

The background features a collage of financial data, including stock market tickers and bar charts, overlaid on a dark blue and purple gradient. A solid yellow horizontal bar is positioned at the top left. The title 'Bank Manage System Project Report' is displayed in white text on a dark blue rectangular background.

# Bank Manage System Project Report

**Group: Nighthawk**

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Yateng Geng / Heping Song

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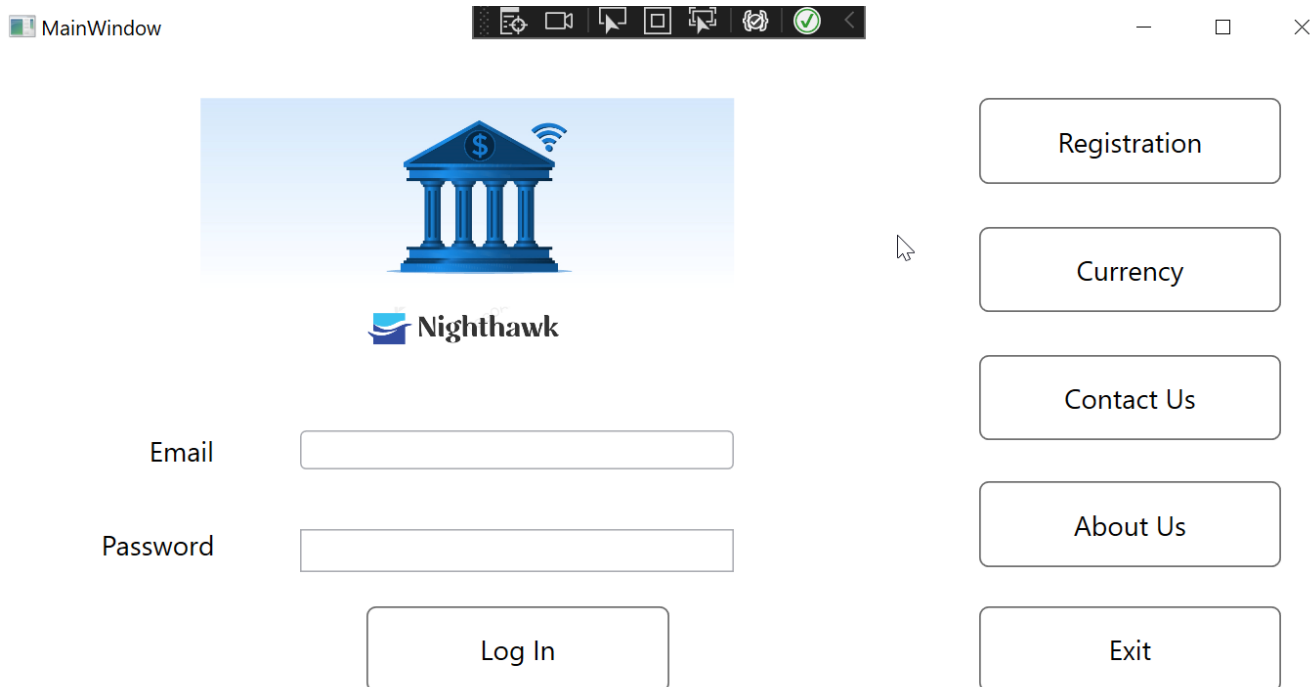
# 1. PROJECT SCOPE

We implemented a banking system, which is a simple but effective application for bank customers who use the bank service in a daily base.

The functions includ:

Register, Currency check, Login, Account Summary, Cash Withdrawal, Cash Deposit, Transaction History, etc.

All our functions are served by Rest-API.



The screenshot displays the 'MainWindow' of a banking application. At the top, there is a title bar with standard window controls (minimize, maximize, close) and a system tray. The main content area features a blue header with a bank building icon and the 'Nighthawk' logo. Below the header, there are two input fields for 'Email' and 'Password', followed by a 'Log In' button. To the right of the login section, there is a vertical stack of five buttons: 'Registration', 'Currency', 'Contact Us', 'About Us', and 'Exit'. A mouse cursor is visible over the 'Currency' button.

MainWindow

Registration

Currency

Contact Us

About Us

Exit

Email

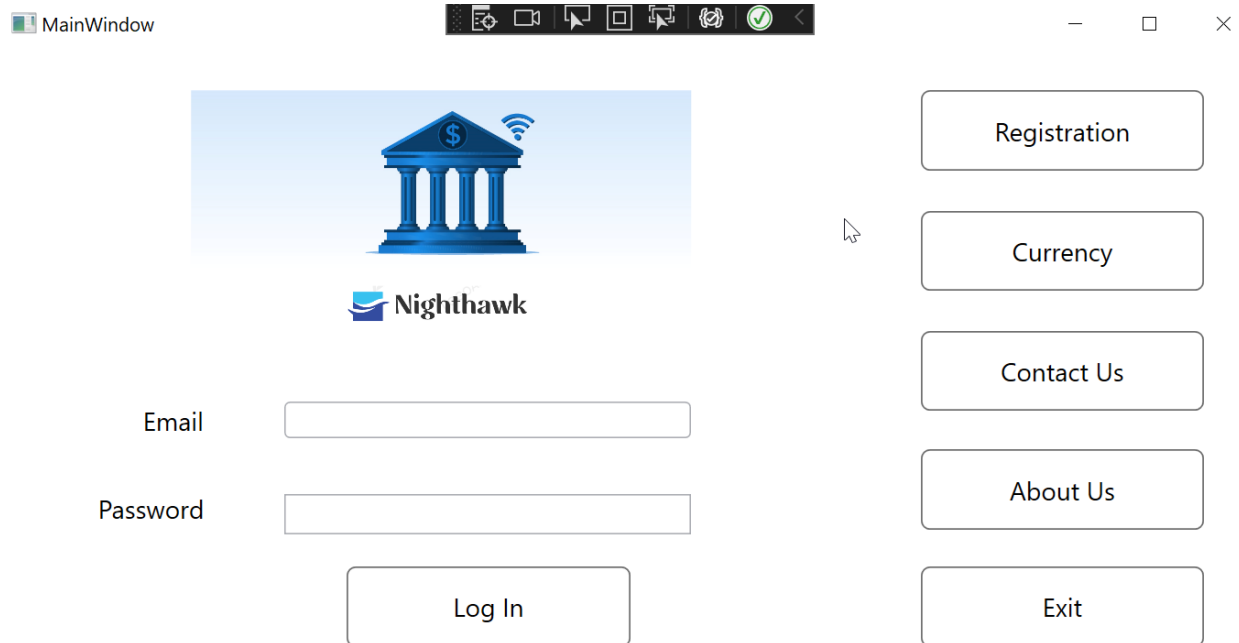
Password

Log In

## 2. PROJECT FUNCTIONALITIES

By running this application, the home window as shown before will show up in the middle of user screen, user will be able to log in by entering email and password.

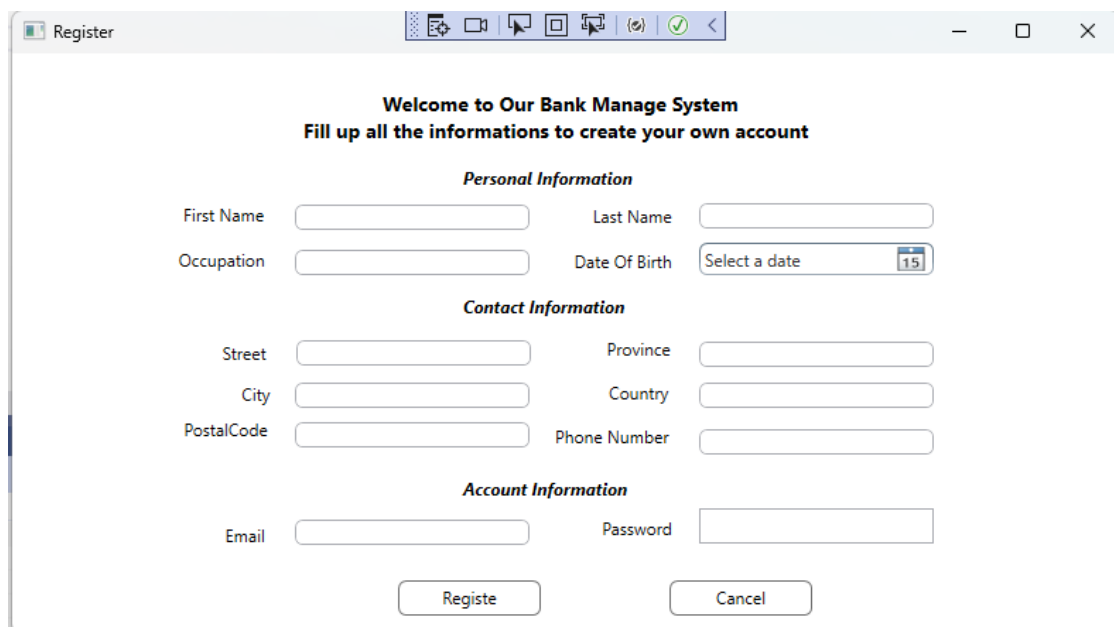
### 2.1 Home Window



The screenshot shows a window titled "MainWindow" with a standard Windows-style title bar. The interface features a central logo area with a blue classical building icon topped with a dollar sign and a Wi-Fi symbol, with the text "Nighthawk" below it. To the left of the logo are two input fields labeled "Email" and "Password", followed by a "Log In" button. To the right of the logo is a vertical stack of five buttons: "Registration", "Currency", "Contact Us", "About Us", and "Exit".

#### 2.1.1 Registration

By clicking on this button, will take users to register window:



The screenshot shows a window titled "Register" with a standard Windows-style title bar. The window contains the following text and form elements:

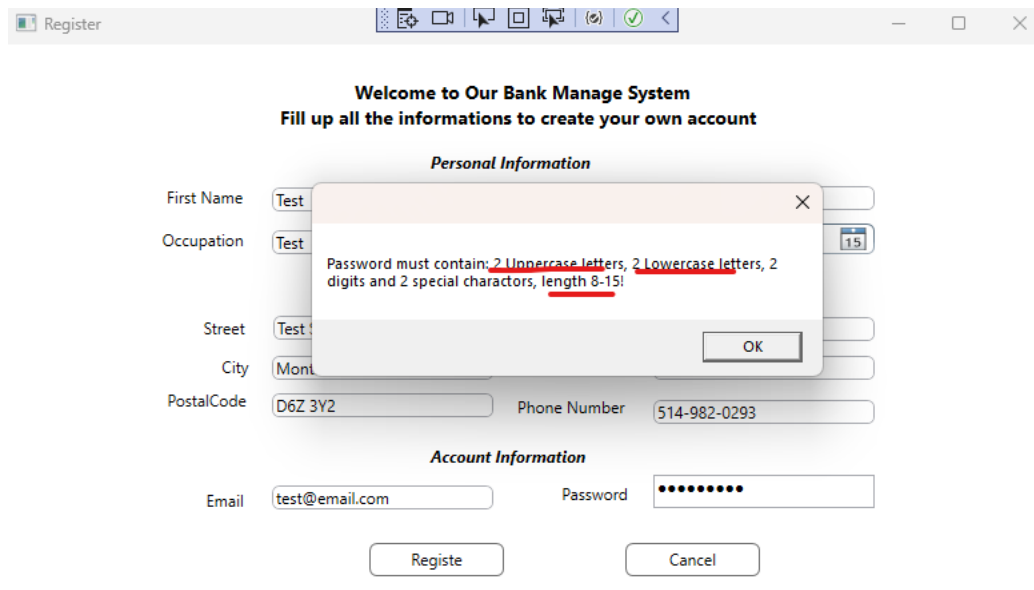
- Welcome to Our Bank Manage System**
- Fill up all the informations to create your own account**
- Personal Information**
  - First Name:
  - Last Name:
  - Occupation:
  - Date Of Birth:  (with a calendar icon showing 15)
- Contact Information**
  - Street:
  - Province:
  - City:
  - Country:
  - PostalCode:
  - Phone Number:
- Account Information**
  - Email:
  - Password:
- At the bottom, there are two buttons: "Registe" (misspelled) and "Cancel".

Will allows New user to register by filling necessary information, if any necessary information didn't fill out properly before click on register button, that field label name will turns red and message box pop-out prompt user fill out the field:

For the Date of Birth field, we pre-setup the calendar will show only the date from 1900-01-01 until the day which is exactly 18 years before the current day. Which will automatically make sure out user is legally to open a bank account (assume is 18 years old).

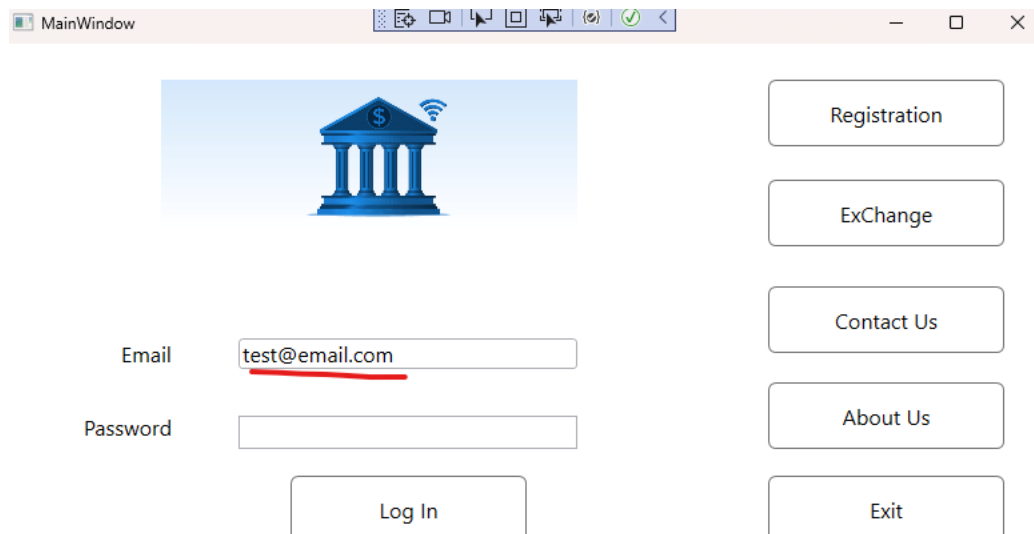
And if user try to enter a date manually which is not sufficient to be 18 years old from current date, error message box will pop-out as well and user wont be register successful.

For password, same as other necessary information, if user left it blank and click on register, error message box will pop-out and the password will turn red to ask user fill it out. We also have a password format pre-setup, which must contain 2 uppercase letters, 2 lowercase letters, 2 digits and also 2 special characters( for safety since it's a bank account). If user input not sufficient to this format(abc123456), error message box will pop-out:



The screenshot shows a 'Register' window titled 'Welcome to Our Bank Manage System' with the instruction 'Fill up all the informations to create your own account'. The window is divided into two sections: 'Personal Information' and 'Account Information'. In the 'Personal Information' section, fields for First Name, Occupation, Street, City, PostalCode, and Phone Number are visible. In the 'Account Information' section, the Email field is filled with 'test@email.com' and the Password field is empty. A modal error message box is displayed over the Password field, stating: 'Password must contain: 2 Uppercase letters, 2 Lowercase letters, 2 digits and 2 special characters, length 8-15!'. The 'Register' button is visible at the bottom.

So that user have to change their password respecting the format, for example we put: AAAb11@@java, then click on register will take user back to main window with the email address is already filled, user now can enter their password to login:

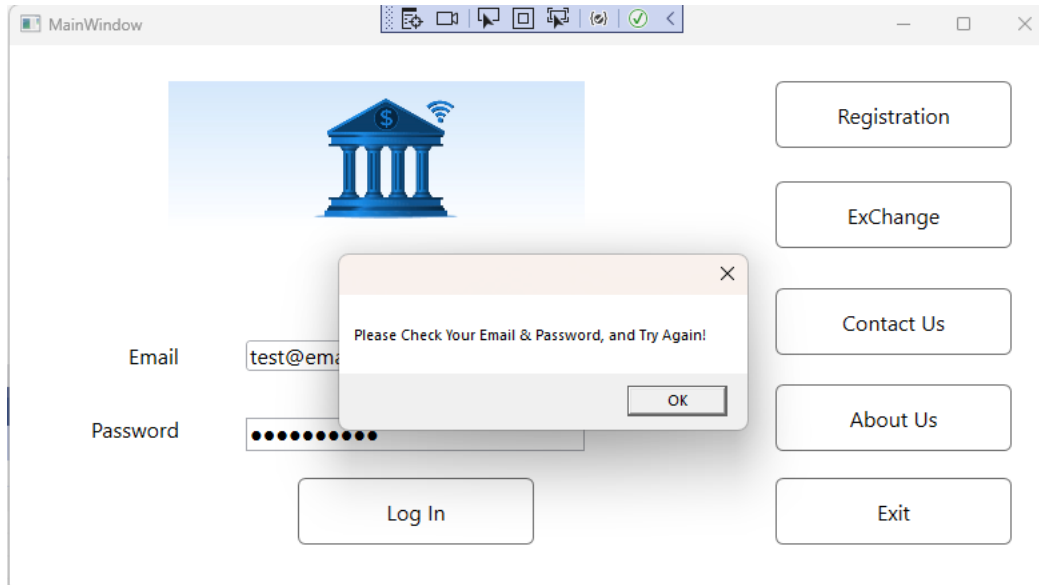


The screenshot shows the 'MainWindow' interface. At the top, there is a blue icon of a classical building with a dollar sign and a Wi-Fi symbol. Below the icon, there are two input fields: 'Email' (filled with 'test@email.com') and 'Password' (empty). A 'Log In' button is positioned below the 'Password' field. On the right side of the window, there is a vertical stack of buttons: 'Registration', 'ExChange', 'Contact Us', 'About Us', and 'Exit'.

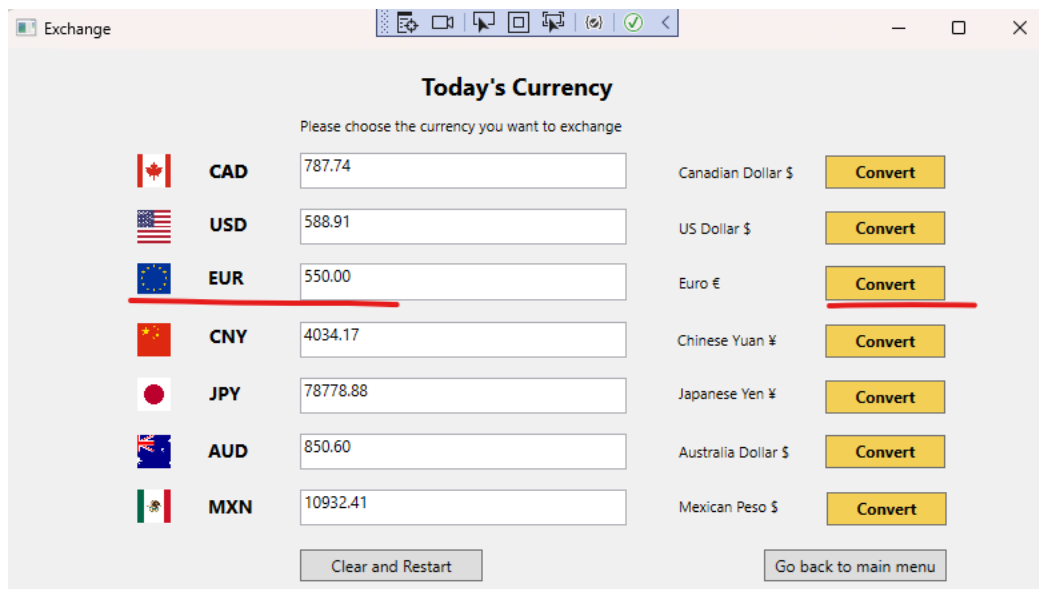
Meanwhile, a random account number/ card number will be generated and saved into database, through Rest-API which will display on after login window.

We encoded the password using UTF-8 encoding and SHA-256 hashing algorithm before saving it into database, which ensure the password saved into database is secured.

If incorrect password entered, error message will pop-out prompt user try again:

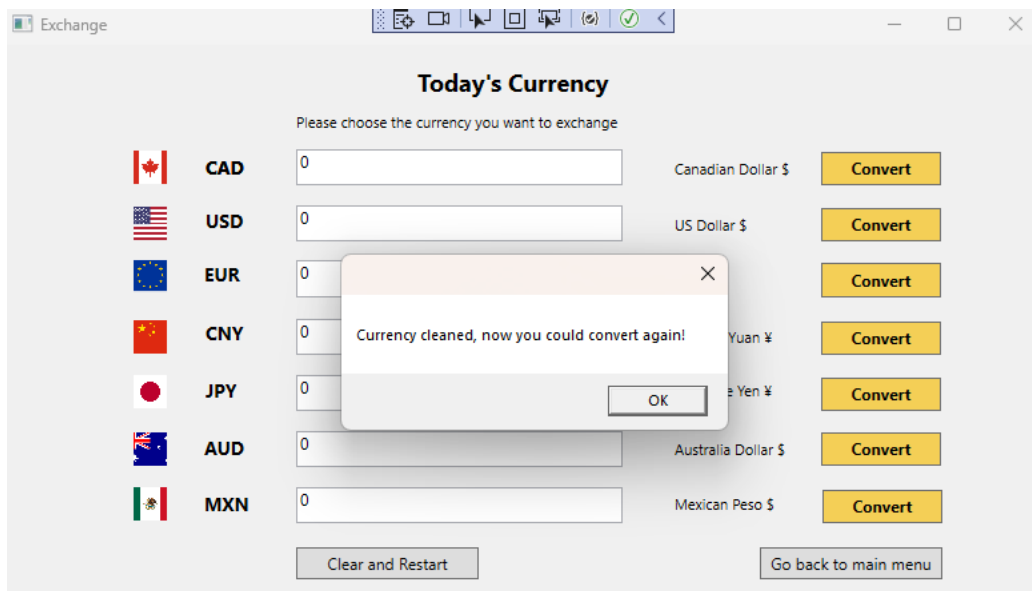


**2.1.2 Exchange:** In this window, user will be able to check current currency information, which is based on pre-setup currency information in our database. User will be able to enter an amount in any currency, then just click on the Convert button, all the others currency will display in place. For example, we enter 550 in EUR, and click on Convert:

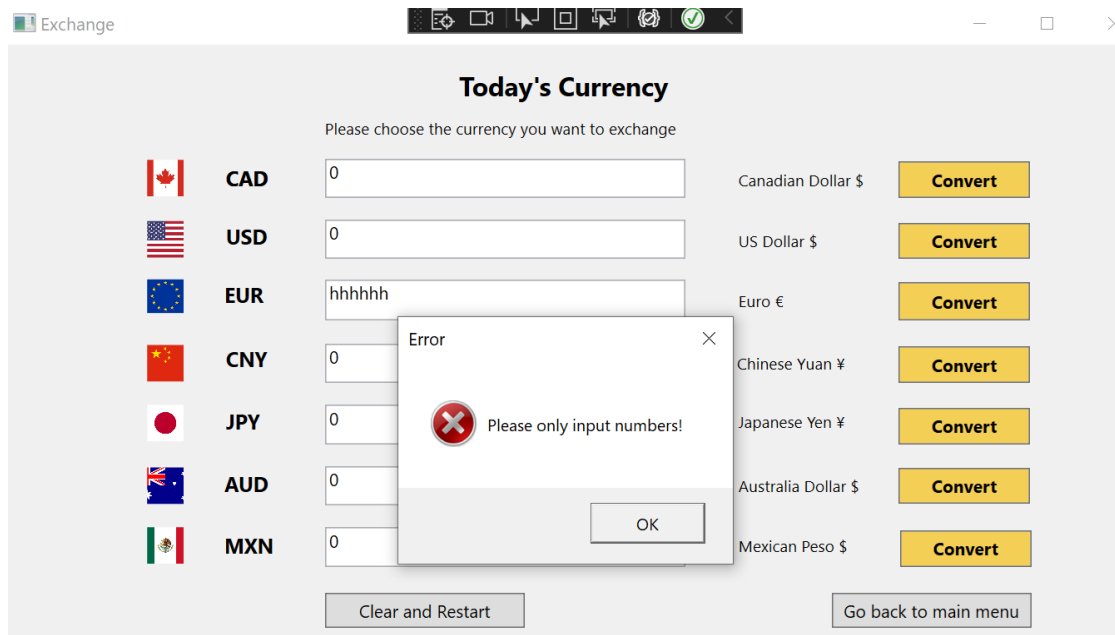


As you can see the corresponding currencies will display in place.

User can also click on the “Clear and Restart” button to clear all data displaying and repeat the process to check any they currency they want.



If users input something mixed with text instead of pure numbers, our system will remind them to only input numbers for conversion when they press the convert button.



### 2.1.3 Contact Us

In this window will allows user to find useful contact information, they can seek for help through this page if we met any issues while using this application.



ContactUs



## Nighthawk Bank of Canada

Personal and Commercial Banking

Banking Accounts	1-800-769-2511
Client Cards	
Lines of Credit and Loans	Teletypewriter (TTY) Services for those who are deaf or hard of hearing: 1-800-661-1275
Mortgages	
Credit Cards	1-800-769-2512
Business Clients	Teletypewriter (TTY) Services for those who are deaf or hard of hearing: 1-800-769-2518
Online Banking	1-800-769-2555
Mobile Banking	

[Main Menu](#)

## 2.1.4 About Us

This will be a bank information introduction window, it contains bank customized information that they want to share with this application users.

AboutUs



## Nighthawk Bank of Canada

Personal and Commercial Banking

Nighthawk Bank of Canada (NBC; French: Banque engoulevent du Canada) is a Canadian multinational financial services company and the largest bank in Canada by market capitalization. The bank serves over 17 million clients and has more than 89,000 employees worldwide. Founded in 1864 in Halifax, Nova Scotia, it maintains a corporate headquarters in Toronto and its head office in Montreal. RBC's institution number is 003. In November 2017, NBC was added to the Financial Stability Board's list of global systemically important banks.

Today, approximately 87,000 client-focused and committed employees help us earn the right to be our clients' first choice, differentiating us as an exceptional source of advice for the 17 million clients worldwide that we serve.

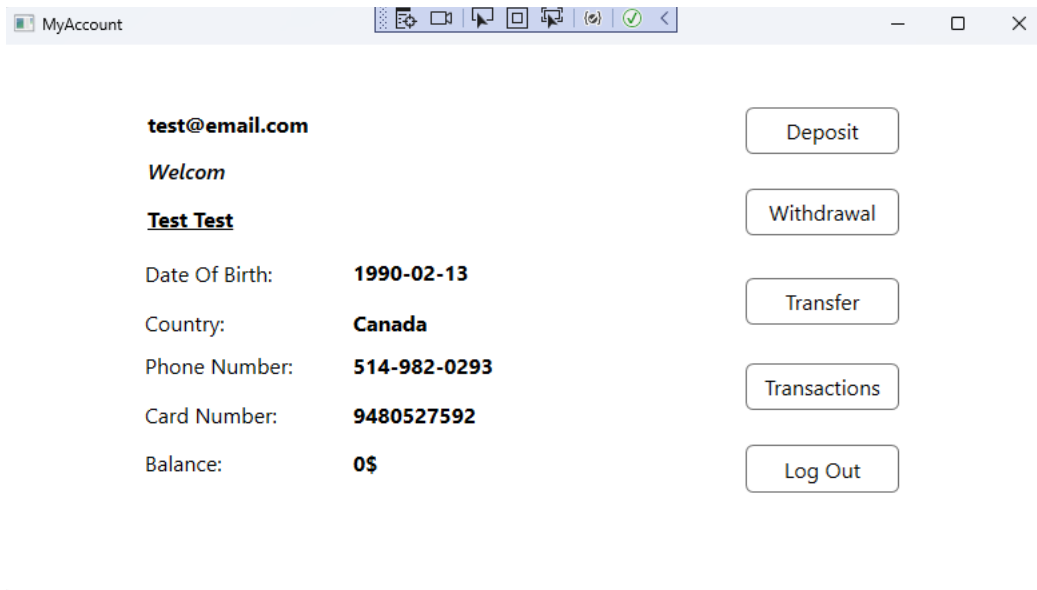
[Contact Us](#)
[Main Menu](#)


## 2.1.5 Exit

User can stop the application by clicking on this button.

## 2.2 MyAccount Window

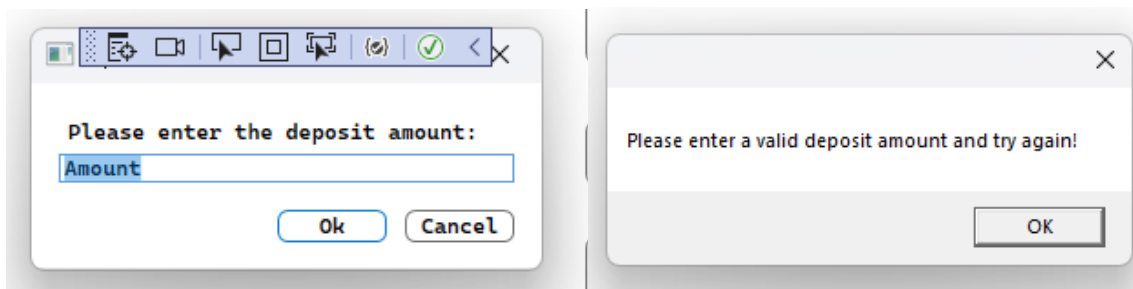
After user login, the MyAccount window will show up, contains user personal information (The generated card number is showing in here) and 5 functions:



The screenshot shows a window titled "MyAccount". On the left, it displays user information: email "test@email.com", a welcome message "Welcom", a name "Test Test", date of birth "1990-02-13", country "Canada", phone number "514-982-0293", card number "9480527592", and balance "0\$". On the right, there are five buttons: "Deposit", "Withdrawal", "Transfer", "Transactions", and "Log Out".

### 2.2.1 Deposit

This function will allow user to deposit an amount, by clicking on this button will pop-out a input box ask user to enter the deposit amount, this input box will accept digits only. If user enter anything else other than digits or just click "ok" with a blank input box, error message box will pop-out to prompt user try again.



The first screenshot shows a dialog box titled "Please enter the deposit amount:" with a text input field labeled "Amount" and "Ok" and "Cancel" buttons. The second screenshot shows an error message dialog box titled "Please enter a valid deposit amount and try again!" with an "OK" button.

While user enter correctly and click on "ok", the new amount will add onto the Balance and updated in this window, and save new amount information into database through Rest-API, this transaction information will be saved as well:

vveicomm

**Test Test**

Date Of Birth:

Country:

Phone Number:

Card Number:

Balance:

Please enter the deposit amount:

200

Ok

Cancel

9480527592

0\$

**Test Test**

Date Of Birth:

Country:

Phone Number:

Card Number:

Balance:

19

Ca

51

9480527592

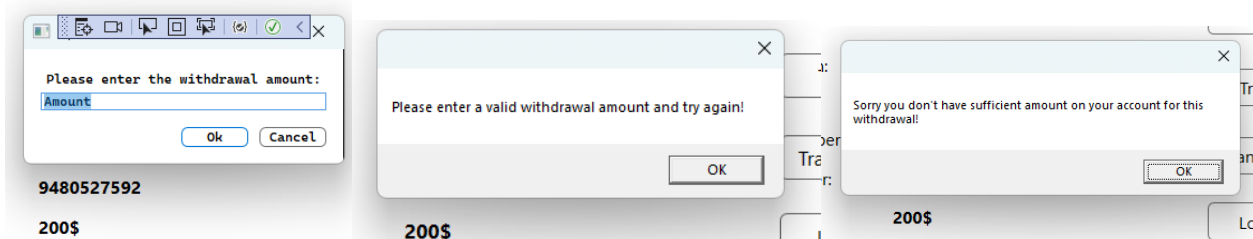
200\$

You have deposited 200\$ successfully!

OK

## 2.2.2 Withdrawal

This function will allow user to withdraw an amount, by click on this button will pop-out an input box ask user to enter the withdraw amount. Same as deposit this box will accept digits only, otherwise will be error message pop-out. And if user enter an amount greater than the current balance, an error message will pop-out as well to prompt user try again.



While user enter correctly and click on ok, success message pop-out and current balance updated automatically as well, and also save new amount information into database through Rest-API, this transaction information will be saved as well:

**Test Test**

Date Of Birth:

Country:

Phone Number:

Card Number:

Balance:

Please enter the withdrawal amount:

20

Ok

Cancel

9480527592

200\$

Date Of Birth:

Country:

Phone Number:

Card Number:

Balance:

19

Ca

51

94

180\$

You have withdrawn 20\$ successfully!

OK

## 2.2.3 Transfer

This function will allow user to make transfer through email addresses or account number, by clicking on this button, the Transfer window will show up.

TransferWindow

Welcome to our Transfer System  
You can transfer amount either through email address or account number

Your Current Balance: 180\$

Amount to Transfer:

By Email Address:

By Account Number:

In this window, user will need to enter the transfer amount first, then click on either “Email address” or “Account Number” button to enter recipient information. If transfer amount leave blank or entered anything else other than digits, then click on anyone of the 2 buttons, error message will pop-out ask user to enter a valid amount first.

Your Current Balance: 180\$

Enter a valide amount first please!

OK

Your Current Balance: 180\$

aaaaa

Enter a valide amount first please!

OK

If user enter an amount greater than the current balance in his/her account, another error message will pop-out and prompt user try again:

Your Current Balance: 180\$

Amount to Transfer: 200

We are sorry, but you don't have sufficient amount on you account for this transfer, try again please!

OK

### • 2.2.3.1 Transfer by Email Address

While user enter correctly in the transfer amount and click on the “Email Address” button, an input box will pop-out ask user to enter the recipient email address, if user leave this blank or just click on “ok”, error message will pop-out:

Two screenshots of a transfer interface. The left one shows a 'Please enter the receiver Email Address:' dialog box with 'Email' entered. The right one shows an error message: 'Please enter a valide Email Address and try again!'.

If user enter an email address which is not saved in our database, no user found message will pop-out and prompt user to try again:

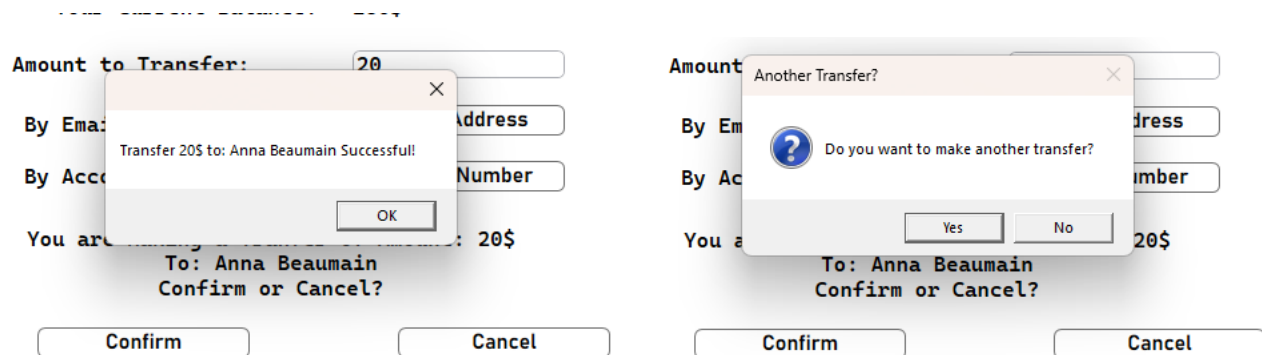
A screenshot of the transfer interface showing an error message: 'No user found! Check the email entered and try again please'.

While user entered correct transfer amount and email address, then click on “ok”, the transfer detail information will display on the transfer window like shown below:

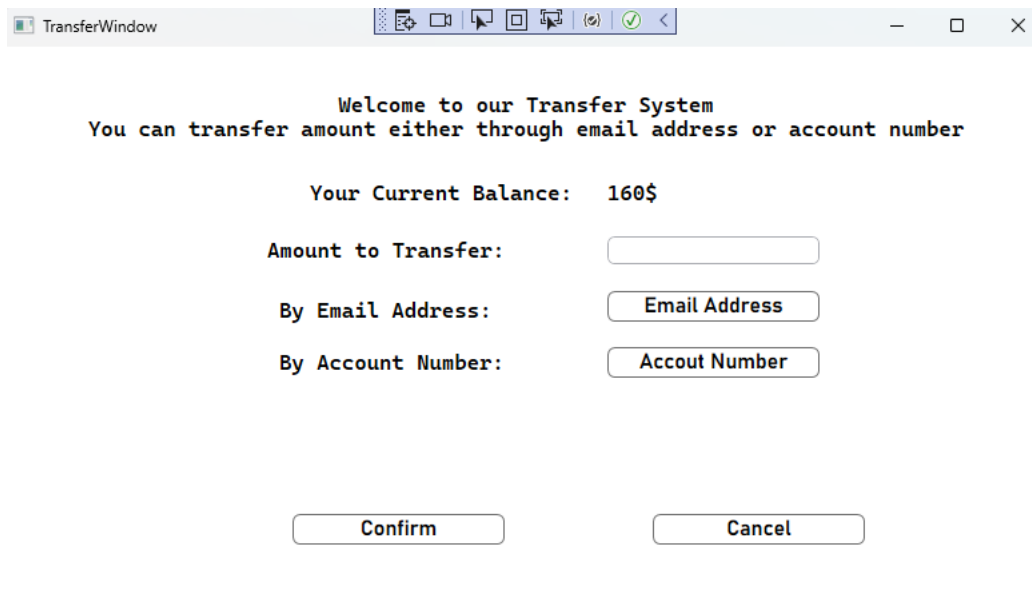
Two screenshots of the transfer interface. The left one shows the 'Please enter the receiver Email Address:' dialog box with 'anna@gmail.com' entered. The right one shows the transfer confirmation screen with the message: 'You are Making a Tranfer of Amount: 20\$ To: Anna Beaumain Confirm or Cancel?'.

User can click on confirm to confirm this transaction or click on cancel to cancel this transaction and go back to MyAccount window.

While user clicked on “Confirm”, success message will pop-out, and click on this “ok” there will be another pop-out message ask user if he/she want make another transfer:



If user click on “Yes”, will stay on this window and clear transfer amount and transfer summary information:



Else if user click on “No”, will leave this window back to MyAccount window.

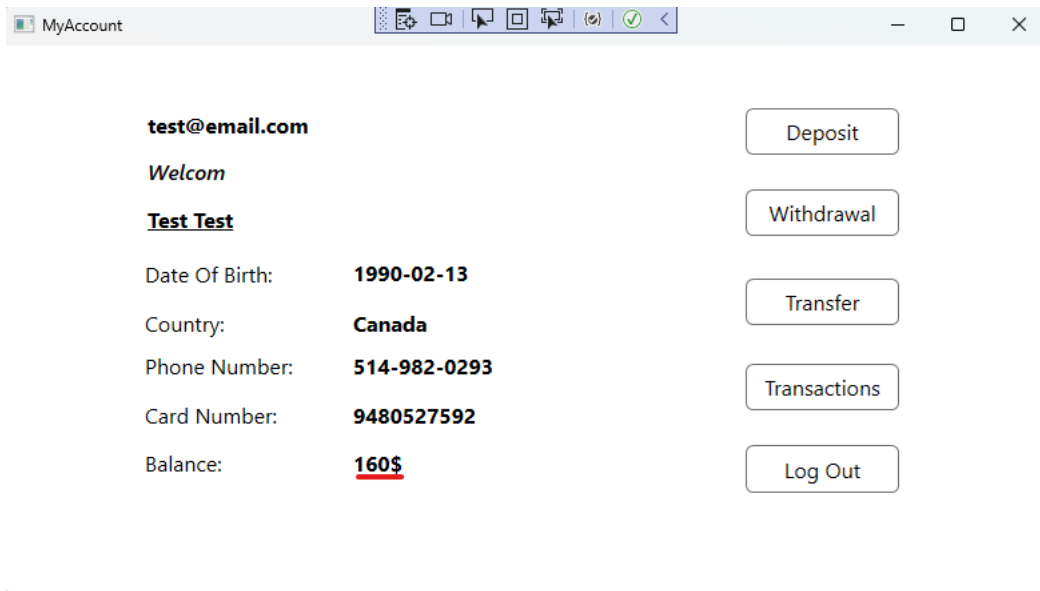
Meanwhile, by clicking “Confirm” to confirm this transaction, this record will be saved into database through Rest-API for both sender and recipient, and also the balance information for both sender and recipient in database will be updated.

- 2.2.3.2 Transfer by Account Number

Basically working in the same way as the “Email Address”.

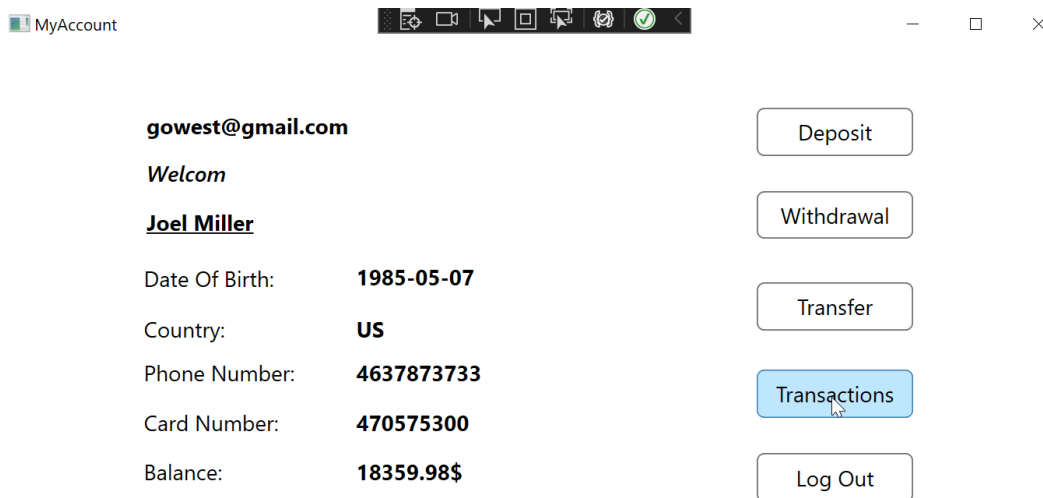
- 2.2.3.3 Cancel

User clicking on this button will take user back to MyAccount window which will showing updated current balance information, all other information will keep the same as current logged in user. This function served by Rest-API as well:



## 2.2.4 Transactions

When users click transaction button, they will load into transactions window. They could check their transaction history there.



In the transactions window, there are 5 buttons.

When users click the "This Month" button, they will be able to view their transactions that were generated in the current month;

Transactions

## Transaction History

recordId	userId	cardNumber	transactionType	transactionTime	transactionAmount
118	1000	652510300	Transfer IN	2023-02-23	500
120	1000	470575300	Deposit	2023-02-26	10000
121	1000	470575300	Deposit	2023-02-26	254
122	1000	470575300	Deposit	2023-02-26	362
123	1000	470575300	Withdrawal	2023-02-26	-777
124	1000	470575300	Deposit	2023-02-26	5000

This Month

Last Month

In 3 Month

This Year

Go Back

When users click the "Last Month" button, they will be able to view the transactions generated in the previous month.

Transactions

## Transaction History

recordId	userId	cardNumber	transactionType	transactionTime	transactionAmount
106	1000	470575300	Withdrawal	2023-01-03	-100

This Month

Last Month

In 3 Month

This Year

Go Back

When users click the "In 3 Month" button, they will be able to view the transactions generated in the past three month;



Transactions



— □ ×

## Transaction History

recordId	userId	cardNumber	transactionType	transactionTime	transactionAmount	
104	1000	470575300	Deposit	2022-12-26	1000	
105	1000	470575300	Deposit	2022-12-28	2000	
106	1000	470575300	Withdrawal	2023-01-03	-100	
118	1000	652510300	Transfer IN	2023-02-23	500	
120	1000	470575300	Deposit	2023-02-26	10000	
121	1000	470575300	Deposit	2023-02-26	254	
122	1000	470575300	Deposit	2023-02-26	362	
123	1000	470575300	Withdrawal	2023-02-26	-777	
124	1000	470575300	Deposit	2023-02-26	5000	

This Month

Last Month

In 3 Month

This Year

Go Back

When users click the "This Year" button, they will be able to view the transactions generated during the current year.

Transactions



— □ ×

## Transaction History

recordId	userId	cardNumber	transactionType	transactionTime	transactionAmount	
106	1000	470575300	Withdrawal	2023-01-03	-100	
118	1000	652510300	Transfer IN	2023-02-23	500	
120	1000	470575300	Deposit	2023-02-26	10000	
121	1000	470575300	Deposit	2023-02-26	254	
122	1000	470575300	Deposit	2023-02-26	362	
123	1000	470575300	Withdrawal	2023-02-26	-777	
124	1000	470575300	Deposit	2023-02-26	5000	

This Month

Last Month

In 3 Month

This Year

Go Back

When users click the "Go Back" button, they will be directed back to their previous page, which is their account page, and all the information and functions will still be available to them.

MyAccount

**gowest@gmail.com***Welcom***Joel Miller**Date Of Birth: **1985-05-07**Country: **US**Phone Number: **4637873733**Card Number: **470575300**Balance: **18359.98**

Deposit

Withdrawal

Transfer

Transactions

Log Out

## 2.2.5 Log Out

Clicking on this button will take user back to Home window and log out from the system, but with user's email already filled out in the email section.

MainWindow

**Nighthawk**Email Password 

Log In

Registration

Currency

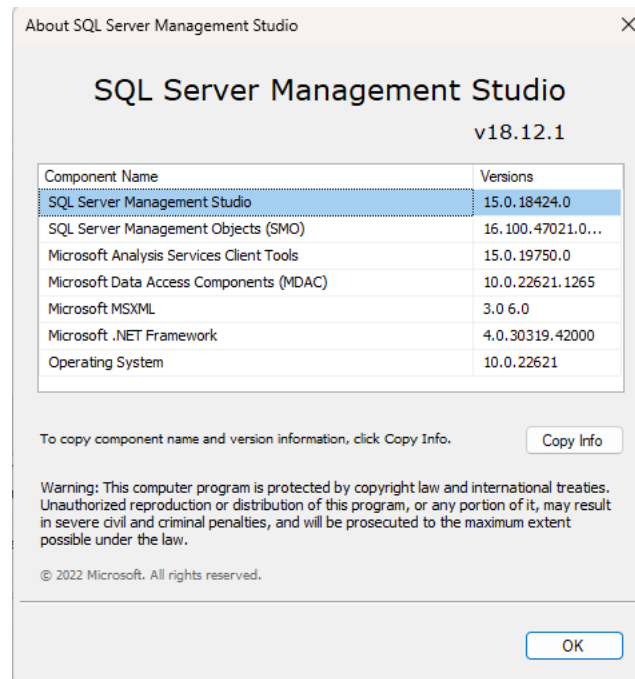
Contact Us

About Us

Exit

### 3. PROJECT SETUP

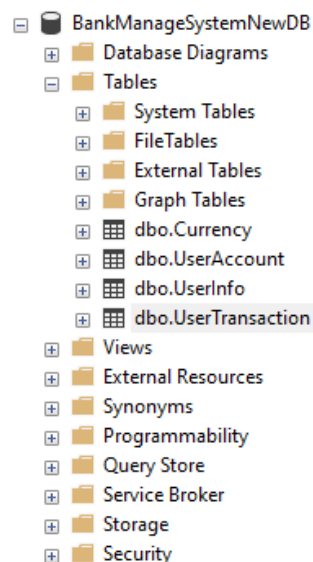
To run and test this project locally, you will need to set up the database first, we used MSSQL as our database and details version information is shown below:



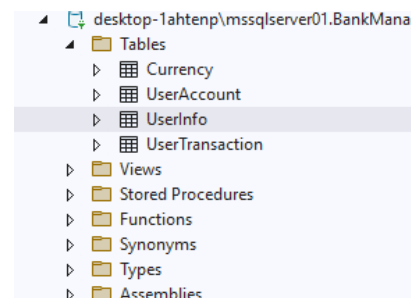
Please make sure you running the same or higher version, then you can create a new database for our project, and finally run the 4 .sql files inside a folder named: SqlTables, which will be found in our submission root folder. In the currency sql file, please make sure excute the insert queries as well, to make sure the Currency function working well.

The properly settled database will be like this:

In SQLSMS.



In Visual Studio



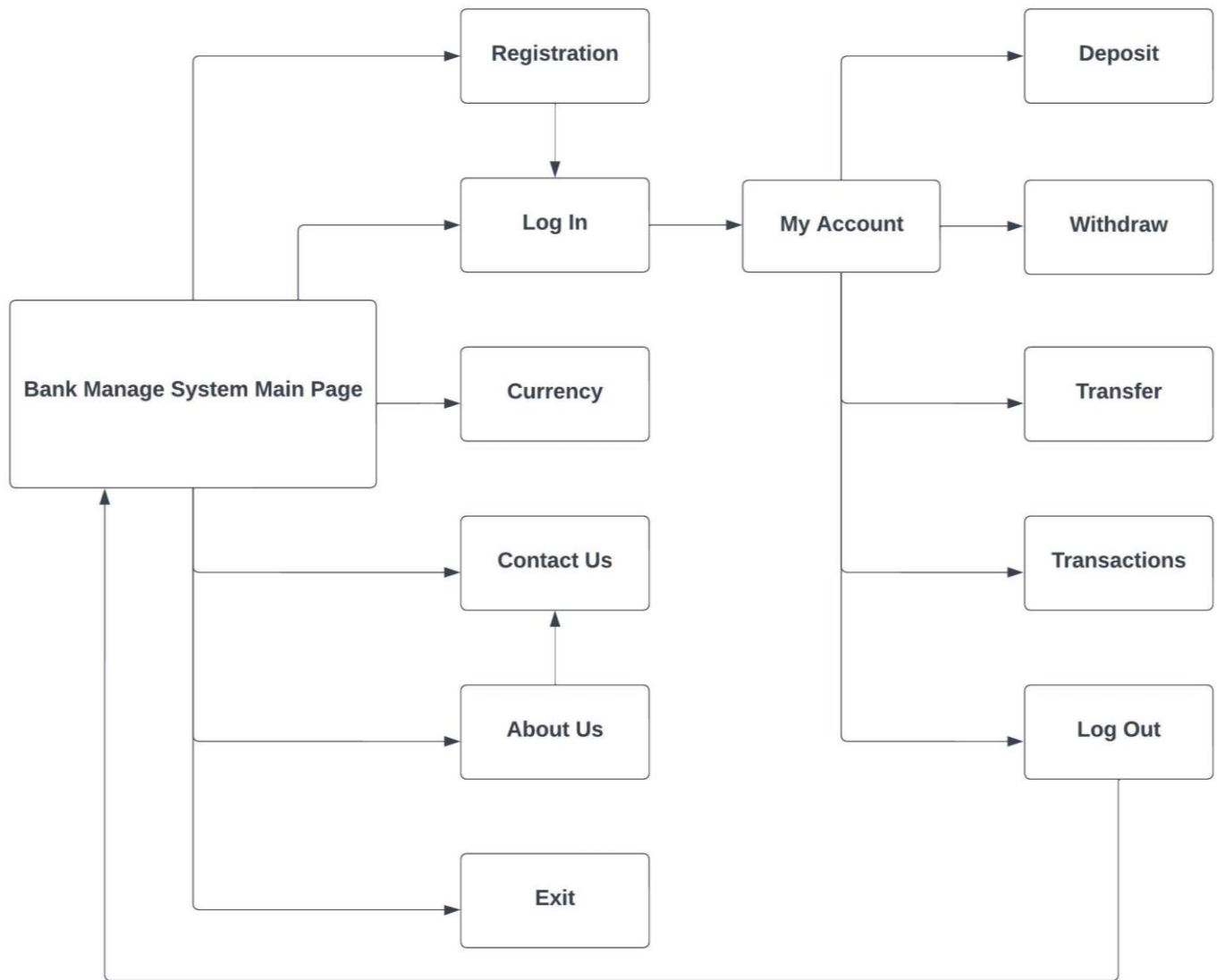
Next you will need open our Rest-API and go to: appsettings.json, change the "CurrencyCon" to be your new created database sql connection string value:



```
1 {
2   "Logging": {
3     "LogLevel": {
4       "Default": "Information",
5       "Microsoft.AspNetCore": "Warning"
6     }
7   },
8   "ConnectionStrings": {
9     "CurrencyCon": "Data Source=DESKTOP-1AHTENP\\MSSQLSERVER01;Initial Catalog=BankManageSystemNewDB;Integrated Security=True"
10   },
11   "AllowedHosts": "*"
12 }
13
14
15
```

After all this you will run the Rest-API first, and then run our wpf project. You will need to register you own account first, then you can try to deposit and withdraw. For test transfer, you will need to register at least one more account.

## 4. SYSTEM STRUCTURE



## 5. REPOSITORY

We build 3 repositories during this project:

The repository at <https://github.com/Yateng198/BankManageSystem> contains all the necessary files and components, including the BankManageAPI zip file, which are synchronized and kept up-to-date.

The repository at <https://github.com/Yateng198/BankManageAPI> specifically contains the API files that are part of our project.

Introducing our project, Nighthawk, which was created for Deliverable 1. This repository can be found at <https://github.com/humphrey777/nighthawk>.

## 6. TEAM DIVISION

### Yateng:

Main Window, Registration, Log In, My Account, Deposit, Withdraw, Transfer, etc;

The API part accordingly (UserInfo and Transfer);

Adjusting and complete the database;

Report.

### Heping:

Transaction, Currency, About Us, Contact Us, etc;

The API part accordingly (Currency and Transaction);

Designing the database;

Report and video.