



CSCI 370 Project Report Banker

Bank Customer and Account Management System

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Introduction

My project is a customer and account management system for banks. A customer can have multiple accounts and can make wire transfers between accounts which he or another customer owns. He can view bank statements of his accounts. Java is used for the application, while MySQL is used as database management system.

Application Requirements

The following functionalities will be accessible through a command-line interface. A menu is displayed after every completed operation, and the user can select the next operation or choose to exit.

Substantial Functionalities

- Create customer: Create a new customer, having a customer ID, name, address, email and phone number. The ID should be auto-generated.
- Open account: Create a new account, having an owning customer, account number, currency and initial balance. The application must ensure that there is no existing account for this customer with this account number. An account is uniquely identified by the combination of customer ID and account number.
- Make wire transfer: Insert a transfer into the transaction table, having a sender, receiver, amount, currency and date of execution. The amount must be positive. The transfer should only be executed if the sender has enough funds.
- Show bank statement: List all incoming and outgoing transactions for an account. Then retrieve the account's current balance, by adding the initial balance and all incoming wire transfers, then subtracting all outgoing wire transfers. The according exchange rate must be used for transfers which were not made in the account currency.

Additional Functionalities

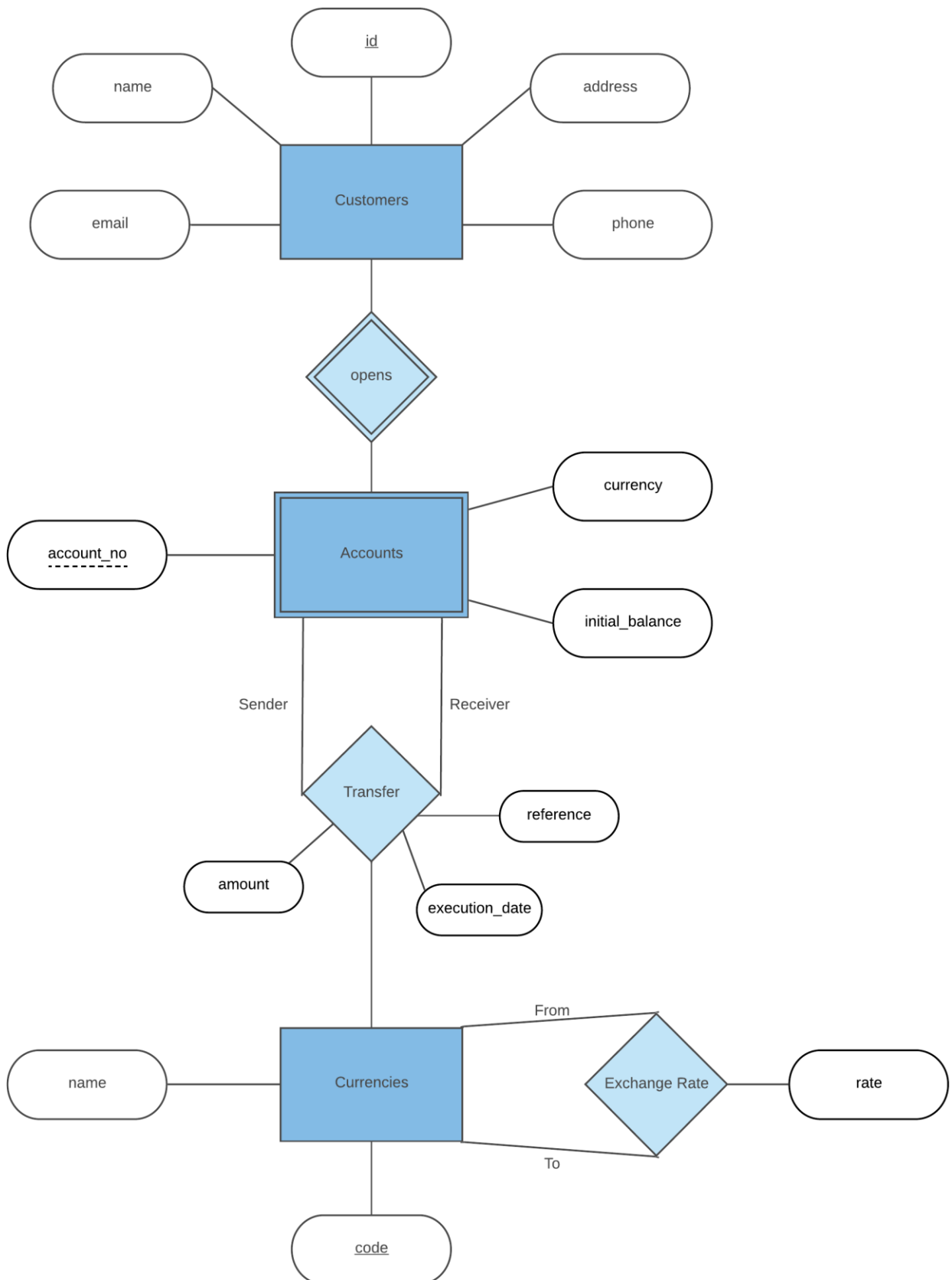
- List all customers: List all customers and the number of accounts they own. Also show this when prompting for a customer ID to assist the user.
- List all accounts: List all accounts and their current balance for a customer. Also show this when prompting for an account number to assist the user.
- Configurable through file: Database connection settings and debug mode can be set in a configuration file.

Necessary Data

The functionalities listed above necessitate the storage of the following data in a database:

- Customers
- Accounts
- Wire transfers
- Currencies and their exchange rates

ER Diagram



Sample Data

Customers

id	name	address	email	phone
1	Roxane Weavers	78976 Almo Drive, North Bay Ontario P1A T7N	rweavers 4@cargo collective .com	126-293-9927
2	Theresina Whitehouse	7 Butterfield Hill, Edson Alberta T7E A0A	twhiteho use3@ab c.net.au	663-893-1617
3	Nicol Powdrell	669 Buell Plaza, Pemberton British Columbia E1W G8A	npowdrel l7@canal blog.com	622-687-1447
4	Worth Rotherham	763 Sherman Trail, Sylvan Lake Alberta T4S T4T	wrotherh am1t@e conomist .com	480-982-2219
5	Wye Najara	073 Hermina Lane, Olds Alberta T4H P7L	wnajara2 5@ning.c om	179-338-0077

Accounts

customer_id	account_no	currency	initial_balance
1	1	CAD	523.21
1	2	USD	2934.12
2	1	EUR	10.32
3	1	CAD	14235.00
4	1	CAD	18900.32
4	2	EUR	25002.88
5	1	USD	239.12
5	2	EUR	521.01

Transfers

id	sender_id	sender_account	receiver_id	receiver_account	amount	currency	execution_date	reference
1	1	1	3	1	200.00	CAD	2019-03-18 19:30:12	
2	2	1	4	1	2.57	EUR	2019-04-05 02:52:18	Movie Theatre Tickets
3	5	2	5	1	300.97	EUR	2019-04-01 09:38:31	
4	4	1	1	2	1500.00	EUR	2019-03-30 12:23:52	Birthday Gift
5	4	1	5	1	1281.34	CAD	2019-04-01 00:00:00	Rent
6	3	1	5	1	890.23	USD	2019-04-02 12:34:35	
7	4	2	4	1	7000.00	EUR	2019-03-29 16:45:12	Transfer to other account

Currencies

code	name
CAD	Canadian Dollar
EUR	Euro
USD	US Dollar

Exchange Rates

from_currency	to_currency	rate
CAD	CAD	1.00000
CAD	EUR	0.66356
CAD	USD	0.75126
EUR	CAD	1.50715
EUR	EUR	1.00000
EUR	USD	1.13220
USD	CAD	1.33114
USD	EUR	0.88323
USD	USD	1.00000

Testing

Create customer

...

LIST CUSTOMERS:

ID	NAME	NO. OF ACCOUNTS	EMAIL	PHONE	ADDRESS
1	Roxane Weavers	2	rweavers4@cargocollective.com	126-293-9927	78976 Almo Drive, North Bay Ontario P1A T7N
...					
5	Wye Najara	2	wnajara25@ning.com	179-338-0077	073 Hermina Lane, Olds Alberta T4H P7L

5 customers found

...

CREATE NEW CUSTOMER:

Name: Simon Richards

Address: Nanaimo, BC

Email: simon@richards.me

Phone: 123-456-7890

Successfully created customer Simon Richards

...

LIST CUSTOMERS:

ID	NAME	NO. OF ACCOUNTS	EMAIL	PHONE	ADDRESS
1	Roxane Weavers	2	rweavers4@cargocollective.com	126-293-9927	78976 Almo Drive, North Bay Ontario P1A T7N
...					
5	Wye Najara	2	wnajara25@ning.com	179-338-0077	073 Hermina Lane, Olds Alberta T4H P7L
6	Simon Richards	0	simon@richards.me	123-456-7890	Nanaimo, BC

6 customers found

Created database row

id	name	address	email	phone
6	Simon Richards	Nanaimo, BC	simon@richards.me	123-456-7890

Open account

...

ACCOUNTS FOR CUSTOMER Simon Richards (ID 6)

ACCOUNT NO.	INITIAL BALANCE	CURRENT BALANCE
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0 accounts found

...

CREATE NEW ACCOUNT:

CUSTOMERS:

ID	NAME
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1	Roxane Weavers
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...

6	Simon Richards
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Customer ID: 6

EXISTING ACCOUNTS FOR CUSTOMER Simon Richards

NO.	BALANCE
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Account Number: 1

Initial balance in CAD/EUR/USD: CAD

Invalid amount, must be positive number

Initial balance in CAD/EUR/USD: 500 CAD

Successfully created account 6-1

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ACCOUNTS FOR CUSTOMER Simon Richards (ID 6)

ACCOUNT NO.	INITIAL BALANCE	CURRENT BALANCE
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6-1	500.00 CAD	500.00 CAD
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1 accounts found

Created database row

customer_id	account_no	currency	initial_balance
6	1	CAD	500.00

Make wire transfer

Successful

SENDER ACCOUNT:

CUSTOMERS:

ID NAME

1 Roxane Weavers

...

6 Simon Richards

Customer ID: 6

EXISTING ACCOUNTS FOR CUSTOMER Simon Richards

NO. BALANCE

1 500.00 CAD

Account Number: 1

RECEIVER ACCOUNT:

CUSTOMERS:

ID NAME

1 Roxane Weavers

...

6 Simon Richards

Customer ID: 4

EXISTING ACCOUNTS FOR CUSTOMER Worth Rotherham

NO. BALANCE

1 25912.18 CAD

2 18002.88 EUR

Account Number: 1

Amount in CAD/EUR/USD: 245.38 USD

Reference: Test transfer

Successfully made wire transfer

TRANSFER DETAILS

Date: 04/11/19 14:25

Sender: Simon Richards (Account 6-1)

Receiver: Worth Rotherham (Account 4-1)

Amount: 245.38 USD

Reference: Test transfer

Unsuccessful

SENDER ACCOUNT:

CUSTOMERS:

ID NAME

1 Roxane Weavers

...

6 Simon Richards

Customer ID: 6

EXISTING ACCOUNTS FOR CUSTOMER Simon Richards

NO. BALANCE

1 500.00 CAD

Account Number: 1

RECEIVER ACCOUNT:

CUSTOMERS:

ID NAME

1 Roxane Weavers

...

6 Simon Richards

Customer ID: 4

EXISTING ACCOUNTS FOR CUSTOMER Worth Rotherham

NO. BALANCE

1 25912.18 CAD

2 18002.88 EUR

Account Number: 1

Amount in CAD/EUR/USD: 500 USD

Reference: Test transfer

Sender account does not have sufficient funds.

Sender account balance: 500.00 CAD

Transfer amount: 500.00 USD

Missing amount: -124.37 USD

Created database row (successful)

id	sender_id	sender_account	receiver_id	receiver_account	amount	currency	execution_date	reference
8	6	1	4	1	245.38	USD	2019-04-11 14:25:25	Test transfer

Show bank statement

BANK STATEMENT:

CUSTOMERS:

ID	NAME
1	Roxane Weavers
2	Theresina Whitehouse
3	Nicol Powdrell
4	Worth Rotherham
5	Wye Najara
6	Simon Richards

Customer ID: 4

EXISTING ACCOUNTS FOR CUSTOMER Worth Rotherham

NO.	BALANCE
1	26238.81 CAD
2	18002.88 EUR

Account Number: 1

TRANSFERS FOR ACCOUNT 4-1

DATE	TIME	AMOUNT	SENDER	RECEIVER	REFERENCE
03/29/19	16:45	+ 7000.00 EUR	Worth Rotherham (4-2)	Worth Rotherham (4-1)	Transfer to other account
03/30/19	12:23	- 1500.00 EUR	Worth Rotherham (4-1)	Roxane Weavers (1-2)	Birthday Gift
04/01/19	00:00	- 1281.34 CAD	Worth Rotherham (4-1)	Wye Najara (5-1)	Rent
04/05/19	02:52	+ 2.57 EUR	Theresina Whitehouse (2-1)	Worth Rotherham (4-1)	Movie Theatre Tickets
04/11/19	14:25	+ 245.38 USD	Simon Richards (6-1)	Worth Rotherham (4-1)	Test transfer
INITIAL BALANCE:		+ 18900.32 CAD			
TOTAL BALANCE:		+ 26238.81 CAD			

No operation

Welcome to Banker!

MENU:

- | | |
|------------------------|------------------------------|
| 1. List customers | 2. List accounts of customer |
| 3. Create customer | 4. Create account |
| 5. Show bank statement | 6. Make wire transfer |
| 0. Exit | |

Choice: 0

Goodbye from Banker!