# Cryptocurrency Project

# Prepared By Group 6

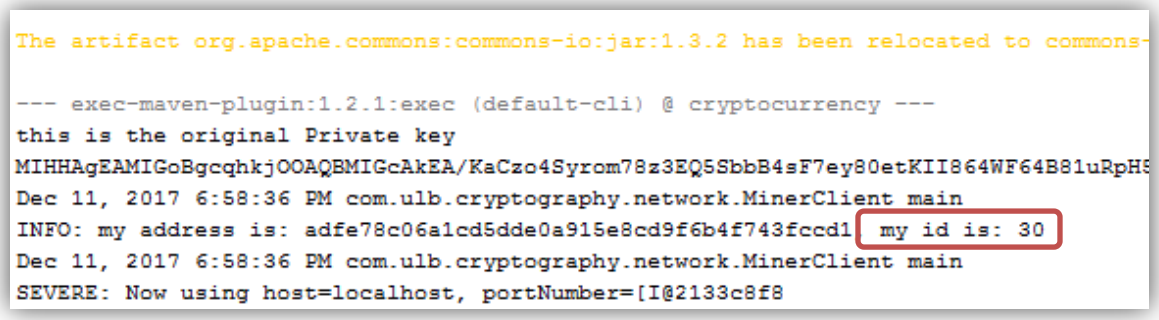
## How to run the Program

The program is a java code that is built using the Netbeans IDE.

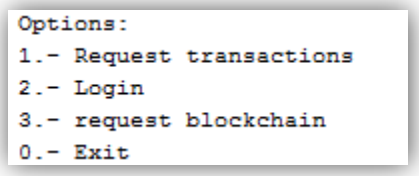
The jar files are located on the folder “jars”

The nodes are run as mentioned in the RUN.md

1. Run master-node.jar
2. Then run relay-node.jar (Relay 1)
3. To start another Relay Node (Relay 2): run another  relay-node.jar
4. Run miner.jar
5. Get the miner ID: (For example the id here is 30)



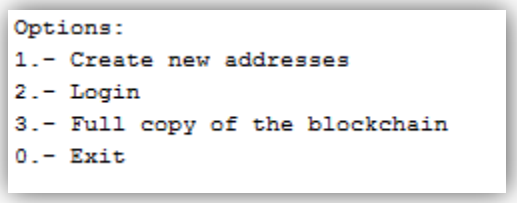

6. To create the first block of the chain and to mine it, from the miner options choose 1. Request transactions...




This will create a new block add the reward transaction to it and mine it. After done mining this new block is sent to the relay node which forwards it to the master node. Now the master node checks that the miner did the proof of work and that the reward transaction is valid... So

it validates the block and if it's valid it creates the block chain and sends it to relay nodes and thus to miners.

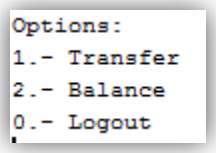
7. Now the miner is rewarded and it has the first created coins so it can do a transaction... To test: Create new Wallet by running wallet.jar (Wallet 1)
8. From wallet options create new address



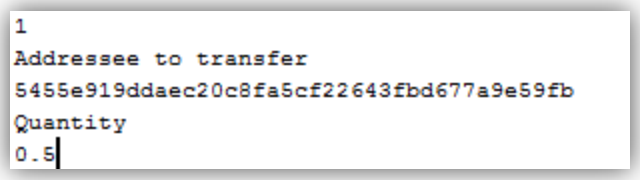

Enter the password to create the new address. Keep wallet id and address.


(For example here the wallet id is 17 and the address is 5455e919ddaec20c8fa5cf22643fbd677a9e59fb)

9. Now, transfer some coins (that for the first time only exists in the miner) from miner to the wallet. To do that, on the miner options choose 2.Login then enter miner id and password (default password is "miner")




Now from these options choose 1. Transfer. Now enter the receiver address (Wallet address that we kept before) and the quantity to send.




10. Now, this block needs to be mined... Start new miner by running miner.jar (Miner 2) and choose the first option 1. Request Transactions...

From now on the remaining functionality can be tested by creating other wallets and creating new transactions.

From a wallet: to create a transaction after creating the address:

- Choose 1.Transfer
- Enter receiver address
- Enter the amount to be sent

This transaction (and others if exist) will wait now until a miner mines the new block. To mine the pending transactions, from the miner choose 1.Request Transaction.

We can check the balance for each wallet and miner (where the miner has a wallet) by loging in and choose the second option 2. Balance, to make sure that the transactions are done correctly.

We've implemented the following Functionality:

| **Functionalities** | |
|---|---|
| **Wallet** | |
| create an address (and associated pairs of keys) | ok |
| create a transaction (and sign it) | ok |
| store encrypted keys (private key) | ok |
| decrypt a key with a password | ok |
| request a copy of the block chain | ok |
| **Relay** | |
| there are several nodes | ok |
| IP addresses are publicly known | ok |
| keep an updated copy of the blockchain | ok |
| send minded blocks | ok |
| forward a copy of the blockchain to the wallets | ok |
| receive transactions requests from wallets | ok |
| send transactions to the miners | ok |

| **Miners** | |
|---|---|
| create valid blocks | ok |
| request transactions from the relay nodes | ok |
| perform proof-of-work (validate transactions) | ok |
| update blockchain | ok |
| receive a reward | ok |
| **Master** | |
| one master node | ok |
| store the blockchain | ok |
| check new minded blocks | ok |
| add the blocks to the block chain | ok |
| send an updated copy of the block chain to relay nodes | ok |