Ethereum Smart Contract Example

07-05-2022

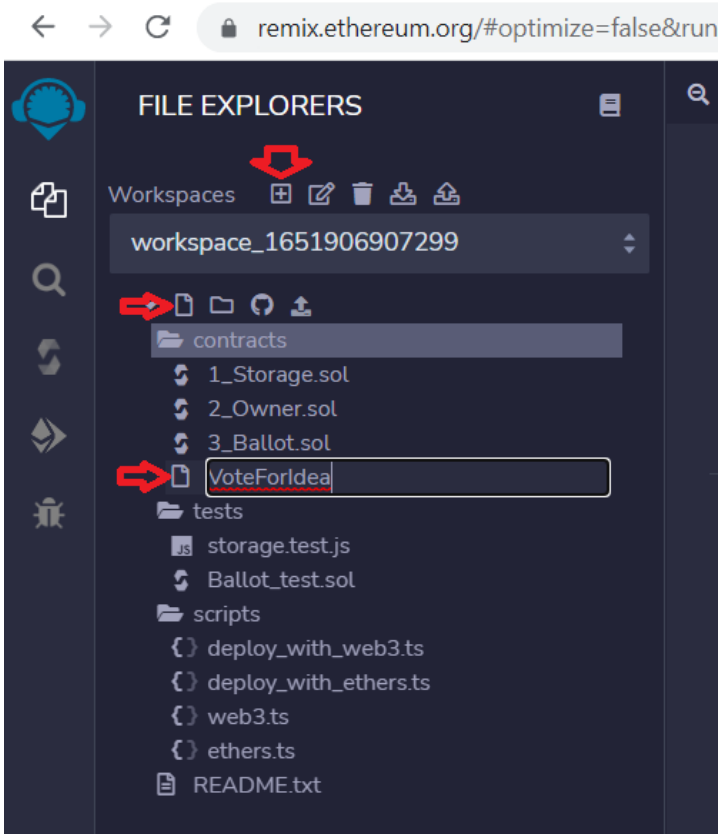
OBJECTIVE

The objective of this example is to get to know how to write a solidity programming language to create a simple voting smart contract in Ethereum blockchain testnet.

STEP 1: IDE

Go to https://remix.ethereum.org , REMIX is an online Ethereum IDE

STEP 2: Create a new workspace and add a new contract called “VoteForIdea”



STEP 3: Write the code “VoteForIdea.sol”

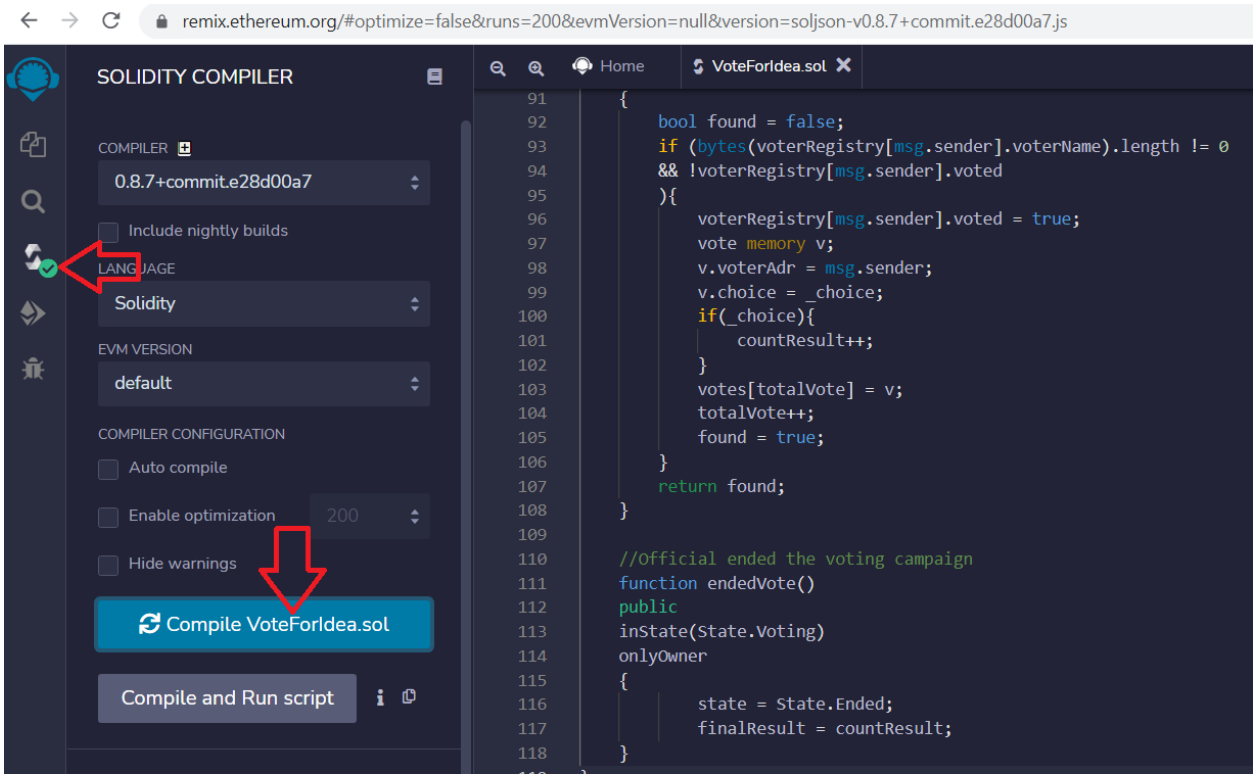
```
// Simple election Ethereum Smart contract
// SPDX-License-Identifier: GPL-3.0
pragma solidity >=0.7.0 <0.9.0;

// The objective of the contract is to ask for ideas from the public
// If an action should take place or not
```

```
contract VoteForIdea{
    //Vote contains the voter's address and their choice true or false (agree or disagree)
  struct vote{
    address voterAdr;
    bool choice;
  }

  //Voter contains the name of the voter and if they have voted or not yet
  struct voter{
    string voterName;
    bool voted;
  }

  uint private countResult =0;
  uint public finalResult =0;
  uint public totalVoter=0;
  uint public totalVote=0;

   //Official is the owner of the contract and starts the voting campaign and his proposal action
  address public officialAdr;
  string public officialName;
  string public proposal;

  mapping (uint => vote) private votes;
  mapping (address => voter) public voterRegistry;

  //The contract has three states
  enum State {Created, Voting, Ended}
  State public state;

  //Modifier is used for input validation
  modifier inState(State _state) {
    require(state == _state);
    _;
  }
  modifier onlyOwner {
   require(msg.sender == officialAdr);
    _;
```

```
}

    //When the contract is started or created, it has an official, proposal and the state of the contract is created
    constructor(
        string memory _officialName,
        string memory _proposal
    ){
        officialAdr = msg.sender;
        officialName = _officialName;
        proposal = _proposal;
        state = State.Created;
    }

    //Only the official can add voters to vote, and only when the contract is created
    function addVoter(
        address _voterAdr,
        string memory _voterName
    )
    public
    inState(State.Created)
    onlyOwner
    {
        voter memory v;
        v.voterName = _voterName;
        v.voted = false;
        voterRegistry[_voterAdr] = v;
        totalVoter++;
    }

    //Official begins the voting campaign
    function startVote()
    public
    inState(State.Created)
    onlyOwner
    {
        state = State.Voting;
    }

    //voter that has been added by an official can vote now
```

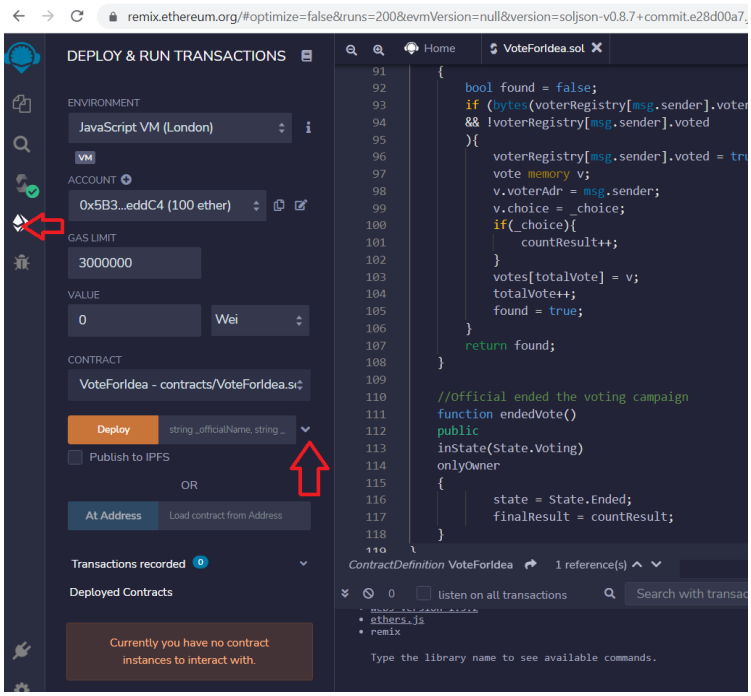
```
    function doVote
    (
        bool _choice
    )
    public
    inState(State.Voting)
    returns (bool voted)
    {
        bool found = false;
        if (bytes(voterRegistry[msg.sender].voterName).length != 0
        && !voterRegistry[msg.sender].voted
        ){
            voterRegistry[msg.sender].voted = true;
            vote memory v;
            v.voterAdr = msg.sender;
            v.choice = _choice;
            if(_choice){
                countResult++;
            }
            votes[totalVote] = v;
            totalVote++;
            found = true;
        }
        return found;
    }

    //Official ended the voting campaign
    function endedVote()
    public
    inState(State.Voting)
    onlyOwner
    {
            state = State.Ended;
            finalResult = countResult;
    }
}
```

STEP 4: Compile the code
Click on the Menu compile on the left side and click on the button compile

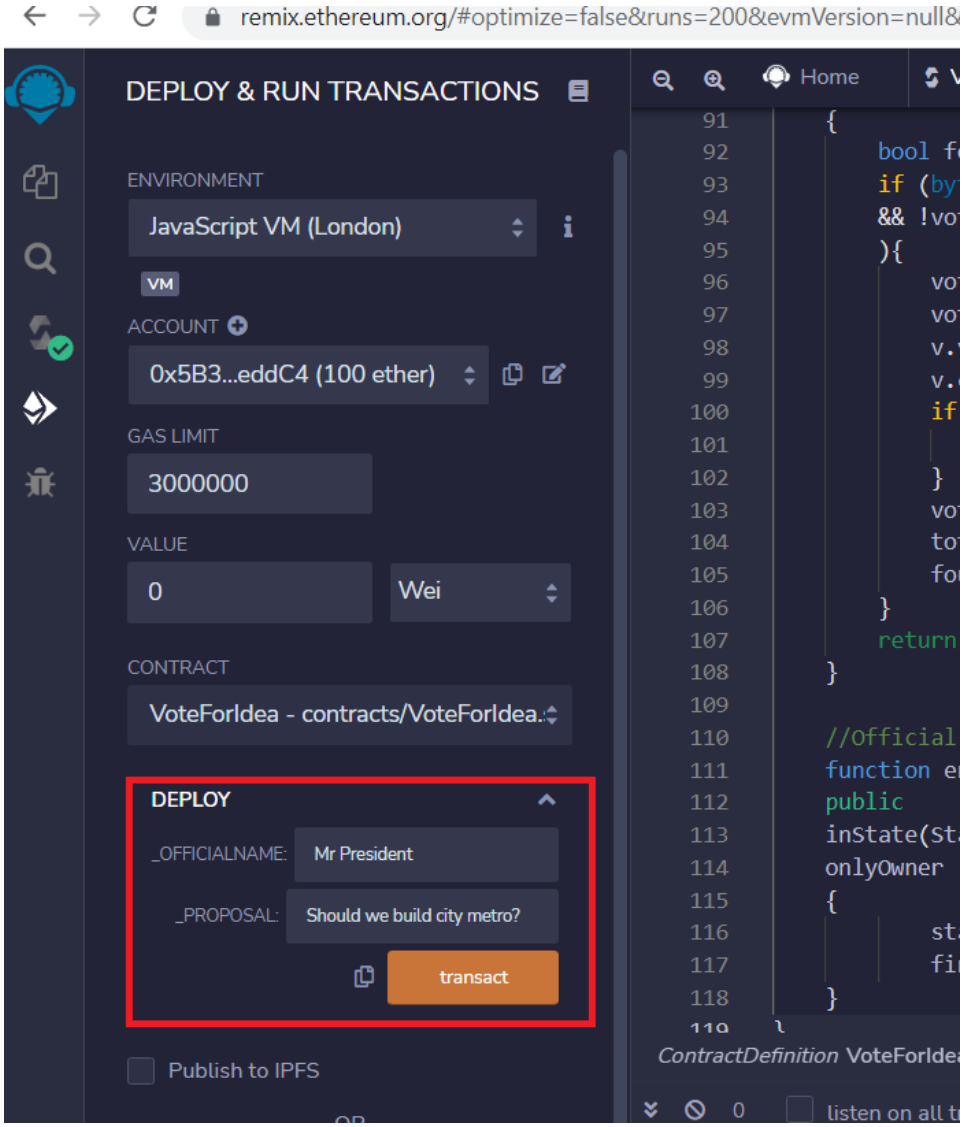


STEP 5: Deploy the contract

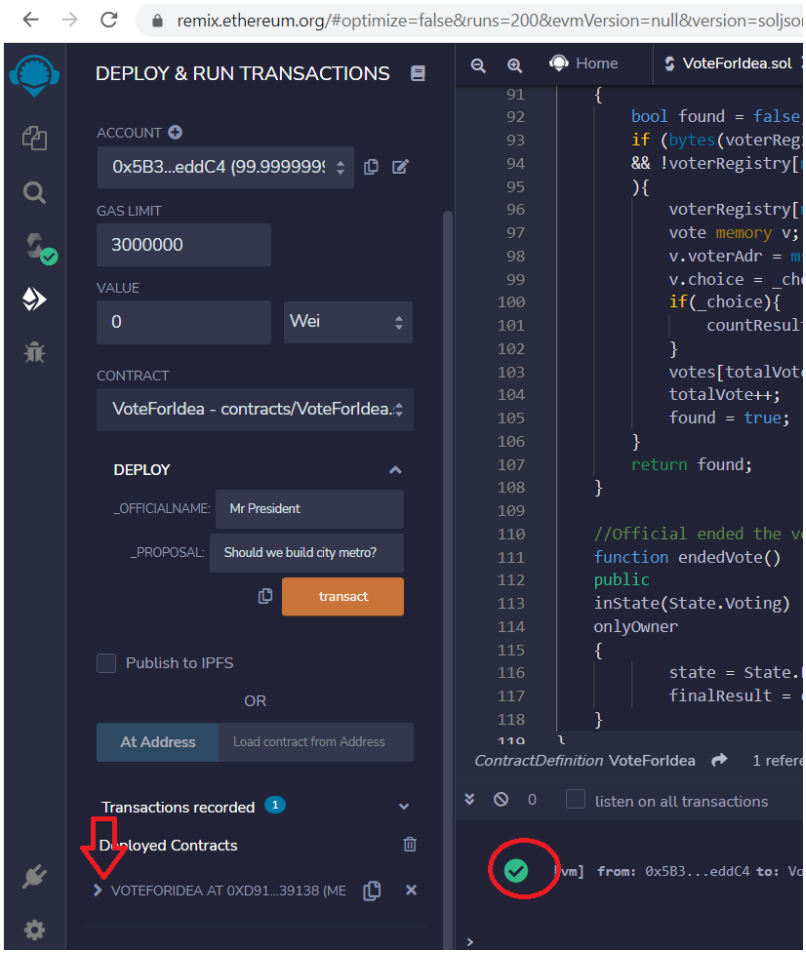
Click on the menu deploy on the left side, and Click on the arrow dropdown to prepare for deploy



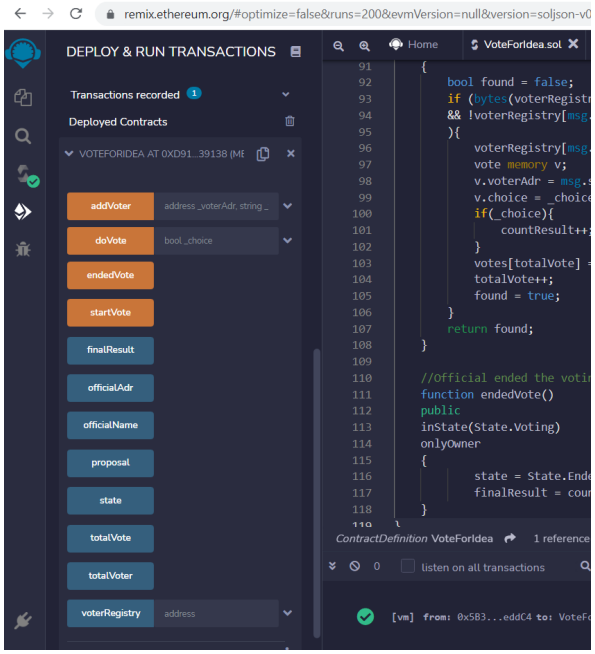
Fill in the official name and the proposal for voting and click on transact button.



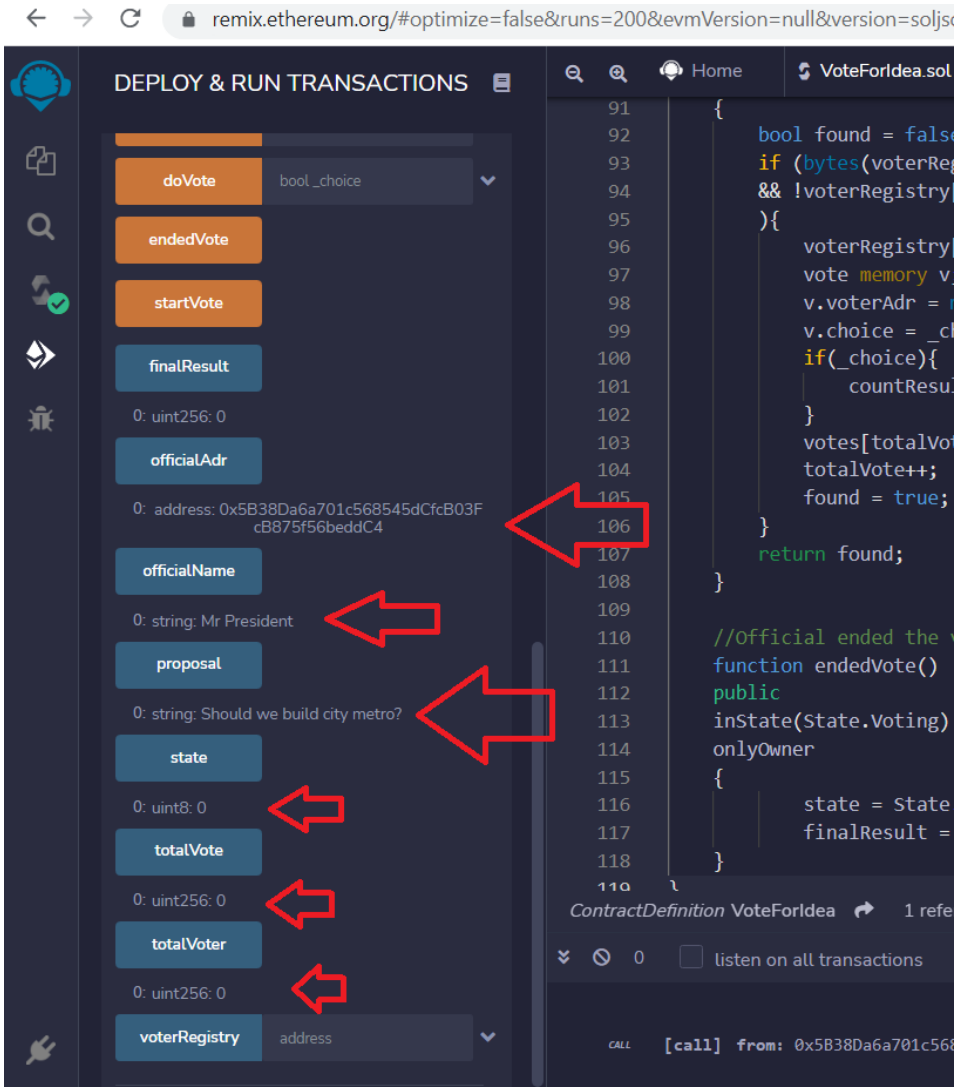
The contract has been deployed successfully, and now you can click on the arrow of the created contract to see and test those codes that you have written



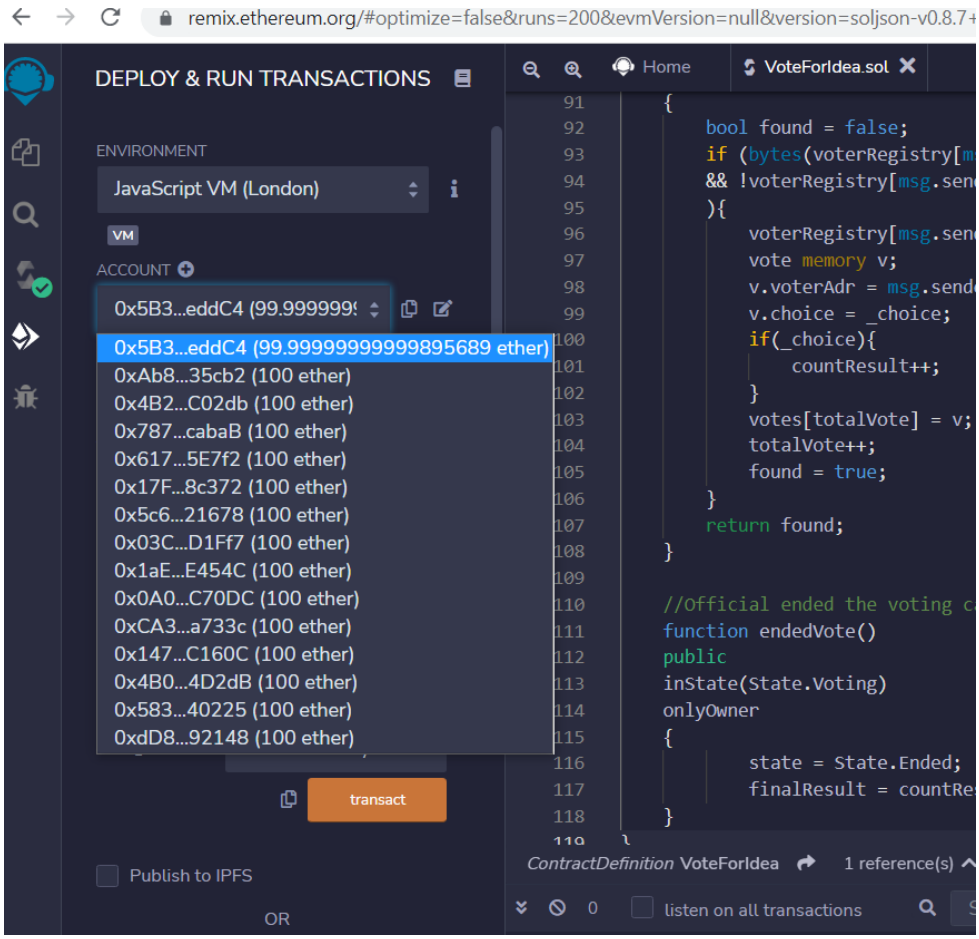
STEP 6: Testing all the functionalities



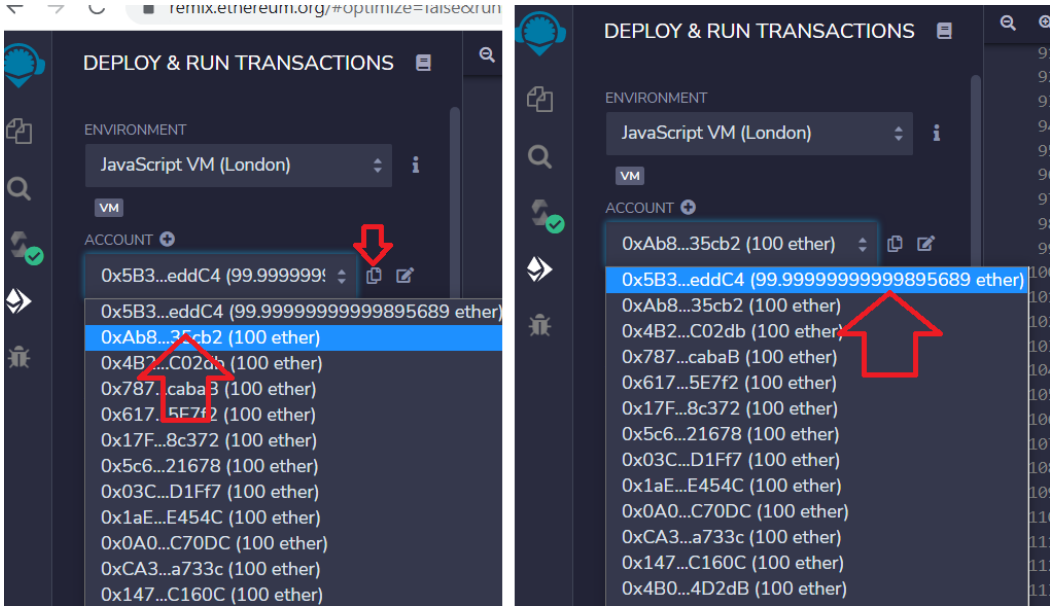
You can click on the blue buttons to see the initial data in your contract such as Official name, proposal, state, total voter, and final result……



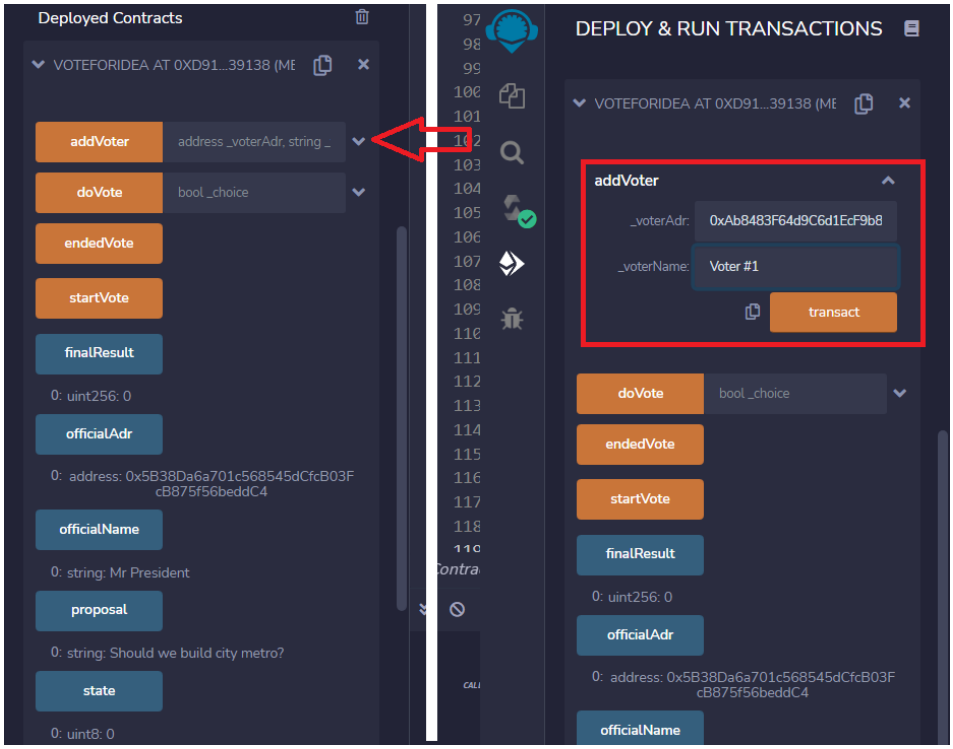
If you scroll to the top you can see that, in order to deploy the Ethereum Smart contract, you need to pay a fee in the form of cryptocurrency. So the money is taken from the first test address account. Initially, the account had 100 Ether, now it has only 99.9999 Ether. This first address is used for the official address, and others are used for voters. So only the official address account and add voter to the contract, and others addresses that have been added could be used for voting.



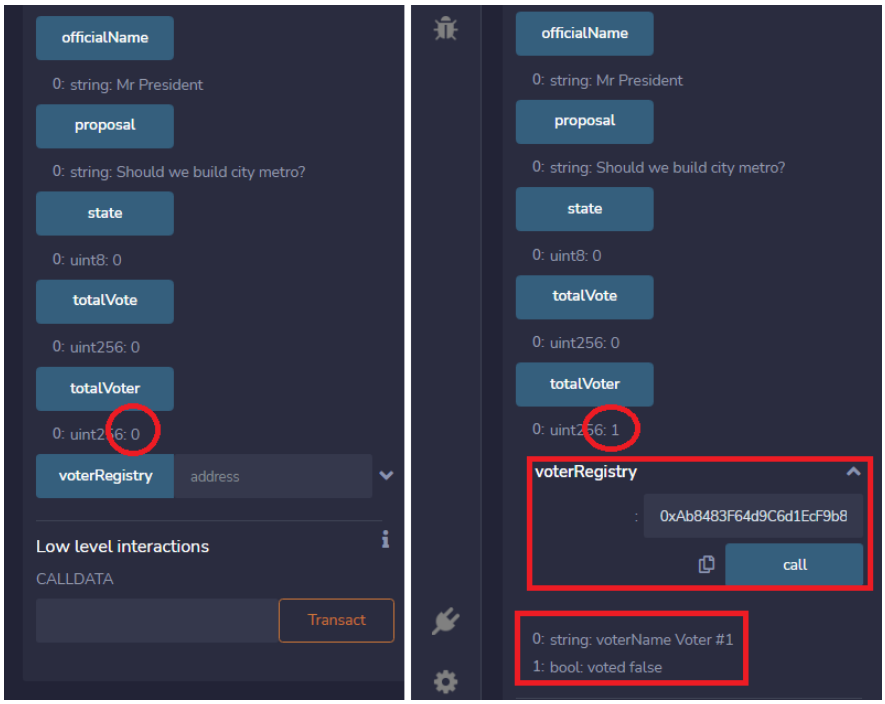
To add a voter, click on the address to drop down, click on the 2nd address, click on copy address, and switch back to the official address account.



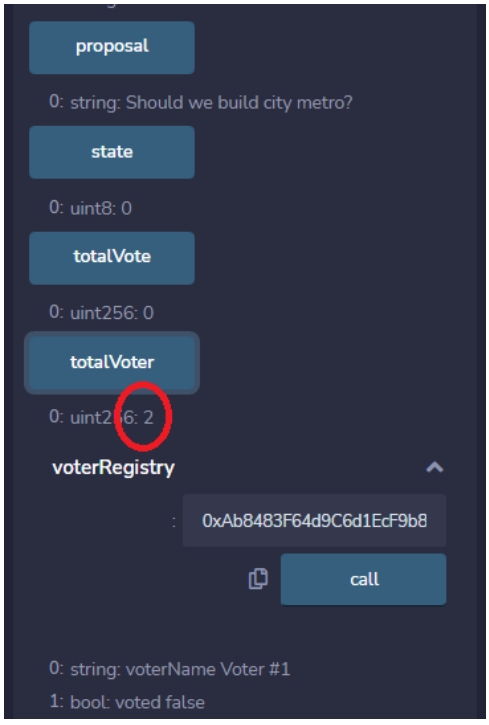
Scroll down and click on the dropdown arrow of addvoter, paste the 2nd address that we have just copied and add voter name “Voter #1”, and then click on transact.



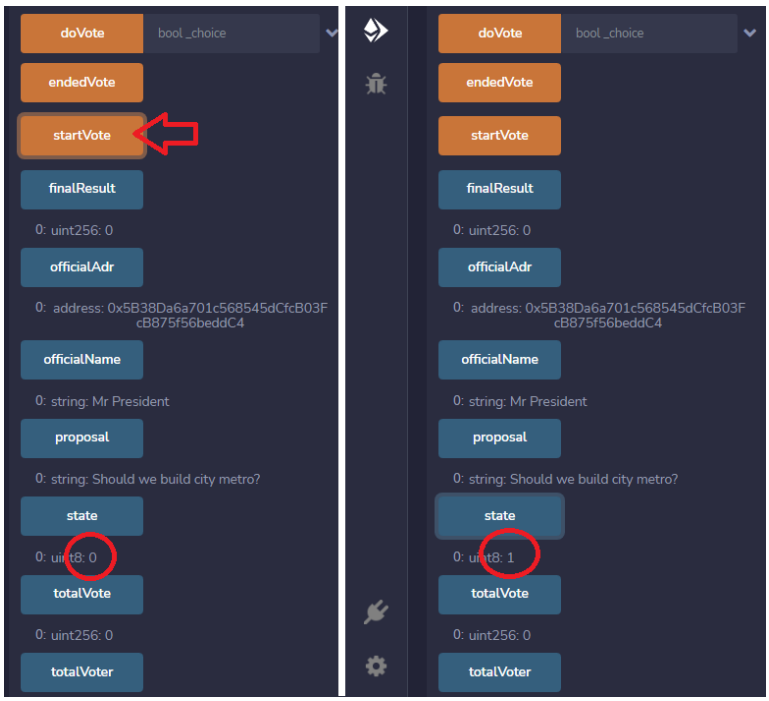
So before the totalVoter is 0, and now when you click on the button again it will give 1. You can also copy and paste the address of the voter #1 into voterRegister and click on the call button, you will see the voter's name and he/she has not voted yet “Vote = false”



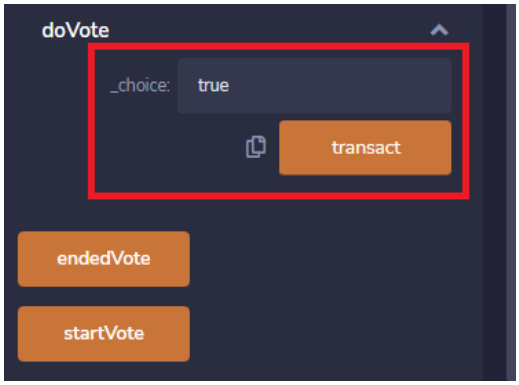
You can add as many voters as you want.



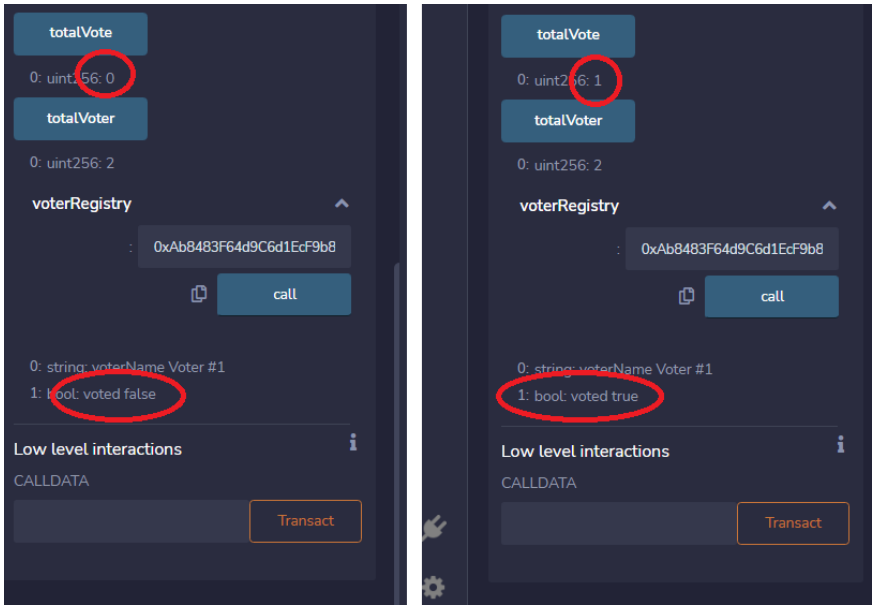
Now, using the official address to start the voting process by clicking on the button startvote and you can see that the state is changed from 0 to 1, which means from created state to voting state.



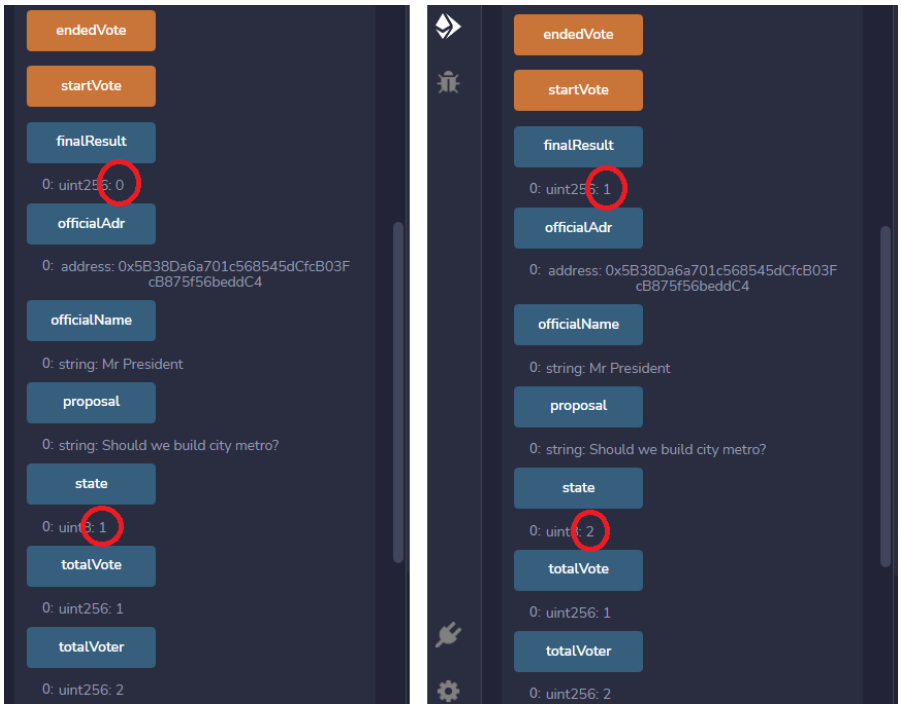
Use one of the voter addresses to vote, by typing “true” in the doVote function and clicking on the button transact.



Now the totalVote becomes 1 and Voter #1 has already voted



So using the official address to stop the voting, by clicking on endedVote, and see the finalresult. The contract state changes to 2 which is ended state.



Some cryptocurrency from the official address and Voter #1 address is lost a bit for paying the transaction fee. If voter #2 votes for “false” their address is also needed to pay the fee.