Building Smart Contracts with Remix

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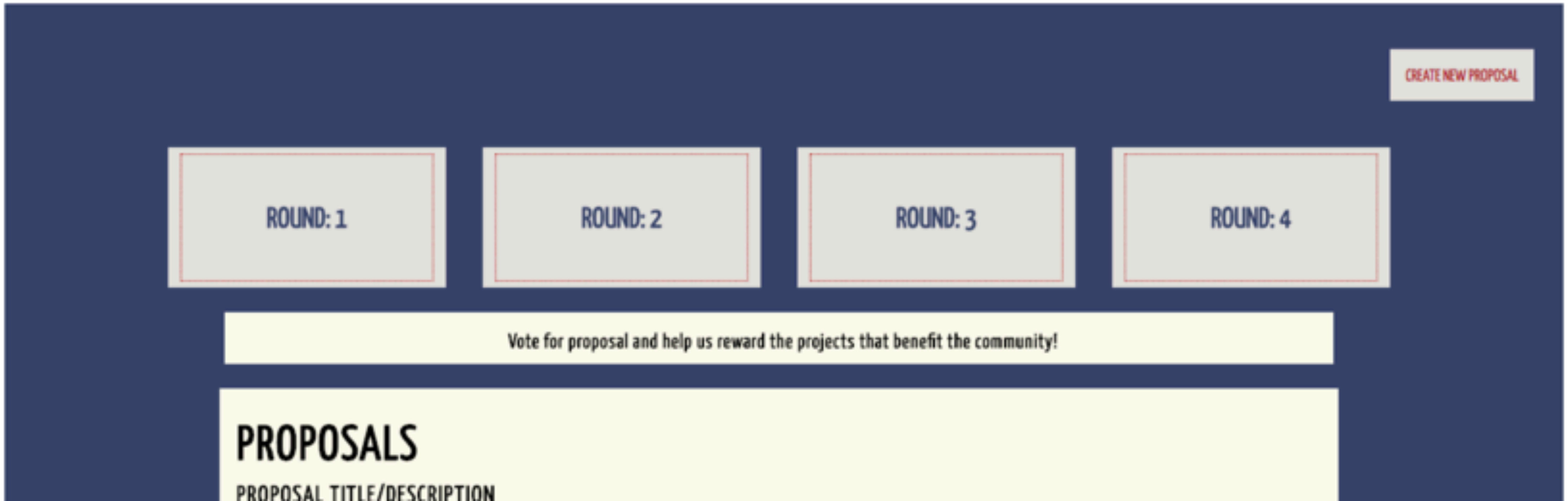
Ballot Dapp Workshop

bit.ly/remix-workshop-repository

PDF: https://updig.is/pdf/remix-chez-coinhouse.pdf



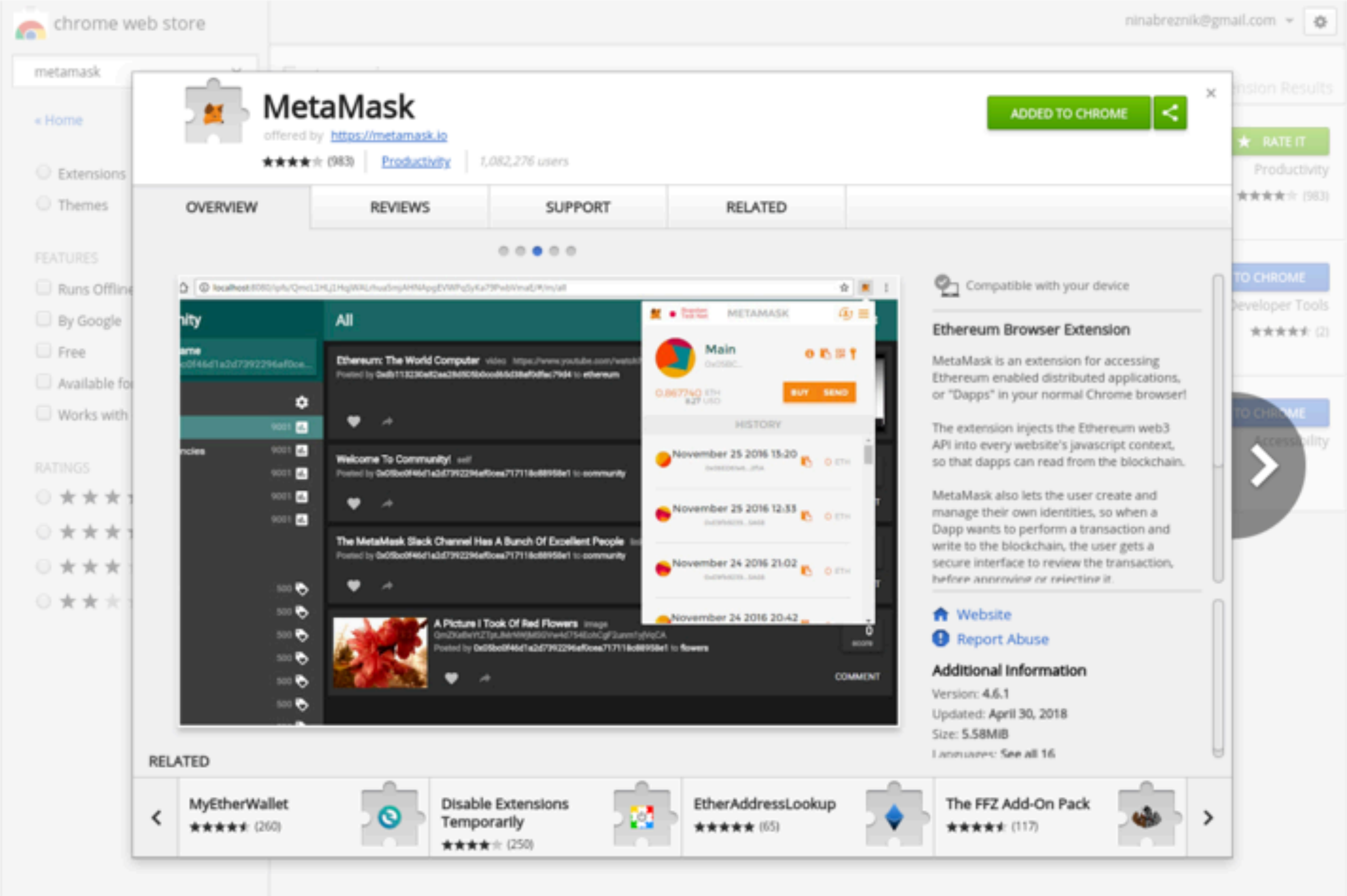
Vote for proposal and help us reward the projects that benefit the community!

PROPOSALS

PROPOSAL TITLE/DESCRIPTION

Install Metamask

chrome.google.com/webstore



MetaMask

offered by https://metamask.io

★★★★☆ (983) | Productivity | 1,082,276 users

Ethereum Browser Extension

MetaMask is an extension for accessing Ethereum enabled distributed applications, or "Dapps" in your normal Chrome browser!

The extension injects the Ethereum web3 API into every website's javascript context, so that dapps can read from the blockchain.

MetaMask also lets the user create and manage their own identities, so when a Dapp wants to perform a transaction and write to the blockchain, the user gets a secure interface to review the transaction, before approving or rejecting it.

Additional Information

Version: 4.6.1

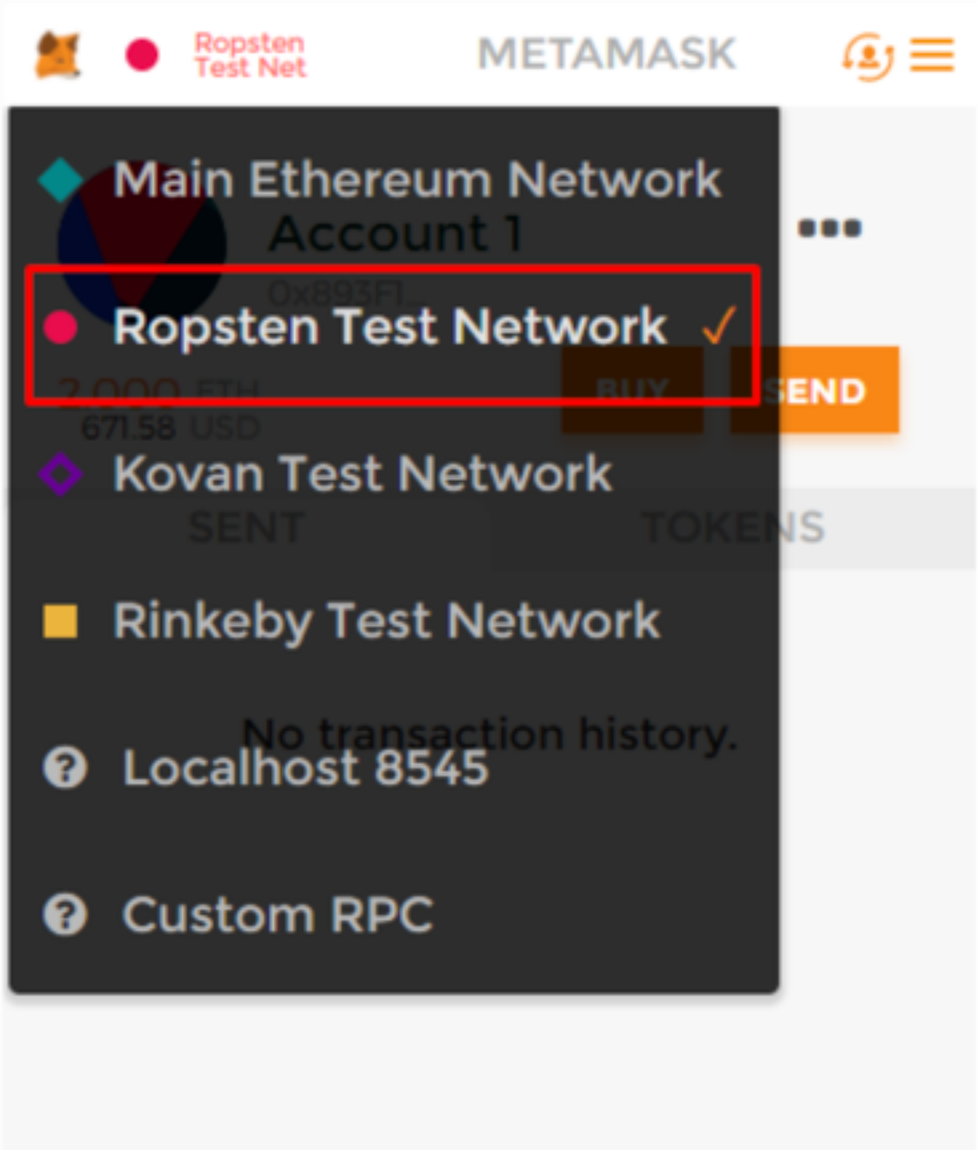
Updated: April 30, 2018

Size: 5.58MiB

Languages: See all 16

Login to Metamask

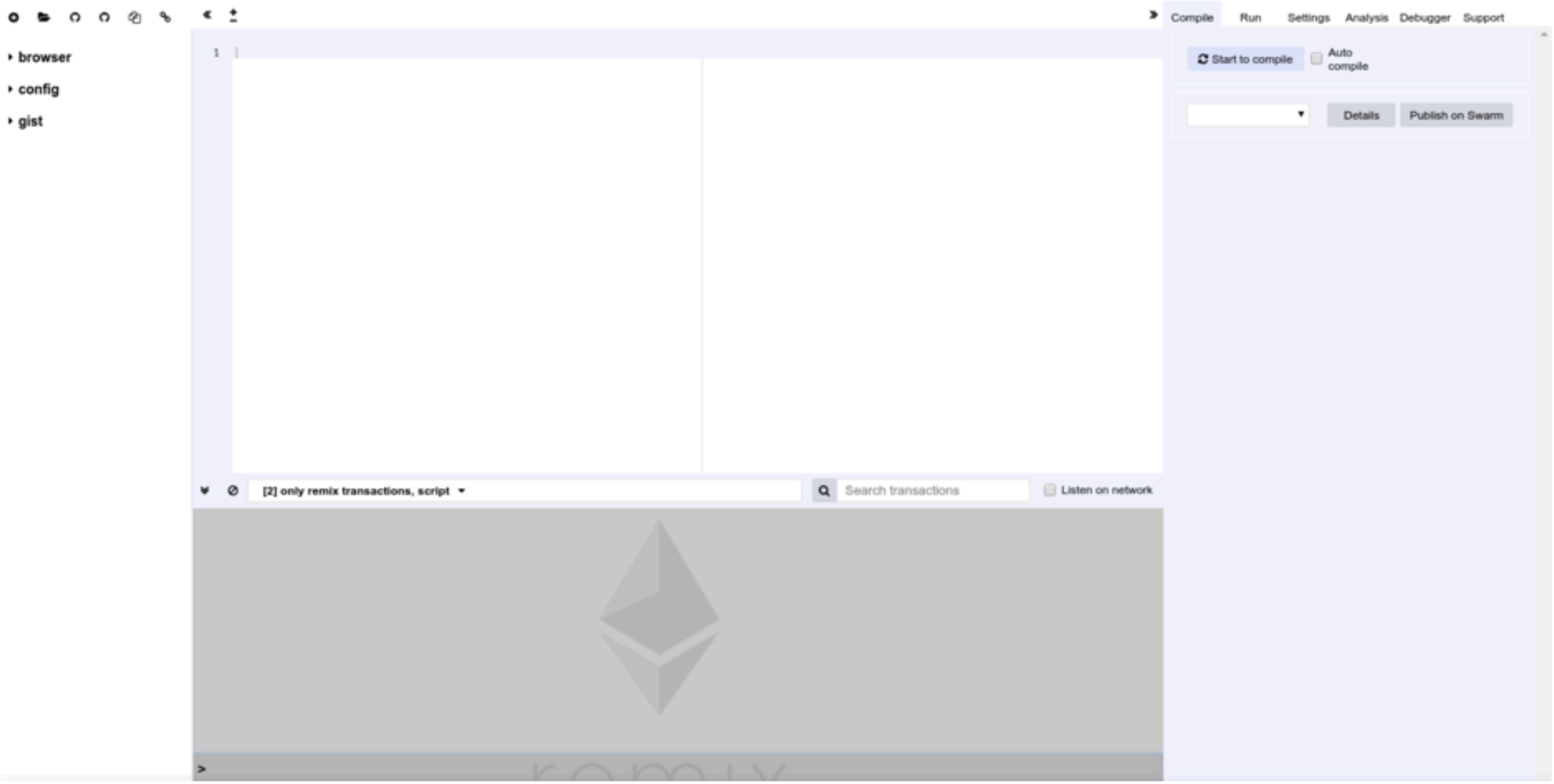
Robsten Test Network



Let’s get started

https://bit.ly/remix-workshop-repository

https://remix-alpha.ethereum.org

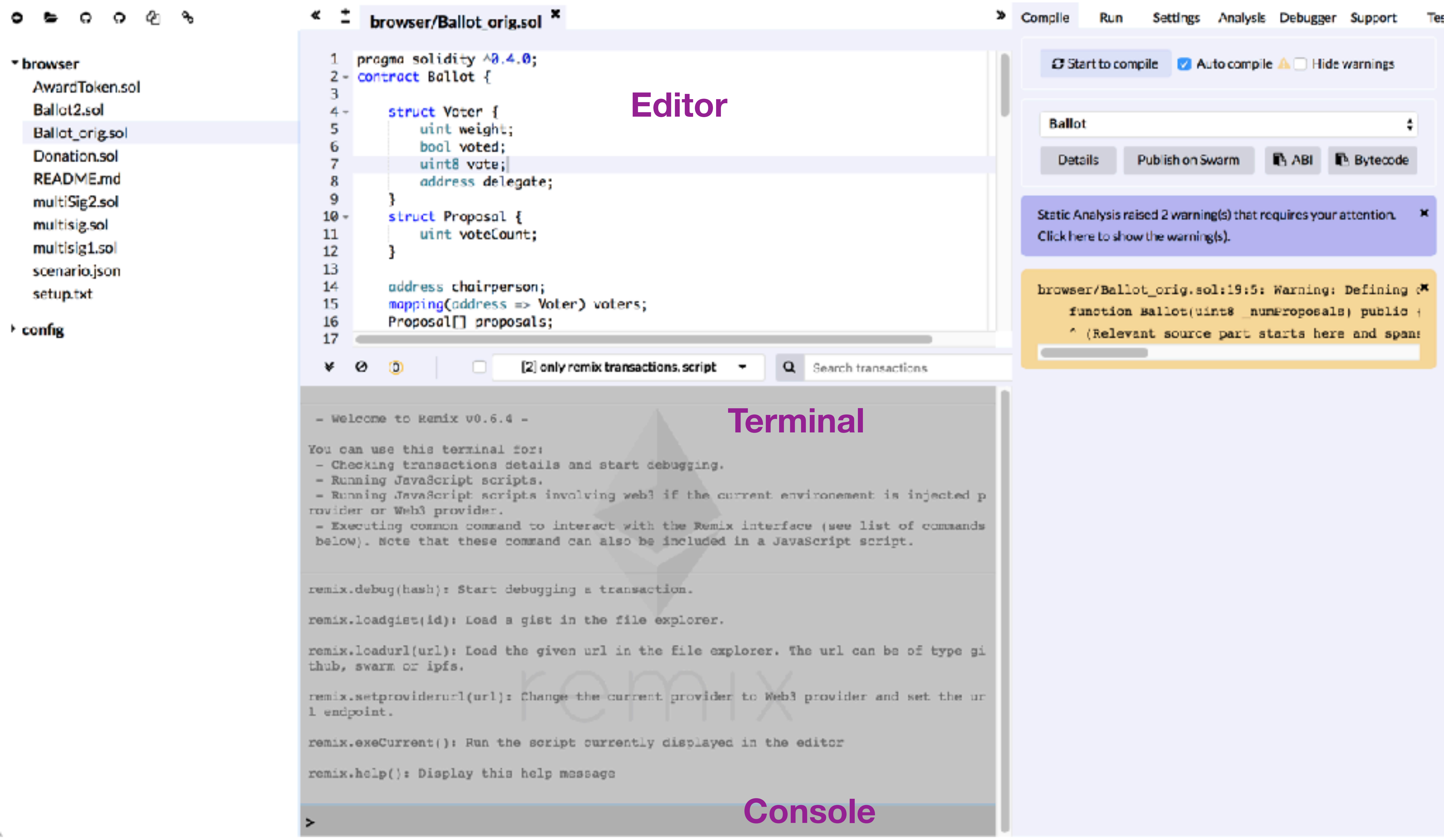


Remix Tour

File Explorer

https://remix-alpha.ethereum.org

Compile Tab (active)



Editor

```
pragma solidity ^0.4.0;
contract Ballot {

    struct Voter {
        uint weight;
        bool voted;
        uint8 vote;
        address delegate;
    }
    struct Proposal {
        uint voteCount;
    }

    address chairperson;
    mapping(address => Voter) voters;
    Proposal[] proposals;

```

Static Analysis raised 2 warning(s) that requires your attention.
Click here to show the warning(s).

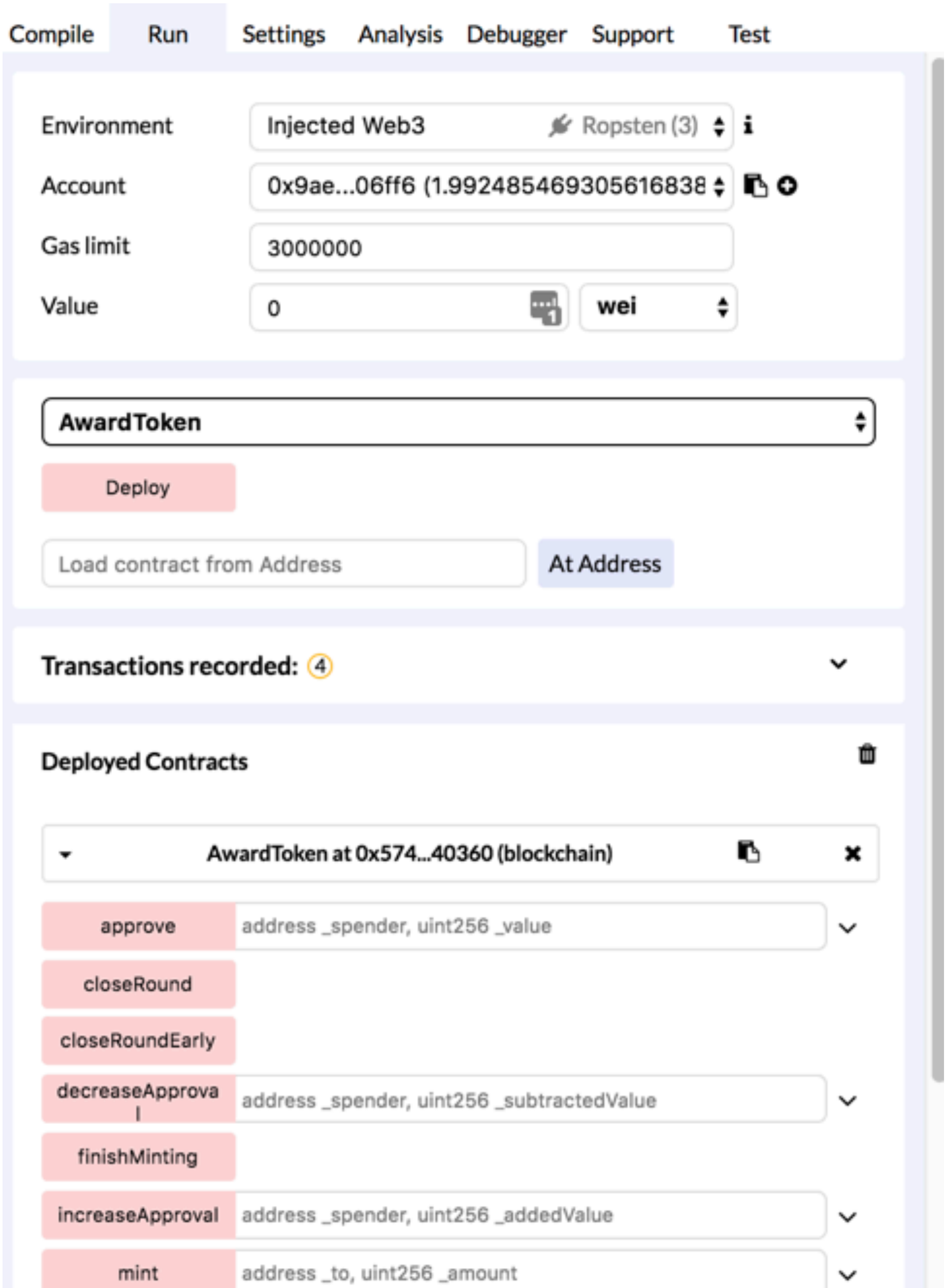
```
browser/Ballot_orig.sol:19:5: Warning: Defining c
    function Ballot(uint8 _numProposals) public {
    ^ (Relevant source part starts here and spans
```

Terminal

```
 - Welcome to Remix v0.6.4 -

You can use this terminal for:
 - Checking transactions details and start debugging.
 - Running JavaScript scripts.
 - Running JavaScript scripts involving web3 if the current environement is injected p
rovider or Web3 provider.
 - Executing common command to interact with the Remix interface (see list of commands
 below). Note that these command can also be included in a JavaScript script.


remix.debug(hash): Start debugging a transaction.

remix.loadgist(id): Load a gist in the file explorer.

remix.loadurl(url): Load the given url in the file explorer. The url can be of type gi
thub, swarm or ipfs.

remix.setproviderurl(url): Change the current provider to Web3 provider and set the ur
l endpoint.

remix.exeCurrent(): Run the script currently displayed in the editor

remix.help(): Display this help message

>
```

Console

Run Tab



Environment: Injected Web3 — Ropsten (3)

Account: 0x9ae...06ff6 (1.99248546930561683

Gas limit: 3000000

Value: 0 wei

AwardToken

Transactions recorded: 4

Deployed Contracts

AwardToken at 0x574...40360 (blockchain)

approve — address _spender, uint256 _value

closeRound

closeRoundEarly

decreaseApproval — address _spender, uint256 _subtractedValue

finishMinting

increaseApproval — address _spender, uint256 _addedValue

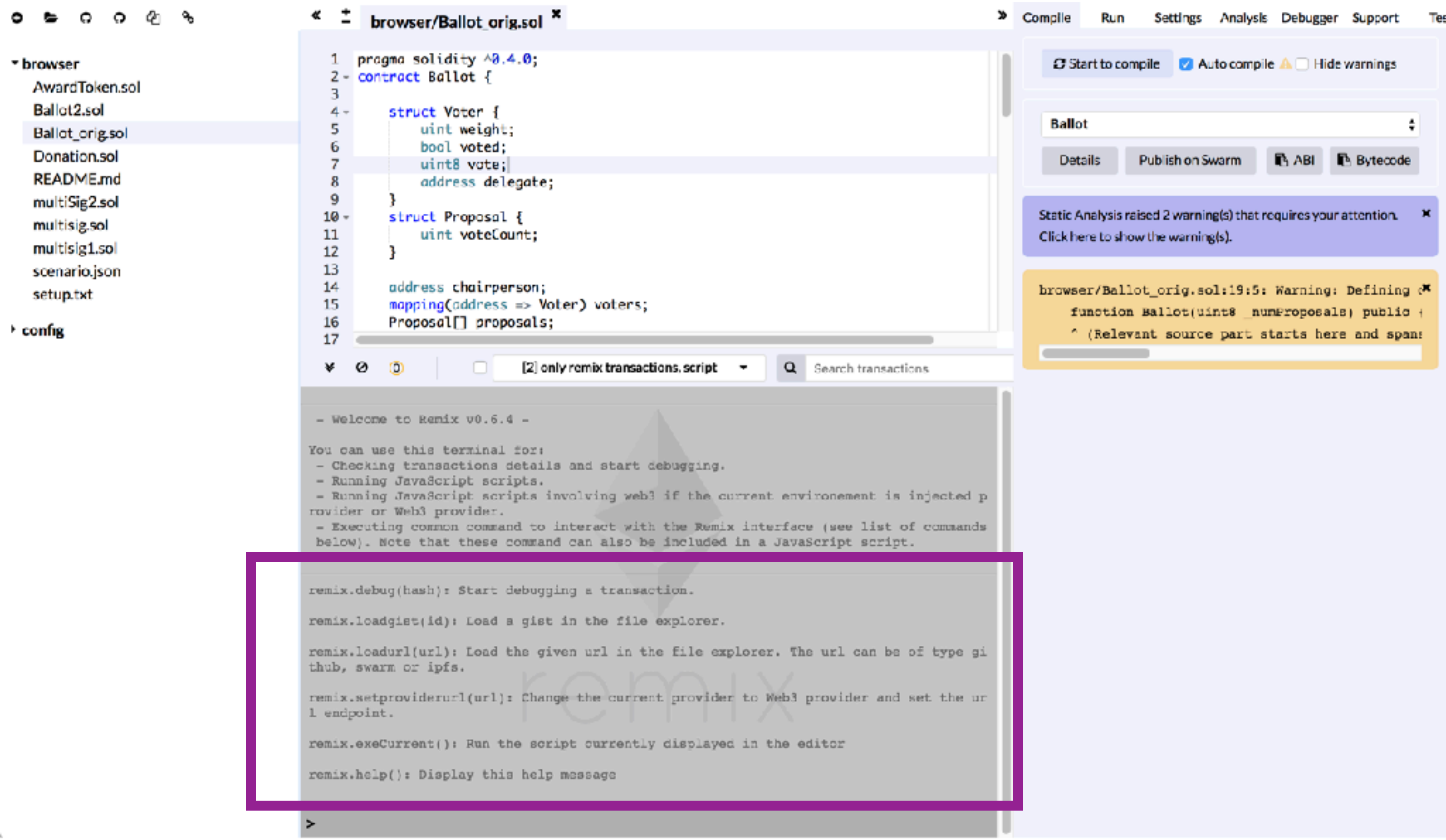
mint — address _to, uint256 _amount

Universal DAPP

UI to the Contract

Remix Commands

https://remix-alpha.ethereum.org



```
pragma solidity ^0.4.0;
contract Ballot {

    struct Voter {
        uint weight;
        bool voted;
        uint8 vote;
        address delegate;
    }
    struct Proposal {
        uint voteCount;
    }

    address chairperson;
    mapping(address => Voter) voters;
    Proposal[] proposals;
```

☑ Auto compile ☐ Hide warnings

Static Analysis raised 2 warning(s) that requires your attention.
Click here to show the warning(s).

```
browser/Ballot_orig.sol:19:5: Warning: Defining c
    function Ballot(uint8 _numProposals) public {
    ^ (Relevant source part starts here and spans
```

```
 - Welcome to Remix v0.6.4 -

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l endpoint.

remix.exeCurrent(): Run the script currently displayed in the editor

remix.help(): Display this help message

>
```
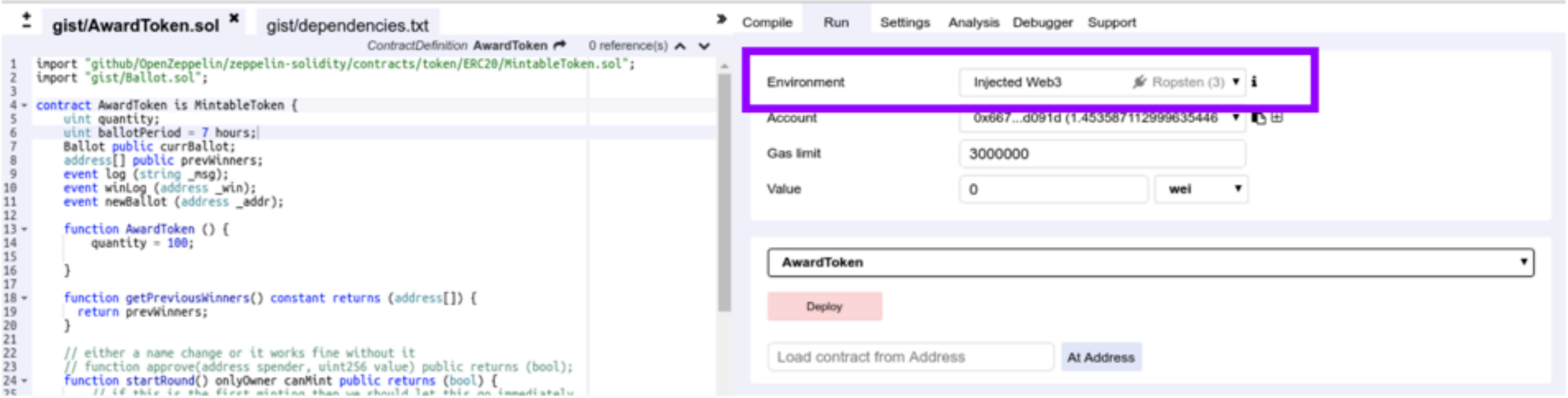

Set environment

Run tab: Environment = Injected web3
(Ropsten)



```
import "github/OpenZeppelin/zeppelin-solidity/contracts/token/ERC20/MintableToken.sol";
import "gist/Ballot.sol";

contract AwardToken is MintableToken {
    uint quantity;
    uint ballotPeriod = 7 hours;
    Ballot public currBallot;
    address[] public prevWinners;
    event log (string _msg);
    event winLog (address _win);
    event newBallot (address _addr);

    function AwardToken () {
        quantity = 100;

    }

    function getPreviousWinners() constant returns (address[]) {
      return prevWinners;
    }

    // either a name change or it works fine without it
    // function approve(address spender, uint256 value) public returns (bool);
    function startRound() onlyOwner canMint public returns (bool) {
        // if this is the first minting then we should let this go immediately
```

Environment: Injected Web3 — Ropsten (3)

Account: 0x667...d091d (1.4535871129996354446

Gas limit: 3000000

Value: 0 wei

AwardToken

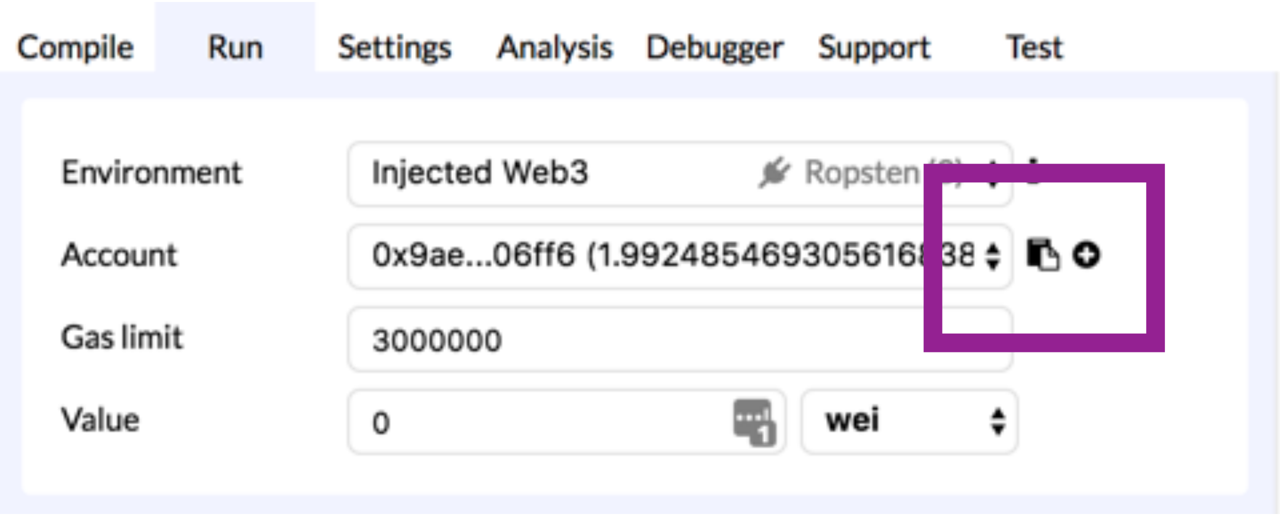
Load contract from Address

Get some TEST ether

http://faucet.ropsten.be:3001/

But FIRST:

Copy your address - here or in Metamask



Environment: Injected Web3 Ropsten

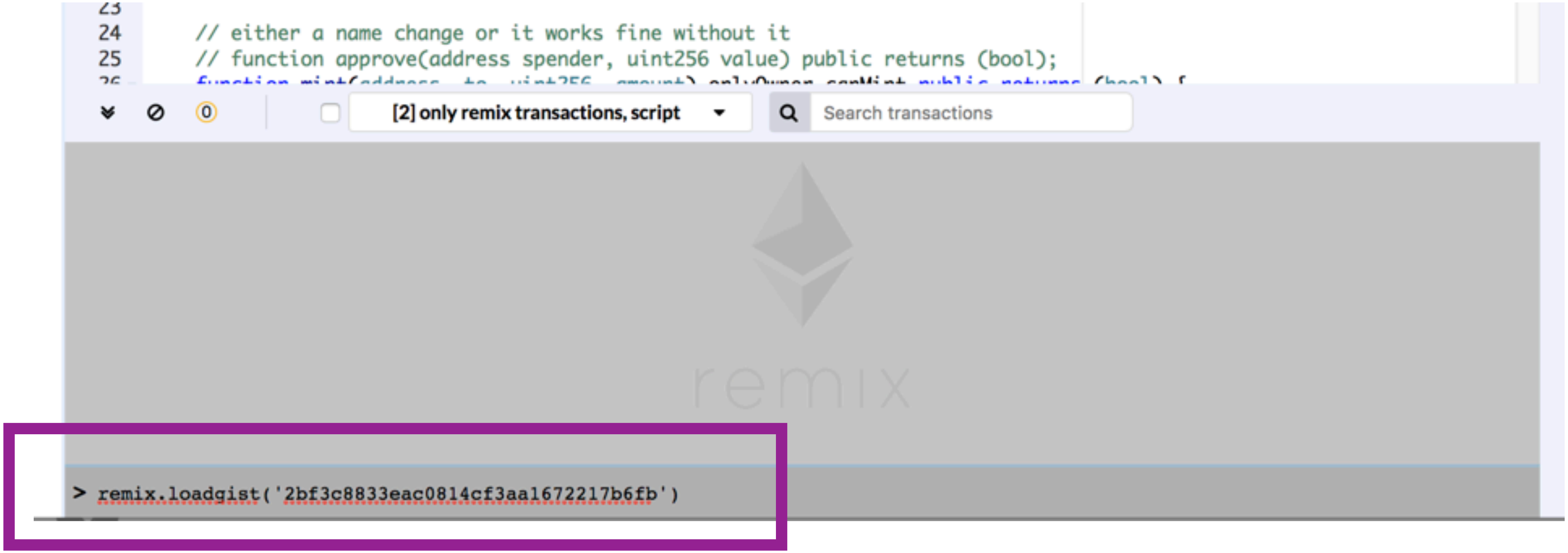
Account: 0x9ae...06ff6 (1.992485469305616838

Gas limit: 3000000

Value: 0 wei

Load files to Remix

remix.loadgist('1b87ded5087790b67b5c4cd90a68065f')



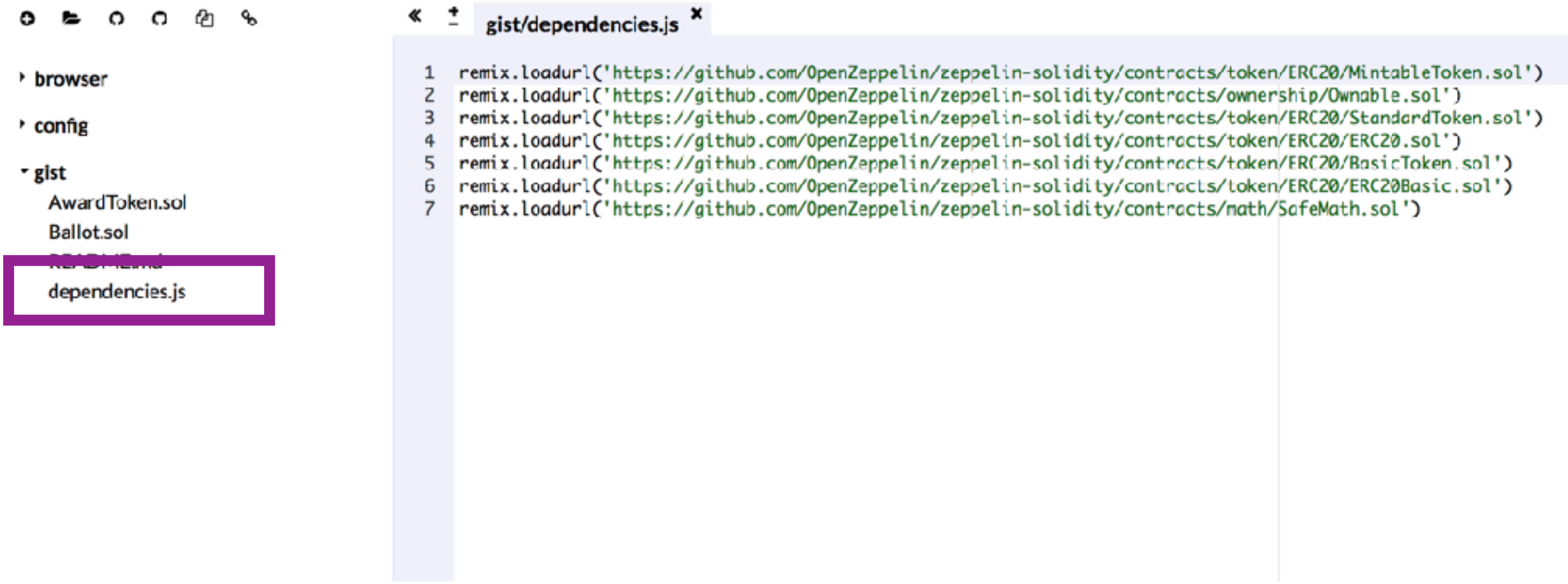
```
    // either a name change or it works fine without it
    // function approve(address spender, uint256 value) public returns (bool);
    function mint(address _to, uint256 _amount) onlyOwner canMint public returns (bool) {
```

```
> remix.loadgist('2bf3c8833eac0814cf3aa1672217b6fb')
```

here in the console

Open file

gist/dependencies.js

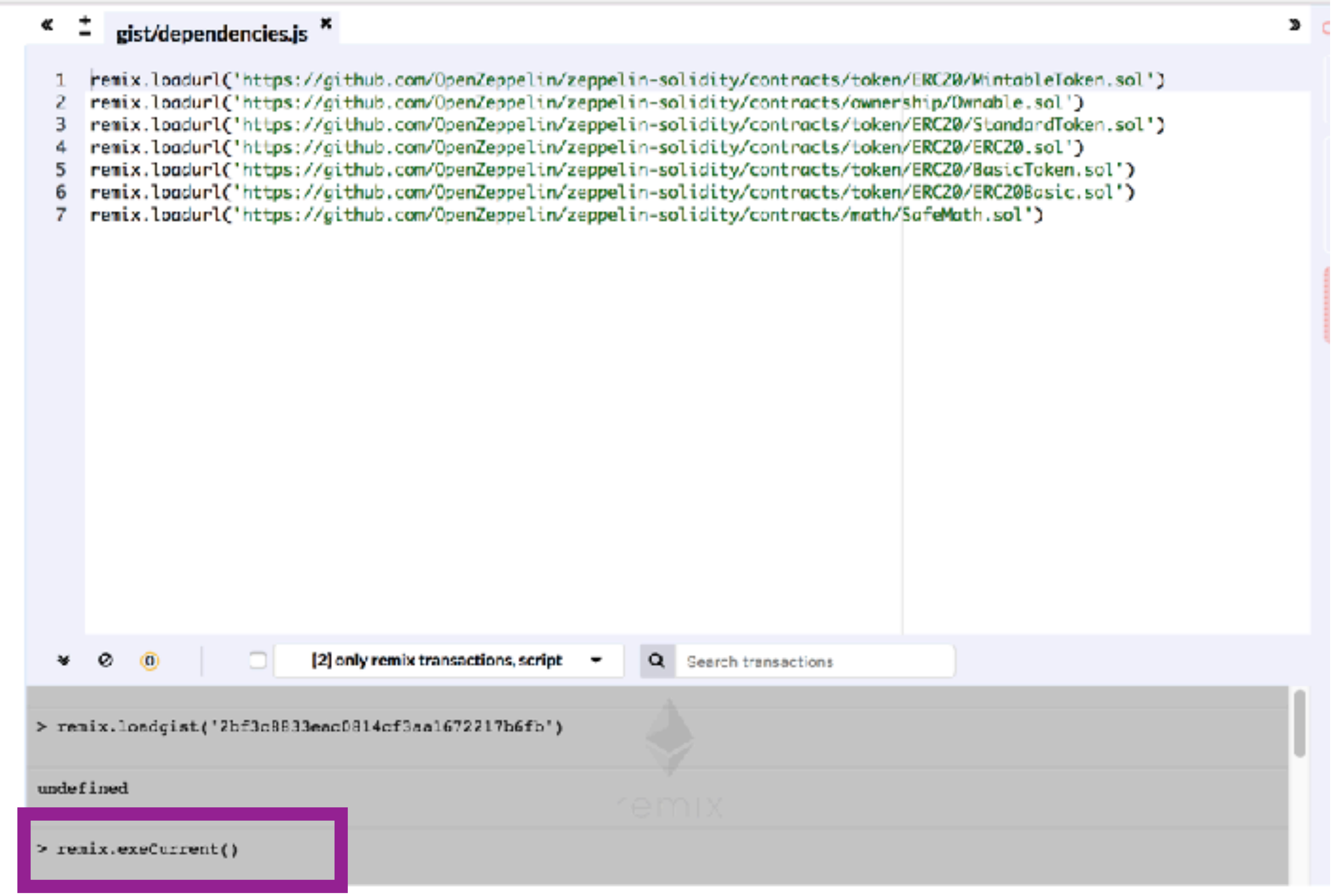


```
remix.loadurl('https://github.com/OpenZeppelin/zeppelin-solidity/contracts/token/ERC20/MintableToken.sol')
remix.loadurl('https://github.com/OpenZeppelin/zeppelin-solidity/contracts/ownership/Ownable.sol')
remix.loadurl('https://github.com/OpenZeppelin/zeppelin-solidity/contracts/token/ERC20/StandardToken.sol')
remix.loadurl('https://github.com/OpenZeppelin/zeppelin-solidity/contracts/token/ERC20/ERC20.sol')
remix.loadurl('https://github.com/OpenZeppelin/zeppelin-solidity/contracts/token/ERC20/BasicToken.sol')
remix.loadurl('https://github.com/OpenZeppelin/zeppelin-solidity/contracts/token/ERC20/ERC20Basic.sol')
remix.loadurl('https://github.com/OpenZeppelin/zeppelin-solidity/contracts/math/SafeMath.sol')
```

Load dependencies

remix.exeCurrent()

(when dependencies.js is the active file)

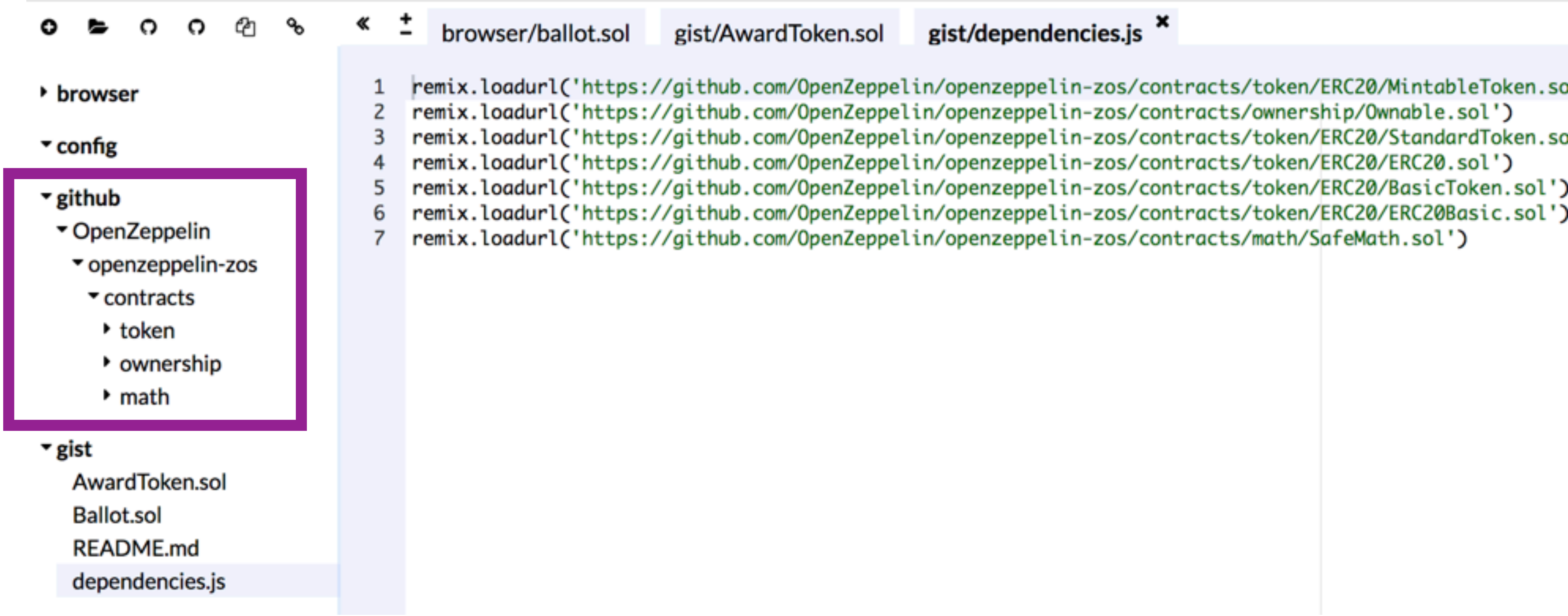


```
remix.loadurl('https://github.com/OpenZeppelin/zeppelin-solidity/contracts/token/ERC20/MintableToken.sol')
remix.loadurl('https://github.com/OpenZeppelin/zeppelin-solidity/contracts/ownership/Ownable.sol')
remix.loadurl('https://github.com/OpenZeppelin/zeppelin-solidity/contracts/token/ERC20/StandardToken.sol')
remix.loadurl('https://github.com/OpenZeppelin/zeppelin-solidity/contracts/token/ERC20/ERC20.sol')
remix.loadurl('https://github.com/OpenZeppelin/zeppelin-solidity/contracts/token/ERC20/BasicToken.sol')
remix.loadurl('https://github.com/OpenZeppelin/zeppelin-solidity/contracts/token/ERC20/ERC20Basic.sol')
remix.loadurl('https://github.com/OpenZeppelin/zeppelin-solidity/contracts/math/SafeMath.sol')
```

```
> remix.loadgist('2bf3c8833eac0814cf3aa1672217b6fb')
undefined
> remix.exeCurrent()
```

See new folder

github/OpenZeppelin/openzeppelin-zos/contracts

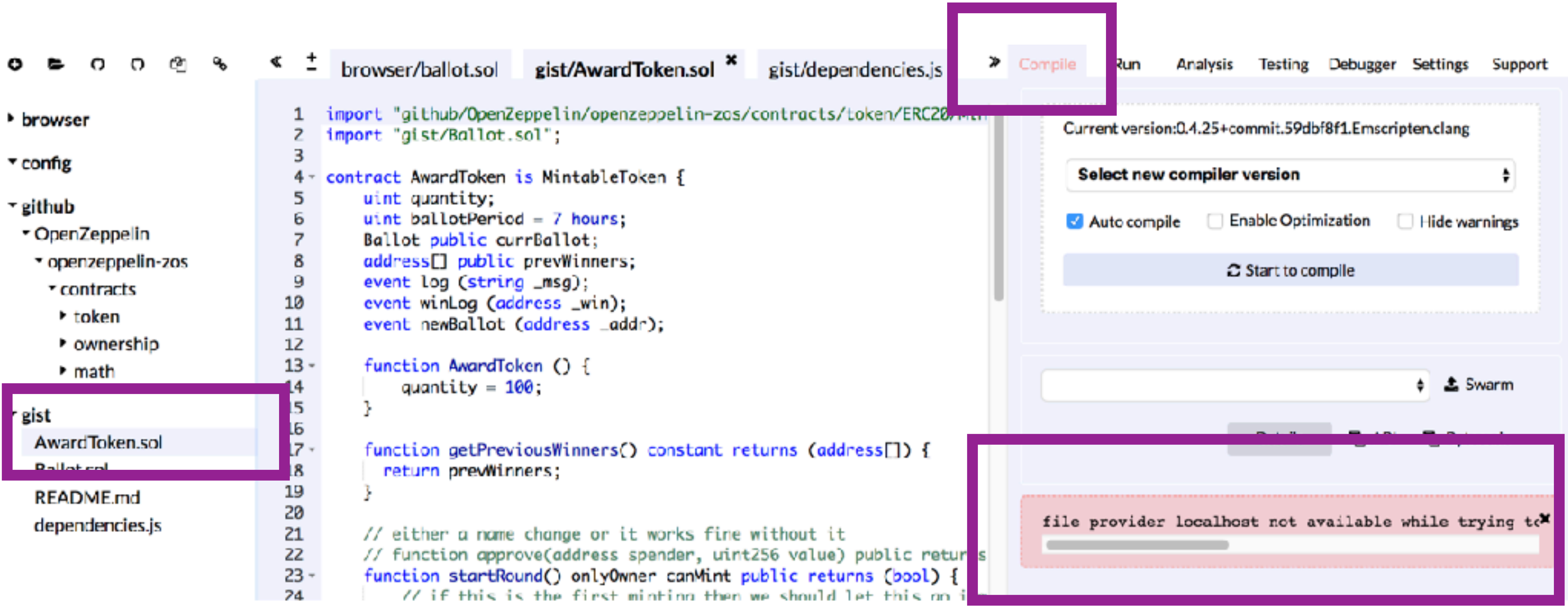


```
remix.loadurl('https://github.com/OpenZeppelin/openzeppelin-zos/contracts/token/ERC20/MintableToken.so
remix.loadurl('https://github.com/OpenZeppelin/openzeppelin-zos/contracts/ownership/Ownable.sol')
remix.loadurl('https://github.com/OpenZeppelin/openzeppelin-zos/contracts/token/ERC20/StandardToken.so
remix.loadurl('https://github.com/OpenZeppelin/openzeppelin-zos/contracts/token/ERC20/ERC20.sol')
remix.loadurl('https://github.com/OpenZeppelin/openzeppelin-zos/contracts/token/ERC20/BasicToken.sol')
remix.loadurl('https://github.com/OpenZeppelin/openzeppelin-zos/contracts/token/ERC20/ERC20Basic.sol')
remix.loadurl('https://github.com/OpenZeppelin/openzeppelin-zos/contracts/math/SafeMath.sol')
```

Try to compile AwardToken.sol

- Click AwardToken in the File Explorer to make it the active file in the Editor
- Compile tab: Start to compile button

But it won't work



```
import "github/OpenZeppelin/openzeppelin-zos/contracts/token/ERC20/
import "gist/Ballot.sol";

contract AwardToken is MintableToken {
    uint quantity;
    uint ballotPeriod = 7 hours;
    Ballot public currBallot;
    address[] public prevWinners;
    event log (string _msg);
    event winLog (address _win);
    event newBallot (address _addr);

    function AwardToken () {
        quantity = 100;
    }

    function getPreviousWinners() constant returns (address[]) {
      return prevWinners;
    }

    // either a name change or it works fine without it
    // function approve(address spender, uint256 value) public returns
    function startRound() onlyOwner canMint public returns (bool) {
        // if this is the first minting then we should let this go i
```

Current version:0.4.25+commit.59dbf8f1.Emscripten.clang

Select new compiler version

☑ Auto compile ☐ Enable Optimization ☐ Hide warnings

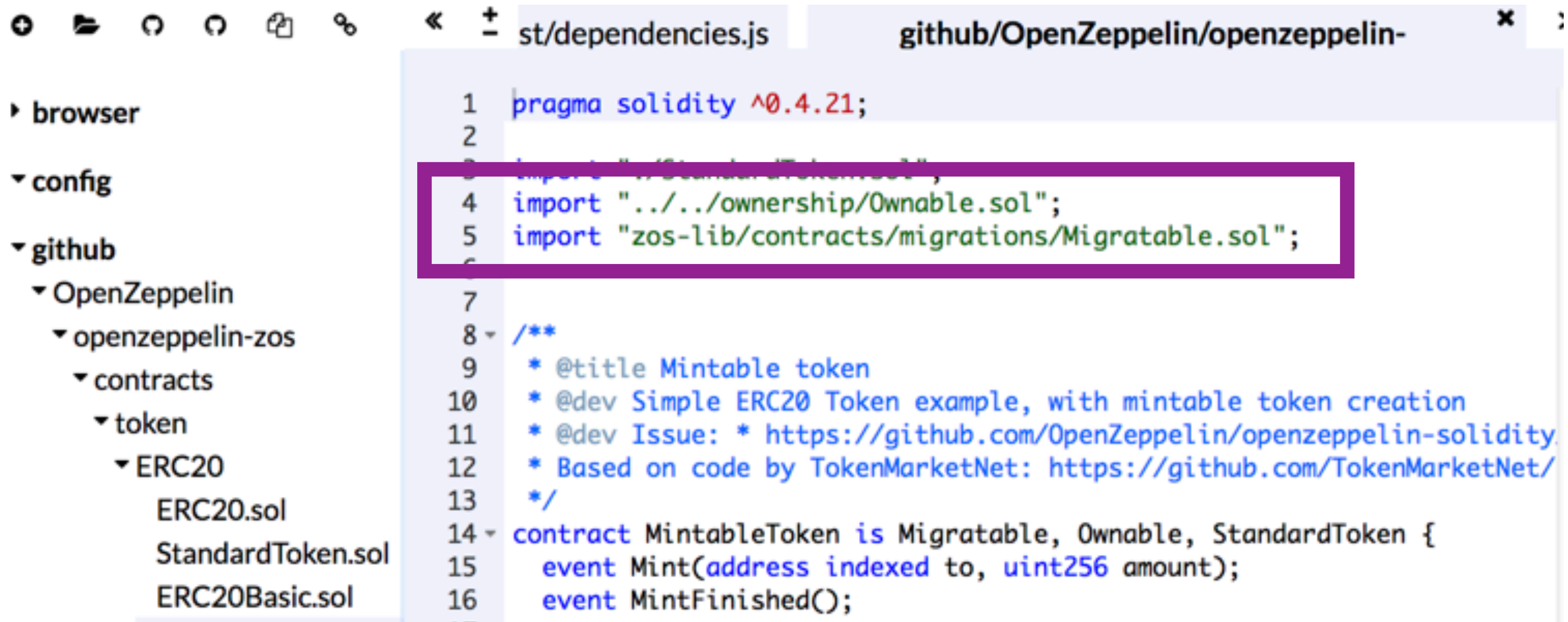
Start to compile

```
file provider localhost not available while trying to
```

AwardToken is importing MintableToken.sol which is trying to import a file inside of zos-lib.

We need to get the zos-lib from NPM

and make the NPM folder accessable from Remix



```
pragma solidity ^0.4.21;

import "./StandardToken.sol";
import "../../ownership/Ownable.sol";
import "zos-lib/contracts/migrations/Migratable.sol";


/**
 * @title Mintable token
 * @dev Simple ERC20 Token example, with mintable token creation
 * @dev Issue: * https://github.com/OpenZeppelin/openzeppelin-solidity
 * Based on code by TokenMarketNet: https://github.com/TokenMarketNet/
 */
contract MintableToken is Migratable, Ownable, StandardToken {
  event Mint(address indexed to, uint256 amount);
  event MintFinished();
```

Setup to access local files
and npm modules

In a Terminal / Console
(not inside remix but on your computer)

cd to a directory where you want to install the npm modules.
(typically your project’s directory)

```
npm install remixd
npm install zos-lib
```

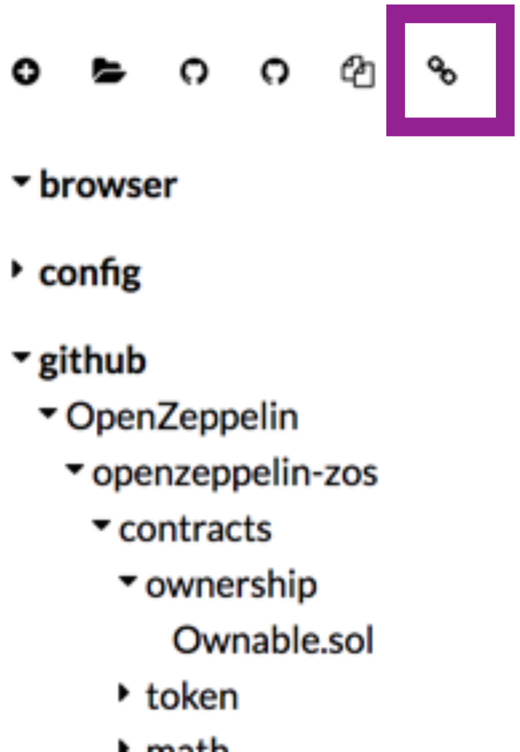
Get Remixd Going!

In a Terminal / Console
from your project's directory

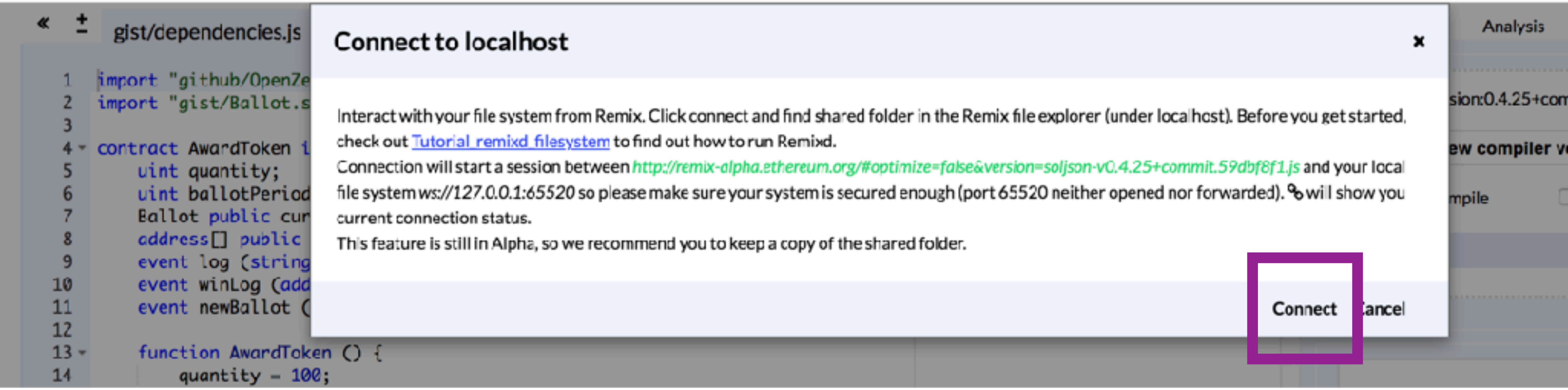
type:

```
remixd -s ./
```

Then go to remix and turn on remixd by clicking the link icon at the top of the File Explorer (top left of Remix)



Click ‘Connect’



```
import "github/OpenZe
import "gist/Ballot.s

contract AwardToken i
    uint quantity;
    uint ballotPeriod
    Ballot public cur
    address[] public
    event log (string
    event winLog (add
    event newBallot (

    function AwardToken () {
        quantity = 100;
```

Connect to localhost ×

Interact with your file system from Remix. Click connect and find shared folder in the Remix file explorer (under localhost). Before you get started, check out Tutorial remixd filesystem to find out how to run Remixd.
Connection will start a session between *http://remix-alpha.ethereum.org/#optimize=false&version=soljson-v0.4.25+commit.59dbf8f1.js* and your local file system *ws://127.0.0.1:65520* so please make sure your system is secured enough (port 65520 neither opened nor forwarded). 🔗 will show you current connection status.
This feature is still in Alpha, so we recommend you to keep a copy of the shared folder.

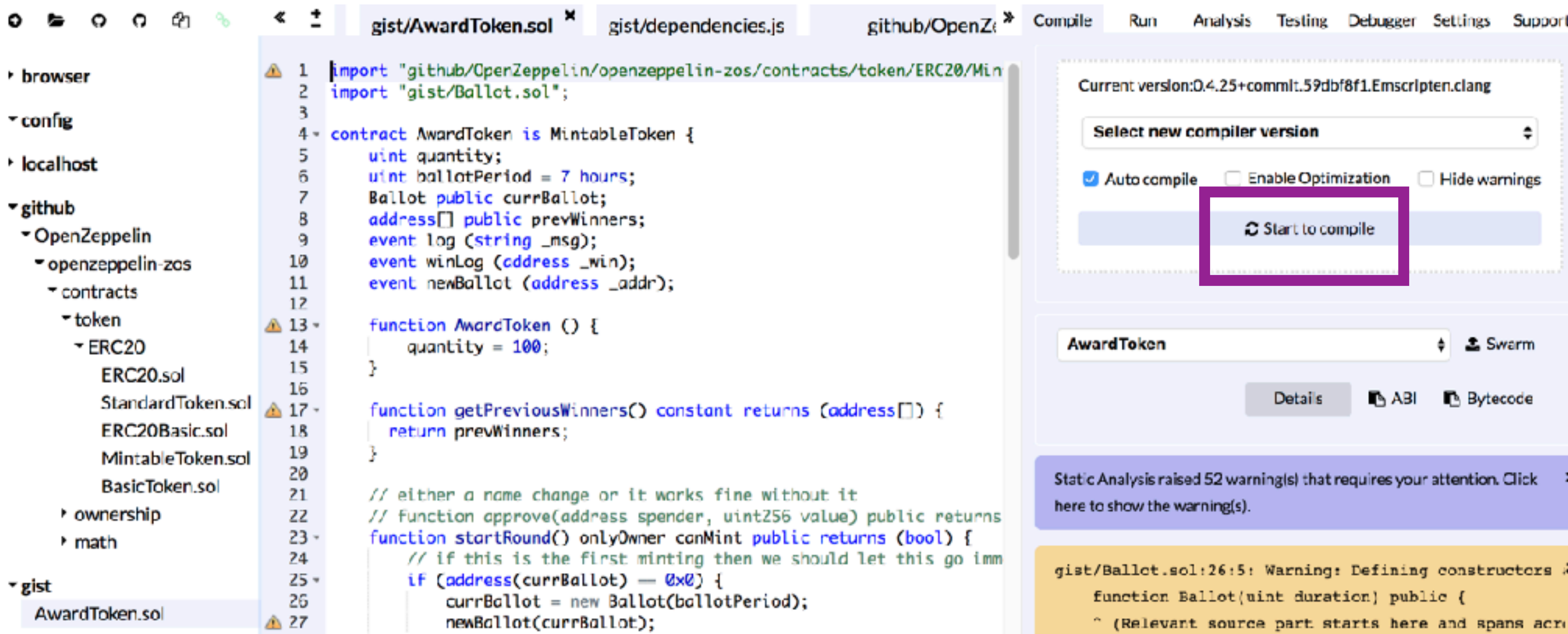
Connect Cancel

Then the link icon should turn green.

Compile AwardToken

Make sure that AwarkToken.sol is the active file in the terminal.

Click the “Start to compile” button



```
import "github/OperZeppelin/openzeppelin-zos/contracts/token/ERC20/Min
import "gist/Ballot.sol";

contract AwardToken is MintableToken {
    uint quantity;
    uint ballotPeriod = 7 hours;
    Ballot public currBallot;
    address[] public prevWinners;
    event log (string _msg);
    event winLog (address _win);
    event newBallot (address _addr);

    function AwardToken () {
        quantity = 100;
    }

    function getPreviousWinners() constant returns (address[]) {
      return prevWinners;
    }

    // either a name change or it works fine without it
    // function approve(address spender, uint256 value) public returns
    function startRound() onlyOwner canMint public returns (bool) {
        // if this is the first minting then we should let this go imm
        if (address(currBallot) == 0x0) {
            currBallot = new Ballot(ballotPeriod);
            newBallot(currBallot);
```

Current version:0.4.25+commit.59dbf8f1.Emscripten.clang

Select new compiler version

☑ Auto compile ☐ Enable Optimization ☐ Hide warnings

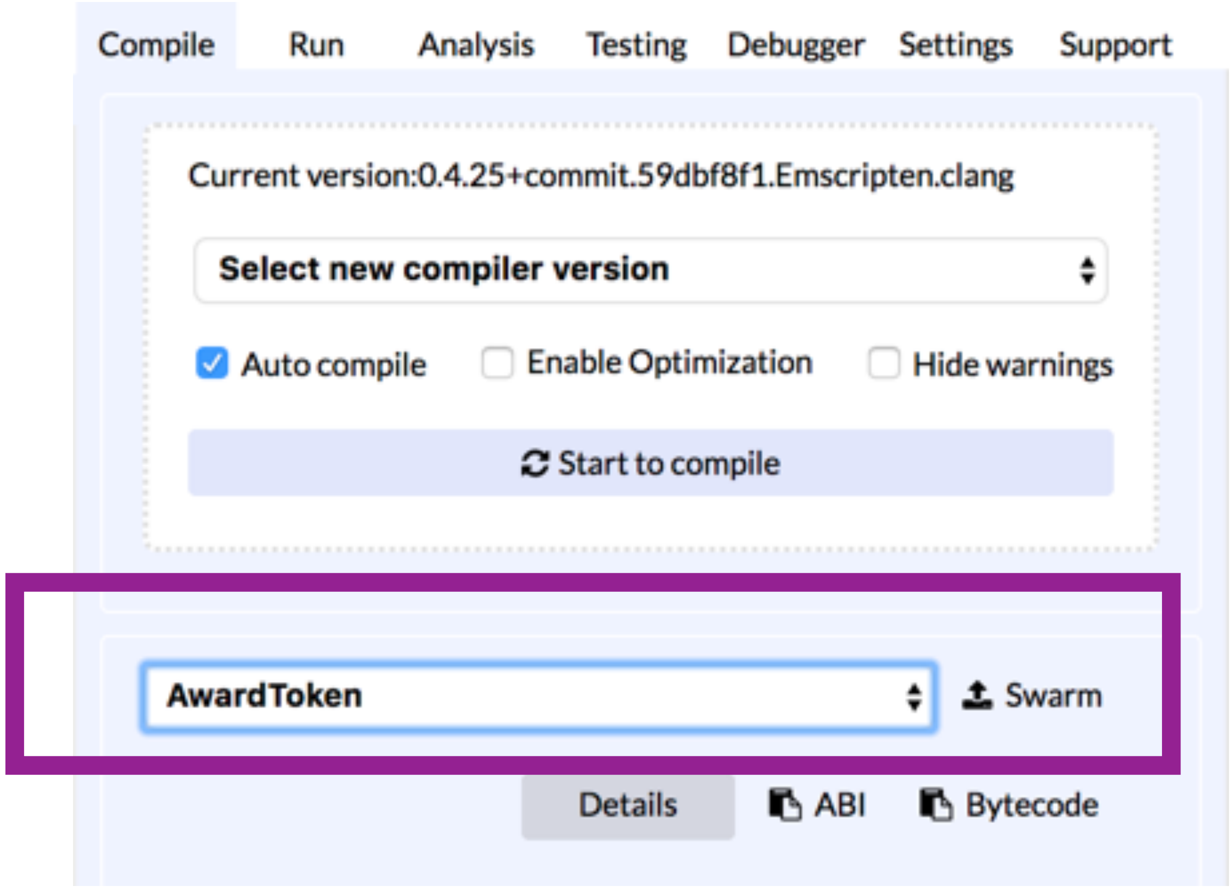
AwardToken

Static Analysis raised 52 warning(s) that requires your attention. Click here to show the warning(s).

```
gist/Ballot.sol:26:5: Warning: Defining constructors a
    function Ballot(uint duration) public {
    ^ (Relevant source part starts here and spans acro
```

See compiled contracts

AwardToken + all it’s imported contracts

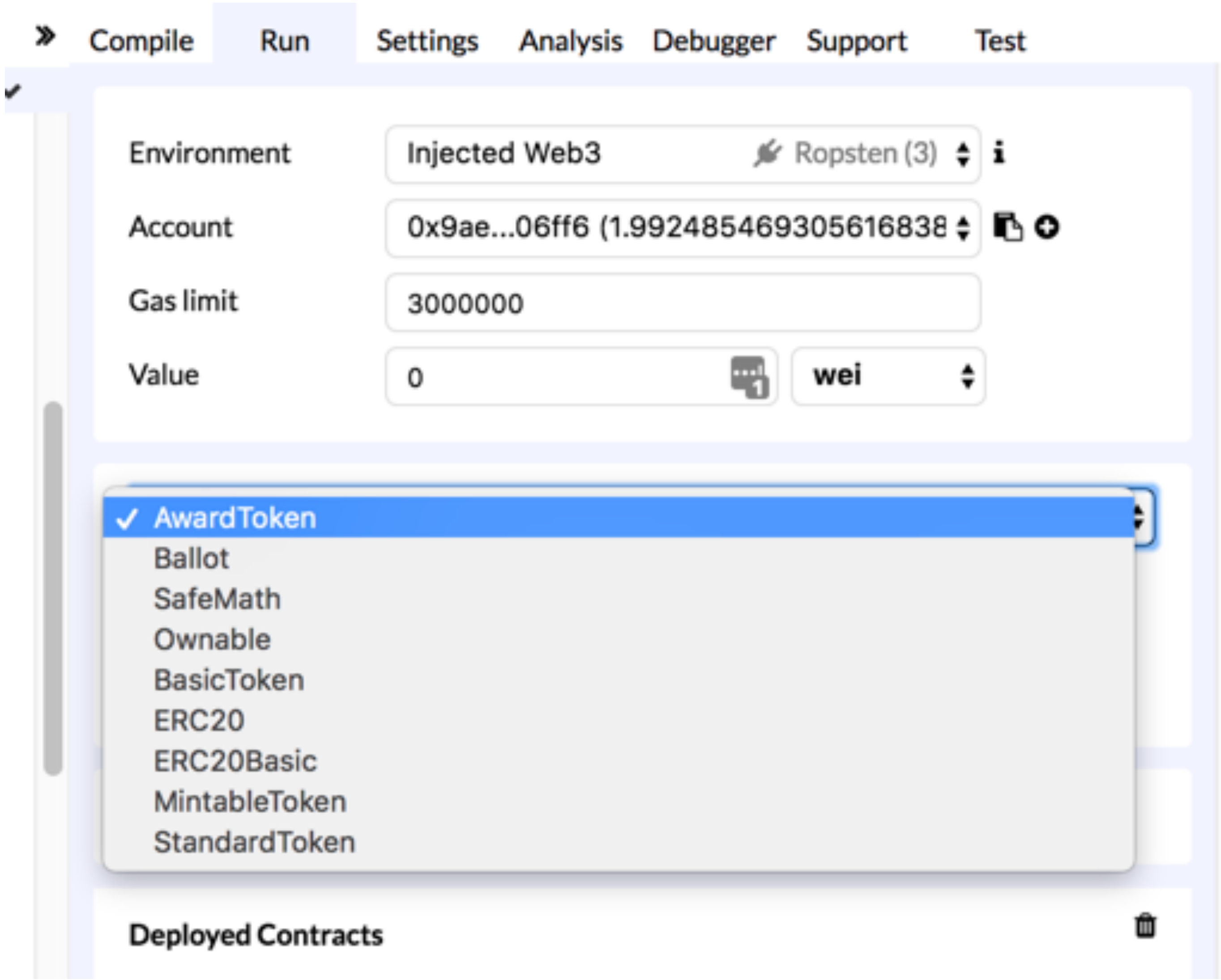


Current version:0.4.25+commit.59dbf8f1.Emscripten.clang

☑ Auto compile ☐ Enable Optimization ☐ Hide warnings

AwardToken

Imported Contracts



Environment: Injected Web3 Ropsten (3)

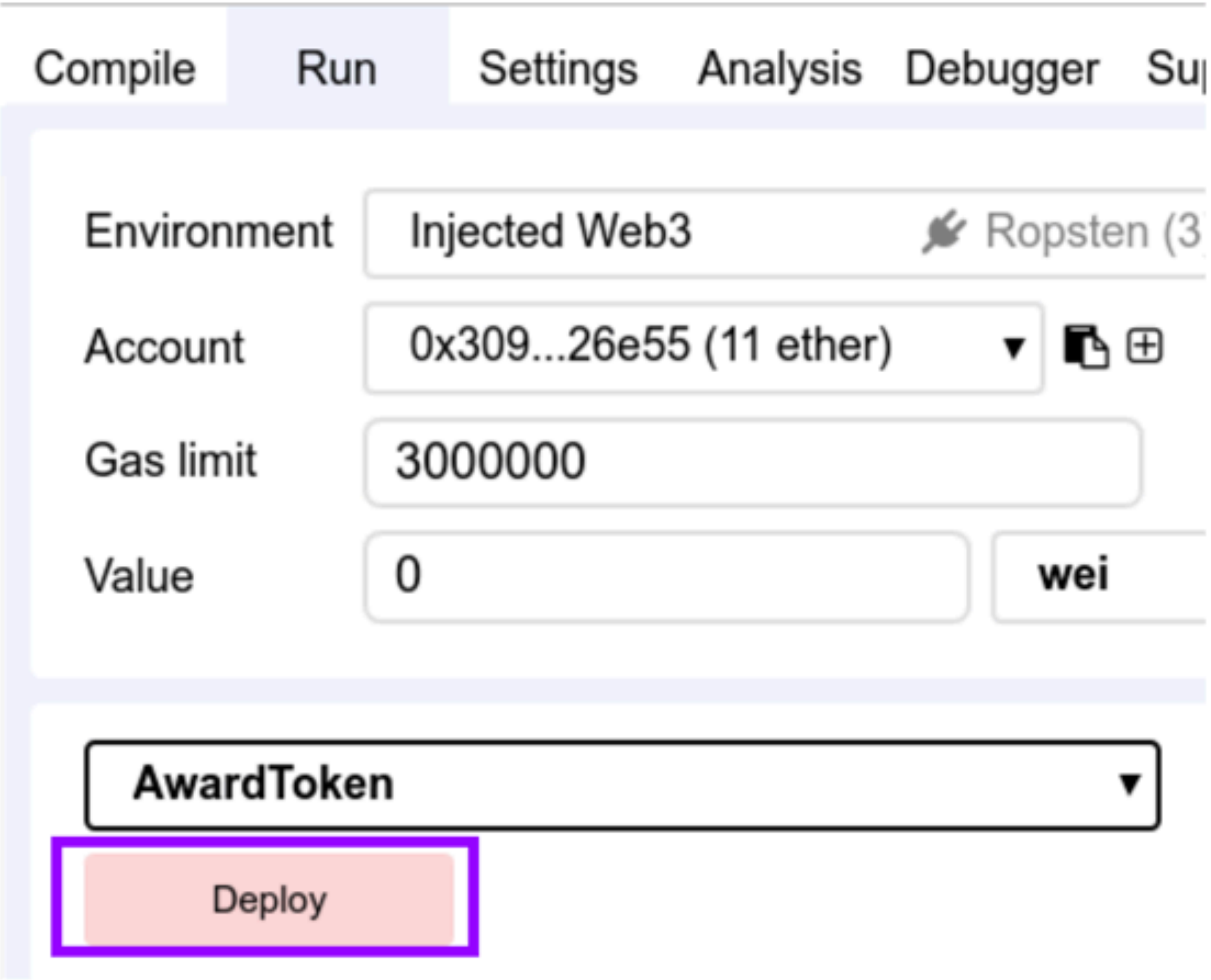
Account: 0x9ae...06ff6 (1.99248546930561683

Gas limit: 3000000

Value: 0 wei

Deploy the contract

Run tab: Deploy button



Environment: Injected Web3 — Ropsten (3

Account: 0x309...26e55 (11 ether)

Gas limit: 3000000

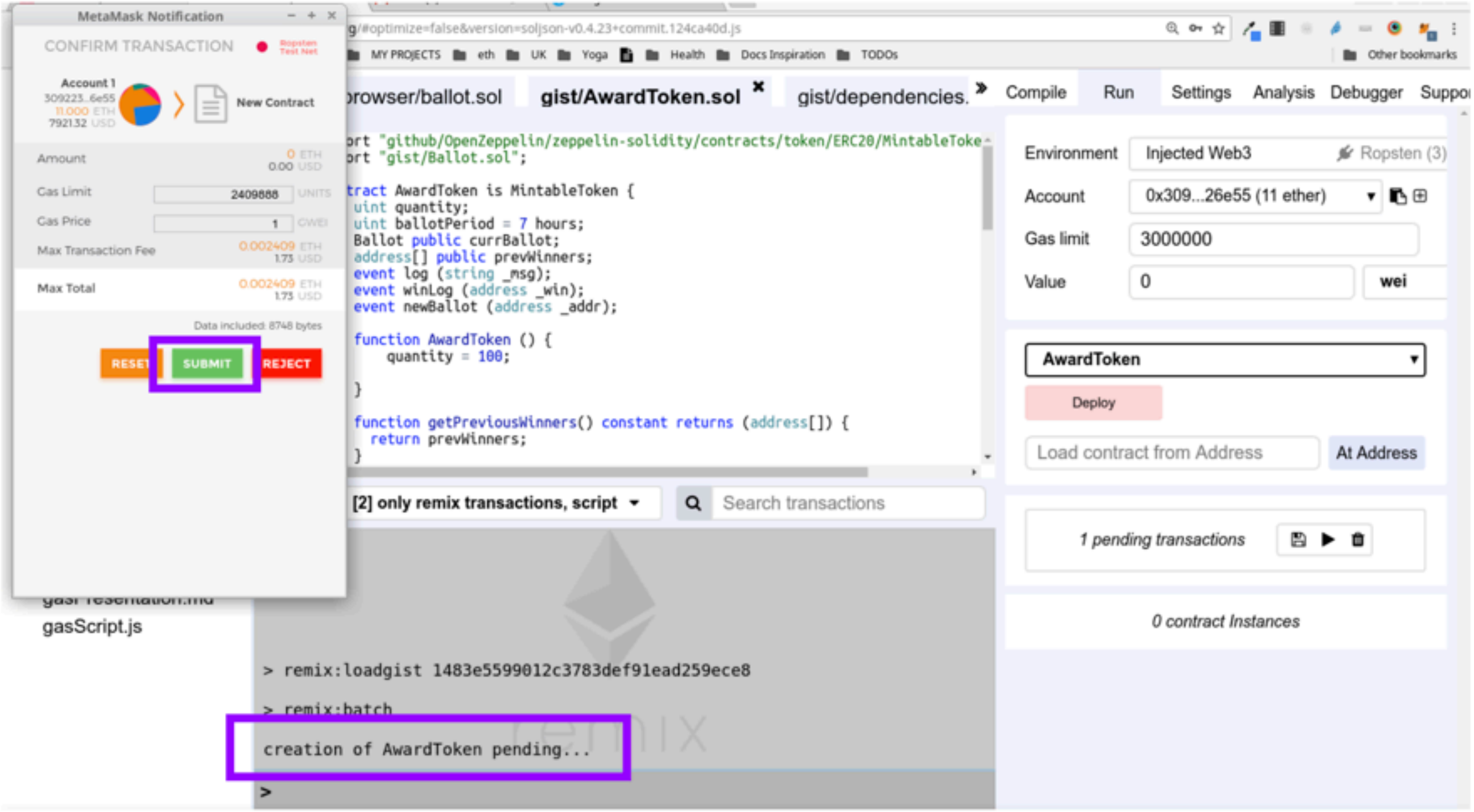
Value: 0 wei

AwardToken

Confirm the transaction

Submit button

But make sure you put in a gas price!



MetaMask Notification

CONFIRM TRANSACTION ● Ropsten Test Net

Account 1
309223...6e55
11.000 ETH
7921.32 USD

New Contract

Amount	0 ETH 0.00 USD
Gas Limit	2409888 UNITS
Gas Price	1 GWEI
Max Transaction Fee	0.002409 ETH 1.73 USD
Max Total	0.002409 ETH 1.73 USD

Data included: 8748 bytes

g/#optimize=false&version=soljson-v0.4.23+commit.124ca40d.js

```
ort "github/OpenZeppelin/zeppelin-solidity/contracts/token/ERC20/MintableToke
ort "gist/Ballot.sol";

tract AwardToken is MintableToken {
 uint quantity;
 uint ballotPeriod = 7 hours;
 Ballot public currBallot;
 address[] public prevWinners;
 event log (string _msg);
 event winLog (address _win);
 event newBallot (address _addr);

 function AwardToken () {
     quantity = 100;

}

 function getPreviousWinners() constant returns (address[]) {
   return prevWinners;
}
```

Environment	Injected Web3 Ropsten (3)
Account	0x309...26e55 (11 ether)
Gas limit	3000000
Value	0 wei

AwardToken

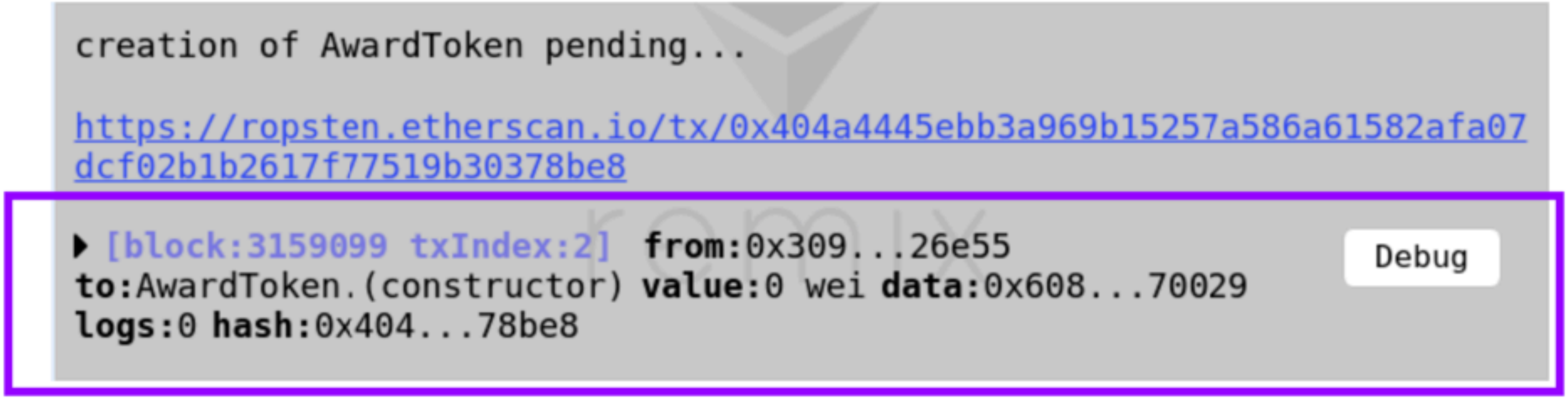
1 pending transactions

0 contract Instances

```
> remix:loadgist 1483e5599012c3783def91ead259ece8

> remix:batch

creation of AwardToken pending...

>
```

Check if tx is mined

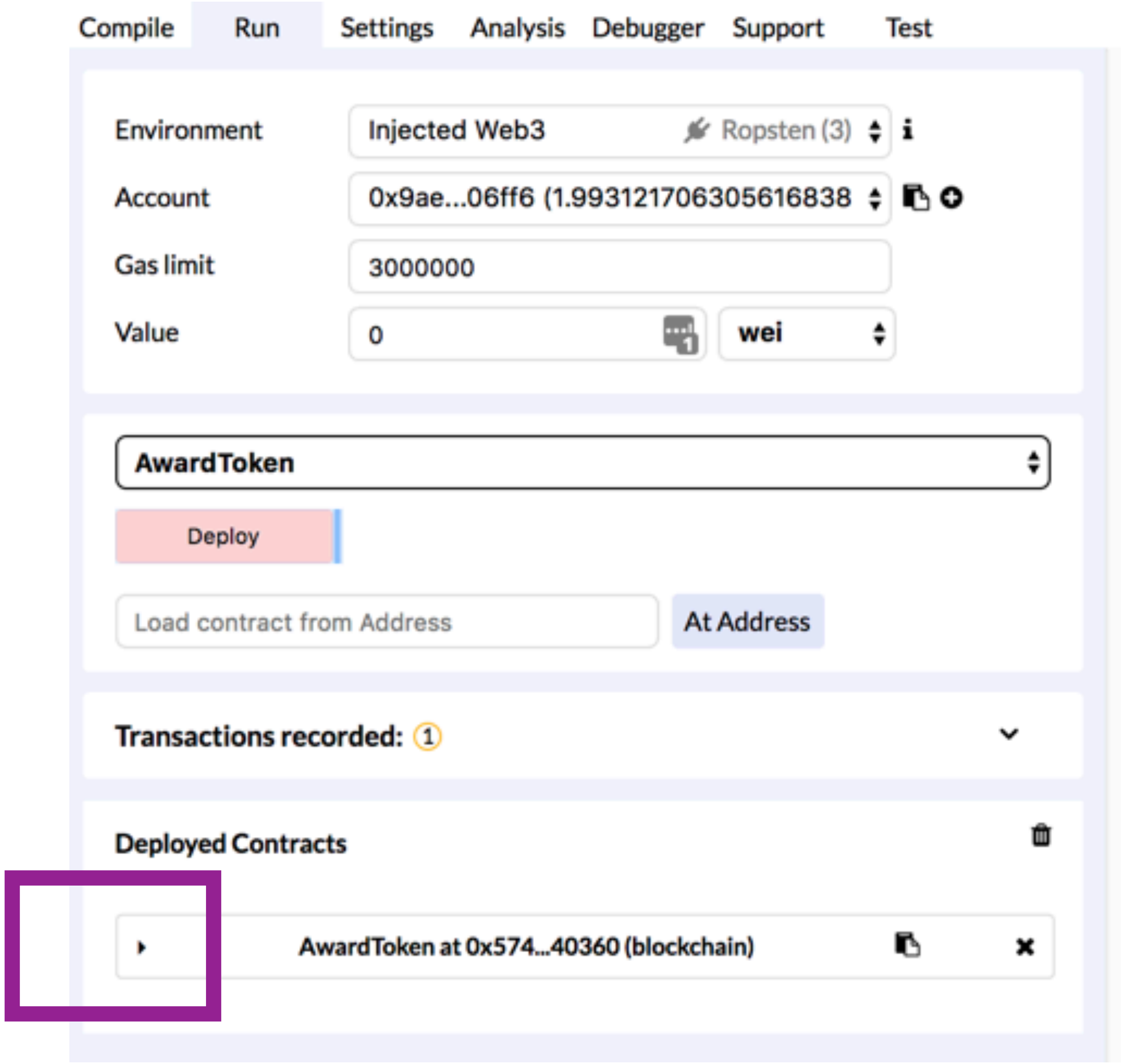
Terminal logs in Remix



```
creation of AwardToken pending...

https://ropsten.etherscan.io/tx/0x404a4445ebb3a969b15257a586a61582afa07
dcf02b1b2617f77519b30378be8

▶ [block:3159099 txIndex:2] from:0x309...26e55
to:AwardToken.(constructor) value:0 wei data:0x608...70029
logs:0 hash:0x404...78be8
```

Click to see the contract's UI

On the deployed contract



Environment: Injected Web3 — Ropsten (3)

Account: 0x9ae...06ff6 (1.993121706305616838

Gas limit: 3000000

Value: 0 wei

AwardToken

Transactions recorded: 1

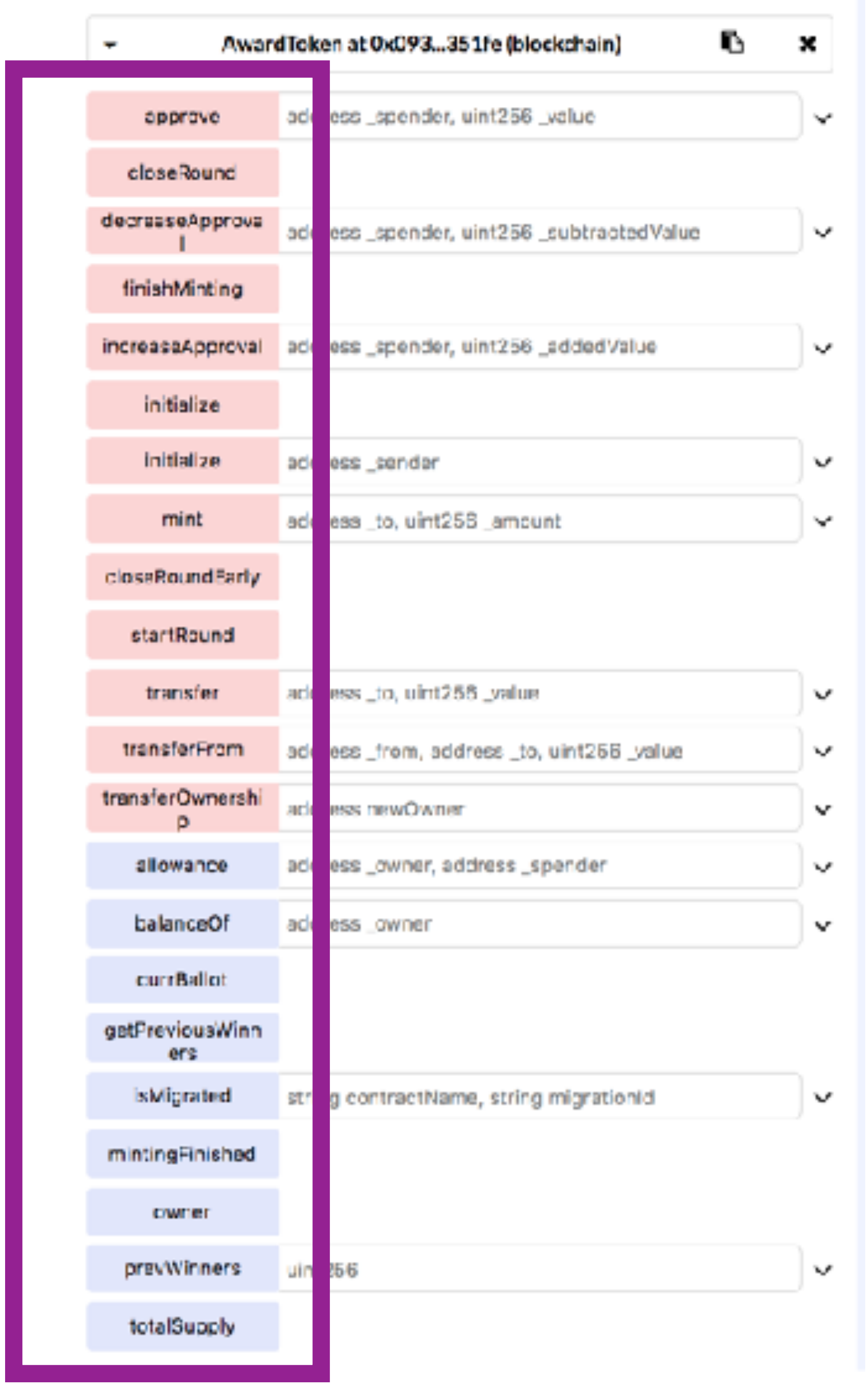
Deployed Contracts

AwardToken at 0x574...40360 (blockchain)

Voilà!

The Interactive UI for AwardToken.sol contract

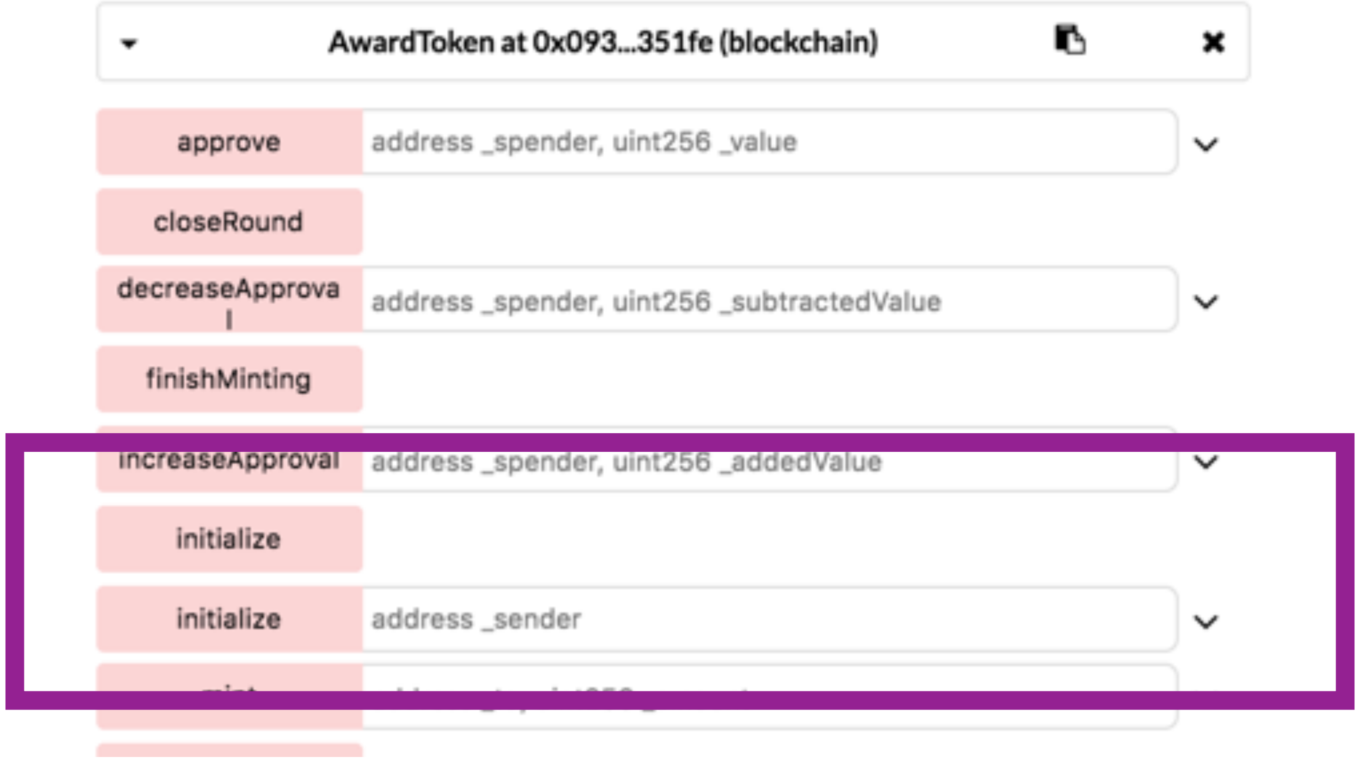
These are all the methods of AwardToken and the classes that it imported.


AwardToken at 0x093...351fe (blockchain)
approve address _spender, uint256 _value
closeRound
decreaseApproval address _spender, uint256 _subtractedValue
finishMinting
increaseApproval address _spender, uint256 _addedValue
initialize
initialize address _sender
mint address _to, uint256 _amount
closeRoundEarly
startRound
transfer address _to, uint256 _value
transferFrom address _from, address _to, uint256 _value
transferOwnership address newOwner
allowance address _owner, address _spender
balanceOf address _owner
currBallot
getPreviousWinners
isMigrated string contractName, string migrationId
mintingFinished
owner
prevWinners uint256
totalSupply

Initialize

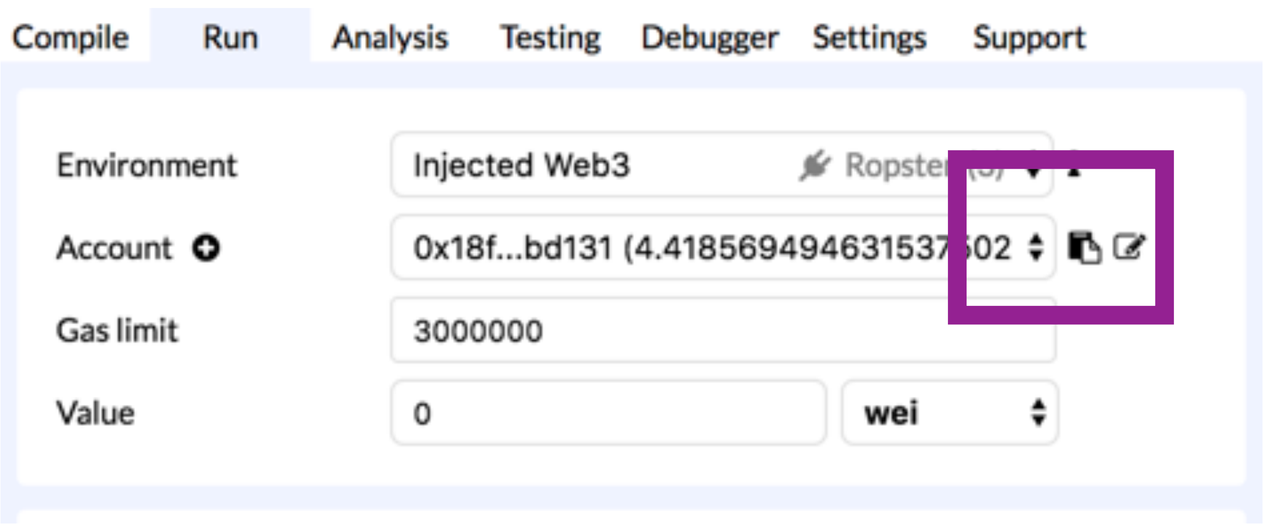
There are 2 initialize functions. Both from the imported Zeppelin contracts. And we need now need to run 1 of them but not the other.

Choose the one with that needs an address and copy your address and past it in there.


AwardToken at 0x093...351fe (blockchain)
approve
address _spender, uint256 _value
closeRound
decreaseApproval
address _spender, uint256 _subtractedValue
finishMinting
increaseApproval
address _spender, uint256 _addedValue
initialize
initialize
address _sender

Run Initialize

In the expanded (see below) or collapsed Initialize method - fire it up and pay for the transaction.

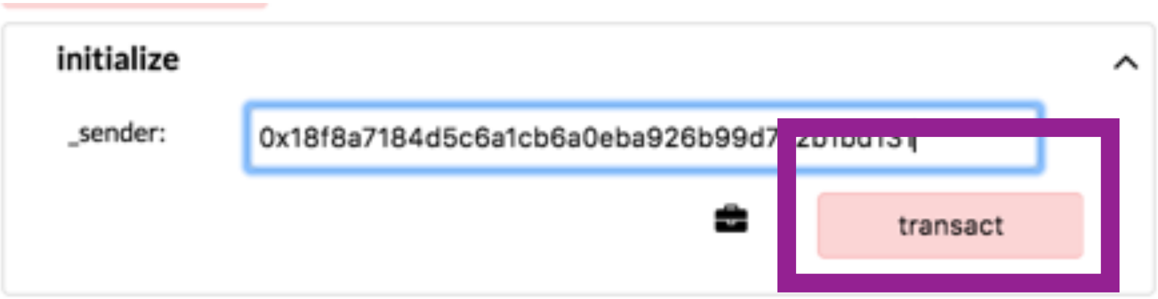


Environment Injected Web3 Ropste

Account 0x18f...bd131 (4.41856949463153702

Gas limit 3000000

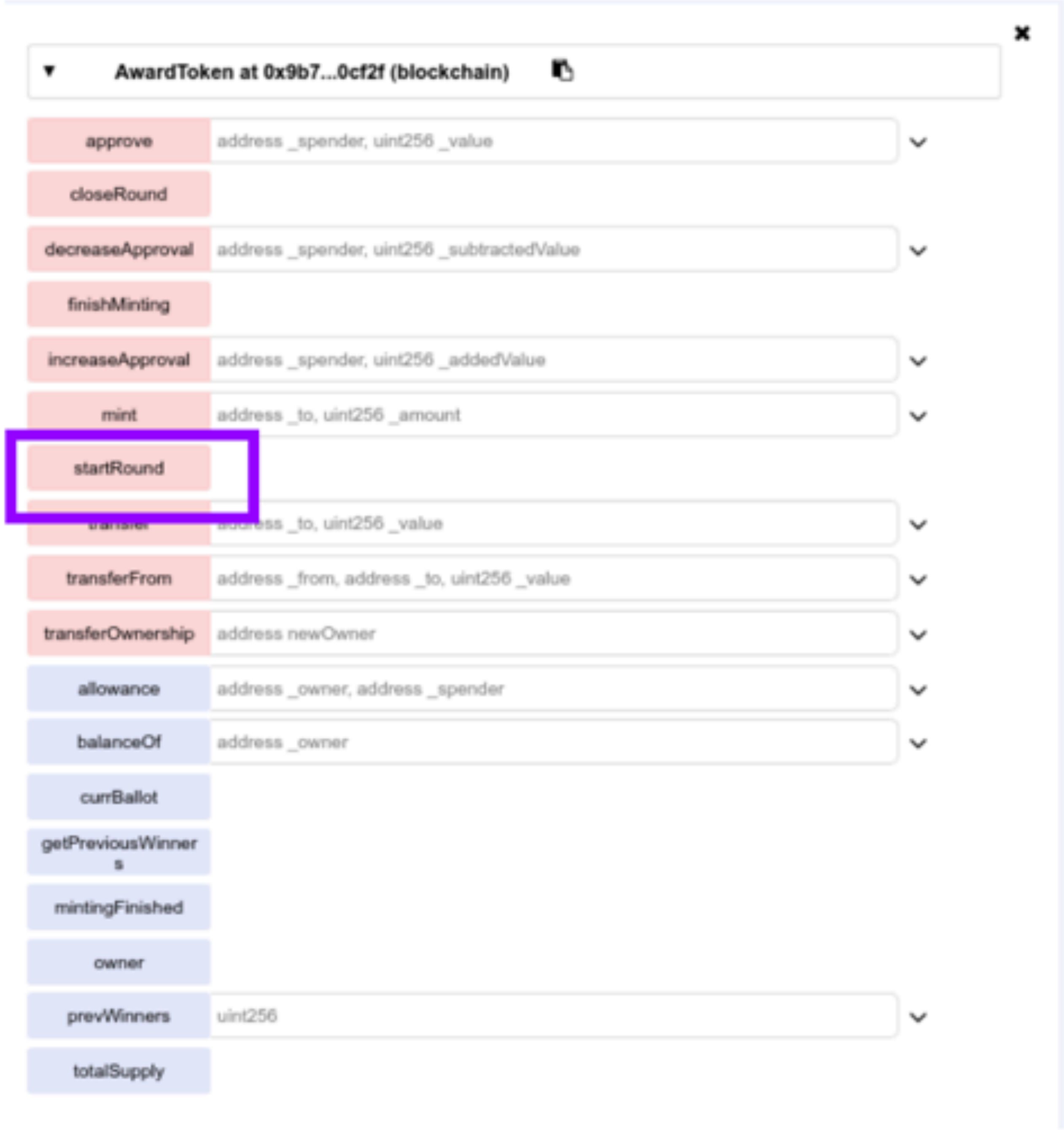
Value 0 wei


initialize

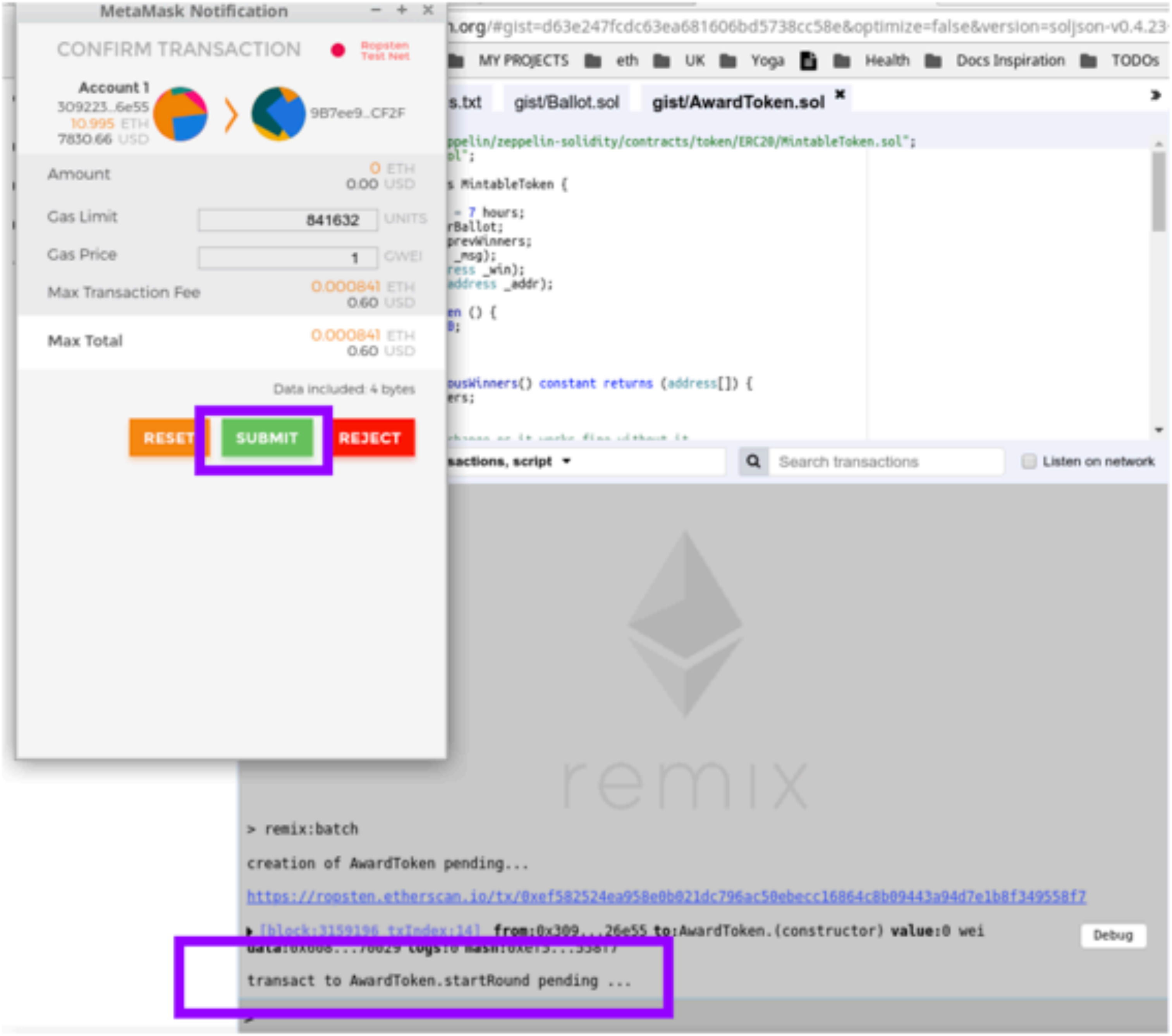
_sender: 0x18f8a7184d5c6a1cb6a0eba926b99d7 2b1bd131

Execute startRound

Its a payable function
(as opposed to a call function - which is free)


AwardToken at 0x9b7...0cf2f (blockchain)
approve
address _spender, uint256 _value
closeRound
decreaseApproval
address _spender, uint256 _subtractedValue
finishMinting
increaseApproval
address _spender, uint256 _addedValue
mint
address _to, uint256 _amount
startRound
transfer
address _to, uint256 _value
transferFrom
address _from, address _to, uint256 _value
transferOwnership
address newOwner
allowance
address _owner, address _spender
balanceOf
address _owner
currBallot
getPreviousWinners
mintingFinished
owner
prevWinners
uint256
totalSupply

Confirm the transaction



Account 1
309223...6e55
10.995 ETH
7830.66 USD

9B7ee9...CF2F

Amount: 0 ETH, 0.00 USD

Gas Limit: 841632 UNITS

Gas Price: 1 GWEI

Max Transaction Fee: 0.000841 ETH, 0.60 USD

Max Total: 0.000841 ETH, 0.60 USD

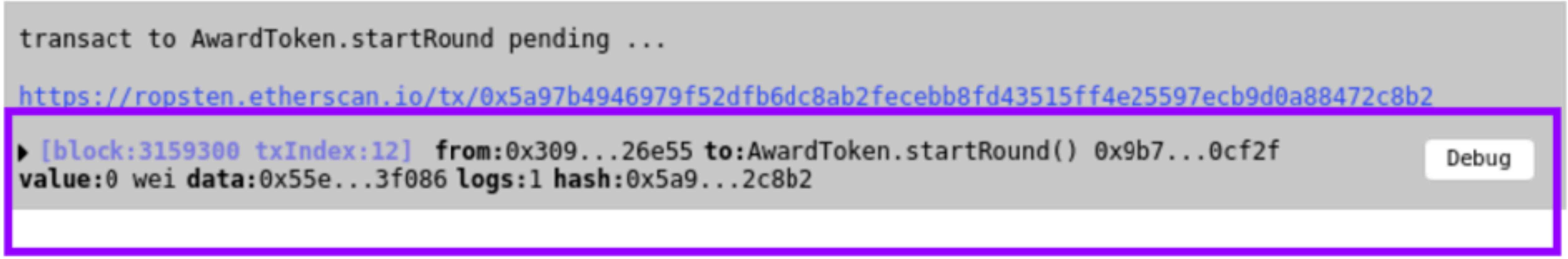
Data included: 4 bytes

```
ppelin/zeppelin-solidity/contracts/token/ERC20/MintableToken.sol";
ol";

s MintableToken {

 = 7 hours;
rBallot;
prevWinners;
 _msg);
ress _win);
address _addr);

en () {
0;



ousWinners() constant returns (address[]) {
ers;
```

```
> remix:batch

creation of AwardToken pending...

https://ropsten.etherscan.io/tx/0xef582524ea958e0b021dc796ac50ebecc16864c8b09443a94d7e1b8f349558f7

▸ [block:3159196 txIndex:14] from:0x309...26e55 to:AwardToken.(constructor) value:0 wei
data:0x608...70029 logs:0 hash:0xef5...558f7

transact to AwardToken.startRound pending ...
```

Check if tx is mined

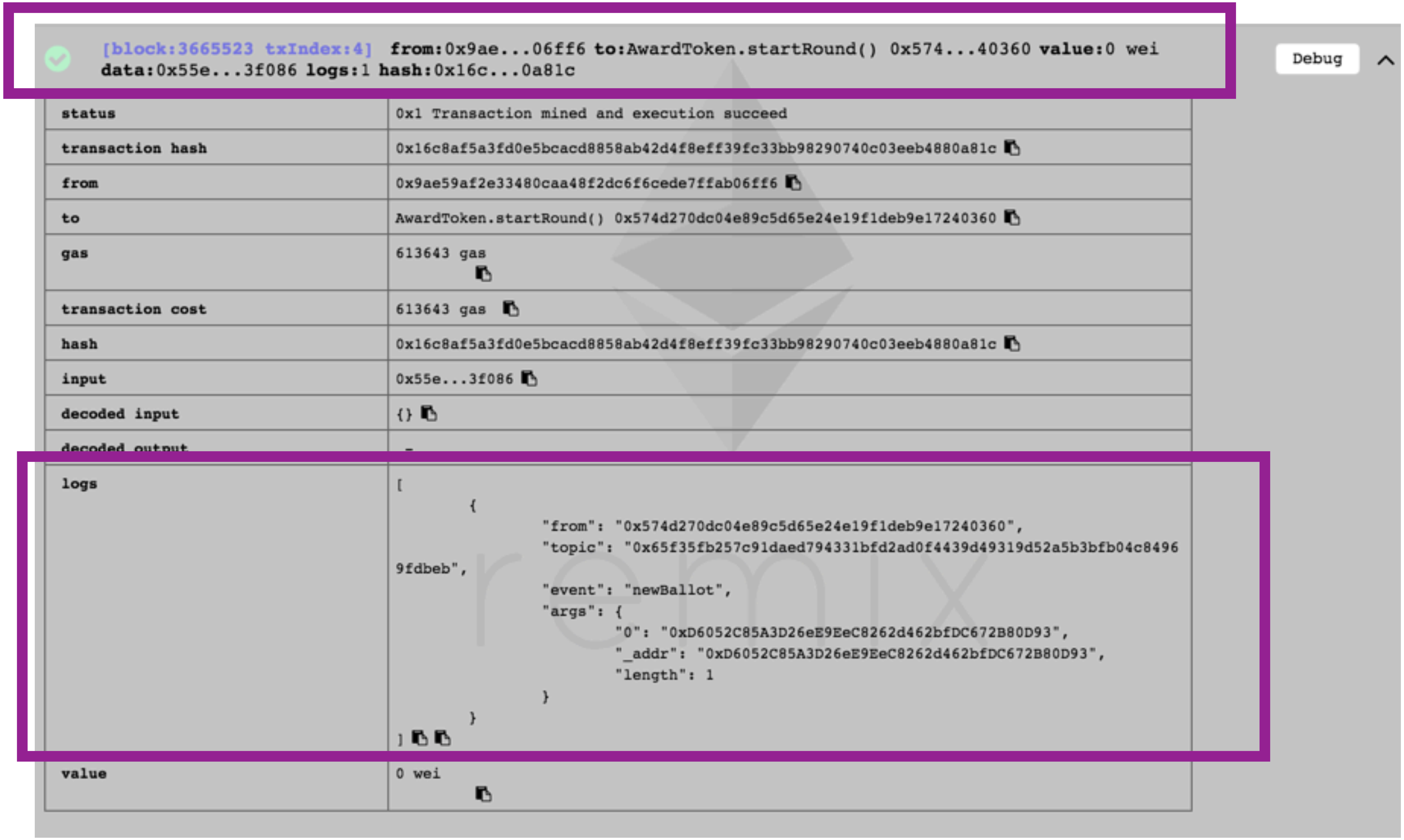
In the terminal logs in Remix



```
transact to AwardToken.startRound pending ...

https://ropsten.etherscan.io/tx/0x5a97b4946979f52dfb6dc8ab2fecebb8fd43515ff4e25597ecb9d0a88472c8b2
▸ [block:3159300 txIndex:12] from:0x309...26e55 to:AwardToken.startRound() 0x9b7...0cf2f
value:0 wei data:0x55e...3f086 logs:1 hash:0x5a9...2c8b2
```

Expand tx log

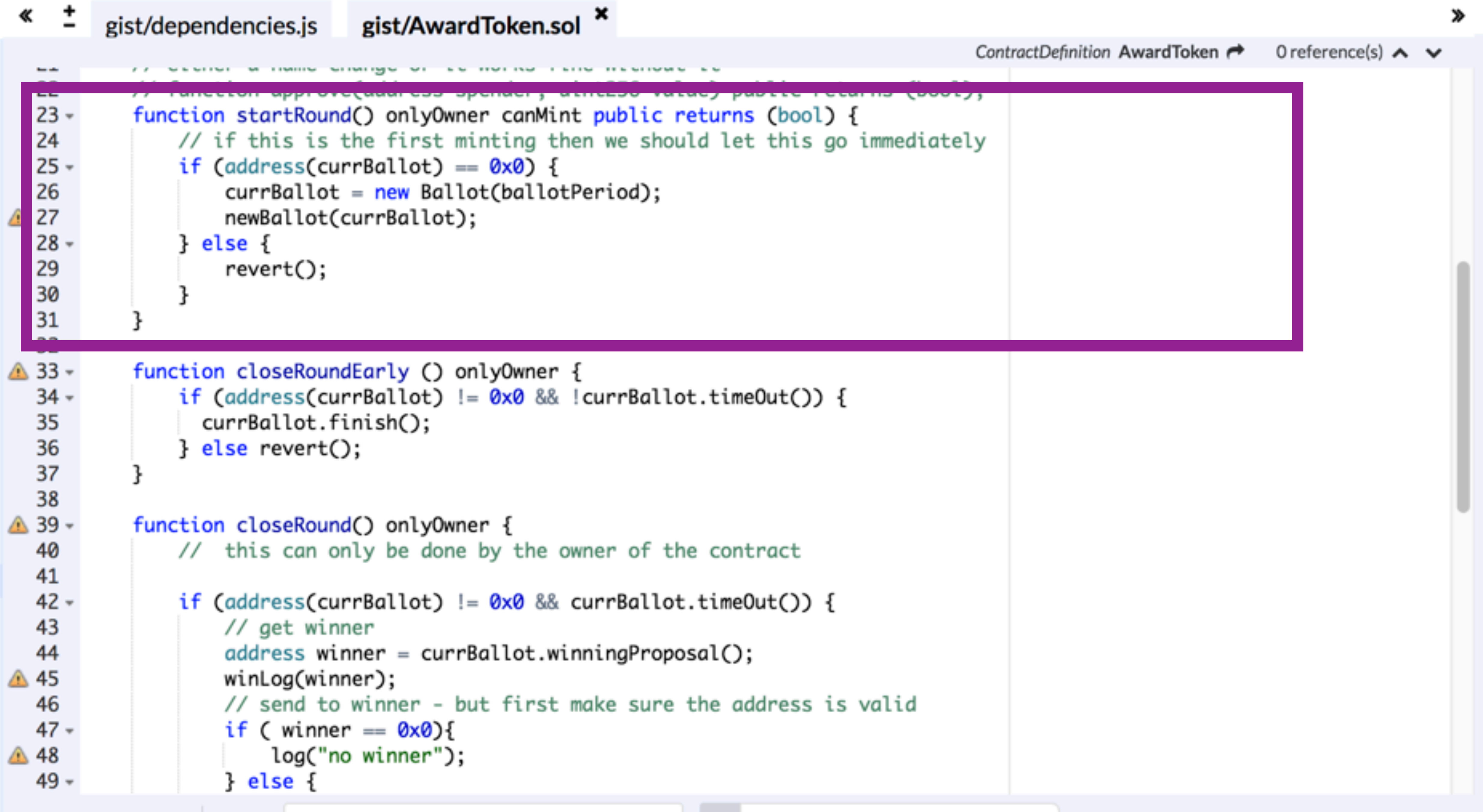
to see the logs



```
[block:3665523 txIndex:4] from:0x9ae...06ff6 to:AwardToken.startRound() 0x574...40360 value:0 wei
data:0x55e...3f086 logs:1 hash:0x16c...0a81c
```

```
status               0x1 Transaction mined and execution succeed
transaction hash     0x16c8af5a3fd0e5bcacd8858ab42d4f8eff39fc33bb98290740c03eeb4880a81c
from                 0x9ae59af2e33480caa48f2dc6f6cede7ffab06ff6
to                   AwardToken.startRound() 0x574d270dc04e89c5d65e24e19f1deb9e17240360
gas                  613643 gas
transaction cost     613643 gas
hash                 0x16c8af5a3fd0e5bcacd8858ab42d4f8eff39fc33bb98290740c03eeb4880a81c
input                0x55e...3f086
decoded input        {}
decoded output       -
logs                 [
                             {
                                     "from": "0x574d270dc04e89c5d65e24e19f1deb9e17240360",
                                     "topic": "0x65f35fb257c91daed794331bfd2ad0f4439d49319d52a5b3bfb04c8496
                     9fdbeb",
                                     "event": "newBallot",
                                     "args": {
                                             "0": "0xD6052C85A3D26eE9EeC8262d462bfDC672B80D93",
                                             "_addr": "0xD6052C85A3D26eE9EeC8262d462bfDC672B80D93",
                                             "length": 1
                                     }
                             }
                     ]
value                0 wei
```

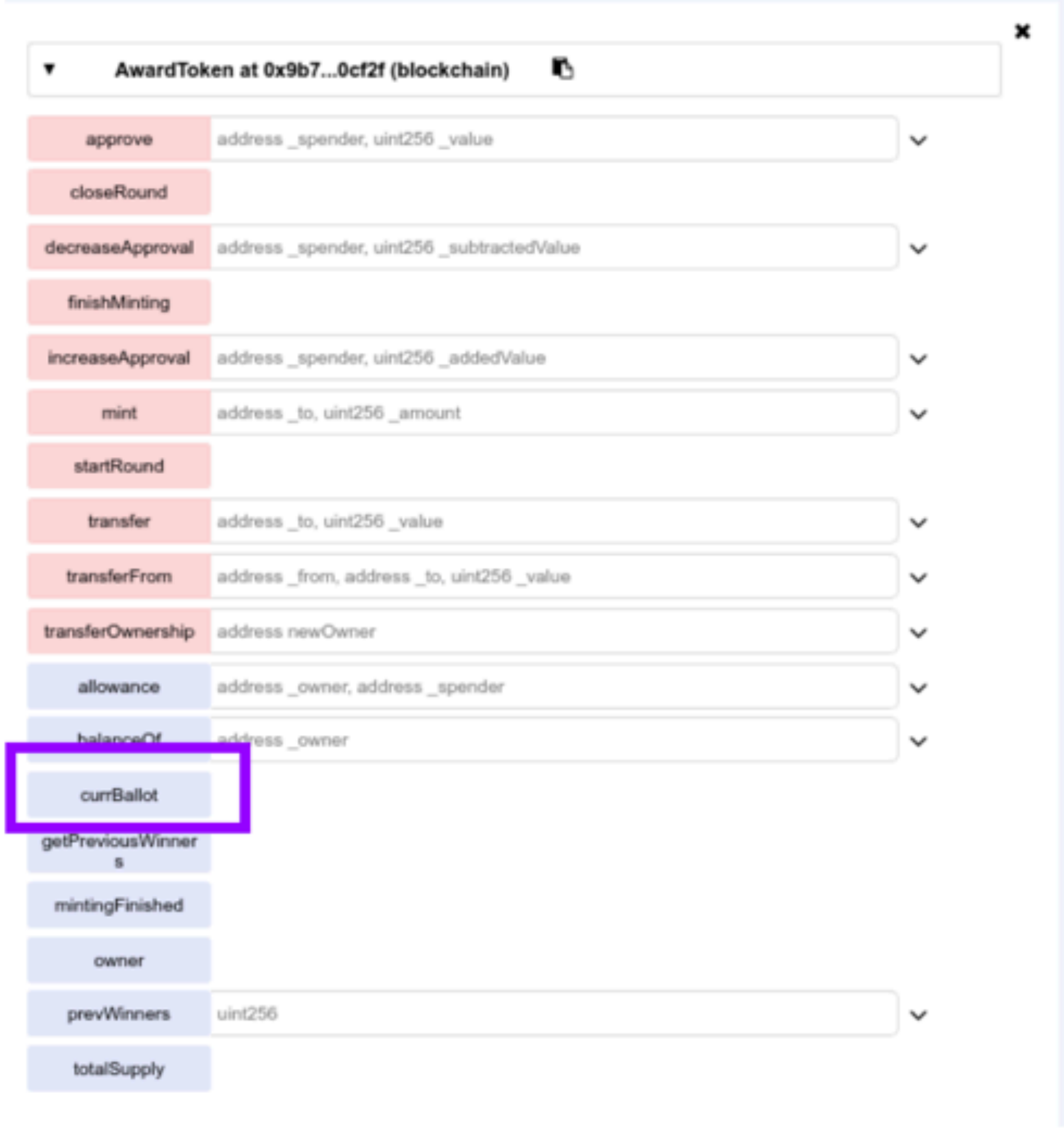
Checkout the startRound function in the editor



```
    // either a name change or it works fine without it
    // function approve(address spender, uint256 value) public returns (bool);
    function startRound() onlyOwner canMint public returns (bool) {
        // if this is the first minting then we should let this go immediately
        if (address(currBallot) == 0x0) {
            currBallot = new Ballot(ballotPeriod);
            newBallot(currBallot);
        } else {
            revert();
        }
    }

    function closeRoundEarly () onlyOwner {
        if (address(currBallot) != 0x0 && !currBallot.timeOut()) {
          currBallot.finish();
        } else revert();
    }

    function closeRound() onlyOwner {
        //  this can only be done by the owner of the contract

        if (address(currBallot) != 0x0 && currBallot.timeOut()) {
            // get winner
            address winner = currBallot.winningProposal();
            winLog(winner);
            // send to winner - but first make sure the address is valid
            if ( winner == 0x0){
                log("no winner");
            } else {
```

Get ballot's address

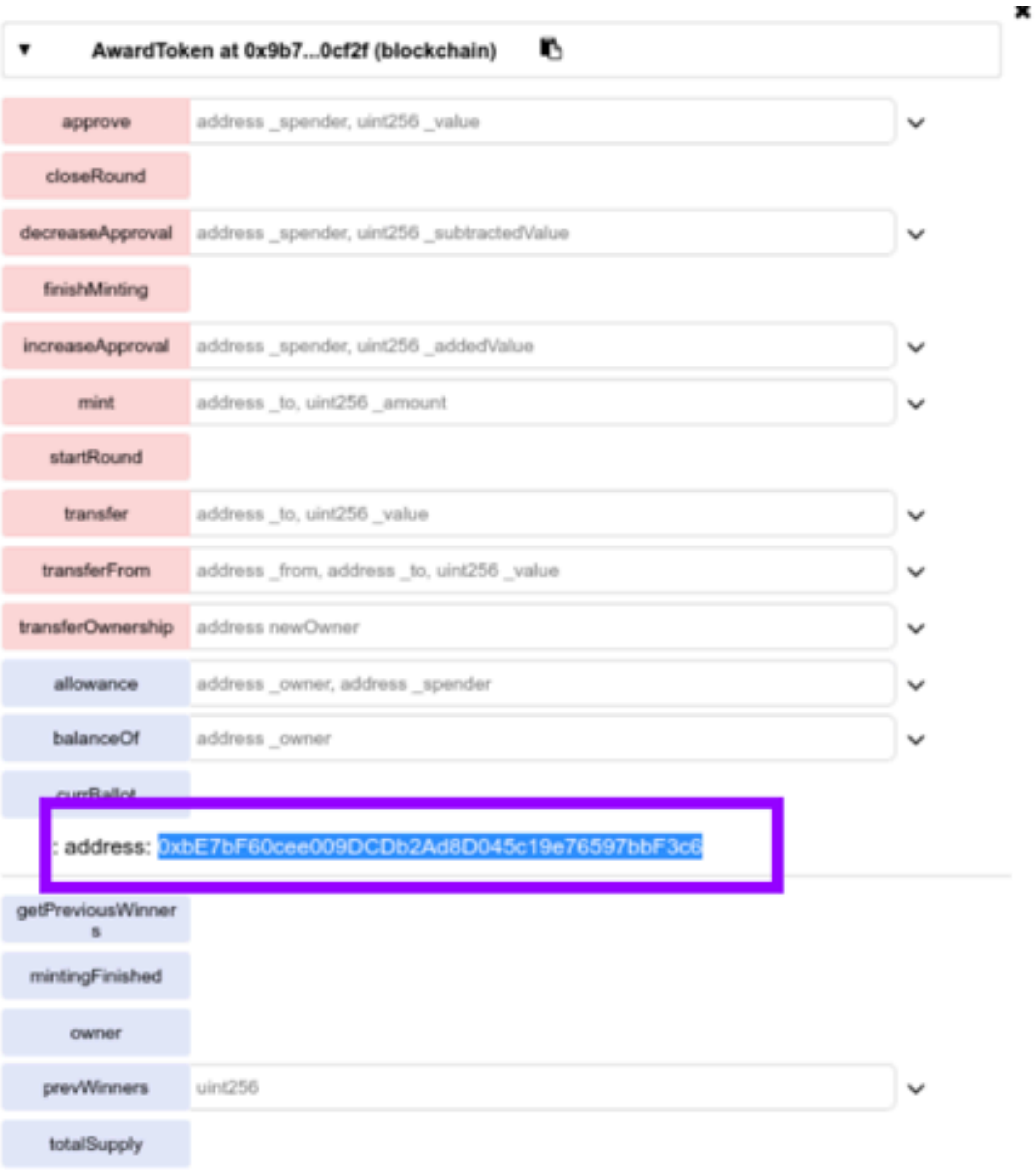
Execute currBallot call



▾ AwardToken at 0x9b7...0cf2f (blockchain)
approve
address _spender, uint256 _value
closeRound
decreaseApproval
address _spender, uint256 _subtractedValue
finishMinting
increaseApproval
address _spender, uint256 _addedValue
mint
address _to, uint256 _amount
startRound
transfer
address _to, uint256 _value
transferFrom
address _from, address _to, uint256 _value
transferOwnership
address newOwner
allowance
address _owner, address _spender
balanceOf
address _owner
currBallot
getPreviousWinners
mintingFinished
owner
prevWinners
uint256
totalSupply

Copy ballot's address

currBallot output

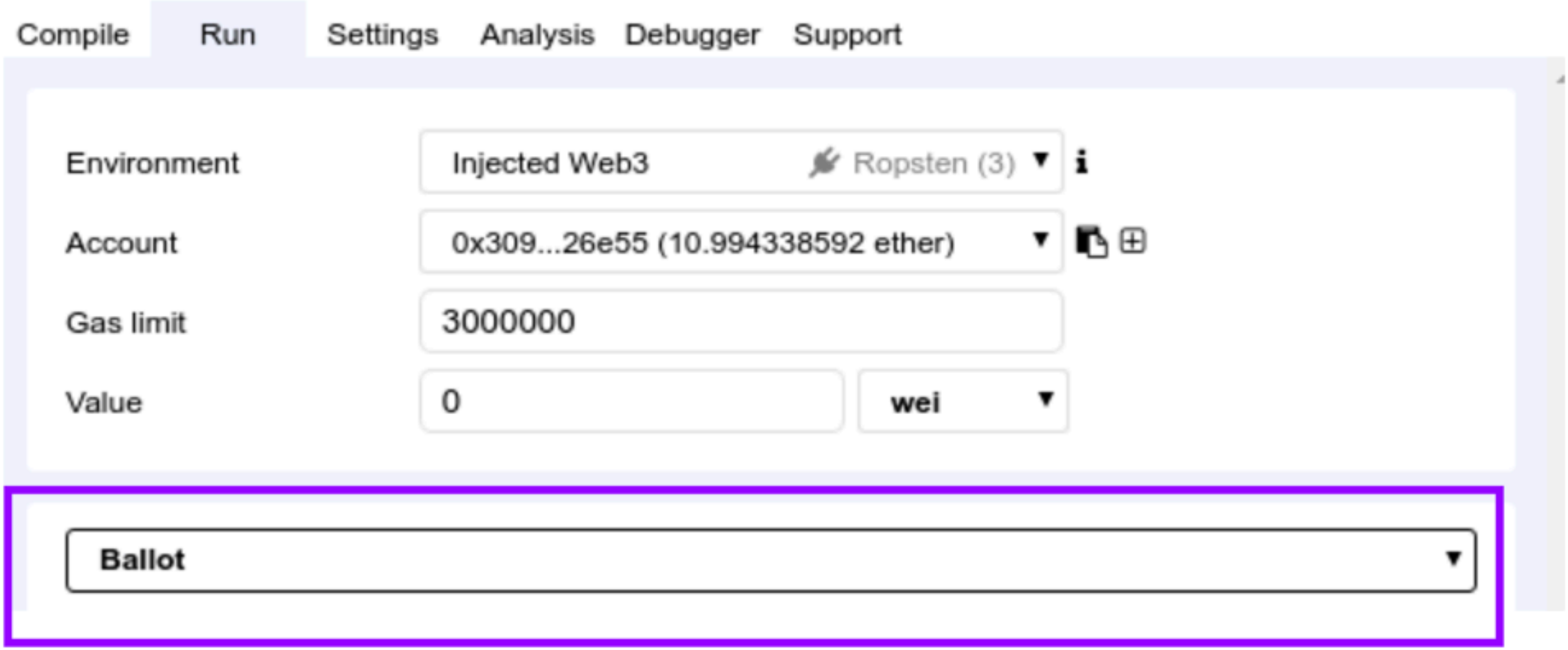

AwardToken at 0x9b7...0cf2f (blockchain)
approve
address _spender, uint256 _value
closeRound
decreaseApproval
address _spender, uint256 _subtractedValue
finishMinting
increaseApproval
address _spender, uint256 _addedValue
mint
address _to, uint256 _amount
startRound
transfer
address _to, uint256 _value
transferFrom
address _from, address _to, uint256 _value
transferOwnership
address newOwner
allowance
address _owner, address _spender
balanceOf
address _owner
currBallot
getPreviousWinners
mintingFinished
owner
prevWinners
uint256
totalSupply

```
: address: 0xbE7bF60cee009DCDb2Ad8D045c19e76597bbF3c6
```

Switch to Ballot

(which is loaded from AwardToken.sol)

Run tab: dropdown



Environment: Injected Web3 Ropsten (3) ▾

Account: 0x309...26e55 (10.994338592 ether) ▾

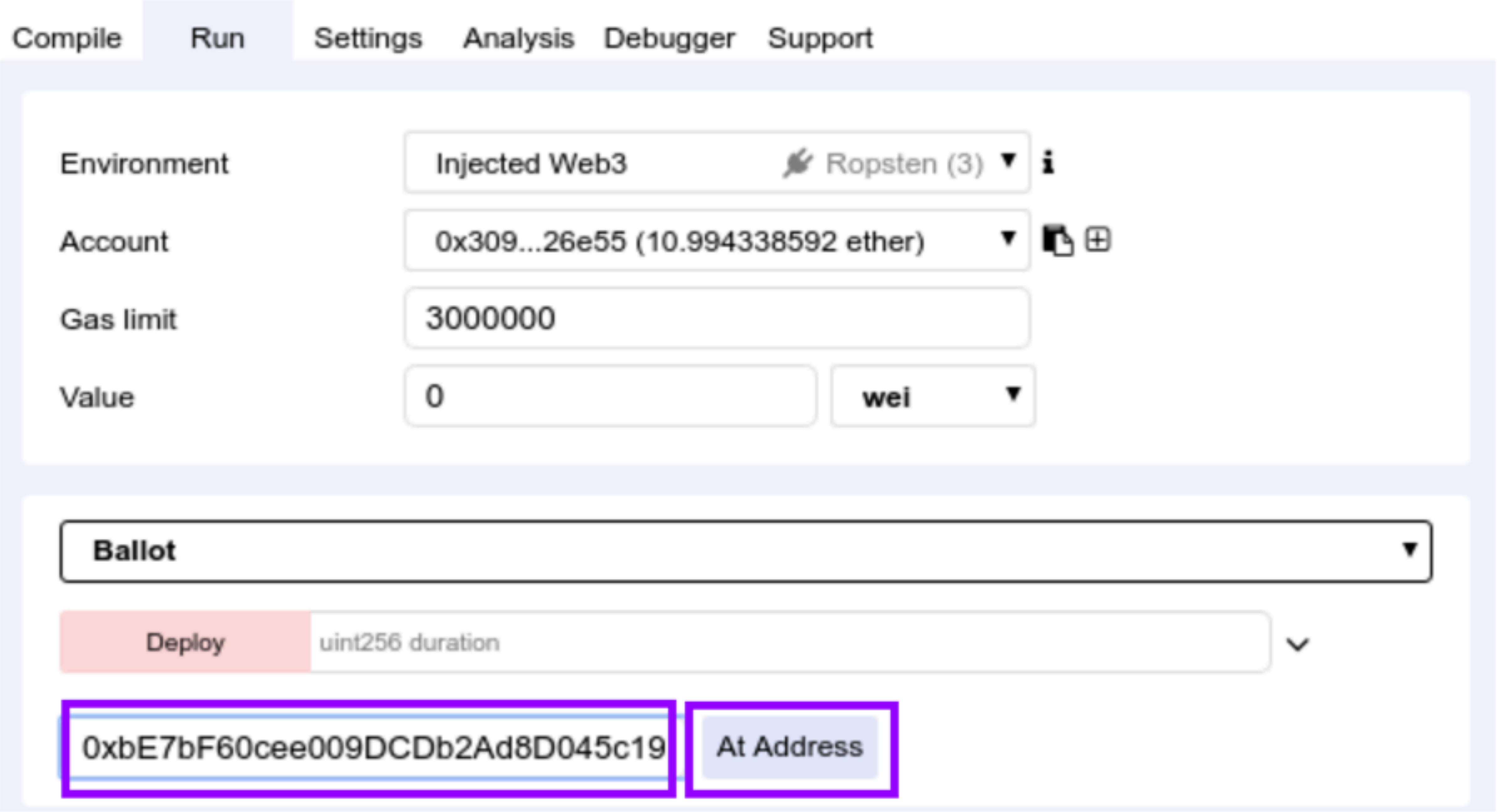
Gas limit: 3000000

Value: 0 wei ▾

Ballot ▾

Access Ballot contract

Paste address + click At Address



Environment: Injected Web3 — Ropsten (3)

Account: 0x309...26e55 (10.994338592 ether)

Gas limit: 3000000

Value: 0 wei

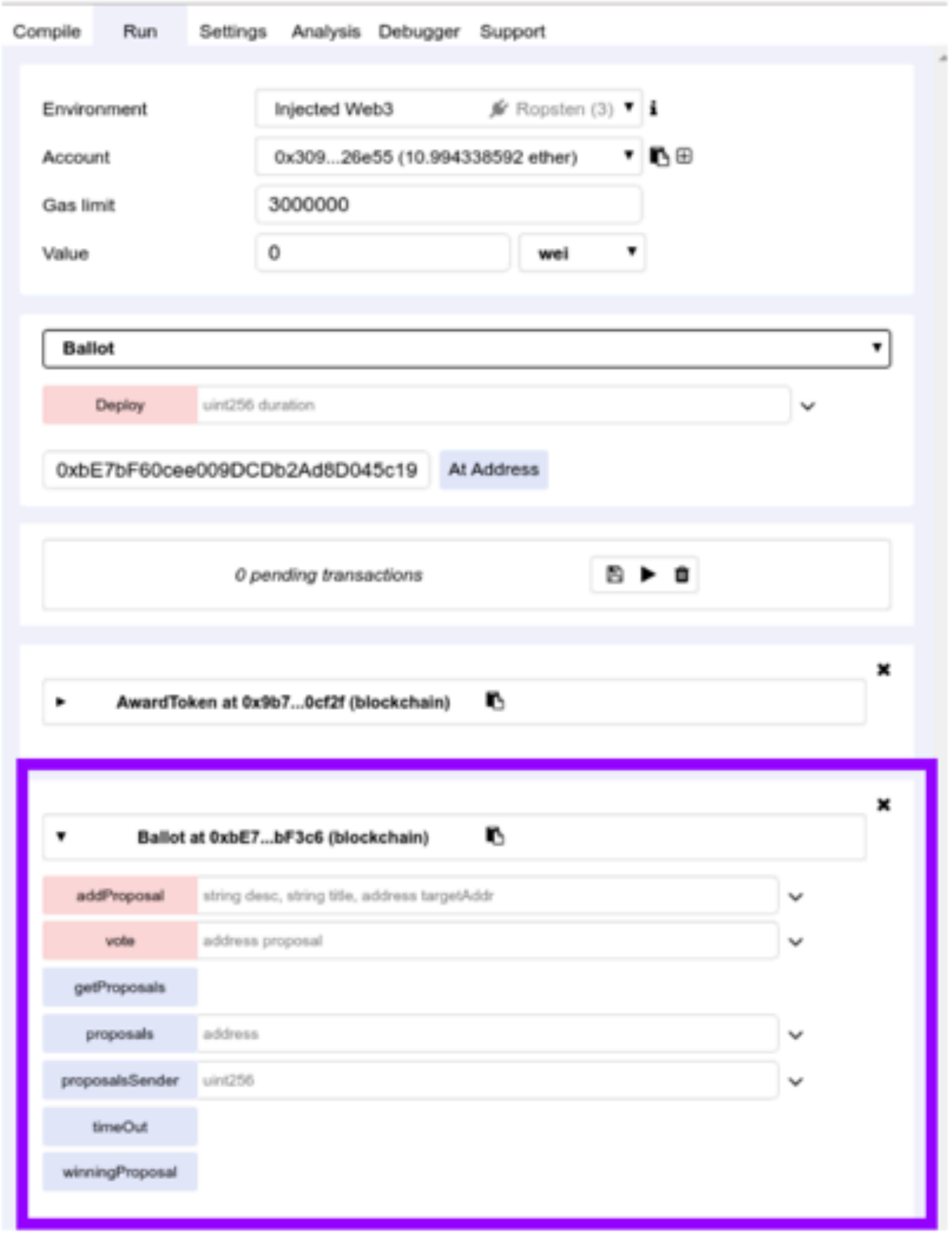
Ballot

Deploy — uint256 duration

0xbE7bF60cee009DCDb2Ad8D045c19

See autogenerated UI

Interactive UI for Ballot.sol contract



Environment: Injected Web3 Ropsten (3)

Account: 0x309...26e55 (10.994338592 ether)

Gas limit: 3000000

Value: 0 wei

Ballot

Deploy: uint256 duration

0xbE7bF60cee009DCDb2Ad8D045c19 At Address

0 pending transactions

AwardToken at 0x9b7...0cf2f (blockchain)

Ballot at 0xbE7...bF3c6 (blockchain)

addProposal: string desc, string title, address targetAddr

vote: address proposal

getProposals

proposals: address

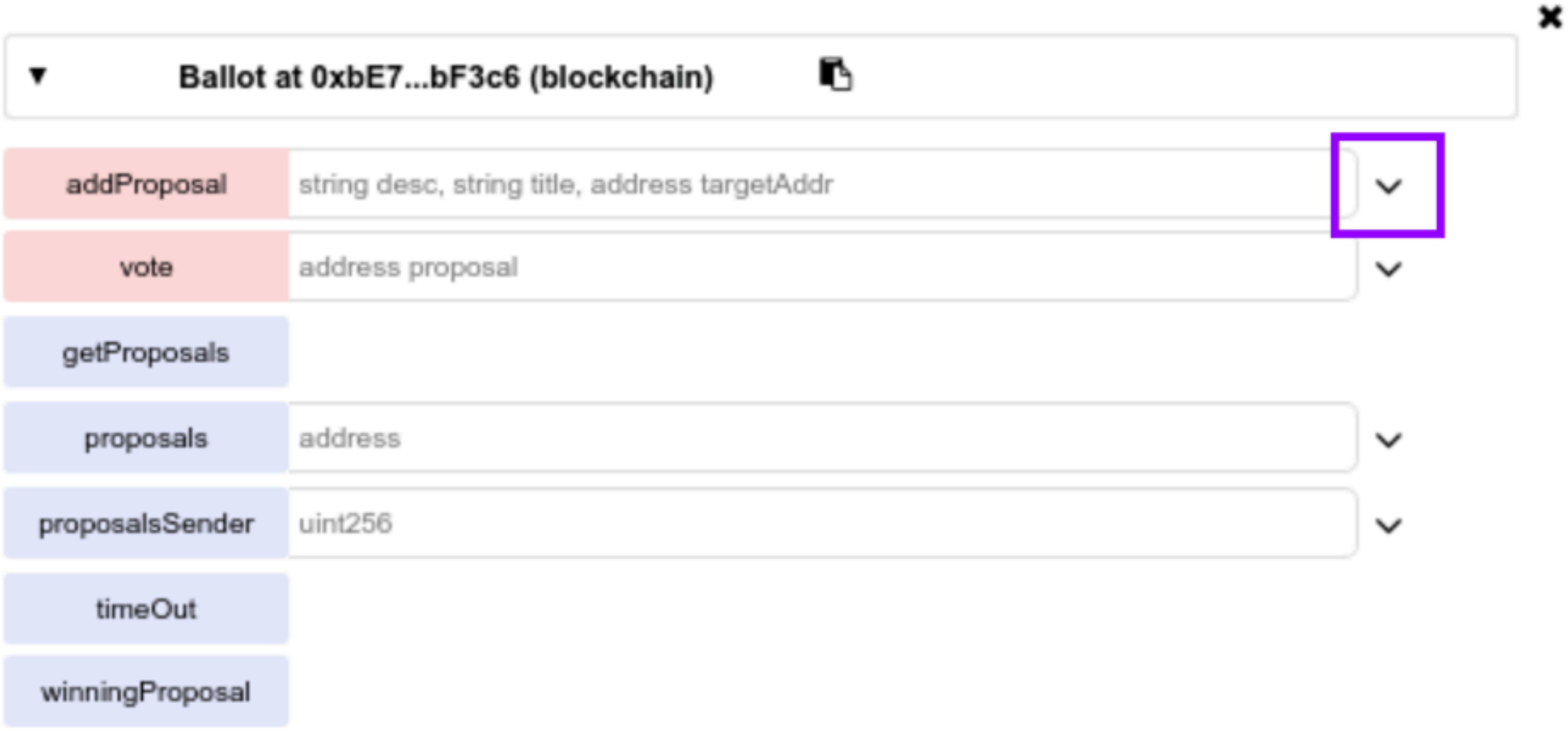
proposalsSender: uint256

timeOut

winningProposal

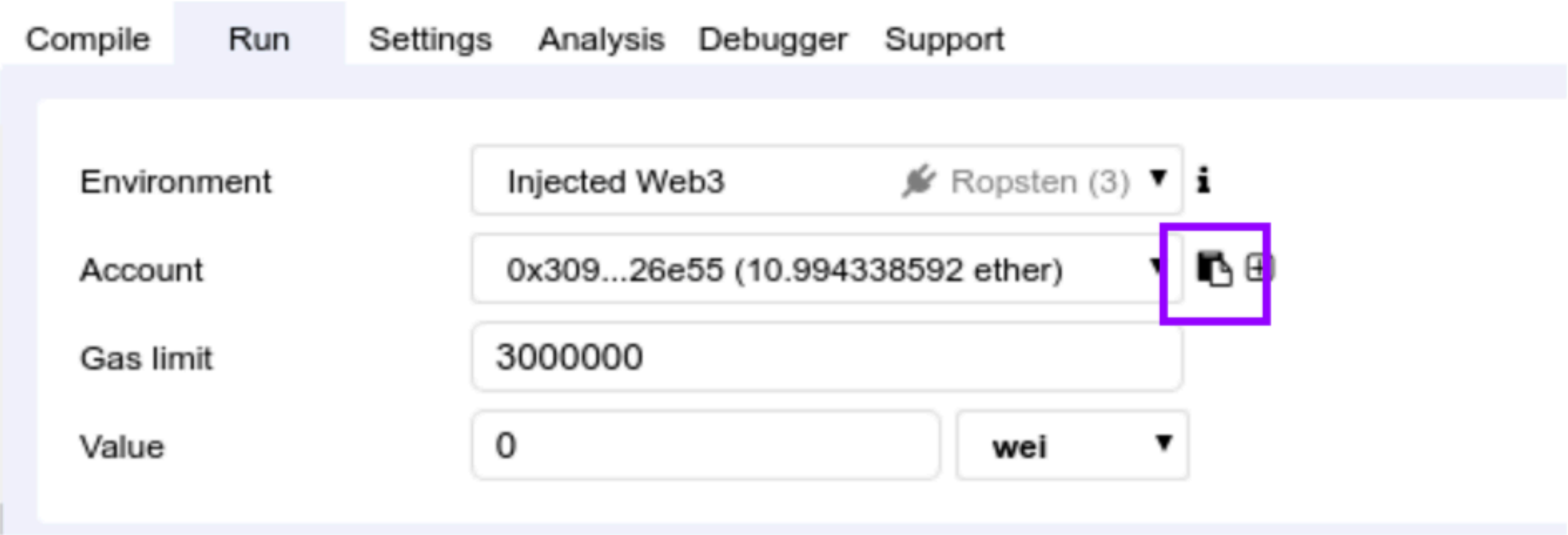
Add a new proposal

Expand addProposal function



Copy your address

Run tab: Account



Environment: Injected Web3 Ropsten (3)

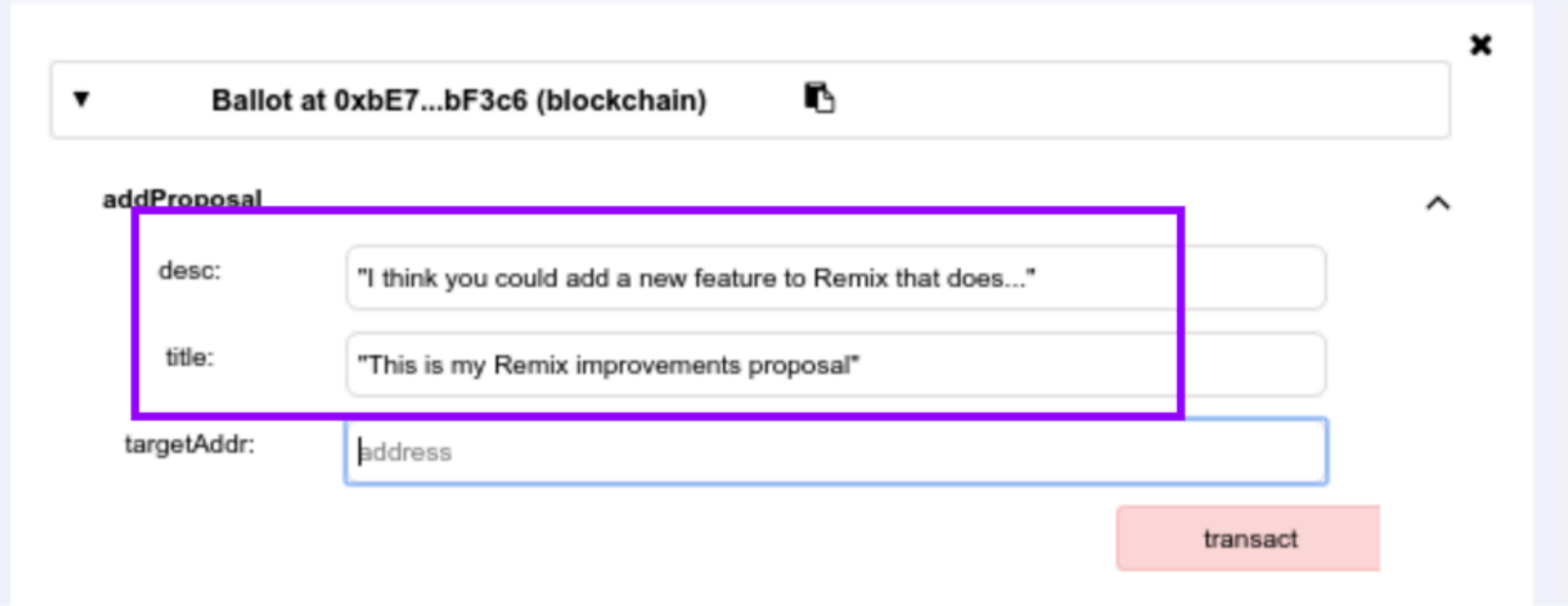
Account: 0x309...26e55 (10.994338592 ether)

Gas limit: 3000000

Value: 0 wei

Type a proposal

Run tab: Account



Ballot at 0xbE7...bF3c6 (blockchain)

addProposal

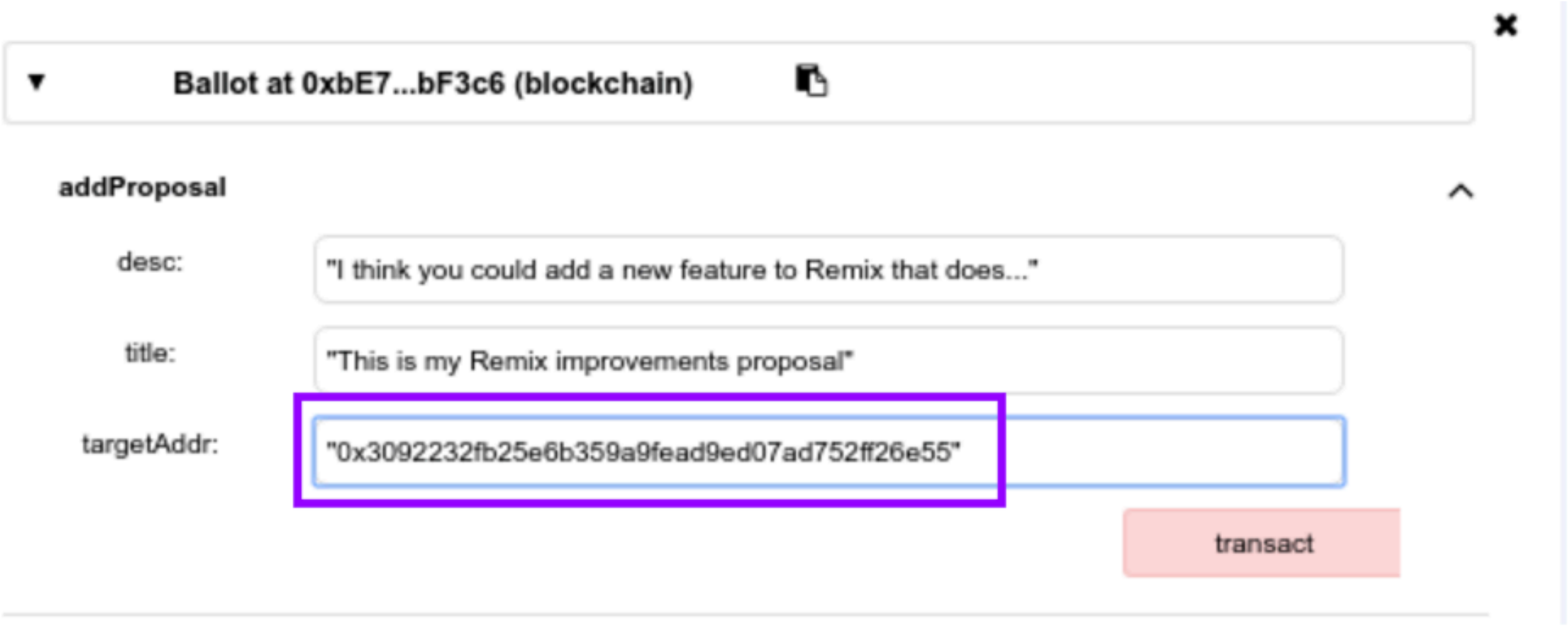
desc: "I think you could add a new feature to Remix that does..."

title: "This is my Remix improvements proposal"

targetAddr: address

Add your address

Paste the address



Ballot at 0xbE7...bF3c6 (blockchain)

addProposal

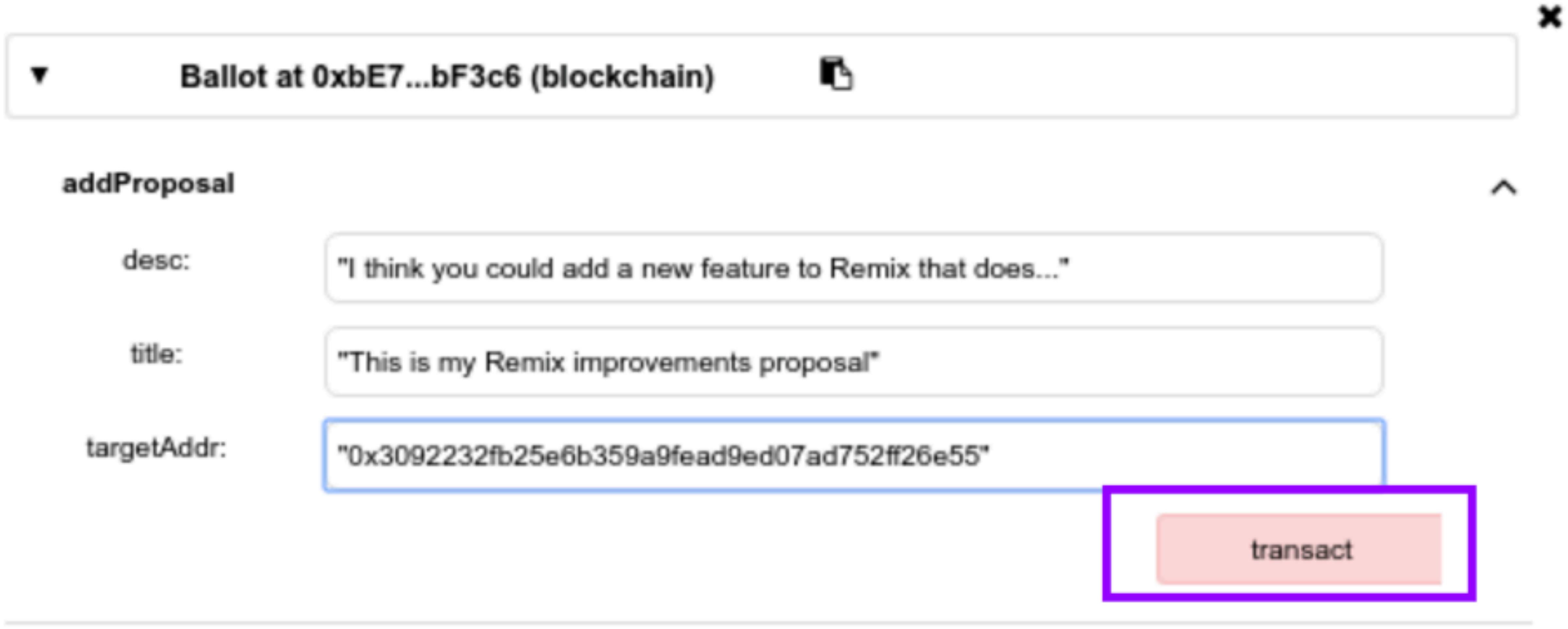
desc: "I think you could add a new feature to Remix that does..."

title: "This is my Remix improvements proposal"

targetAddr: "0x3092232fb25e6b359a9fead9ed07ad752ff26e55"

Execute addProposal

transact button



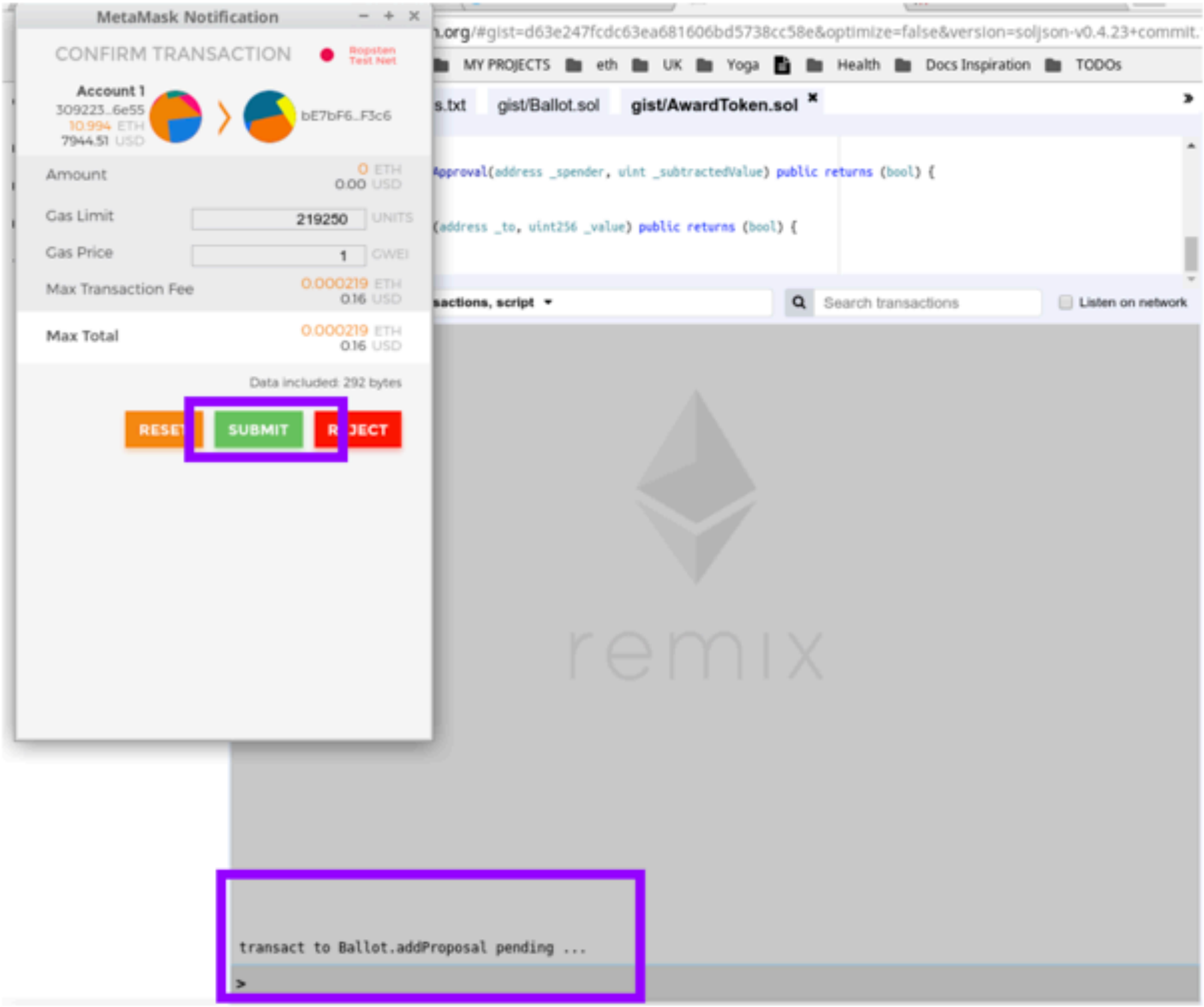
desc: "I think you could add a new feature to Remix that does..."

title: "This is my Remix improvements proposal"

targetAddr: "0x3092232fb25e6b359a9fead9ed07ad752ff26e55"

Confirm the transaction

Submit button



MetaMask Notification

CONFIRM TRANSACTION

Ropsten Test Net

Account 1
309223...6e55
10.994 ETH
7944.51 USD

bE7bF6...F3c6

Amount 0 ETH 0.00 USD

Gas Limit 219250 UNITS

Gas Price 1 GWEI

Max Transaction Fee 0.000219 ETH 0.16 USD

Max Total 0.000219 ETH 0.16 USD

Data included: 292 bytes

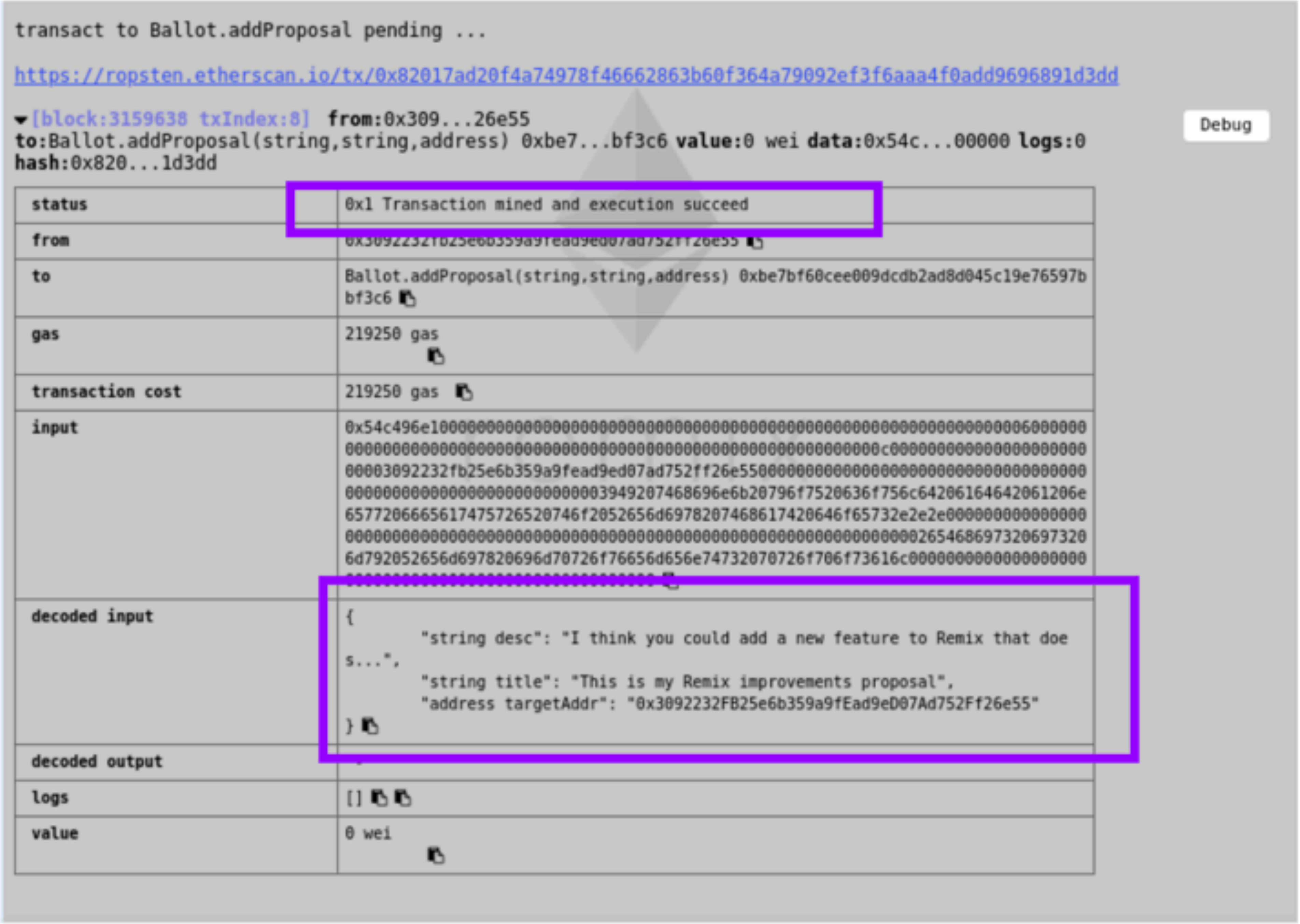
.org/#gist=d63e247fcdc63ea681606bd5738cc58e&optimize=false&version=soljson-v0.4.23+commit.

```
Approval(address _spender, uint _subtractedValue) public returns (bool) {

(address _to, uint256 _value) public returns (bool) {
```

```
transact to Ballot.addProposal pending ...
>
```

Check if tx succeeded

Terminal logs in Remix



```
transact to Ballot.addProposal pending ...

https://ropsten.etherscan.io/tx/0x82017ad20f4a74978f46662863b60f364a79092ef3f6aaa4f0add9696891d3dd

▾[block:3159638 txIndex:8] from:0x309...26e55
to:Ballot.addProposal(string,string,address) 0xbe7...bf3c6 value:0 wei data:0x54c...00000 logs:0
hash:0x820...1d3dd
```

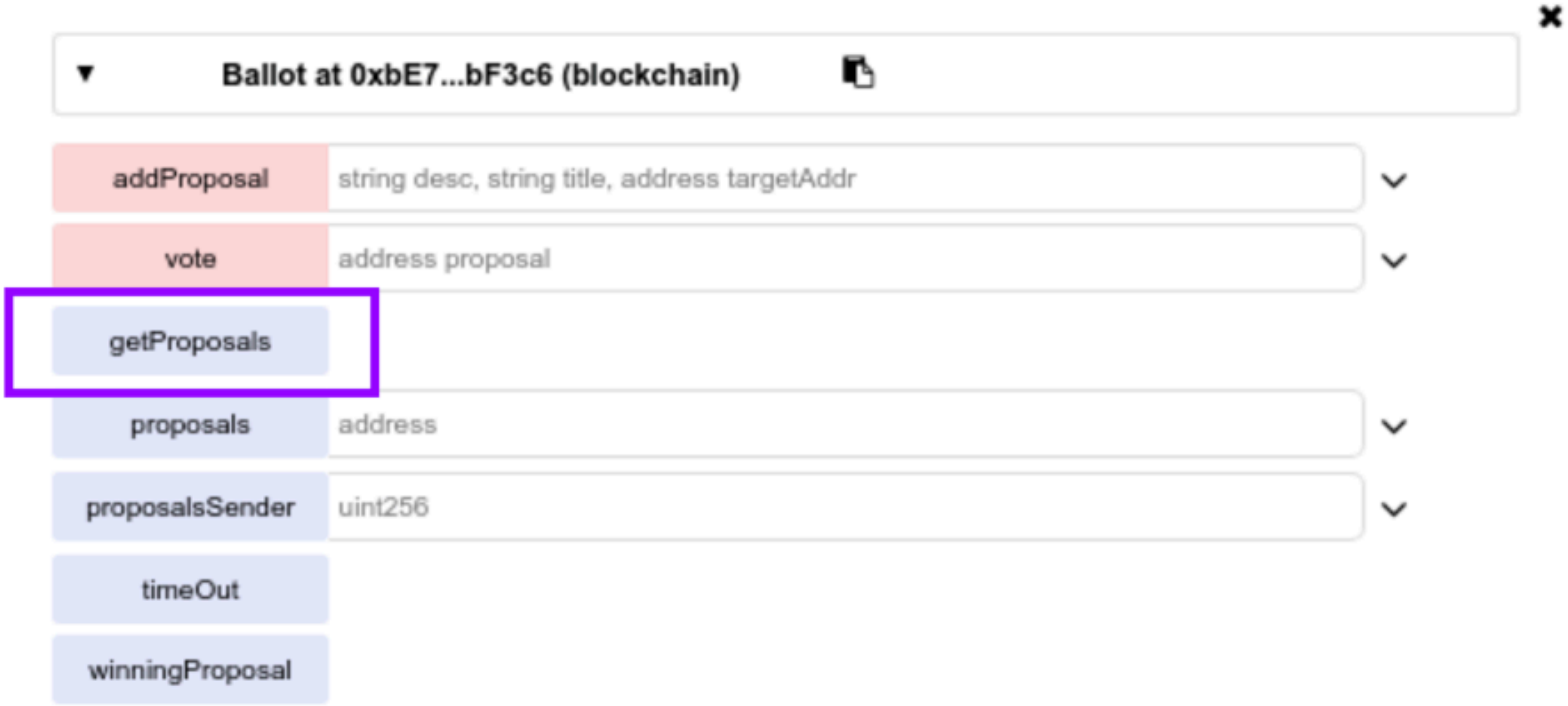
status	0x1 Transaction mined and execution succeed
from	0x3092232fb25e6b359a9fead9ed07ad752ff26e55
to	Ballot.addProposal(string,string,address) 0xbe7bf60cee009dcdb2ad8d045c19e76597b bf3c6
gas	219250 gas
transaction cost	219250 gas
input	0x54c496e1000000000000000000000000000000000000000000000000000000000000006000000 000000000000000000000000000000000000000000000000000c0000000000000000000000 00003092232fb25e6b359a9fead9ed07ad752ff26e55000000000000000000000000000000000000 000000000000000000000000000039492074686 96e6b20796f7520636f756c64206164642061206e 6577206665617475726520746f2052656d6978207468617420646f65732e2e2e0000000000000000 000000000000000000000000000000000000000000000000000000000000002654686973206973 20 6d792052656d697820696d70726f76656d656e74732070726f706f73616c00000000000000000000 00000000000000000000000000000000

decoded input	{
	"string desc": "I think you could add a new feature to Remix that doe
	s...",
	"string title": "This is my Remix improvements proposal",
	"address targetAddr": "0x3092232FB25e6b359a9fEad9eD07Ad752Ff26e55"
	}

decoded output	-
logs	[]
value	0 wei

Execute getProposals

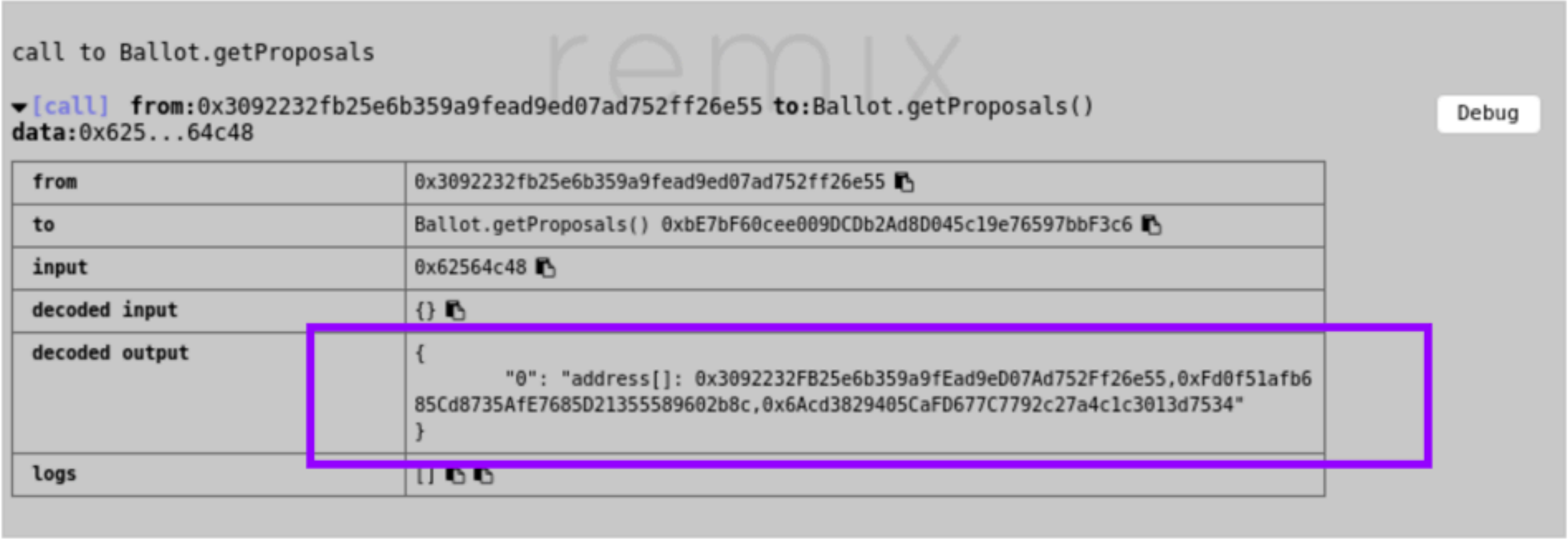
getProposals call



try it live!

See Proposals Addresses

well in so far there will only be 1 address



```
call to Ballot.getProposals

▼[call]  from:0x3092232fb25e6b359a9fead9ed07ad752ff26e55 to:Ballot.getProposals()
data:0x625...64c48
```

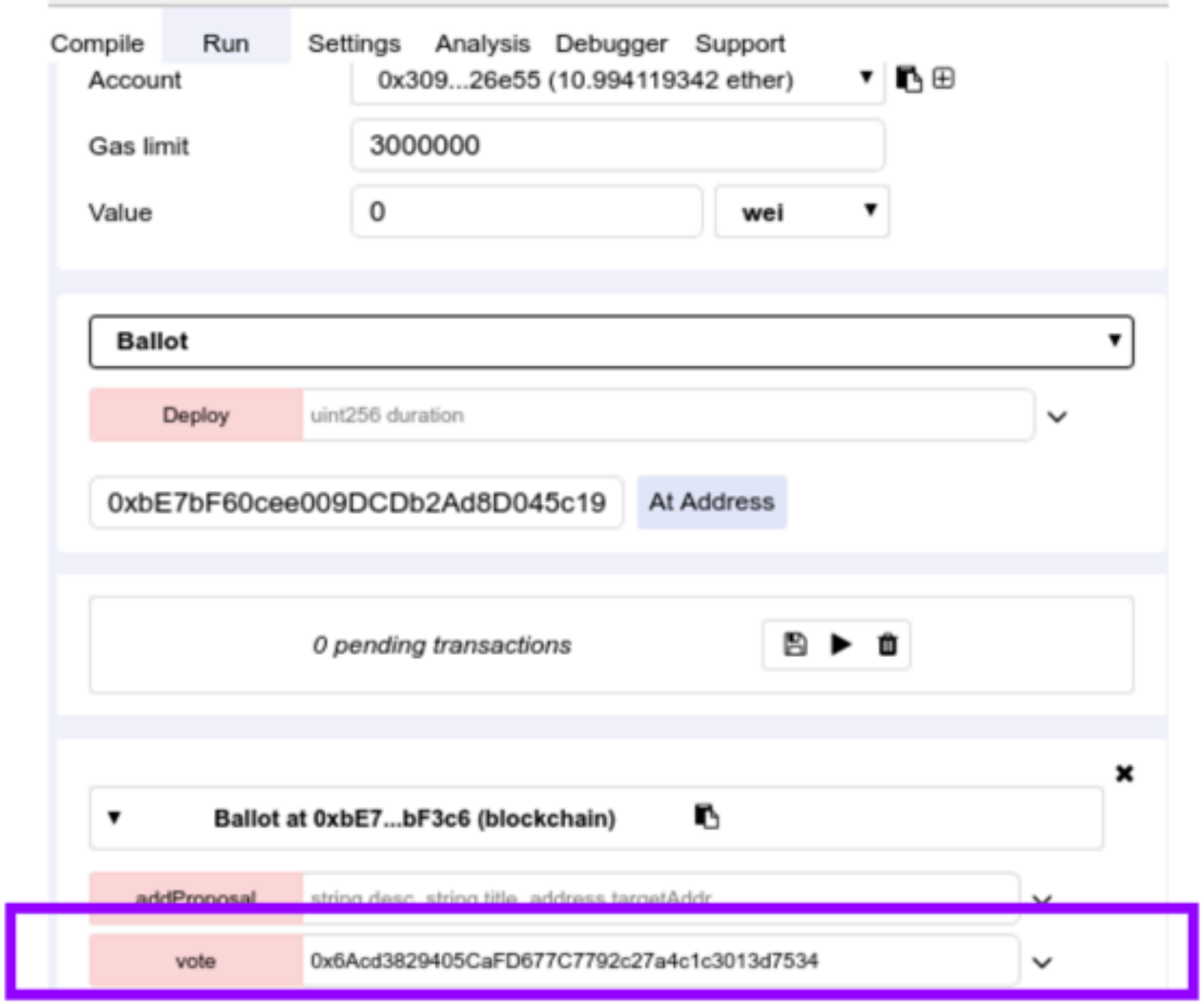
from	0x3092232fb25e6b359a9fead9ed07ad752ff26e55
to	Ballot.getProposals() 0xbE7bF60cee009DCDb2Ad8D045c19e76597bbF3c6
input	0x62564c48
decoded input	{}

decoded output	{
	"0": "address[]: 0x3092232FB25e6b359a9fEad9eD07Ad752Ff26e55,0xFd0f51afb685Cd8735AfE7685D21355589602b8c,0x6Acd3829405CaFD677C7792c27a4c1c3013d7534"
	}

logs	[]

Vote for one Proposal

Paste Proposal Address you want to vote for



Account 0x309...26e55 (10.994119342 ether)

Gas limit 3000000

Value 0 wei

Ballot

0xbE7bF60cee009DCDb2Ad8D045c19

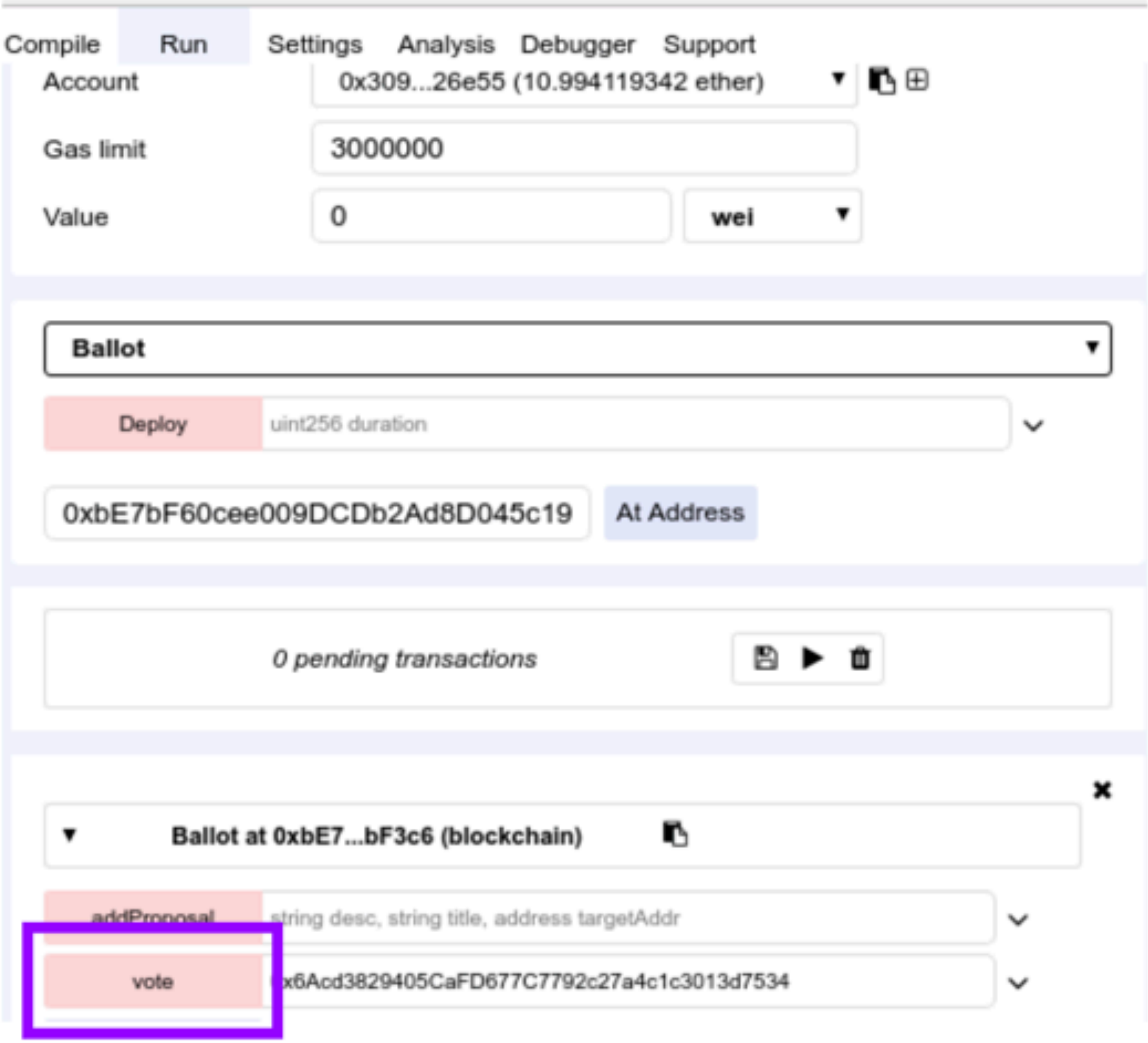
0 pending transactions

Ballot at 0xbE7...bF3c6 (blockchain)

vote 0x6Acd3829405CaFD677C7792c27a4c1c3013d7534

Execute vote transaction

vote button



Account 0x309...26e55 (10.994119342 ether)

Gas limit 3000000

Value 0 wei

Ballot

Deploy uint256 duration

0xbE7bF60cee009DCDb2Ad8D045c19 At Address

0 pending transactions

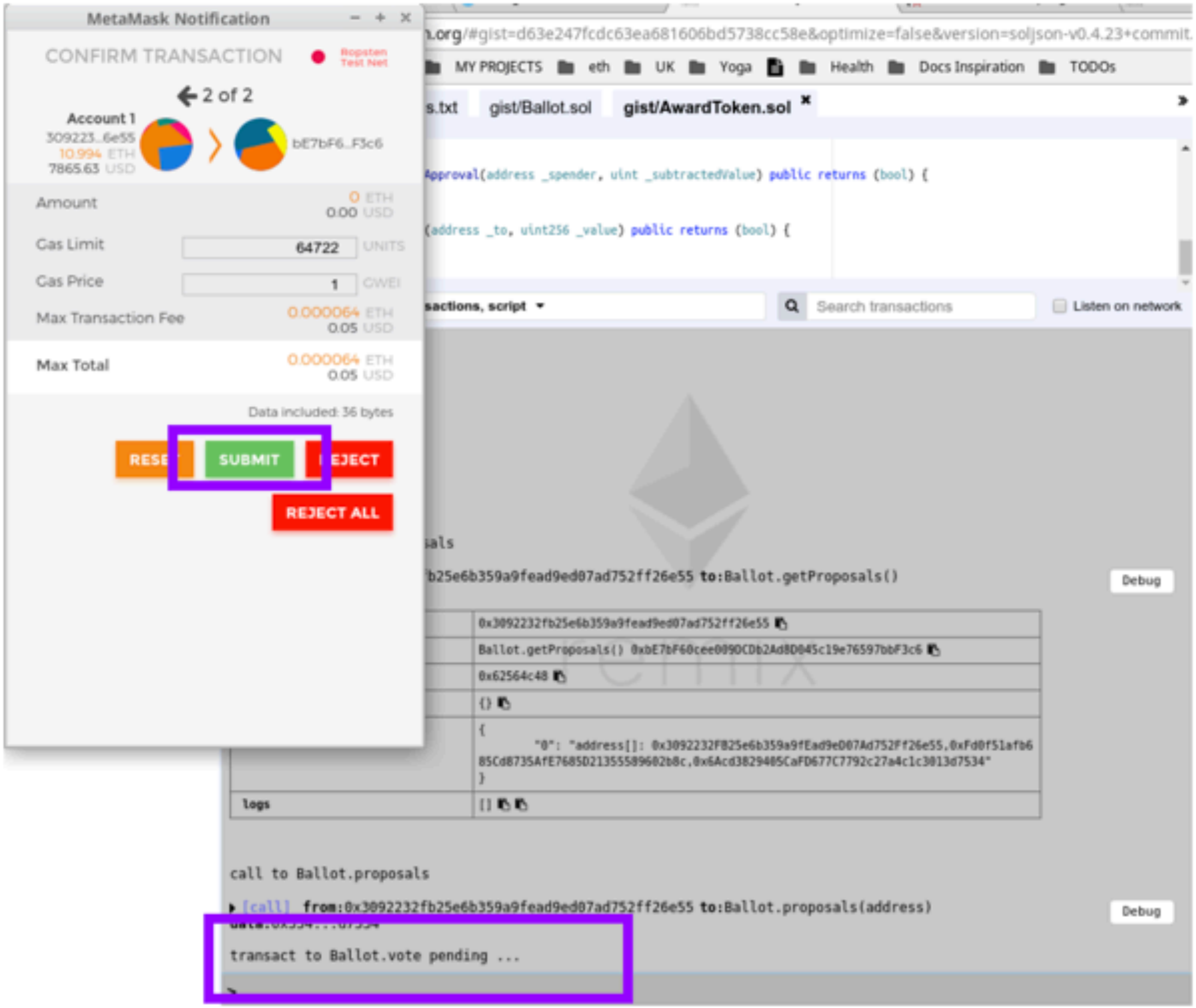
▼ Ballot at 0xbE7...bF3c6 (blockchain)

addProposal string desc, string title, address targetAddr

vote 0x6Acd3829405CaFD677C7792c27a4c1c3013d7534

Confirm the transaction

Submit button



MetaMask Notification

CONFIRM TRANSACTION ● Ropsten Test Net

2 of 2

Account 1
309223...6e55
10.994 ETH
7865.63 USD

bE7bF6...F3c6

Amount 0 ETH 0.00 USD

Gas Limit 64722 UNITS

Gas Price 1 GWEI

Max Transaction Fee 0.000064 ETH 0.05 USD

Max Total 0.000064 ETH 0.05 USD

Data included: 36 bytes

```
Approval(address _spender, uint _subtractedValue) public returns (bool) {

(address _to, uint256 _value) public returns (bool) {
```

```
sals
fb25e6b359a9fead9ed07ad752ff26e55 to:Ballot.getProposals()
```

	0x3092232fb25e6b359a9fead9ed07ad752ff26e55
	Ballot.getProposals() 0xbE7bF60cee009OCDb2Ad8D045c19e76597bbF3c6
	0x62564c48
	{}

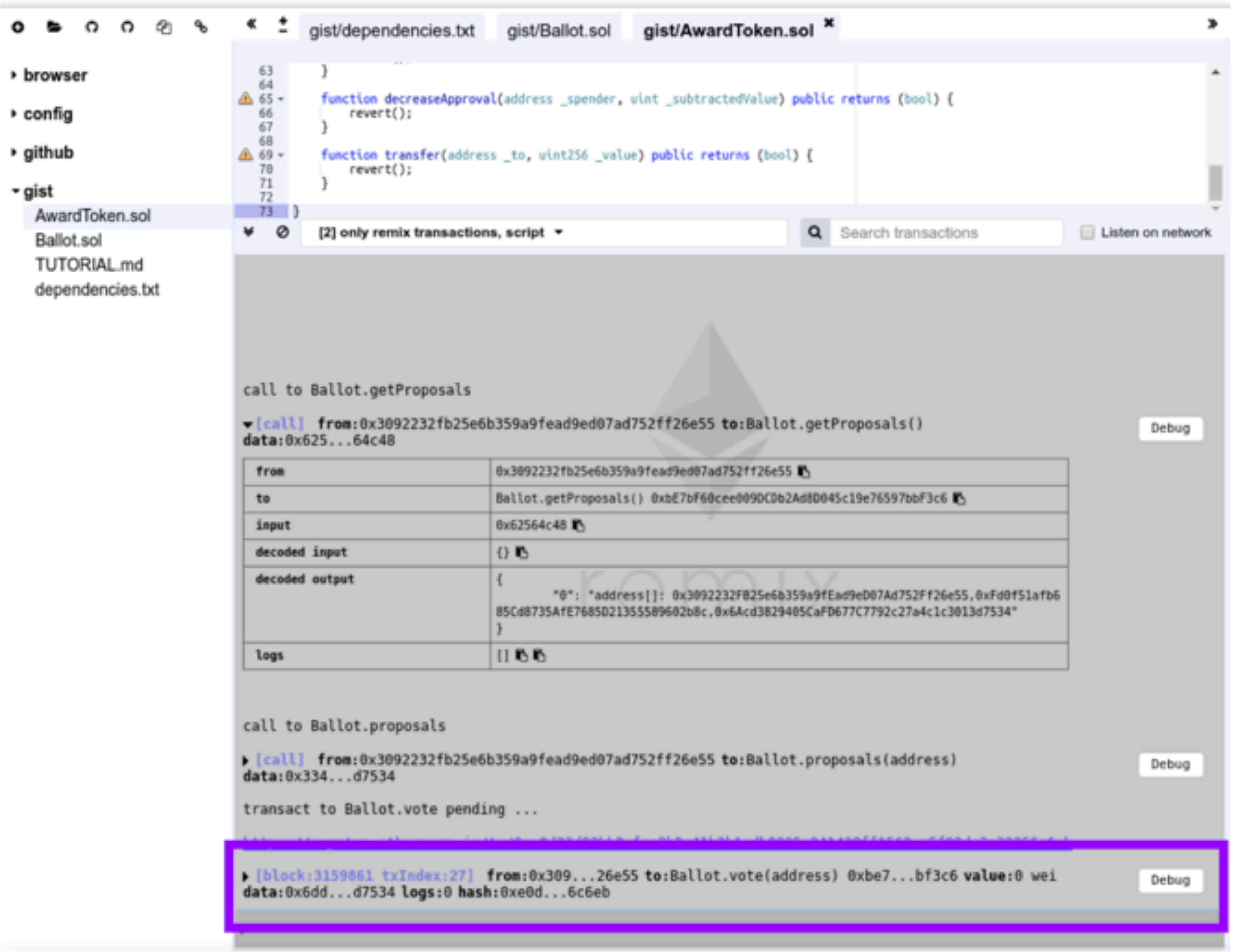
	{
	"0": "address[]: 0x3092232FB25e6b359a9fEad9eD07Ad752Ff26e55,0xFd0f51afb685Cd8735AfE7685D21355589602b8c,0x6Acd3829405CaFD677C7792c27a4c1c3013d7534"
	}

logs	[]

```
call to Ballot.proposals

[call] from:0x3092232fb25e6b359a9fead9ed07ad752ff26e55 to:Ballot.proposals(address)
data:0x354...07354

transact to Ballot.vote pending ...
```

Check if tx succeeded

Terminal logs in Remix



```
    }

    function decreaseApproval(address _spender, uint _subtractedValue) public returns (bool) {
        revert();
    }

    function transfer(address _to, uint256 _value) public returns (bool) {
        revert();
    }

}
```

```
call to Ballot.getProposals

[call] from:0x3092232fb25e6b359a9fead9ed07ad752ff26e55 to:Ballot.getProposals()
data:0x625...64c48
```

from	0x3092232fb25e6b359a9fead9ed07ad752ff26e55
to	Ballot.getProposals() 0xbE7bF60cee009DCDb2Ad8D045c19e76597bbF3c6
input	0x62564c48
decoded input	{}

decoded output	{
	"0": "address[]: 0x3092232FB25e6b359a9fEad9eD07Ad752Ff26e55,0xFd0f51afb685Cd8735AfE7685D21355589602b8c,0x6Acd3829405CaFD677C7792c27a4c1c3013d7534"
	}

logs	[]

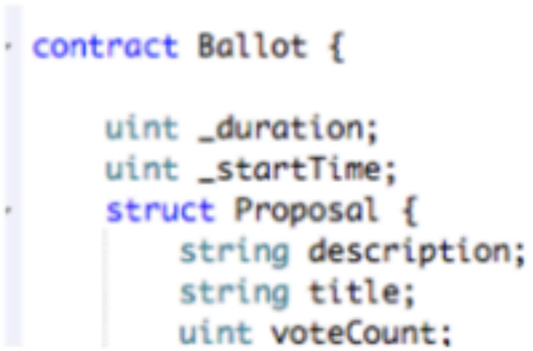
```
call to Ballot.proposals

[call] from:0x3092232fb25e6b359a9fead9ed07ad752ff26e55 to:Ballot.proposals(address)
data:0x334...d7534

transact to Ballot.vote pending ...

[block:3159861 txIndex:27] from:0x309...26e55 to:Ballot.vote(address) 0xbe7...bf3c6 value:0 wei
data:0x6dd...d7534 logs:0 hash:0xe0d...6c6eb
```

Now let's try it out connecting a frontend

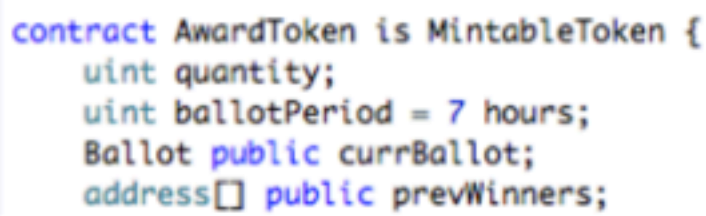
http://bit.ly/remix-voting

To access our Award Token from this frontend - you need the address of the Award Token.

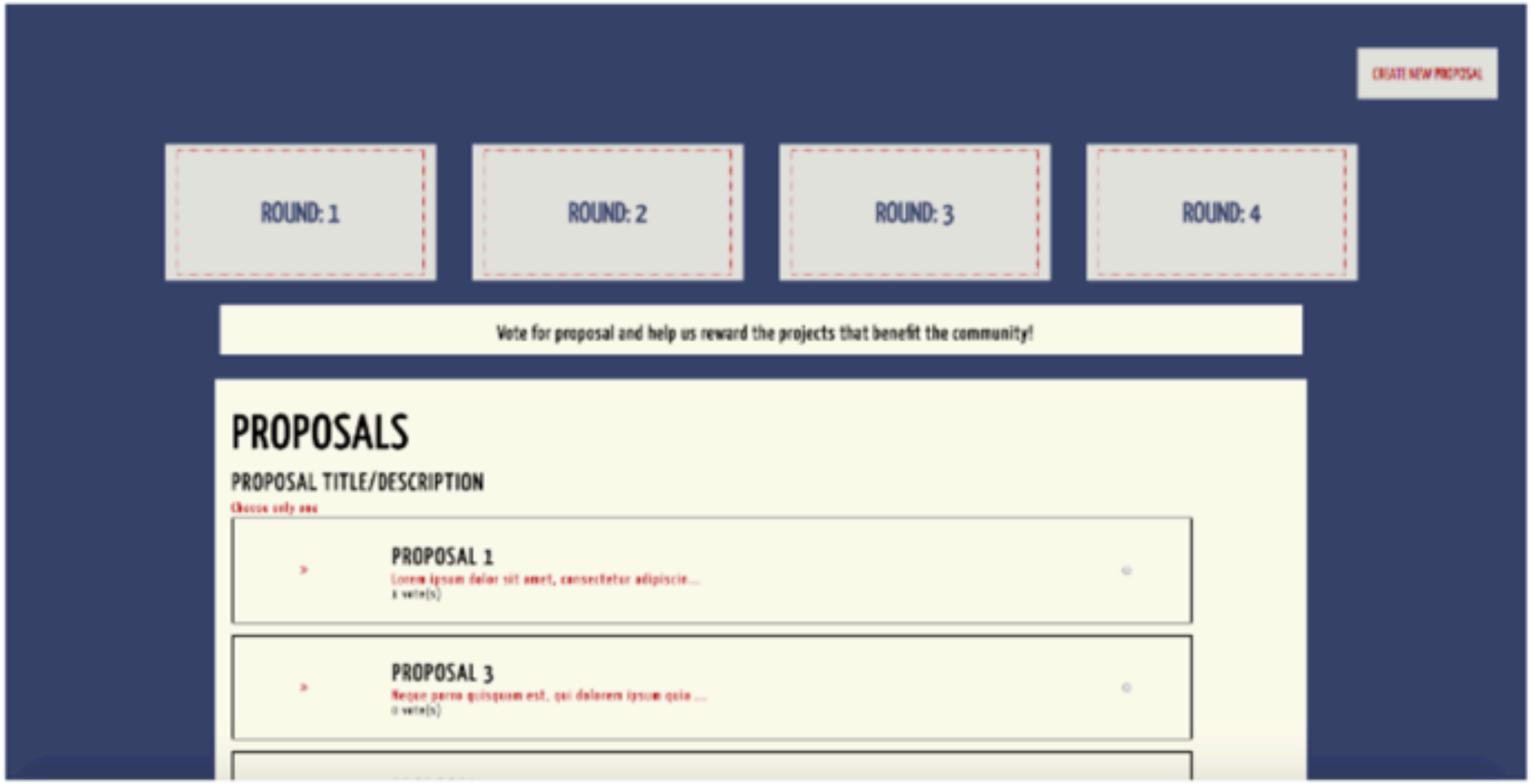
Go to ethereum/remix-workshop to access the award token I just deployed



```
contract Ballot {

    uint _duration;
    uint _startTime;
    struct Proposal {
        string description;
        string title;
        uint voteCount;
```



```
contract AwardToken is MintableToken {
    uint quantity;
    uint ballotPeriod = 7 hours;
    Ballot public currBallot;
    address[] public prevWinners;
```



Vote for proposal and help us reward the projects that benefit the community!

PROPOSALS

PROPOSAL TITLE/DESCRIPTION

Choose only one

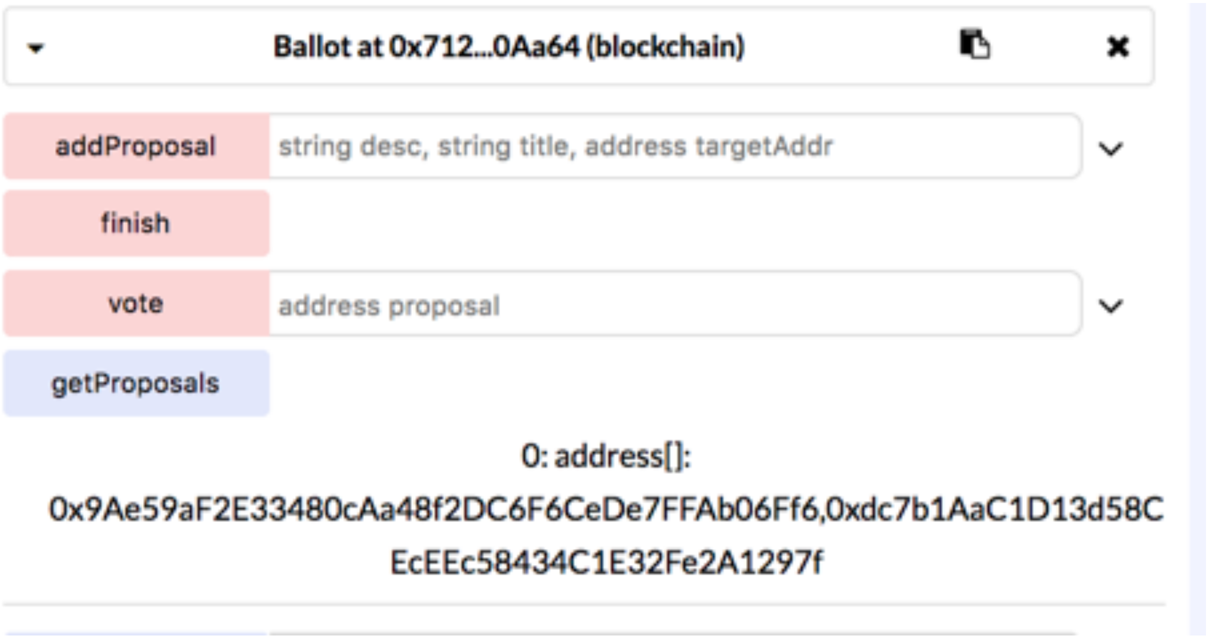
PROPOSAL 1
Lorem ipsum dolor sit amet, consectetur adipiscie...
1 vote(s)

PROPOSAL 3
Neque porro quisquam est, qui dolorem ipsum quia ...
0 vote(s)

Let's check results

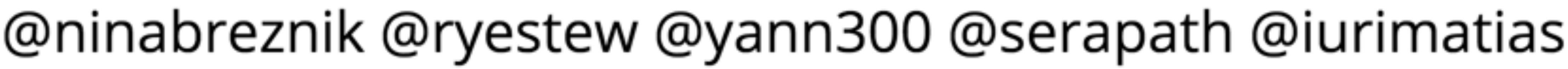
http://bit.ly/remix-voting

Check the state of the contract


Ballot at 0x712...0Aa64 (blockchain)
addProposal
string desc, string title, address targetAddr
finish
vote
address proposal
getProposals

```
0: address[]:
0x9Ae59aF2E33480cAa48f2DC6F6CeDe7FFAb06Ff6,0xdc7b1AaC1D13d58C
EcEEc58434C1E32Fe2A1297f
```

2 proposals have been added



@ninabreznik @ryestew @yann300 @serapath @iurimatias

http://bit.ly/remix-workshop-repository

bit.ly/remix-workshop-repository

Current AwardToken

0x0933e16e31e3f7cbbdcd2375c7b9a28fab7351fe