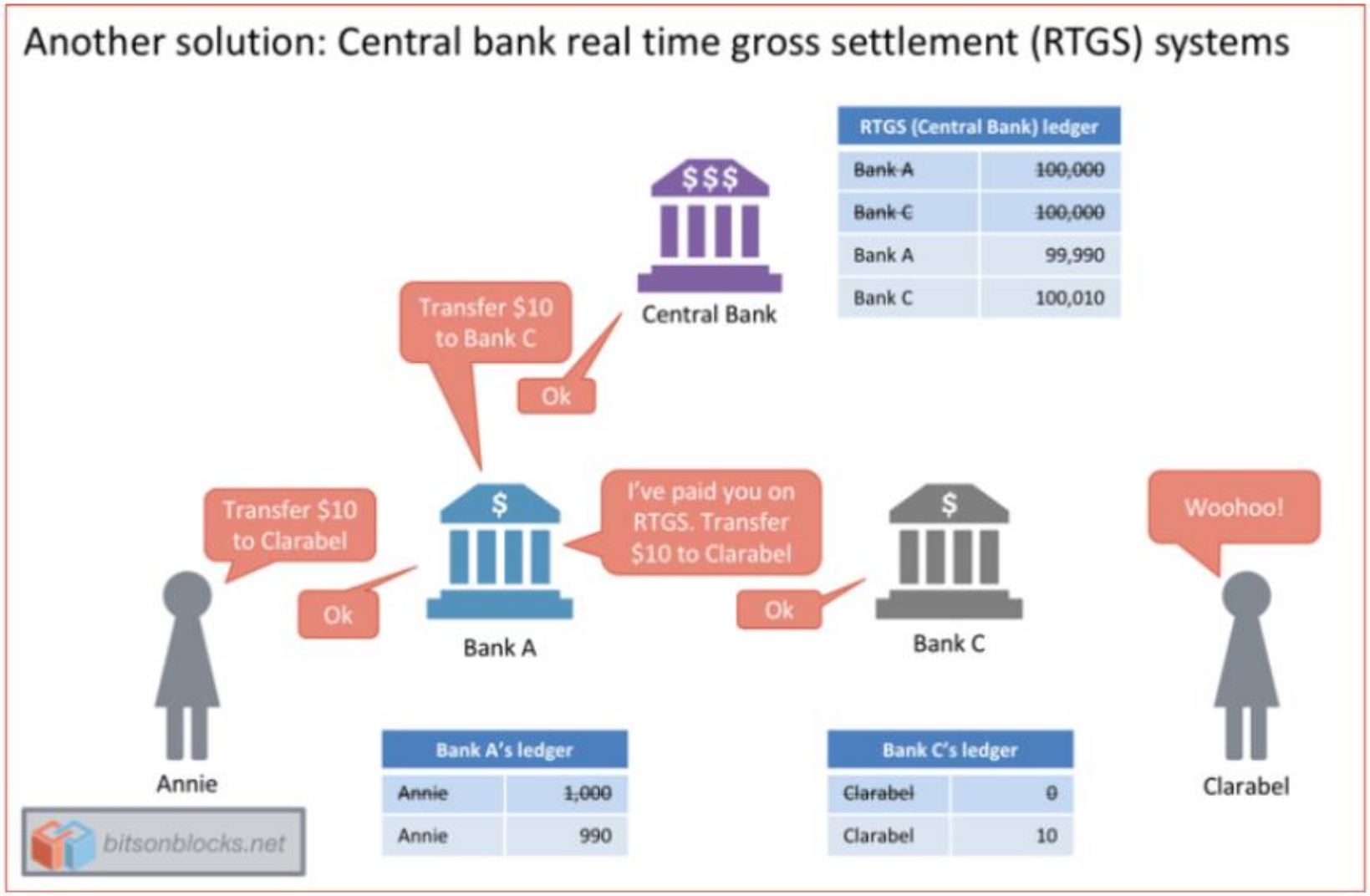
BLOCKCHAIN HOMEWORK INTERBANK TRANSFER

RTGS (CHATS in Hong Kong)



Functional Specification

- Deploy a smart contract to simulate a Central Bank RTGS
- Deploy multiple smart contracts to simulate Banks

Use Cases:

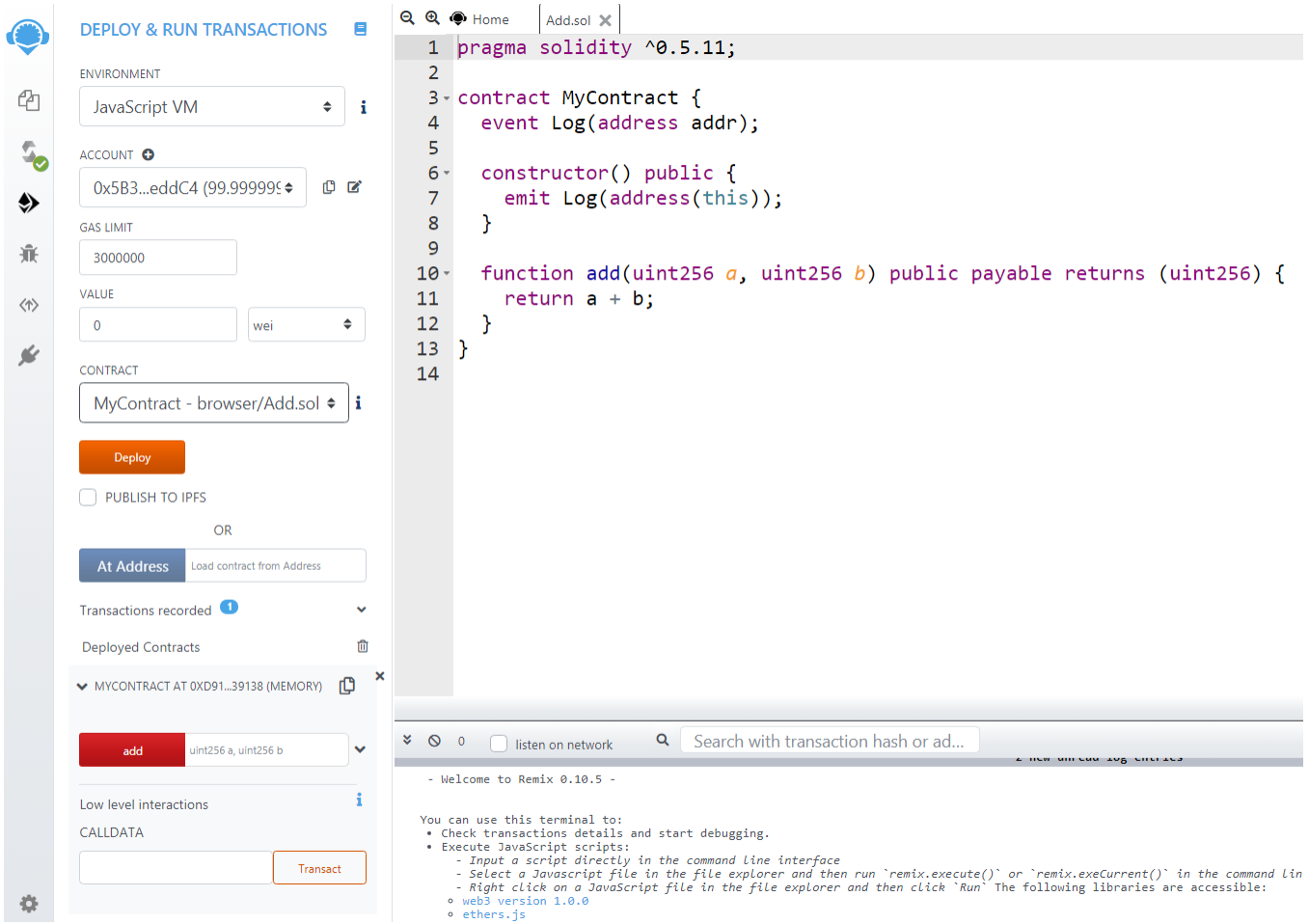
- *registerRTGS* register bank at RTGS and initialize account balance
- *ledgerRTGS* display ledger of RTGS
- *openAccount*: create account at bank if account does not exist
- *deposit*: deposit x value from user's wallet if account exists
- *withdraw*: withdraw y value from user's balance
- *balance*: output the user's current balance
- *ledger*: display ledger of bank
- *transfer*: with an account at Bank1, transfer x value to another account at Bank2
  need to update RTGS accounts
- *closeBank*: bank owner can return all funding back to their users (including owner)

Some Checking Required

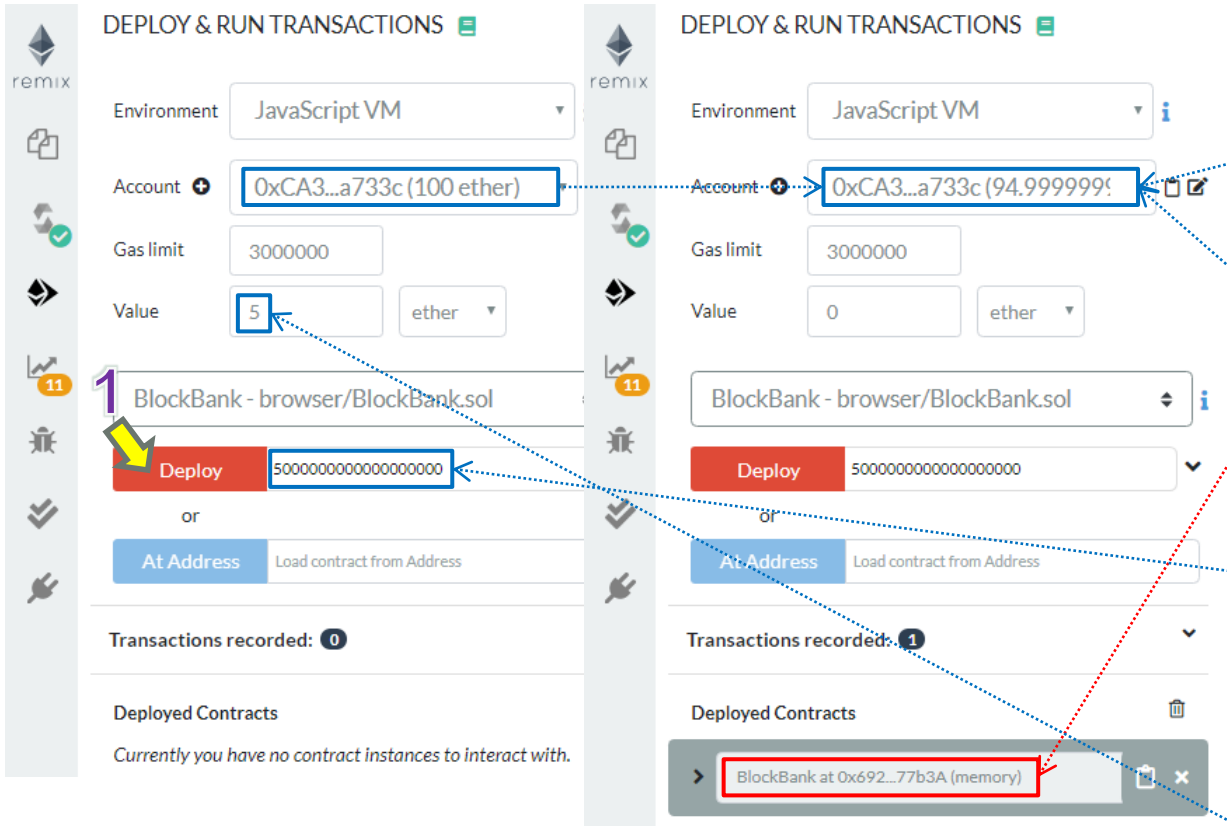
- Require initial funding of bank 5 ether (parameter)
- Bank register RTGS with initial funding 3 ether (parameter)
- Ensure there is enough funding before any transfer
- Every deposit, withdraw will emit AuditLog
- Only bank creator can close the bank
- Throw error when parameters do not pass checking
- Assume maximum of 10 accounts are allowed

IDE Environment

- Remix - https://remix.ethereum.org/



Deploy Example



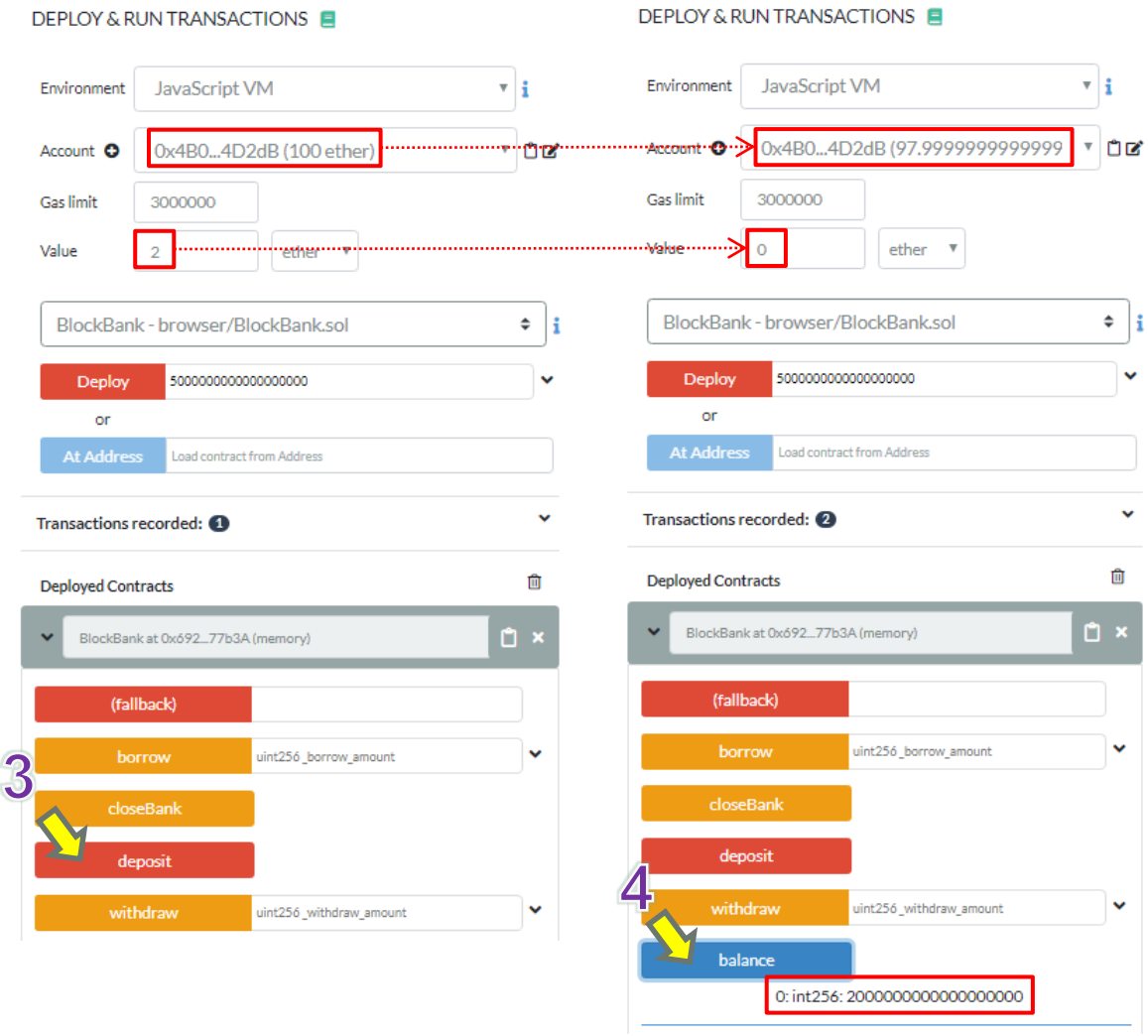
status	0x1 Transaction mined and execution succeed
transaction hash	0xf90d09ea7ff1d3bf14d51be57e16ac533bdf9f38e8e86cbab706cff5c0592b5f
contract address	0x692a70d2e424a56d2c6c27aa97d1a86395877b3a
from	0xca35b7d915458ef540ade6068dfe2f44e8fa733c
to	BlockBank.(constructor)
gas	3000000 gas
transaction cost	1014402 gas
execution cost	715630 gas

logs

```
[
{
"from": "0x692a70d2e424a56d2c6c27aa97d1a86395877b3a",
"topic":
"0xc11ff3038529d93428d78e9b5e9db25891866213e7bfe9dde0f7bf79397c2edf",
"event": "AuditLog",
"args": {
                    "0": "0xCA35b7d915458EF540aDe6068dFe2F44E8fa733c",
                    "1": "500000000000000000",
                    "accountAddress":
"0xCA35b7d915458EF540aDe6068dFe2F44E8fa733c",
                    "amount": "500000000000000000",
                    "length": 2
                }
}
]
```

value 500000000000000000 wei

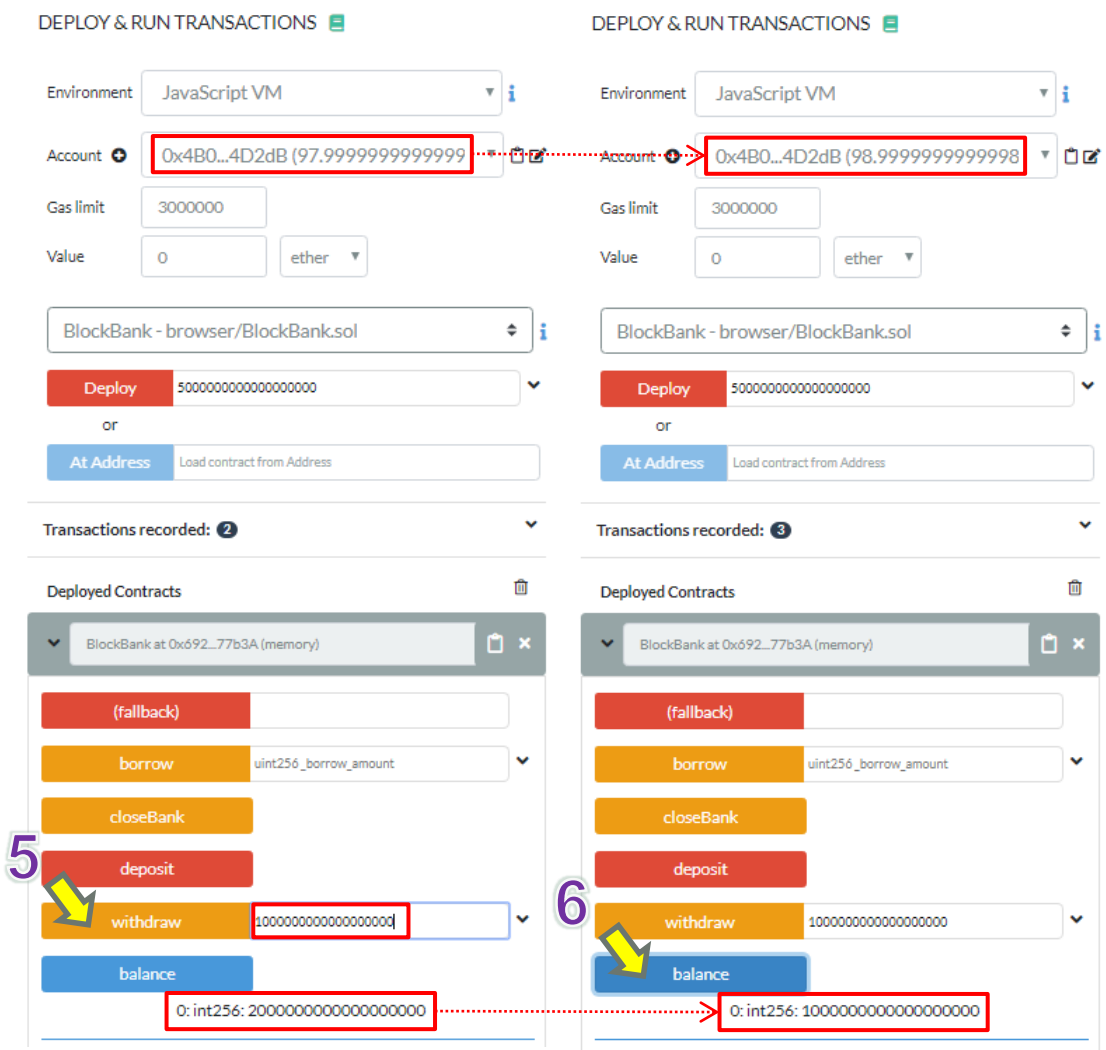
Deposit Example



logs


```
[
{
"from": "0x692a70d2e424a56d2c6c27aa97d1a86395877b3a",
"topic": "0xc11ff3038529d93428d78e9b5e9db25891866213e7bfe9dde0f7bf79397c2edf",
"event": "AuditLog",
"args": {
"0": "0x4B0897b0513fdC7C541B6d9D7E929C4e5364D2dB",
"1": "2000000000000000000",
"accountAddress": "0x4B0897b0513fdC7C541B6d9D7E929C4e5364D2dB",
"amount": "2000000000000000000",
"length": 2
}
}
]
```

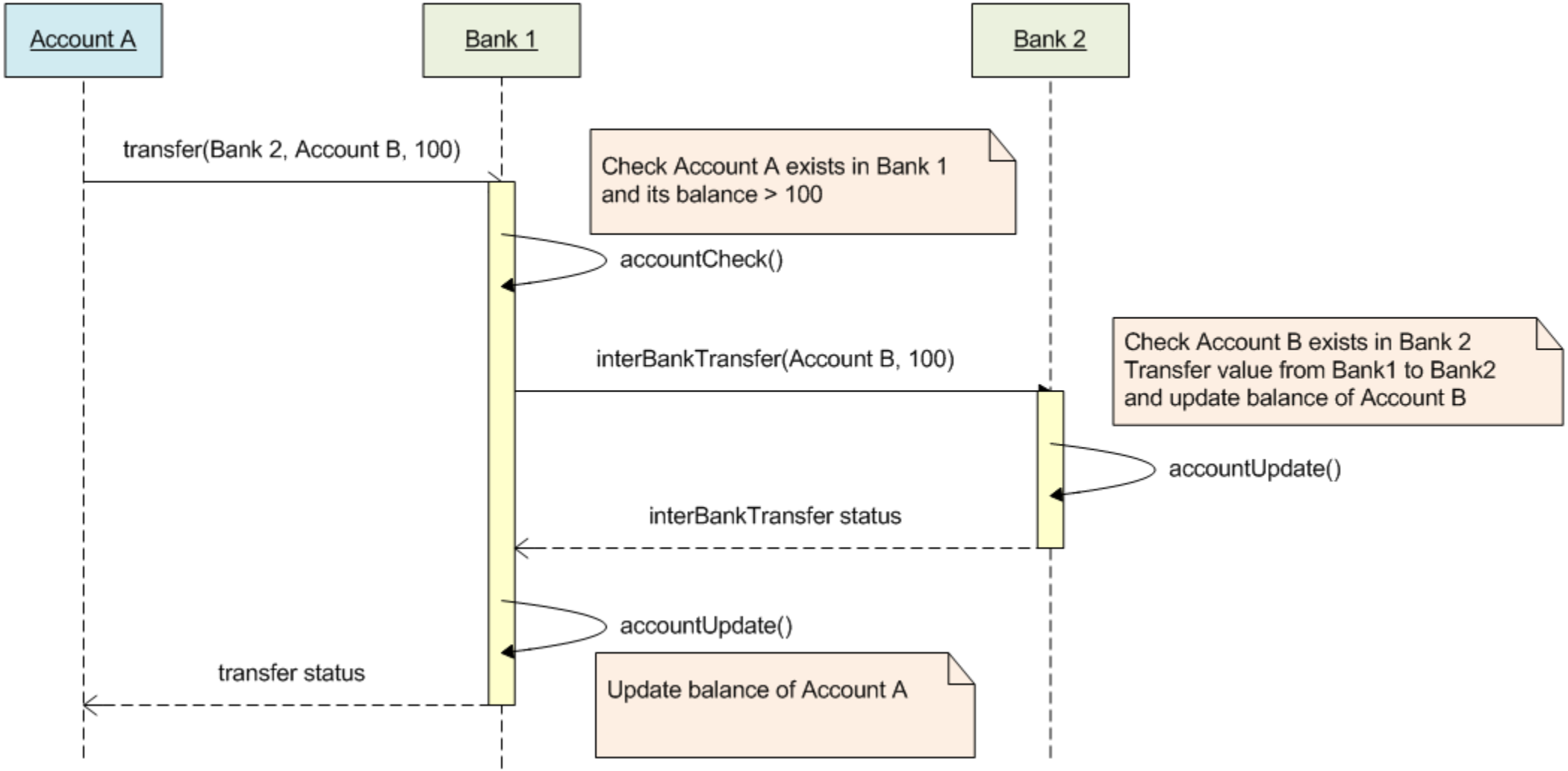
Withdraw Example



logs


```
[
{
"from": "0x692a70d2e424a56d2c6c27aa97d1a86395877b3a",
"topic": "0xc11ff3038529d93428d78e9b5e9db25891866213e7bfe9dde0f7bf79397c2edf",
"event": "AuditLog",
"args": {
"0": "0x4B0897b0513fdC7C541B6d9D7E929C4e5364D2dB",
"1": "100000000000000000",
"accountAddress": "0x4B0897b0513fdC7C541B6d9D7E929C4e5364D2dB",
"amount": "100000000000000000",
"length": 2
}
}
]
```

Direct Bank Transfer Example
Note that you need RTGS in this Homework



Submissions

- The .sol file containing smart contracts
  - Inline documents expected
- A Word file clearly illustrating (with screen caps) of the following scenario:
  - Deploy RTGS
  - Deploy Bank1, Bank2
  - Register Bank1 and Bank2 with RTGS
  - Show ledger of RTGS
  - Open Account1 and Account2 with Bank1 and Bank2 respectively
  - Deposit in Bank1 and Bank2
  - Show ledgers of Bank1 and Bank2
  - Transfer money from Account1 to Account2
  - Show ledger of Bank1 and Bank2
  - Show ledger of RTGS