GROUP 5 – HOMEWORK n.3

INTRODUCTION

We are committing the current document highlighting some steps happened during interactions with both the contracts.

We also provide a proof that an error message is generated if nobody has voted yet.

```
allot$ npx hardhat run ./scripts/checkVotingResults.ts --network sepolia
Argentina qty votes is 0 (proposal index 0)
Brazil qty votes is 0 (proposal index 1)
ContractFunctionExecutionError: The contract function "winningProposal" reverted with the following reason:
Nobody has been voting yet
Contract Call:
   address: 0xe73d2eaac33cc13acdfaad2bf8a536600aadee3a
function: winningProposal()
Docs: https://viem.sh/docs/contract/readContract
Version: viem@2.23.14
      at getContractError (/home/md/projects/evm/group5_repo/tokenizedBallot/node_modules/<u>viem</u>/utils/errors/getContractError.ts:78:10)
     at readContract (/home/md/projects/evm/group5_repo/tokenizedBallot/node_modules/<u>viem</u>/actions/public/readContract.ts:136:27) at processTicksAndRejections (node:internal/process/task_queues:95:5) at async main (/home/md/projects/evm/group5_repo/tokenizedBallot/scripts/checkVotingResults.ts:16:50) {
   cause: ContractFunctionRevertedError: The contract function "winningProposal" reverted with the following reason:
   Nobody has been voting yet
   Version: viem@2.23.14
        at /home/md/projects/evm/group5_repo/tokenizedBallot/node_modules/<u>viem</u>/utils/errors/getContractError.ts:65:14
at getContractError (/home/md/projects/evm/group5_repo/tokenizedBallot/node_modules/<u>viem</u>/utils/errors/getContractError.ts:76:5)
at readContract (/home/md/projects/evm/group5_repo/tokenizedBallot/node_modules/<u>viem</u>/actions/public/readContract.ts:136:27)
at processTicksAndRejections (node:internal/process/task_queues:95:5)
          at async main (/home/md/projects/evm/group5_repo/tokenizedBallot/scripts/checkVotingResults.ts:16:50) {
      details: undefined,
docsPath: undefined,
                            'The contract function "winningProposal" reverted with the following reason:\n' + been voting yet',
      shortMessage:
      data: { abiItem: [Object], args: [Array], errorName: 'Error' },
      reason: 'Nobody has been voting yet', signature: undefined
```

This has been accomplished by slightly modifying the *winningProposal* function in the TokenizedBallot contract and adding a require statement, as showed in the following image:

```
function winningProposal() public view returns (uint winningProposal_) {
    uint winningVoteCount = 0;
    for (uint p = 0; p < proposals.length; p++) {
        if (proposals[p].voteCount > winningVoteCount) {
            winningVoteCount = proposals[p].voteCount;
            winningProposal_ = p;
        }
    require(winningVoteCount > 0, "Nobody has voted yet");
}

function winnerName() external view returns (bytes32 winnerName_) {
        winnerName_ = proposals[winningProposal()].name;
}
```

SCRIPTS

1) deployContracts script

In the current test, executed on the local environment (no connection with the testnet) two results are showcased:

- a) The block including the deployment transaction is one of the first blocks of the chain (since, as said, the script has been executed on the local environment).
- b) Even if 5 tokens per account have been minted, the voting power for each of them is still zero, since it is necessary to call the self-delegation transaction to gain voting power.

```
PS C:\Users\mgian\OneDrive\Desktop\GIT REPOS\EncodeEVMBootcampProjects\Homework3> npx hardhat run .\scripts\deployTokenContract.ts

TokenContract deployed at address: 0x5fbbb2315678afecb367f032d93f642f64180aa3

Deployer address is 0xf39fd6e51aad88f6f4ce6ab8827279cfffb92266

The current blocknumber is 1

Minted 5 tokens of MyToken to account 0x81D51adbC06827784cE72184Fce6861FFF31D16C

Minted 5 tokens of MyToken to account 0xE9A6D4CE4df50D8966ec33Fc86F54581ceD2961E

Minted 5 tokens of MyToken to account 0xC35c40Bd72F7528893a259dbf40Fcb266002663e

Minted 5 tokens of MyToken to account 0x0936203E154ed749c099fc585770063fAD30BE35

Balance of Trust after minting is 5

Balance of Artur after minting is 5

Balance of Marco after minting is 5

My balance after minting is 0 before self delegation

Voting power for Trust is 0 before self delegation

Voting power for Marco is 0 before self delegation

My voting power is 0 before self delegation
```

The testnet token contract address is: 0xFF198373b61Fc6132EFe421A47637A17C75986C8

The testnet tokenized ballot contract address is: 0xE73D2eAaC33Cc13aCDFAaD2bf8a536600aADEe3a

2) selfDelegate script

In the current test, executed interacting by command line directly with the contract deployed on the testnet, one result is showcased:

a) The voting power before and after the self-delegation function call is equal because other self-delegation interactions with the contract happened before. Interactions with the contracts by using Remix IDE (compiling the contracts and selecting the right address of the contract deployed on the testnet, provided opportunely) or by command line are both possible and have been experimented.

```
PS C:\Users\mgian\OneDrive\Desktop\GIT REPOS\EncodeEVMBootcampProjects\Homework3> npx hardhat run .\scripts\selfDelegate.ts —network sepolia

Self delegator address is 0xc35c40bd72f7528893a259dbf40fcb266002663e
The current blocknumber is 7970120
Fetched contract at address 0xff198373b61fc6132efe421a47637a17c75986c8

Voting power before self delegation is 5

Voting power after self delegation is 5

Voting power enabled for address 0xc35c40bd72f7528893a259dbf40fcb266002663e in block 7970121
```

3) vote script

In the current test, executed interacting by command line directly with the contract deployed on the testnet, four results are showcased:

- a) Account 0xC35c40Bd72F7528893a259dbf40Fcb266002663e voted successfully on one proposal by submitting 3 tokens
- b) Account 0xC35c40Bd72F7528893a259dbf40Fcb266002663e has previously voted different times, but choosing a wrong amount of tokens (wei unit)
- c) Account 0xC35c40Bd72F7528893a259dbf40Fcb266002663e has still tokens for voting
- d) Account 0xC35c40Bd72F7528893a259dbf40Fcb266002663e tried to vote another proposal by submitting more tokens than effectively owned

```
PS C:\Users\mgian\OneDrive\Desktop\GIT REPOS\EncodeEVMBootcampProjects\Homework3> npx hardhat run .\scripts\vote.ts --network sepolia
The current blocknumber is 7970148

Self delegator address is 0xc35c40bd72f7528893a259dbf40fcb266002663e

Fetched contract at address 0xe73d2eaac33cc13acdfaad2bf8a536600aadee3a

Voting power for account before voting = 4999999999999999985

Voted 3 tokens on brazil with tx 0x179c4bal0acfd1834c402f3f25350c5abf3fe4617aa436196874ff5a63cf86e7

Voting power for account after voting on brazil = 1999999999999985

ContractFunctionExecutionError: The contract function "vote" reverted with the following reason:
TokenizedBallot: voter is trying to vote with more votes that he/she has

Contract Call:
   address: 0xe73d2eaac33cc13acdfaad2bf8a536600aadee3a
   function: vote(uint256 proposal, uint256 amount)
   args: (0, 20000000000000000000)
   sender: 0xc35c40bd72f7528893a259dbf40fcb266002663e
```

4) checkVotingPower script

In the following the remaining voting power and a snapshot of past votes for all the accounts involved in the ballot are showcased.

As a target block, it has been chosen block number 7965798, subsequent to one of the last self-delegation transactions.

5) checkVotingResults script

In the following the results of the tokenized ballot are showcased.

TESTNET INTERACTIONS

1) Contracts creation

a) Token Contract Address: 0xFF198373b61Fc6132EFe421A47637A17C75986C8

Token Contract Tx hash:

0x879f973a3a5f1d4f8dce318c3c22d2ce996003de90c1e80a0d531e661ba58405

Event: successful

b) TokenizedBallot Contract Address:

0xE73D2eAaC33Cc13aCDFAaD2bf8a536600aADEe3a

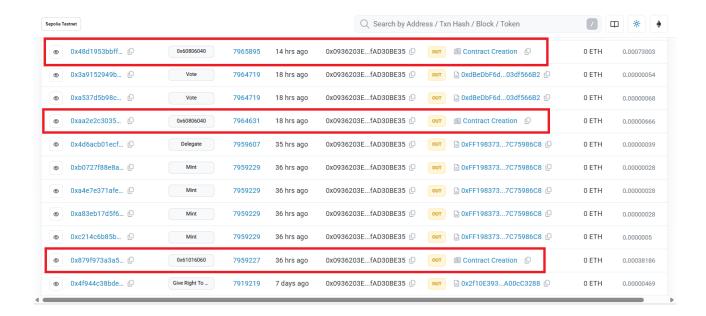
TokenizedBallot Contract Tx hash:

0x48d1953bbff35a8ea3782d0bed537c3d565898ccbbb8160e9c4d2b786408f188

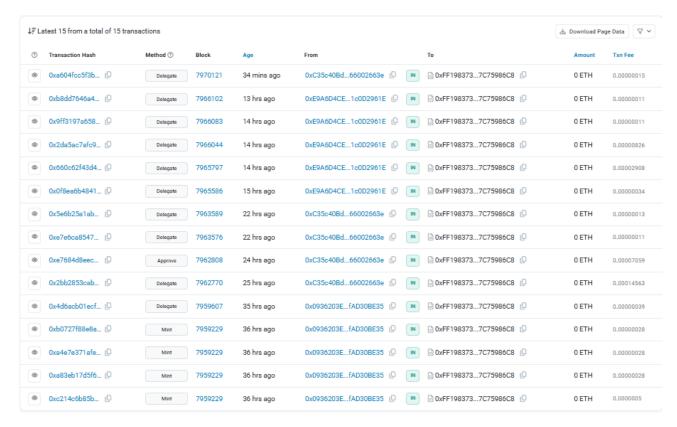
Event: successful

Contract creator: 0x0936203E154ed749c099fc585770063fAD30BE35

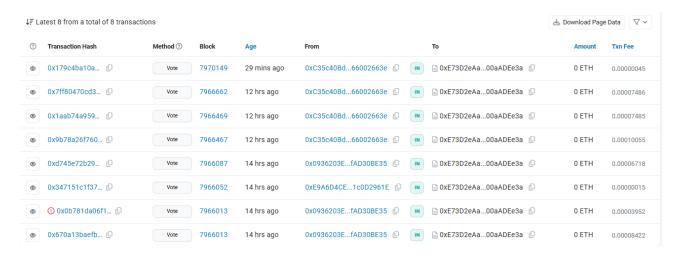
As showed in the following image, the TokenizedBallot contract has been deployed twice. It has been decided to restart the voting process, hence re-deploying the contract.



List of Token Contract interactions:

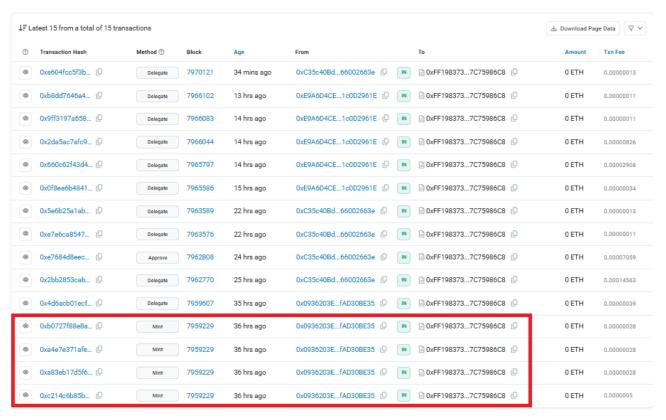


List of TokenizedBallot Contract interactions:



2) mint function call

The deployer interacted with the Token Contract to mint 5 tokens to each member. Hence, being 4 the voters involved, the total supply was 20.

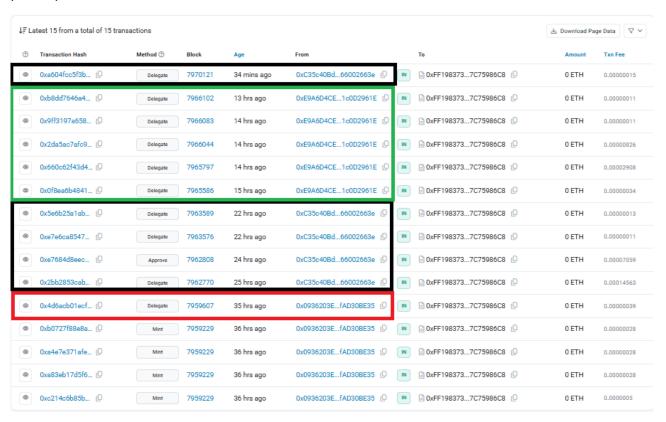


3) delegate function call

As stated, to enable voting power, each account needed to self delegate.

As can be seen, account 0x0936203E154ed749c099fc585770063fAD30BE35 (red box) called the delegate function just once.

Account 0xC35c40Bd72F7528893a259dbf40Fcb266002663e (black box) and account 0xE9A6D4CE4df50DB966ec33Fc86F54581c0D2961E (green box) called the function different times, even if just by calling it once they received voting power needed to participate in the ballot.



4) vote function call

As can be seen, there have been different votes.

Account 0x0936203E154ed749c099fc585770063fAD30BE35 (red box) voted 3 times: 2 votes have been successful, 1 vote has been reverted, since it tried to vote by using more tokens than effectively owned.

Account 0xC35c40Bd72F7528893a259dbf40Fcb266002663e (black box) voted different times, by submitting votes most of the times with a tiny amount of tokens.

Account 0xE9A6D4CE4df50DB966ec33Fc86F54581c0D2961E (green box) voted only once and using just part of the tokens, saving tokens for future ballots.



In the following images, details about one of the vote transactions executed by account 0xC35c40Bd72F7528893a259dbf40Fcb266002663e and the only vote transaction executed by account 0xE9A6D4CE4df50DB966ec33Fc86F54581c0D2961E are showed.

