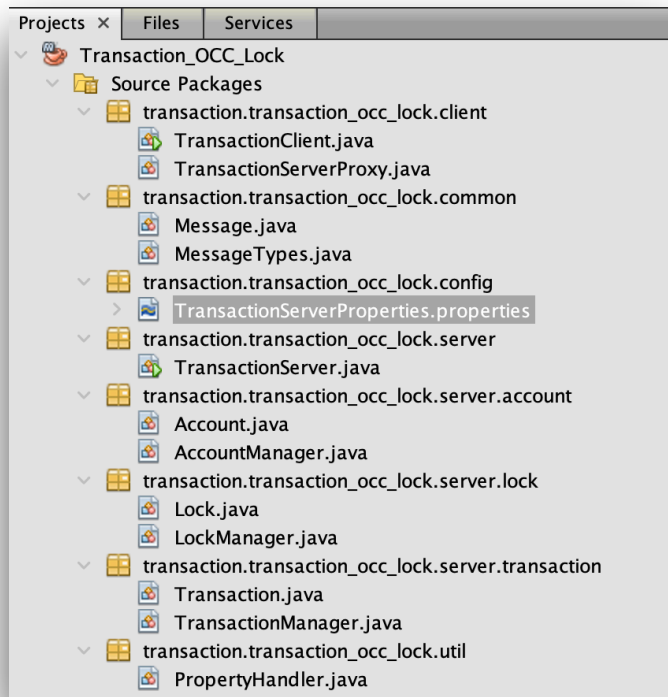


Transaction Server with Locking Mechanism

1. Project Structure



Client -

- | - TransactionClient.java -
- | - TransactionServerProxy.java -

Common -

- | - Message.java -
- | - MessageTypes.java -

Config -

- | - TransactionServerProperties.properties -

Server -

- | - TransactionServer.java -

Account -

- | - Account.java
- | - AccountManager.java

Transaction -

- | - Transaction.java -
- | - TransactionManager.java -

Lock -

- | - Lock.java
- | - LockManager.java

Util -

- | - PropertyHandler.java

Executing Project -

1. Make configuration changes in **TransactionServerProperties.properties**

HOST=localhost (Hostname)

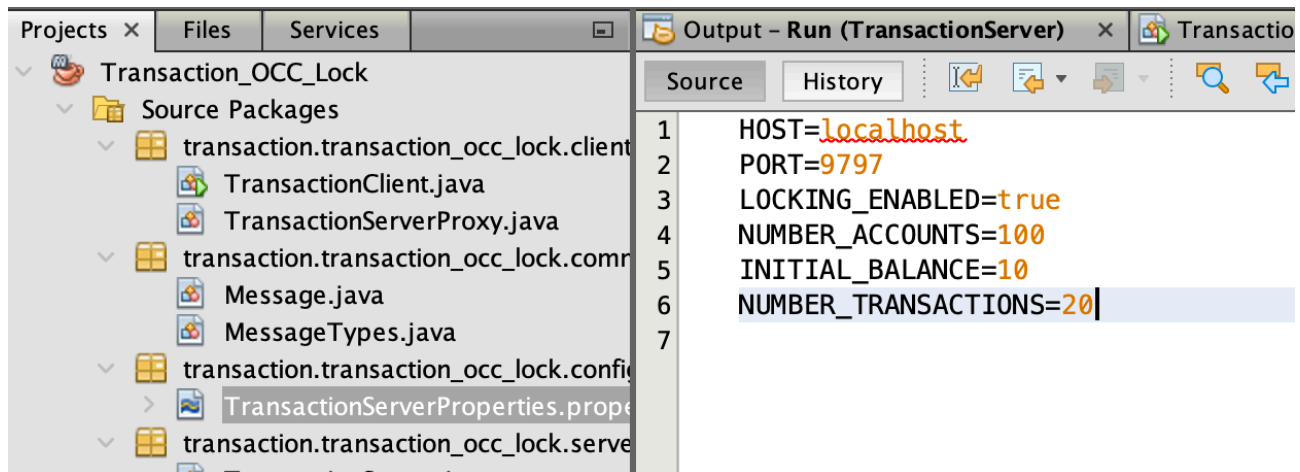
PORT=9797 (Port Number)

LOCKING_ENABLED=true (change it to false to disable locking mechanism)

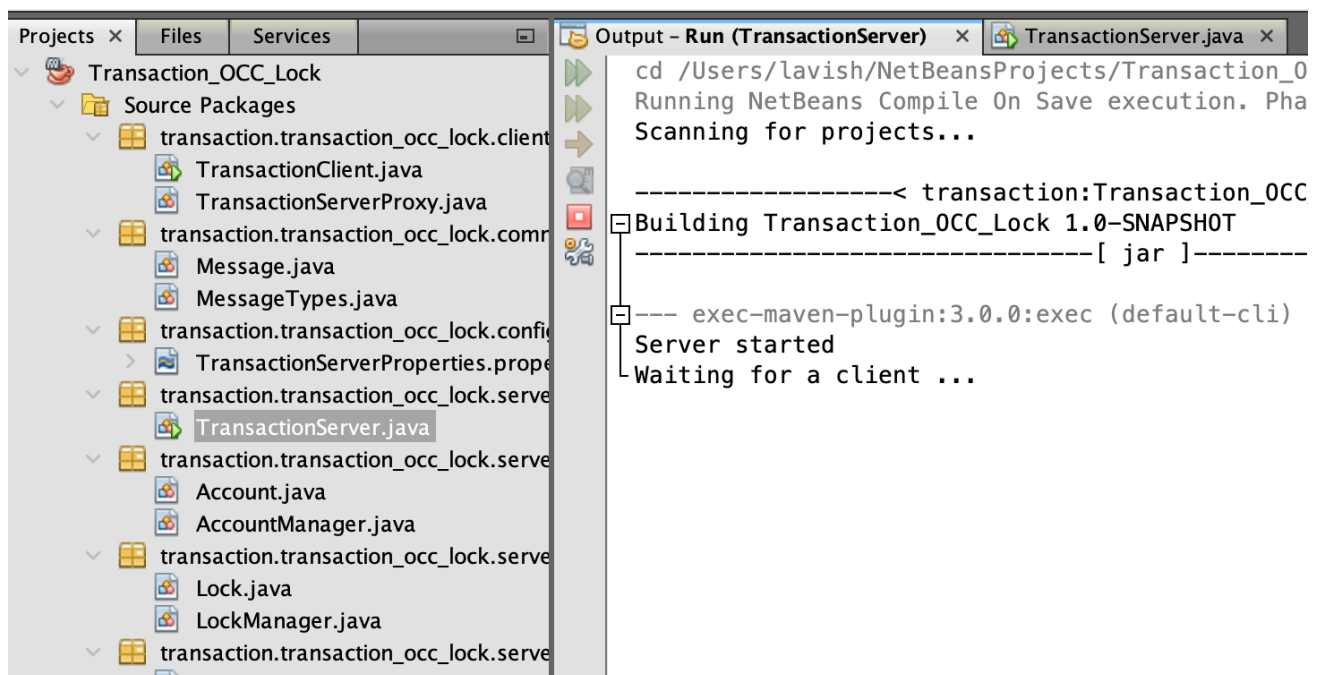
NUMBER_ACCOUNTS=100 (Total number of accounts)

INITIAL_BALANCE=10 (Initial Balance in each Account)

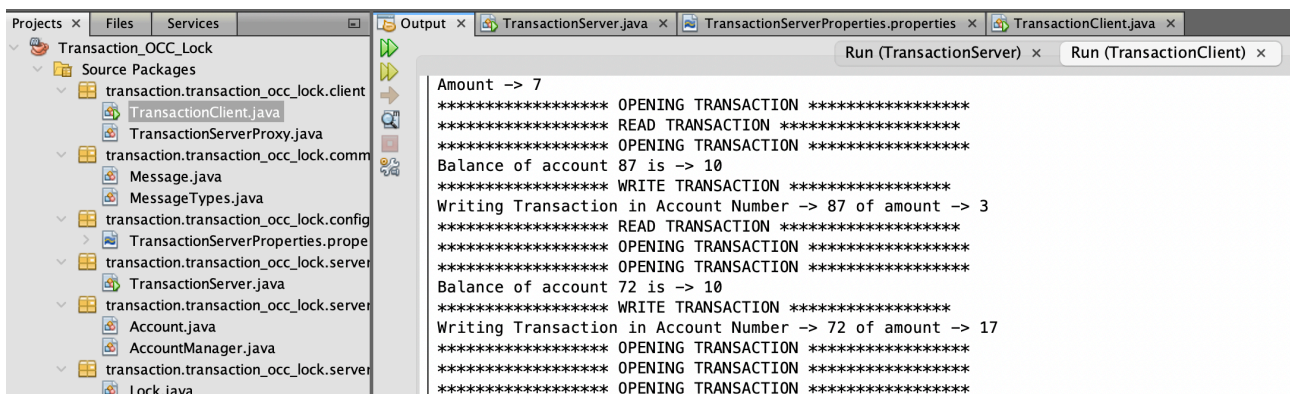
NUMBER_TRANSACTIONS=20 (Number of transactions to be executed by client)



2. Run **TransactionServer.java**



3. Run TransactionClient.java



Logs in console -

Client side Logs(Explanation)

- Shows Total accounts (Value from Configuration file)
- Shows Initial Balance (Value from Configuration file)
- Shows Total Transactions (from Configuration file)
- TRANSACTION ID INITIATED (SRC, DESTINATION) -> AMOUNT
- OPENING TRANSACTION (Initialisation of client thread)
- READ TRANSACTION (Reading of account balance of random account)
- WRITE TRANSACTION (Writing an amount in random account)
- CLOSE TRANSACTION (Closing of client thread)
- Closing Socket.... (Termination of all client threads)

```
***** WRITE TRANSACTION *****
Writing Transaction in Account Number -> 26 of amount -> 26
***** CLOSE TRANSACTION *****
***** READ TRANSACTION *****
***** WRITE TRANSACTION *****
Balance of account 35 is -> 10
Writing Transaction in Account Number -> 35 of amount -> 3
***** READ TRANSACTION *****
Balance of account 49 is -> 10
***** WRITE TRANSACTION *****
Writing Transaction in Account Number -> 49 of amount -> 17
***** CLOSE TRANSACTION *****
***** READ TRANSACTION *****
Balance of account 43 is -> 10
***** WRITE TRANSACTION *****
Writing Transaction in Account Number -> 43 of amount -> 2
***** READ TRANSACTION *****
Balance of account 31 is -> 10
***** WRITE TRANSACTION *****
Writing Transaction in Account Number -> 31 of amount -> 18
***** CLOSE TRANSACTION *****
Closing Socket....
```

BUILD SUCCESS

Server side Logs(Explanation)

- OPEN TRANSACTION (Initialisation of server thread)
- READ REQUEST (Reading Source account balance)
- WRITE REQUEST (Writing an amount in Source account)
- READ REQUEST (Reading Destination account balance)
- WRITE REQUEST (Writing an amount in Destination account)
- CLOSE TRANSACTION (Closing of server thread)
- SHUTTING IT DOWN (After all the server threads are done executing)
- PRINTOUT SUMMARY (Shows total balance in all Accounts and Account wise balance)
- LOCK ACQUIRED BY TID (When a lock is acquired by a thread)
- SETTING LOCK ON TRANSACTION ID(When a lock is set on Transaction)
- UNSETTING LOCK ON Transaction ID(When a lock is unset on Transaction)
- DEADLOCK OCCURED FOR TRANSACTION ID (When deadlock occurs)
- LOCK RELEASED BY TID(When acquired lock is released)
- TRANSACTION COMMITTED FOR TRANSACTION ID(when transaction is committed)
- TRANSACTION ABORTED ID(when transaction aborted due to deadlock)
- TOTAL AMOUNT IN THE BANK(shown in last, the sum of balance of accounts)

```
Lock acquired by TID #1924
Read Account balance -> 10
(#1924) --- Balance of Account Number 1 is 10
Read Account balance -> 10
(#1924) --- Balance of Account Number 1 is 10
WriteAccount balance -> 3
(#1924) -- Writing 3 into Account Number -> 1
Read Account balance -> 3
(#1924) --- Balance of Account Number 1 is 3
Read Account balance -> 3
UnSetting Lock on Transaction ID #74742
(#1924) --- Balance of Account Number 1 is 3
WriteAccount balance -> 10
(#1924) -- Writing 10 into Account Number -> 1
UnSetting Lock on Transaction ID #1924
Lock released by TID #1924
Transaction Committed for Transaction ID #1924
Lock acquired by TID #95538
Read Account balance -> 10
(#95538) --- Balance of Account Number 1 is 10
Read Account balance -> 10
(#95538) --- Balance of Account Number 1 is 10
WriteAccount balance -> 1
(#95538) -- Writing 1 into Account Number -> 1
Read Account balance -> 1
(#95538) --- Balance of Account Number 1 is 1
Read Account balance -> 1
(#95538) --- Balance of Account Number 1 is 1
WriteAccount balance -> 10
(#95538) -- Writing 10 into Account Number -> 1
UnSetting Lock on Transaction ID #95538
Lock released by TID #95538
Transaction Committed for Transaction ID #95538
SHUTTING IT DOWN
PRINTOUT SUMMARY
```

```
***** Total Amount in the Bank -> 20
```

```
(Account Number , Balance) ==> (1 , 10)
- (Account Number , Balance) ==> (2 , 10)
```

All Client side logs for

NUMBER_ACCOUNTS=5

INITIAL_BALANCE=10

NUMBER_TRANSACTIONS=10

Total accounts -> 2

Initial Balance -> 10

Total Transactions -> 10

Transaction ID (38342) Initaited (Src, Destination) -> Amount (1,1) -> \$4

Transaction ID (53292) Initaited (Src, Destination) -> Amount (1,1) -> \$8

Transaction ID (74742) Initaited (Src, Destination) -> Amount (1,1) -> \$7

Transaction ID (95538) Initaited (Src, Destination) -> Amount (1,1) -> \$9

Balance of account 1 is -> 10

Writing Transaction in Account Number -> 1 of amount -> 2

Transaction ID (1924) Initaited (Src, Destination) -> Amount (1,1) -> \$7

Balance of account 1 is -> 2

Writing Transaction in Account Number -> 1 of amount -> 10

Transaction ID (91050) Initaited (Src, Destination) -> Amount (1,1) -> \$7

Transaction ID (99453) Initaited (Src, Destination) -> Amount (1,1) -> \$1

Transaction ID (26757) Initaited (Src, Destination) -> Amount (1,1) -> \$1

Balance of account 1 is -> 10

Writing Transaction in Account Number -> 1 of amount -> 6

Balance of account 1 is -> 6

Writing Transaction in Account Number -> 1 of amount -> 10

Transaction ID (78871) Initaited (Src, Destination) -> Amount (1,1) -> \$4

Transaction ID (11946) Initaited (Src, Destination) -> Amount (1,1) -> \$3

Balance of account 1 is -> 10

Writing Transaction in Account Number -> 1 of amount -> 9

Balance of account 1 is -> 9

Writing Transaction in Account Number -> 1 of amount -> 10

Balance of account 1 is -> 10

Writing Transaction in Account Number -> 1 of amount -> 7

Balance of account 1 is -> 7

Writing Transaction in Account Number -> 1 of amount -> 10

Balance of account 1 is -> 10

Writing Transaction in Account Number -> 1 of amount -> 9

Balance of account 1 is -> 9

Writing Transaction in Account Number -> 1 of amount -> 10
Balance of account 1 is -> 10
Writing Transaction in Account Number -> 1 of amount -> 6
Balance of account 1 is -> 6
Writing Transaction in Account Number -> 1 of amount -> 10
Balance of account 1 is -> 10
Writing Transaction in Account Number -> 1 of amount -> 3
Balance of account 1 is -> 3
Writing Transaction in Account Number -> 1 of amount -> 10
Balance of account 1 is -> 10
Writing Transaction in Account Number -> 1 of amount -> 3
Balance of account 1 is -> 3
Writing Transaction in Account Number -> 1 of amount -> 10
Balance of account 1 is -> 10
Writing Transaction in Account Number -> 1 of amount -> 3
Balance of account 1 is -> 3
Writing Transaction in Account Number -> 1 of amount -> 10
Balance of account 1 is -> 10
Writing Transaction in Account Number -> 1 of amount -> 1
Balance of account 1 is -> 1
Writing Transaction in Account Number -> 1 of amount -> 10
Closing Socket....

Server Side Logs for

Server started
Waiting for a client ...
Setting Lock on Transaction ID #53292
Setting Lock on Transaction ID #38342
Lock acquired by TID #53292
Read Account balance -> 10
Setting Lock on Transaction ID #74742
Deadlock occurred for Transaction ID #74742
Transaction Aborted ID #74742
(#53292) --- Balance of Account Number 1 is 10
Deadlock occurred for Transaction ID #95538
Transaction Aborted ID #95538
Setting Lock on Transaction ID #95538
Deadlock occurred for Transaction ID #1924
Transaction Aborted ID #1924
Setting Lock on Transaction ID #1924
Read Account balance -> 10
(#53292) --- Balance of Account Number 1 is 10
WriteAccount balance -> 2
(#53292) -- Writing 2 into Account Number -> 1
Read Account balance -> 2
(#53292) --- Balance of Account Number 1 is 2
Read Account balance -> 2
(#53292) --- Balance of Account Number 1 is 2
WriteAccount balance -> 10
(#53292) -- Writing 10 into Account Number -> 1
Setting Lock on Transaction ID #91050
Deadlock occurred for Transaction ID #91050
Transaction Aborted ID #91050
Setting Lock on Transaction ID #99453
Deadlock occurred for Transaction ID #99453
Transaction Aborted ID #99453
Setting Lock on Transaction ID #26757
Deadlock occurred for Transaction ID #26757
Transaction Aborted ID #26757
UnSetting Lock on Transaction ID #53292
Lock released by TID #53292
Lock acquired by TID #38342
Read Account balance -> 10
(#38342) --- Balance of Account Number 1 is 10
Transaction Committed for Transaction ID #53292
Read Account balance -> 10
(#38342) --- Balance of Account Number 1 is 10
WriteAccount balance -> 6
(#38342) -- Writing 6 into Account Number -> 1

Read Account balance -> 6
(#38342) --- Balance of Account Number 1 is 6
Read Account balance -> 6
(#38342) --- Balance of Account Number 1 is 6
WriteAccount balance -> 10
(#38342) -- Writing 10 into Account Number -> 1
Setting Lock on Transaction ID #78871
Deadlock occurred for Transaction ID #78871
Transaction Aborted ID #78871
Setting Lock on Transaction ID #11946
Deadlock occurred for Transaction ID #11946
Transaction Aborted ID #11946
UnSetting Lock on Transaction ID #38342
Lock released by TID #38342
Transaction Committed for Transaction ID #38342
Lock acquired by TID #26757
Read Account balance -> 10
(#26757) --- Balance of Account Number 1 is 10
Read Account balance -> 10
(#26757) --- Balance of Account Number 1 is 10
WriteAccount balance -> 9
(#26757) -- Writing 9 into Account Number -> 1
Read Account balance -> 9
(#26757) --- Balance of Account Number 1 is 9
Read Account balance -> 9
(#26757) --- Balance of Account Number 1 is 9
WriteAccount balance -> 10
(#26757) -- Writing 10 into Account Number -> 1
Lock released by TID #26757
Transaction Committed for Transaction ID #26757
UnSetting Lock on Transaction ID #26757
Lock acquired by TID #11946
Read Account balance -> 10
(#11946) --- Balance of Account Number 1 is 10
Read Account balance -> 10
(#11946) --- Balance of Account Number 1 is 10
WriteAccount balance -> 7
(#11946) -- Writing 7 into Account Number -> 1
Read Account balance -> 7
(#11946) --- Balance of Account Number 1 is 7
Read Account balance -> 7
(#11946) --- Balance of Account Number 1 is 7
WriteAccount balance -> 10
(#11946) -- Writing 10 into Account Number -> 1
UnSetting Lock on Transaction ID #11946
Lock released by TID #11946
Transaction Committed for Transaction ID #11946
Lock acquired by TID #99453

Read Account balance -> 10
(#99453) --- Balance of Account Number 1 is 10
Read Account balance -> 10
(#99453) --- Balance of Account Number 1 is 10
WriteAccount balance -> 9
(#99453) -- Writing 9 into Account Number -> 1
Read Account balance -> 9
(#99453) --- Balance of Account Number 1 is 9
Read Account balance -> 9
(#99453) --- Balance of Account Number 1 is 9
WriteAccount balance -> 10
(#99453) -- Writing 10 into Account Number -> 1
UnSetting Lock on Transaction ID #99453
Lock released by TID #99453
Transaction Committed for Transaction ID #99453
Lock acquired by TID #78871
Read Account balance -> 10
(#78871) --- Balance of Account Number 1 is 10
Read Account balance -> 10
(#78871) --- Balance of Account Number 1 is 10
WriteAccount balance -> 6
(#78871) -- Writing 6 into Account Number -> 1
Read Account balance -> 6
(#78871) --- Balance of Account Number 1 is 6
Read Account balance -> 6
(#78871) --- Balance of Account Number 1 is 6
WriteAccount balance -> 10
(#78871) -- Writing 10 into Account Number -> 1
UnSetting Lock on Transaction ID #78871
Lock released by TID #78871
Transaction Committed for Transaction ID #78871
Lock acquired by TID #91050
Read Account balance -> 10
(#91050) --- Balance of Account Number 1 is 10
Read Account balance -> 10
(#91050) --- Balance of Account Number 1 is 10
WriteAccount balance -> 3
(#91050) -- Writing 3 into Account Number -> 1
Read Account balance -> 3
(#91050) --- Balance of Account Number 1 is 3
Read Account balance -> 3
(#91050) --- Balance of Account Number 1 is 3
WriteAccount balance -> 10
(#91050) -- Writing 10 into Account Number -> 1
UnSetting Lock on Transaction ID #91050
Lock released by TID #91050
Transaction Committed for Transaction ID #91050
Lock acquired by TID #74742

Read Account balance -> 10
(#74742) --- Balance of Account Number 1 is 10
Read Account balance -> 10
(#74742) --- Balance of Account Number 1 is 10
WriteAccount balance -> 3
(#74742) -- Writing 3 into Account Number -> 1
Read Account balance -> 3
(#74742) --- Balance of Account Number 1 is 3
Read Account balance -> 3
(#74742) --- Balance of Account Number 1 is 3
WriteAccount balance -> 10
(#74742) -- Writing 10 into Account Number -> 1
Lock released by TID #74742
Transaction Committed for Transaction ID #74742
Lock acquired by TID #1924
Read Account balance -> 10
(#1924) --- Balance of Account Number 1 is 10
Read Account balance -> 10
(#1924) --- Balance of Account Number 1 is 10
WriteAccount balance -> 3
(#1924) -- Writing 3 into Account Number -> 1
Read Account balance -> 3
(#1924) --- Balance of Account Number 1 is 3
Read Account balance -> 3
UnSetting Lock on Transaction ID #74742
(#1924) --- Balance of Account Number 1 is 3
WriteAccount balance -> 10
(#1924) -- Writing 10 into Account Number -> 1
UnSetting Lock on Transaction ID #1924
Lock released by TID #1924
Transaction Committed for Transaction ID #1924
Lock acquired by TID #95538
Read Account balance -> 10
(#95538) --- Balance of Account Number 1 is 10
Read Account balance -> 10
(#95538) --- Balance of Account Number 1 is 10
WriteAccount balance -> 1
(#95538) -- Writing 1 into Account Number -> 1
Read Account balance -> 1
(#95538) --- Balance of Account Number 1 is 1
Read Account balance -> 1
(#95538) --- Balance of Account Number 1 is 1
WriteAccount balance -> 10
(#95538) -- Writing 10 into Account Number -> 1
UnSetting Lock on Transaction ID #95538
Lock released by TID #95538
Transaction Committed for Transaction ID #95538
SHUTTING IT DOWN

PRINTOUT SUMMARY

***** Total Amount in the Bank -> 20

(Account Number , Balance) ==> (1 , 10)

(Account Number , Balance) ==> (2 , 10)