funds

Welcome to Bank!

Are you:

1. A Customer
2. A Bank Manager

Type 'EXIT' to quit.

> 1

Please enter your name:

> Minnie Mouse

What would you like to do?

1. Inquire balance
2. Deposit money
3. Withdraw money
4. Transfer money
5. Pay someone

> 5

Who would you like to pay?

> Goofy

Which of your accounts will you use to pay?

1. Checking-56789
2. Savings-98765

> 1

Enter the amount to pay:

> 100

Error: Insufficient funds. Your current balance for Checking-56789 is \$60.

Enter a new amount to pay:

> 50

Payment of \$50 from Checking-56789 to Goofy successful.

Your new balance for Checking-56789: \$10

Goofy's new balance for Checking-33333: \$60

Transfer Money exceeding balance

Welcome to Bank!

Are you:

1. A Customer
2. A Bank Manager

Type 'EXIT' to quit.

> 1

Please enter your name:

> Donald Duck

What would you like to do?

1. Inquire balance
2. Deposit money
3. Withdraw money
4. Transfer money
5. Pay someone

> 4

Which account would you like to transfer from?

1. Checking-12346
2. Savings-11112

> 1

Enter the amount to transfer:

> 200

Error: Insufficient funds. Your current balance for Checking-12346 is \$125.

Enter a new amount to transfer:

> 100

Transfer of \$100 from Checking-12346 to Savings-11112 successful.

Your new balance for Checking-12346: \$25

Your new balance for Savings-11112: \$180

Invalid bank number as Bank Manager

Welcome to Bank!

Are you:

1. A Customer
2. A Bank Manager

Type 'EXIT' to quit.

> 2

What would you like to do?

- A. Inquire account by name
- B. Inquire account by type/number

> B

What is the account type?

1. Checking
2. Savings
3. Credit

> 1

What is the account number?

> 99999

Error: Account number 99999 not found. Please check the account number and try again.

What would you like to do next?

- A. Inquire account by name
- B. Inquire account by type/number

> A

Whose account would you like to inquire about?

> Mickey Mouse

Mickey Mouse's Accounts:

1. Checking-12345: Balance \$100
2. Credit-54321: Balance -\$50