#### **Assignment**2 以太坊原理與應用開發

https://drive.google.com/drive/folders/1QvZBZXy6lcJgGmB4TSwYLp31Xmbas37R Sample code:

Due date: 12:00, Nov. 28, 2018

#### 作業內容

- ► 完成Bank.sol智能合約
- ▶ 使用solc編譯智能合約
- ▶ 使用web3部署智能合約
- ▶ 透過web3使用合約function

#### Bank.sol

- 請將Bank.sol中未完成的function完成
- ▼ mint
- ► buy
- transferCoin
- ► transferOwner

```
function mint(uint256 coinValue) public isOwner {
                                                      uint256 value = coinValue * 1 ether;
                                                                                                           // 增加 msg.sender 的 coinBalance
// your code
                                                                                                                                                                                         // emit MintEvent
// your code
```

#### Bank.sol

```
// 使用 bank 中的 ether 向 owner 購買 coin function buy(uint256 coinvalue) public {
    uint256 value = coinvalue * 1 ether;
    // require owner 的 coinBalance 不小於 value
    // your code

// msg.sender 的 etherBalance 減少 value

// owner 的 etherBalance 增加 value

// pour code

// msg.sender 的 coinBalance 增加 value

// your code

// msg.sender 的 coinBalance 增加 value

// your code

// wor code

// wor code

// owner 的 coinBalance 減少 value

// your code

// wour code

// your code
```

```
function transfercoin(address to, uint256 coinvalue) public uint256 value = coinvalue * 1 ether;

// require msg.sender 的 coinBalance 不小於 value
// your code
// your code
// your code
// wour code
// emit TransferCoinEvent
// your code
// transfer ownership
// your code
// wour code
```

#### SOIC

► 使用npm下載solc npm install -g solc

solcjs -o ./contract --bin --abi Bank.sol ▼ 編譯Bank.sol

▲ contract

≣ Bank\_sol\_Bank.abi

■ Bank sol\_Bank.bin

## web3.js部署智能合約

► 使用npm下載web3 npm install web3

npm install --global --production windows-build-tools ▶ 如果無法安裝,請使用系統管理員的身分執行

安裝完成windows-build-tools後,再嘗試下載web3

## web3.js部署智能合約

► 完成deploy.js node deploy.js

```
:\Chiu\桌面\Assignment2>node deploy.js
transactionHash: 'Oxdd086bde6ab5310da498ce6069fd7f5853e9f17c12b26d2c1f0c6a032a997552'
                                                 transactionIndex: 0,
blockHash: '0xa643186eb99ef3c39f0051bb64371dc2dde193b96c63256ce2a812bd70102cc6',
                                                                                                                                                        cumulativeGasUsed: 1900365,
contractAddress: '0xF8b6Ce4A01df222B34974eF12A1558466ECDDFac',
                                                                                                     blockNumber: 4,
gasUsed: 1900365,
```

## web3.js部署智能合約

部署成功後將合約address寫至address.txt

fs.writeFileSync('./address.txt', contractAddress)



- ▶ 完成exercise資料夾裡的:
- mint.js
- ► buy.js
- transferCoin.js
- transferOwner.js
- coinBalance.js
- owner.js
- ► 提供sample code:
- deposit.js vithdraw.js transfer.js balance.js

mint.js : accounts[0] mint 3 \* 10^18 coins

#### node mint.js

```
trānsactionindex: 0,
transactionHash: '0x51354c9ff97a3cc2f6f16e5b38211547f75ce8418f088a20834efcf0c350bae4',
blockHash: '0x1a796f7b6efc883dfd50b0df7babfb3c4d6754bf2d09c43de0a4d22860c3ec6e',
:\Chiu\异面\Assignment2>node mint.js
transactionHash: '0x51354c9ff97a3cc2f6f16e5b38211547f75ce8418f088a20834efcf0c350bae4',
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               type: 'mined',
id: 'log_3c9308ba',
returnValues: [Object],
event: 'MintBvent',
signature: '0x8069ef4945469d029cc32e222031bccdc99b2eaaf4ee374cd268012f7ddee907'
                                              transactionIndex: 0, blockHash: '0xla796f7b6efc883dfd50b0df7babfb3c4d6754bf2d09c43de0a4d22860c3ec6e', blockNumber: 10, gasUsed: 44200,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           blockNumber: 10,
address: 'OxF8b6Ce4A01df222B34974eF12A1558466ECDDFac',
                                                                                                                                                             cumulativeGasUsed: 44200,
                                                                                                                                                                                         contractAddress: null,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          raw: [Object]
                                                                                                                                                                                                                                                                                                                                                                                                                                                logIndex: 0
                                                                                                                                                                                                                           status: true,
```

▶ buy.js : accounts[1] 向 accounts[0] 購買 1 \* 10^18 coins

```
transactionindex: 0,
transactionHash: '0xd286e8f4965e7fbf2b091efa6db706fb4d0a3307960adc3f4657a464700d00e0',
blockHash: '0x27404a42baf872a92b411d8619ab74f29569e48a3f0b34f2677aab2e86e6d214',
                                                       ):\Chiu\果面\Assignment2>node buy.js
_ transactionHash: '0xd286e8f4965e7fbf2b091efa6db706fb4d0a3307960adc3f4657a464700d00e0',
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         signature: 'Ox4c5ad1aea676c1e1613de5416105424342b84655de046903409dea58418bedff',
                                                                                                            transactionIndex: 0,
blockHash: '0x27404a42baf872a92b411d8619ab74f29569e48a3f0b34f2677aab2e86e6d214',
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           blockNumber: 11,
address: 'OxF8b6Ce4A01df222B34974eF12A1558466ECDDFac',
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     type: 'mined',
id: 'log_6b41fd04',
returnValues: [Object],
event: 'BuyCoinBvent',
                                                                                                                                                                                                     gasUsed: 46331,
cumulativeGasUsed: 46331,
                                                                                                                                                                                                                                                                  contractAddress: null,
node buy.js
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           raw: [Object] }
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           [ logIndex: 0,
                                                                                                                                                                                                                                                                                                  status: true,
```

transferCoin.js : transfer 1 \* 10^18 coins from accounts[0] to accounts[1] node transferCoin.js

```
transactionÍndex: 0,
transactionHash: 'Oxf0elda669fb463207913368aa7145813f56705eefe4d537d111d9e48c133b8e8',
blockHash: 'Oxe8a49b24a85f994a680b38fef8fc878935acd7e1c17ff23b4520b6b3d638eb20',
):\Chiu\集面\Assignment2>node transferCoin.js
transactionHash: 'Oxf0elda669fb463207913368aa7145813f56705eefe4d537d111d9e48c133b8e8',
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            '0x941d755df54ad0234b406209d0c923107cabf6d4f1ce335b8ae5d89d6a28c2d2',
                                                                  transactionIndex: 0,
blockHash: '0xe8a49b24a85f994a680b38fef8fc878935acd7e1c17ff23b4520b6b3d638eb20',
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         blockNumber: 12,
address: 'OxF8b6Ce4A01df222B34974eF12A1558466ECDDFac',
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              event: 'TransferCoinEvent'
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           type: 'mined',
id: 'log_c48b1520',
returnValues: [Object],
                                                                                                                             blockNumber: 12,
gasUsed: 51373,
cumulativeGasUsed: 51373,
                                                                                                                                                                                                                                         contractAddress: null,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    TransferCoinEvent:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    logIndex: 0,
```

transferOwner.js: accounts[0] transferOwner to accounts[1]

### node transferOwner.js

```
logIndex: 0,
transactionIndex: 0,
transactionHash: '0x7f1d2b968871a524ebddbc5aa24881fa2d2aa17031ee21d3a2608f5a3b24f2ca',
blockHash: '0xb082b76c4abad20482ba76527eafb47f1c9b75b5fc80bd7a18281374508dca07',
::\Chiu\真面\Assignment2>node transferOwner.js
transactionHash: 'Ox7f1d2b968871a524ebddbc5aa24881fa2d2aa17031ee21d3a2608f5a3b24f2ca',
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  "0x587a4fcff87b7be11c779eb502f8b2584f996387d8b8cda0e5113fef424f7316',
                                                                                     blockHash: '0xb082b76c4abad20482ba76527eafb47f1c9b75b5fc80bd7a18281374508dca07',
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       blockNumber: 13,
address: '0xF8b6Ce4A01df222B34974eF12A1558466ECDDFac',
                                                                                                                                                                                                                                                                                                                                                                                            type: 'mined',
id: 'log_294f6b41',
returnValues: [Object],
event: 'TransferOwnerEvent'
                                                                                                              blockNumber: 13,
gasUsed: 30569,
cumulativeGasUsed: 30569,
                                                                                                                                                                                                             contractAddress: null,
                                                                                                                                                                                                                                                                                                                                                                                                                                                       TransferOwnerEvent:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       raw: [Object]
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     logIndex: 0
```

coinBalance.js : get accounts[0] coin balance in bank node coinBalance.js

D:\Chiu\集面\Assignment2>node coinBalance.js 1000000000000000000

owner.js : get contract owner node owner.js

D:\Chiu\集画\Assignment2>node owner.js Ox15e40B72C280b6b7d64340BF2eFbeE20eb903a8D