

NCCU

以太坊原理與應用開發

# Assignment2

Sample code:  
<https://drive.google.com/drive/folders/1QvZBZXy6lcJgGmB4TSwYLP31Xmbas37R>

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

```
// mint coin
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

    // require msg.sender 的 etherBalance 不小於 value
    // your code

    // msg.sender 的 etherBalance 減少 value
    // your code

    // owner 的 etherBalance 增加 value
    // your code

    // msg.sender 的 coinBalance 增加 value
    // your code

    // owner 的 coinBalance 減少 value
    // your code

    // emit BuyCoinEvent
    // your code
}
```

```
// 轉移 coin
function transferCoin(address to, uint256 coinValue) public
    uint256 value = coinValue * 1 ether;

    // require msg.sender 的 coinBalance 不小於 value
    // your code

    // msg.sender 的 coinBalance 減少 value
    // your code

    // to 的 coinBalance 增加 value
    // your code

    // emit TransferCoinEvent
    // your code
}
```

```
// 轉移 owner
function transferOwner(address newOwner) public isOwner

    // transfer ownership
    // your code

    // emit TransferOwnerEvent
    // your code
}
```

# solc

## ▲ 使用npm下載solc

npm install -g solc

## ▲ 編譯Bank.sol

solcjs -o ./contract --bin --abi 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
- ▲ 如果無法安裝，請使用系統管理員的身分執行  
npm install --global --production windows-build-tools
- ▲ 安裝完成windows-build-tools後，再嘗試下載web3

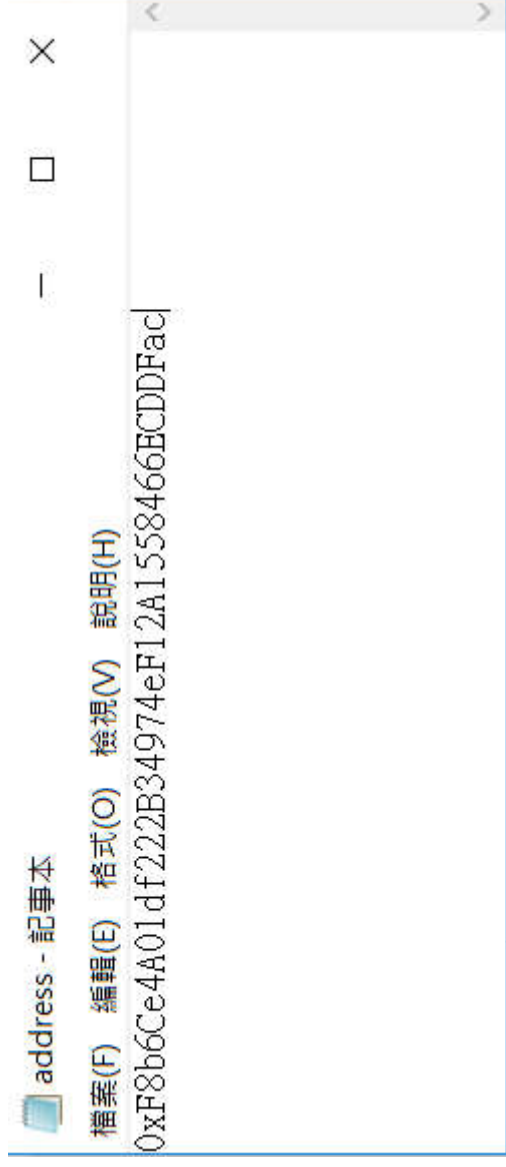
## web3.js部署智能合约

- 完成deploy.js

[illegible]

# 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)`





# web3.js使用合約function

- ▶ 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、withdraw.js、transfer.js、balance.js

# web3.js使用合約function

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

# node mint.js

[illegible]

# web3.js使用合約function

- buy.js : accounts[1] 向 accounts[0] 購買  $1 * 10^{18}$  coins

node buy.js

[illegible]

# web3.js使用合約function

- transferCoin.js : transfer  $1 * 10^{18}$  coins from accounts[0] to accounts[1]

# node transferCoin.js

[illegible]

# web3.js使用合約function

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

node transferOwner.is

[illegible]

# web3.js使用合約function

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

```
D:\Chiu\桌面\Assignment2>node coinBalance.js  
1000000000000000000
```

- ▶ owner.js : get contract owner  
node owner.js

```
D:\Chiu\桌面\Assignment2>node owner.js  
0x15e40B72C280b6b7d64340BF2eFbeE20eb903a8D
```