







TEST PLAN

Our approach is to divide the test into 2 parts: **Unit testing and Program Testing**

1. Unit testing:

- Microsoft.VisualStudio.TestTools.UnitTesting is used.
- The MS Test project is included in our program solution.
- Each function in the class diagram has a corresponding test method.
- For details, please check the codes in the Exchange_test folder.
- The result for unit is included as below.

# No.	 Test Method	 Result	 Note
1	<u>TestAddBank1()</u>	Pass	Test if the program can register a bank and destinate it with an ID Test if the input information can be written in the database
2	<u>TestAddBank2()</u>	Pass	Test the “add new bank” situation when the banks has similar name and assign them different ID
3	<u>TestFindBank()</u>	Pass	Test if the “key not found exception” is thrown when the given bankID is not registered and if the bank is in the database, there will be the output of bank name
4	<u>TestGetAllBanks()</u>	Pass	Test whether the bank is attach to the Dictionary
5	<u>TestSetMoneyOwed()</u>	Pass	Test the transaction money being stored in the bank object

# No.	 Test Method	 Result	 Note
6	<u>TestUpdateBankDB()</u>	Pass	Check if the bank database is updated after modification
7	<u>TestRegister()</u>	Pass	Bank IU process the register action
8	<u>TestRequestAQuote1()</u>	Pass	The situation when the share code does not exist in the system
9	<u>TestRequestAQuote2()</u>	Pass	The situation when the bank request for share code that has the volume = 0
10	<u>TestRequestAQuote3()</u>	Pass	The situation when the requested share code is available in the system
11	<u>TestBuyShares1()</u>	Pass	Test bankUI process when buying unknown share codes
12	<u>TestBuyShares2()</u>	Pass	Test bankUI process when buying no share with corresponding share code
13	<u>TestBuyShares3()</u>	Pass	Test bankUI process when the volume wanted match the available volume
14	<u>TestBuyShares4()</u>	Pass	Test bankUI process when request amount is bigger than the available volume with the condition of the request price is smaller and equal the maximum price
15	<u>TestBuyShares5()</u>	Pass	Test bankUI process request amount is bigger than the available volume with the condition of the request price is bigger than the maximum price

# No.	Aa Test Method	▼ Result	☰ Note
16	<u>TestCreateRequest()</u> .	Pass	Test the record manager with its ability to create request and add request to database
17	<u>TestCreateResponse()</u> .	Pass	Test the record manager with its ability to create response and add request to database
18	<u>TestGetResponse()</u> .	Pass	Test the response whether it has similar ID
19	<u>TestGetAllRequest()</u> .	Pass	Test the find all request function of the record manager
20	<u>TestSetResponseToARequest()</u> .	Pass	Test whether the response is successfully added to the request
21	<u>TestGetBankSuccessfulTransactions()</u> .	Pass	Test the ability of the record manager to recall every successful transactions of the bank
22	<u>TestGetInventoryReport()</u> .	Pass	Test whether the regulator can get the inventory report
23	<u>TestGetFinancialReport()</u> .	Pass	Test whether the regulator can get the financial report
24	<u>TestGetTransactionLog()</u> .	Pass	Test whether the regulator can get the transaction log
25	<u>TestGetBankInvoice()</u> .	Pass	Test whether the regulator can get bank invoice
26	<u>TestAddSharesAndGetAllShares()</u> .	Pass	Test share manager with the ability to add new share and add the share to database
27	<u>TestFindShare()</u> .	Pass	Test share manager on finding share code

# No.	Aa Test Method	▼ Result	☰ Note
28	<u>TestGetQuotePrice1()</u>	Pass	Test share manager on getting code with the condition of the basePrice given < minimum price of the shares
29	<u>TestGetQuotePrice2()</u>	Pass	Test share manager on getting code with the condition of the minimum price of the shares < basePrice given < maximum price of the shares
30	<u>TestGetQuotePrice3()</u>	Pass	Test share manager on getting code with the condition of the basePrice given > maximum price of the shares
31	<u>TestGetSharesToBuy()</u>	Pass	Test whether all shares with price lower or equal to the request price are found by share manager
32	<u>TestGetSharesAtAPrice()</u>	Pass	Test share manager on finding all shares at the request price
33	<u>TestGetAvailableShares()</u>	Pass	Test share manager on finding all available share
34	<u>TestUpdateShareDB()</u>	Pass	Test the ability of the share manager to recall the share that has recently been modified

Result of Unit Testing in the terminal:

```
--bash-- 137x24
Starting test execution, please wait...
A total of 1 test files matched the specified pattern.

Passed! - Failed: 0, Passed: 34, Skipped: 0, Total: 34, Duration: 1 s - /Users/ /SDAM2
/Project/Exchange_v5/Exchange_test/Exchange_test/bin/Debug/netcoreapp3.1/Exchange_test.dll (netcoreapp3.1)
(base) dotnet test /Users/ /SDAM2/Project/Exchange_v5/Exchange_t
est/Exchange_test/Exchange_test.csproj
Determining projects to restore...
All projects are up-to-date for restore.
Exchange - materials/SDAM2/Project/Exchange_v5/Exchange/Exchange/bin/Debug/netcoreapp3.1/Exchange.d
ll
Exchange_test -> /Users/ /SDAM2/Project/Exchange_v5/Exchange_test/Exchange_test/bin/Debug/netcoreap
p3.1/Exchange_test.dll
Test run for /Users/ /SDAM2/Project/Exchange_v5/Exchange_test/Exchange_test/bin/Debug/netcoreapp3.1/E
xchange_test.dll (.NETCoreApp,Version=v3.1)
Microsoft (R) Test Execution Command Line Tool Version 16.10.0
Copyright (c) Microsoft Corporation. All rights reserved.

Starting test execution, please wait...
A total of 1 test files matched the specified pattern.

Passed! - Failed: 0, Passed: 34, Skipped: 0, Total: 34, Duration: 364 ms - /Users/ /SD
AM2/Project/Exchange_v5/Exchange_test/Exchange_test/bin/Debug/netcoreapp3.1/Exchange_test.dll (netcoreapp3.1)
(base)
```

2. Program testing:

- The exchange software is built in Visual Studio.
- Our group use computer terminal to test the overall program.
- The results for this action would be shown below.
- You can also find the database file: "Banks.txt", "Shares.txt" and "Records.txt" in the Test_result folder. They contain the information of all banks, shares and records used for testing and their states after the simulation.

Terminal test

Initial data used
for testing

```
BankManager bankM = new BankManager();
ShareManager shareM = new ShareManager();
RecordManager recordM = new RecordManager();

bkUI = new BankUI(bankM, shareM, recordM);
reUI = new RegulatorUI(bankM, shareM, recordM);

//bank for initial test
bankM.AddBank("A", "Banks.txt");

//shares for initial test
shareM.AddShare(new Share("FLC", 13.45, false), "Shares.txt");
shareM.AddShare(new Share("FLC", 13.45, false), "Shares.txt");
shareM.AddShare(new Share("FLC", 14.45, false), "Shares.txt");
shareM.AddShare(new Share("FLC", 15.00, false), "Shares.txt");
shareM.AddShare(new Share("VIC", 14.45), "Shares.txt");
shareM.AddShare(new Share("VIC", 14.45), "Shares.txt");
shareM.AddShare(new Share("VIC", 14.45), "Shares.txt");
shareM.AddShare(new Share("VIC", 15.00), "Shares.txt");
shareM.AddShare(new Share("VIC", 15.30), "Shares.txt");
shareM.AddShare(new Share("VIC", 15.30), "Shares.txt");
shareM.AddShare(new Share("VIC", 15.75), "Shares.txt");
shareM.AddShare(new Share("VIC", 15.75), "Shares.txt");
shareM.AddShare(new Share("VNM", 15.30), "Shares.txt");
shareM.AddShare(new Share("VNM", 15.56), "Shares.txt");
shareM.AddShare(new Share("VNM", 16.00), "Shares.txt");
shareM.AddShare(new Share("VNM", 16.75), "Shares.txt");
```

Test 1: Output
error when
option is out of
range

```
-----
If you haven't got an account, please enter 1 to register for an exchange account.

1. Register for an exchange account
2. Buy shares or request for a quote
3. Request an inventory report
4. Request a financial report
5. Request a transaction log
6. Request a bank's invoice
7. Exit

Option: > 0

Choice not recognised. Please try again

Option: > 8

Choice not recognised. Please try again

Option: > 1
Enter bank name: > B
Bank registered
Your ID is 1

-----
If you haven't got an account, please enter 1 to register for an exchange account.

1. Register for an exchange account
2. Buy shares or request for a quote
3. Request an inventory report
4. Request a financial report
5. Request a transaction log
6. Request a bank's invoice
7. Exit

Option: > 3
INVENTORY REPORT:
```

Test 2: Register
for an exchange
account

Test 3: Initial
inventory report

Share code	Price(\$)/Share	Total volume	Sold volume	Available volume
FLC	13.45	2	2	0
FLC	14.45	1	1	0
FLC	15.00	1	1	0
VIC	14.45	3	0	3
VIC	15.00	1	0	1
VIC	15.30	2	0	2
VIC	15.75	2	0	2
VNM	15.30	1	0	1
VNM	15.56	1	0	1
VNM	16.00	1	0	1

Test 4: Initial financial report

Test 5: Initial transaction log

Test 6: Initial invoice of each bank

Test 7: An unregistered bank requests for a quote

```
VNM                16.75                1                0                1

-----
If you haven't got an account, please enter 1 to register for an exchange account.

1. Register for an exchange account
2. Buy shares or request for a quote
3. Request an inventory report
4. Request a financial report
5. Request a transaction log
6. Request a bank's invoice
7. Exit

Option: > 4
FINANCIAL REPORT:

      Bank's ID      Bank's name      Amount of money owed to the exchange ($)
      0              A              0
      1              B              0

The total amount of processing fee is $0

-----
If you haven't got an account, please enter 1 to register for an exchange account.

1. Register for an exchange account
2. Buy shares or request for a quote
3. Request an inventory report
4. Request a financial report
5. Request a transaction log
6. Request a bank's invoice
7. Exit

Option: > 5
TRANSACTION LOG:

-----
If you haven't got an account, please enter 1 to register for an exchange account.

1. Register for an exchange account
2. Buy shares or request for a quote
3. Request an inventory report
4. Request a financial report
5. Request a transaction log
6. Request a bank's invoice
7. Exit

Option: > 6
Enter bank ID: > 0
BANK NO.0'S INVOICE:

      Time                Share code      Price ($)/share      Volume

-----
If you haven't got an account, please enter 1 to register for an exchange account.

1. Register for an exchange account
2. Buy shares or request for a quote
3. Request an inventory report
4. Request a financial report
5. Request a transaction log
6. Request a bank's invoice
7. Exit

Option: > 6
Enter bank ID: > 1
BANK NO.1'S INVOICE:

      Time                Share code      Price ($)/share      Volume

-----
If you haven't got an account, please enter 1 to register for an exchange account.

1. Register for an exchange account
2. Buy shares or request for a quote
3. Request an inventory report
4. Request a financial report
5. Request a transaction log
6. Request a bank's invoice
7. Exit

Option: > 2
If you want to request for a quote, please enter 0 as the volume of share to buy.

Enter bank ID: > 10
Enter share code: > VIC
Enter the volume of share you want to buy: > 0
```

NOTE

If the quote price is -1, it means that all shares of request code are sold.

ERROR: Bank not found. Register to request for a quote or buy shares.

If you haven't got an account, please enter 1 to register for an exchange account.

1. Register for an exchange account
2. Buy shares or request for a quote
3. Request an inventory report
4. Request a financial report
5. Request a transaction log
6. Request a bank's invoice
7. Exit

Option: > 2

If you want to request for a quote, please enter 0 as the volume of share to buy.

Enter bank ID: > 0

Enter share code: > ABC

Enter the volume of share you want to buy: > 0

NOTE

If the quote price is -1, it means that all shares of request code are sold.

EXCH@20213130:20.31.43.56660: quote 0 Unknown share code at \$0

If you haven't got an account, please enter 1 to register for an exchange account.

1. Register for an exchange account
2. Buy shares or request for a quote
3. Request an inventory report
4. Request a financial report
5. Request a transaction log
6. Request a bank's invoice
7. Exit

Option: > 0

Choice not recognised. Please try again

Option: > 2

If you want to request for a quote, please enter 0 as the volume of share to buy.

Enter bank ID: > 0

Enter share code: > FLC

Enter the volume of share you want to buy: > 0

NOTE

If the quote price is -1, it means that all shares of request code are sold.

EXCH@20213230:20.32.49.63234: quote 0 FLC at \$-1

If you haven't got an account, please enter 1 to register for an exchange account.

1. Register for an exchange account
2. Buy shares or request for a quote
3. Request an inventory report
4. Request a financial report
5. Request a transaction log
6. Request a bank's invoice
7. Exit

Option: > 2

If you want to request for a quote, please enter 0 as the volume of share to buy.

Enter bank ID: > 0

Enter share code: > VIC

Enter the volume of share you want to buy: > 0

NOTE

If the quote price is -1, it means that all shares of request code are sold.

EXCH@20213330:20.33.22.55153: quote 3 VIC at \$14.45

If you haven't got an account, please enter 1 to register for an exchange account.

Test 8: An
unknown share
code is
requested

Test 9: No share
with matching
code is available

Test 10:
Successful
request

Test 11: An unregistered bank buys shares

```

1. Register for an exchange account
2. Buy shares or request for a quote
3. Request an inventory report
4. Request a financial report
5. Request a transaction log
6. Request a bank's invoice
7. Exit

Option: > 2
If you want to request for a quote, please enter 0 as the volume of share to buy.

Enter bank ID: > 10
Enter share code: > VIC
Enter the volume of share you want to buy: > 1
Enter price ($) per share: > 1

NOTE

If the quote price is -1, it means either that all shares of request code are sold or there are no available shares with higher price

ERROR: Bank not found. Register to request for a quote or buy shares.

-----
If you haven't got an account, please enter 1 to register for an exchange account.

1. Register for an exchange account
2. Buy shares or request for a quote
3. Request an inventory report
4. Request a financial report
5. Request a transaction log
6. Request a bank's invoice
7. Exit

```

Test 12: Bank wants to buy an unknown sharecode

```

Option: > 2
If you want to request for a quote, please enter 0 as the volume of share to buy.

Enter bank ID: > 0
Enter share code: > ABC
Enter the volume of share you want to buy: > 1
Enter price ($) per share: > 1

NOTE

If the quote price is -1, it means either that all shares of request code are sold or there are no available shares with higher price

EXCH@20213430:20.34.36.34862: quote 0 Unknown share code at $0

-----
If you haven't got an account, please enter 1 to register for an exchange account.

1. Register for an exchange account
2. Buy shares or request for a quote
3. Request an inventory report
4. Request a financial report
5. Request a transaction log
6. Request a bank's invoice
7. Exit

```

Test 13: No shares with requested code are available to buy

```

Option: > 2
If you want to request for a quote, please enter 0 as the volume of share to buy.

Enter bank ID: > 0
Enter share code: > FLC
Enter the volume of share you want to buy: > 1
Enter price ($) per share: > 15.5

NOTE

If the quote price is -1, it means either that all shares of request code are sold or there are no available shares with higher price

EXCH@20213630:20.36.01.63527: quote 0 FLC at $-1

-----
If you haven't got an account, please enter 1 to register for an exchange account.

1. Register for an exchange account
2. Buy shares or request for a quote
3. Request an inventory report
4. Request a financial report
5. Request a transaction log
6. Request a bank's invoice
7. Exit

```

Test 14: Successful transaction

```

Option: > 2
If you want to request for a quote, please enter 0 as the volume of share to buy.

```

```

Enter bank ID: > 0
Enter share code: > VIC
Enter the volume of share you want to buy: > 3
Enter price ($) per share: > 15.15

NOTE

If the quote price is -1, it means either that all shares of request code are sold or there are no available shares with higher price

EXCH@20214030:20.40.51.50453: bought 3 VIC at $15.15

-----
If you haven't got an account, please enter 1 to register for an exchange account.

1. Register for an exchange account
2. Buy shares or request for a quote
3. Request an inventory report
4. Request a financial report
5. Request a transaction log
6. Request a bank's invoice
7. Exit

Option: > 2
If you want to request for a quote, please enter 0 as the volume of share to buy.

Enter bank ID: > 1
Enter share code: > VIC
Enter the volume of share you want to buy: > 10
Enter price ($) per share: > 15.65

NOTE

If the quote price is -1, it means either that all shares of request code are sold or there are no available shares with higher price

EXCH@20214230:20.42.00.88207: only 3 VIC at $15.65
EXCH@20214230:20.42.00.88531: quote 2 VIC at $15.75

-----
If you haven't got an account, please enter 1 to register for an exchange account.

1. Register for an exchange account
2. Buy shares or request for a quote
3. Request an inventory report
4. Request a financial report
5. Request a transaction log
6. Request a bank's invoice
7. Exit

Option: > 2
If you want to request for a quote, please enter 0 as the volume of share to buy.

Enter bank ID: > 1
Enter share code: > VIC
Enter the volume of share you want to buy: > 3
Enter price ($) per share: > 15.65

NOTE

If the quote price is -1, it means either that all shares of request code are sold or there are no available shares with higher price

EXCH@20214330:20.43.23.83271: bought 3 VIC at $15.65

-----
If you haven't got an account, please enter 1 to register for an exchange account.

1. Register for an exchange account
2. Buy shares or request for a quote
3. Request an inventory report
4. Request a financial report
5. Request a transaction log
6. Request a bank's invoice
7. Exit

Option: > 2
If you want to request for a quote, please enter 0 as the volume of share to buy.

Enter bank ID: > 1
Enter share code: > VIC
Enter the volume of share you want to buy: > 1
Enter price ($) per share: > 15.75

NOTE

If the quote price is -1, it means either that all shares of request code are sold or there are no available shares with higher price

EXCH@20214330:20.43.43.14095: bought 1 VIC at $15.75

```

Test I5: The requested volume is greater than the available volume to buy. Then, the bank decides to buy available volume and an extra share at quote price

Test 16: The available volume is smaller than the request one. The request price is higher than the maximum price available now

Test 17: Final inventory report

Test 18: Final financial report

Test 19: Final transaction log

```
-----
If you haven't got an account, please enter 1 to register for an exchange account.

1. Register for an exchange account
2. Buy shares or request for a quote
3. Request an inventory report
4. Request a financial report
5. Request a transaction log
6. Request a bank's invoice
7. Exit

Option: > 2
If you want to request for a quote, please enter 0 as the volume of share to buy.

Enter bank ID: > 0
Enter share code: > VIC
Enter the volume of share you want to buy: > 5
Enter price ($) per share: > 18

NOTE

If the quote price is -1, it means either that all shares of request code are sold or there are no available shares with higher price

EXCH@20214430:20.44.05.17545: only 1 VIC at $18
EXCH@20214430:20.44.05.17642: quote 0 VIC at $-1

-----
If you haven't got an account, please enter 1 to register for an exchange account.

1. Register for an exchange account
2. Buy shares or request for a quote
3. Request an inventory report
4. Request a financial report
5. Request a transaction log
6. Request a bank's invoice
7. Exit

Option: > 3
INVENTORY REPORT:

      Share code      Price($)/Share      Total volume      Sold volume      Available volume
      FLC              13.45              2              2              0
      FLC              14.45              1              1              0
      FLC              15.00              1              1              0
      VIC              14.45              3              3              0
      VIC              15.00              1              1              0
      VIC              15.30              2              2              0
      VIC              15.75              2              1              1
      VNM              15.30              1              0              1
      VNM              15.56              1              0              1
      VNM              16.00              1              0              1
      VNM              16.75              1              0              1

-----
If you haven't got an account, please enter 1 to register for an exchange account.

1. Register for an exchange account
2. Buy shares or request for a quote
3. Request an inventory report
4. Request a financial report
5. Request a transaction log
6. Request a bank's invoice
7. Exit

Option: > 4
FINANCIAL REPORT:

      Bank's ID      Bank's name      Amount of money owed to the exchange ($)
      0              A              45.45
      1              B              62.7

The total amount of processing fee is $5.41

-----
If you haven't got an account, please enter 1 to register for an exchange account.

1. Register for an exchange account
2. Buy shares or request for a quote
3. Request an inventory report
4. Request a financial report
5. Request a transaction log
6. Request a bank's invoice
7. Exit

Option: > 5
TRANSACTION LOG:

A@20213130:20.31.43.53157: buy 0 ABC at $0
```

Test 19: Final
invoice of each
bank

```
EXCH@20213130:20.31.43.56660: quote 0 Unknown share code at $0
A@20213230:20.32.49.62964: buy 0 FLC at $0
EXCH@20213230:20.32.49.63234: quote 0 FLC at $-1
A@20213330:20.33.22.54292: buy 0 VIC at $0
EXCH@20213330:20.33.22.55153: quote 3 VIC at $14.45
A@20213430:20.34.36.34636: buy 1 ABC at $1
EXCH@20213430:20.34.36.34862: quote 0 Unknown share code at $0
A@20213630:20.36.01.62959: buy 1 FLC at $15.5
EXCH@20213630:20.36.01.63527: quote 0 FLC at $-1
A@20214030:20.40.51.48500: buy 3 VIC at $15.15
EXCH@20214030:20.40.51.50453: bought 3 VIC at $15.15
B@20214230:20.42.00.87852: buy 10 VIC at $15.65
EXCH@20214230:20.42.00.88207: only 3 VIC at $15.65
EXCH@20214230:20.42.00.88531: quote 2 VIC at $15.75
B@20214330:20.43.23.81140: buy 3 VIC at $15.65
EXCH@20214330:20.43.23.83271: bought 3 VIC at $15.65
B@20214330:20.43.43.11717: buy 1 VIC at $15.75
EXCH@20214330:20.43.43.14095: bought 1 VIC at $15.75
A@20214430:20.44.05.17385: buy 5 VIC at $18
EXCH@20214430:20.44.05.17545: only 1 VIC at $18
EXCH@20214430:20.44.05.17642: quote 0 VIC at $-1
```

If you haven't got an account, please enter 1 to register for an exchange account.

1. Register for an exchange account
2. Buy shares or request for a quote
3. Request an inventory report
4. Request a financial report
5. Request a transaction log
6. Request a bank's invoice
7. Exit

Option: > 6

Enter bank ID: > 0

BANK NO.0'S INVOICE:

Time	Share code	Price (\$)/share	Volume
20214030:20.40.51.50453	VIC	15.15	3

If you haven't got an account, please enter 1 to register for an exchange account.

1. Register for an exchange account
2. Buy shares or request for a quote
3. Request an inventory report
4. Request a financial report
5. Request a transaction log
6. Request a bank's invoice
7. Exit

Option: > 6

Enter bank ID: > 1

BANK NO.1'S INVOICE:

Time	Share code	Price (\$)/share	Volume
20214330:20.43.23.83271	VIC	15.65	3
20214330:20.43.43.14095	VIC	15.75	1

If you haven't got an account, please enter 1 to register for an exchange account.

1. Register for an exchange account
2. Buy shares or request for a quote
3. Request an inventory report
4. Request a financial report
5. Request a transaction log
6. Request a bank's invoice
7. Exit

Option: > 7