

# Try it out in Remix!

It ain't your grandma's Remix

**Rob Stupay**  
DevRel, Remix Project EF

## Remix stuff to try out

- Latest: Verification plugin & Remix Guide
- Template Explorer & Provider list settings
- Remix Desktop
- AI tools & concepts
- Git
- Right Side panel, Pinning, Language Switcher, etc
- Getting files into Remix
- Quickly generate a front end: QuickDapp
- Circom

# Survey

Who hasn't used the plugin manager?

# Survey

Who uses Remixd regularly?

The screenshot shows the Remix IDE interface with several UI elements highlighted by red circles:

- Top Left (File Explorer):** A red circle highlights the workspace navigation bar, which includes icons for Home, Search, and Help, along with a workspace dropdown menu.
- Top Right (Language Selection):** A red circle highlights the language selection dropdown menu, showing "EN" and a dropdown arrow.
- Middle Left (File Explorer):** A red circle highlights the file tree sidebar, showing a "Basic - 9" workspace with a "contracts" folder containing artifacts, scripts, tests, and other files.
- Middle Right (Watch to Learn):** A red circle highlights a video player icon with a play button, part of the "WATCH TO LEARN" section.
- Bottom Right (AI Capilot):** A red circle highlights the "RemixAI Capilot (disabled)" button in the bottom right corner.

The main interface includes:

- Header:** "FILE EXPLORER" and "WORKSPACES" sections.
- Central Area:** "REMIX" logo, "The Native IDE for Web3 Development.", "Website" link, "Search Documentation" bar, and "Explore. Prototype. Create." section with "Start Coding", "ZK Semaphore", "ERC20", "Uniswap V4 Hooks", and "NFT / ERC721" buttons.
- Bottom Area:** "Recent Workspaces" list (blank - 2, blank - 1, Basic - 9), "Files" section with "New", "Open", "Gist", "Clone" buttons, and "Connect to Local Filesystem" button.
- Bottom Left:** "GIT" tab and "main" branch indicator.
- Bottom Right:** "Scan Alert" notification, "Did you know?" tooltip about the Recorder, and "Filter with transaction hash or address" search bar.

FILE EXPLORER >

WORKSPACES Basic - 9

REMX

The Native IDE for Web3 Development.

Website Remix Desktop

Search Documentation

Explore. Prototype. Create.

Start Coding ZK Semaphore ERC20

Uniswap V4 Hooks NFT / ERC721

MultiSig

Recent Workspaces blank - 2 blank - 1 Basic - 9

Files

New Open Gist Clone

Connect to Local Filesystem

web3.js ethers.js sol-gpt <your Solidity question here>

Type the library name to see available commands.

Scam Alert main

Did you know? You can use the Recorder to record and replay your transactions to any network from the Deploy and Run plugin.

RemixAI Copilot (disabled)

EN EN ES FR IT KO RU ZH

## Featured

PROFESSOR

LearnEth: Tutorials inside Remix

Check out tutorials on Remix, Solidity, and other Web3 proj Great for all skill levels.

Start Learning

## Featured Plugins

RS **Remix,** LEARNETH TUTORIALS Learn about Remix, Solidity, and other Web3 projects.

COOKBOOK Find smart contracts, solidity libraries, and discover protocols.

SOLIDITY Compile, test, and analyze smart contracts.

I'm here to help you!

# Right Side Panel

The image shows the Solidity IDE interface. On the left side, there is a vertical sidebar with various icons and sections. The main workspace consists of two main panes: a code editor on the right and a terminal or logs pane at the bottom.

**Left Sidebar:**

- LEARNETH**: A header section with a green checkmark icon.
- Home**: A house icon.
- Search**: A magnifying glass icon.
- Help**: A question mark icon.
- Profile**: A person icon.
- Check Answer**: A button at the bottom left.
- Show answer**: A button at the bottom left.
- Initialize as git repo**: A button at the bottom left.

**Code Editor (Top Right):**

File: `readAndWrite.sol`

```
// SPDX-License-Identifier: MIT
pragma solidity ^0.8.3;

contract SimpleStorage {
    // State variable to store a number
    uint public num;

    // You need to send a transaction to write to a state variable.
    function set(uint _num) public { 22520 gas
        num = _num;
    }

    // You can read from a state variable without sending a transaction.
    function get() public view returns (uint) { 2459 gas
        return num;
    }
}
```

**Code Editor (Bottom Right):**

Type the library name to see available commands.  
Solidity copilot not activated!

**Bottom Bar:**

- 0 Listen on all transactions
- Filter with transaction hash or address

# Right Side Panel



FILE EXPLORER

WORKSPACES

default\_workspace

.learneth

- ethereum
- remix-workshops
- 5.1 Functions - Reading and Writing
- readAndWrite.sol

contracts

scripts

tests

.prettierrc.json

README.txt

readAndWrite.sol

```
// SPDX-License-Identifier: MIT
pragma solidity ^0.8.3;

contract SimpleStorage {
    // State variable to store a number
    uint public num;

    // You need to send a transaction to write to a state variable.
    function set(uint _num) public {
        num = _num;
    }

    // You can read from a state variable without sending a transaction.
    function get() public view returns (uint) {
        return num;
    }
}
```

LEARNETH

If the function takes inputs like our `set` function (line 9), you must specify the parameter types and names. A common convention is to use an underscore as a prefix for the parameter name to distinguish them from state variables.

You can then set the visibility of a function and declare them `view` or `pure` as we do for the `get` function if they don't modify the state. Our `get` function also returns values, so we have to specify the return types. In this case, it's a `uint` since the state variable `num` that the function returns is a `uint`.

We will explore the particularities of Solidity functions in more detail in the following sections.

[Watch a video tutorial on Functions.](#)

★ Assignment

1. Create a public state variable called `b` that is of type `bool` and initialize it to `true`.
2. Create a public function called `get_b` that returns the value of `b`.

Type the library name to see available commands.  
Solidity copilot not activated!

0 Listen on all transactions Filter with transaction hash or address

Check Answer Show answer

# LearnEth follows the language chooser

The screenshot shows the Remix IDE interface with the LearnEth plugin installed. A red arrow points from the top right towards the language selection dropdown in the top right corner of the interface.

**Remix IDE Interface:**

- Header:** REMIX (with a blue icon), Home X
- Left Sidebar:**
  - El IDE Nativo para el Desarrollo de la Web 3.
  - Sitio web Escritorio Remix
  - Buscar documentación (Search documentation)
  - Project Templates
    - Start Coding
    - ZK Semaphore
    - ERC20
    - Uniswap V4 Hooks
    - NFT / ERC721
    - MultiSig
  - Recent Workspaces
    - Basic - 8 scaffold-eth-challenges.git
    - Basic - 7
  - Archivos
    - Nuevo archivo (New file)
    - Abrir archivo (Open file)
    - Gist
    - Clone
- Center Content:**
  - Destacado:** v0.56.0 RELEASE HIGHLIGHTS
    - Added new 'Contract Verification' plugin to verify contract on multiple platforms
    - Added new 'Remix Guide' plugin to learn using Remix IDE using videos
    - Added support for message signing using EIP712[Read More](#)
  - Plugins Destacados:**
    - SOLIDITY ANALYZERS
    - LEARNETH TUTORIALS
    - COOKBOOK
- Top Right (LearnEth Panel):** LEARNETH
  - Tutorials from: ethereum/remix-workshops
  - Date modified: 6/7/2022, 3:19:04 AM
  - Import another tutorial repo
    - Select a repo ▾
    - reset list
  - REPO ?
    - ethereum/remix-workshops
  - BRAND ?
    - es
  - Import ethereum/remix-workshops**
  - Beginner:**
    - Curso de Solidity NFT
    - Curso de Solidity ERC20 Token
    - Solidity para principiantes
  - Intermediate:**
    - Contrato de subasta NFT

# LearnEth



LEARNETH ✓ > □

Tutorials from:  
[ethereum/remix-workshops](#)

Date modified: 4/30/2024, 11:27:35 PM

> Import another tutorial repo

Beginner:

- > Basics of Remix
- > Multisig Wallet
- > Solidity Beginner Course
- > Solidity ERC20 Token Course
- > Solidity NFT Course

Intermediate:

- > Basic use of web3.js
- > Multichain Protocols with Axelar
- > NFT Auction Contract
- > Recorder
- > Uniswap Swap Course

Advanced:

- > All about Proxy Contracts
- > Deploy with Libraries
- > Opcodes in the Debugger

# LearnEth

LEARNETH ✓ > ⌂

Tutorials from:  
**ethereum/remix-workshops**

Date modified: 4/30/2024, 11:27:35 PM

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Beginner:

- > Basics of Remix
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- > Basic use of web3.js
- > Multichain Protocols with Axelar
- > NFT Auction Contract
- > Recorder
- > Uniswap Swap Course

Advanced:

- > All about Proxy Contracts
- > Deploy with Libraries
- > Opcodes in the Debugger

LEARNETH ✓ > ⌂

Tutorials from:  
**ethereum/remix-workshops**

Date modified: 4/30/2024, 11:27:35 PM

> Import another tutorial repo

Select a repo ▾

reset list

REPO ?

ethereum/remix-workshops

BRANCH

master

Import ethereum/remix-workshops

Beginner:

- > Basics of Remix
- > Multisig Wallet

# AI in Remix

- Code Explanations
- Coding Assistance on request
- Coding Completion while you type

# RemixAI

- Code Explanations initiated from:
  - ◆ **The Robot Icon**
  - ◆ Compiler Errors
  - ◆ Right clicking on some code

The image shows the Solidity Compiler interface from the Remix IDE. On the left, there's a sidebar with various icons and settings. In the center, there's a code editor with a red arrow pointing to the first line of the Solidity contract source code.

```
// SPDX-License-Identifier: GPL-3.0
pragma solidity >=0.7.0 <0.9.0;
import "hardhat/console.sol";
/**
 * @title Owner
 * @dev Set & change owner
 */
contract Owner {
    address private owner;

    // event for EVM logging
    event OwnerSet(address indexed oldOwner, address indexed newOwner);

    // modifier to check if caller is owner
    modifier isOwner() {
        // If the first argument of 'require' evaluates to false
        // changes to the state and to Ether balances are
        // This used to consume all gas in old EVM versions
        // It is often a good idea to use 'require' to check
        // As a second argument, you can also provide an
        require(msg.sender == owner, "Caller is not owner");
    }
}
```

**SOLIDITY COMPILER**

COMPILER +

0.8.26+commit.8a97fa7a

Include nightly builds

Auto compile

Hide warnings

Advanced Configurations >

**Compile 2\_Owner.sol**

Compile and Run script

CONTRACT

Owner (2\_Owner.sol)

Run Remix Analysis

Run SolidityScan

Publish on IPFS

Publish on Swarm

Compilation Details

ABI

// SPDX-License-Identifier: GPL-3.0

pragma solidity >=0.7.0 <0.9.0;

import "hardhat/console.sol";

/\*\*  
 \* @title Owner  
 \* @dev Set & change owner  
 \*/

contract Owner {

address private owner;

// event for EVM logging

event OwnerSet(address indexed oldOwner, address indexed newOwner);

// modifier to check if caller is owner

modifier isOwner() {  
 // If the first argument of 'require' evaluates to 'false', execution terminates and all  
 // changes to the state and to Ether balances are reverted.  
 // This used to consume all gas in old EVM versions, but not anymore.  
 // It is often a good idea to use 'require' to check if functions are called correctly.  
 // As a second argument, you can also provide an explanation about what went wrong.  
 require(msg.sender == owner, "Caller is not owner");  
 };

/\*\*  
 \* @dev Set contract deployer as owner  
 \*/

constructor() {  
 infinite gas 234000 gas  
 console.log("Owner contract deployed by:", msg.sender);  
 owner = msg.sender; // 'msg.sender' is sender of current call, contract deployer for a const  
 emit OwnerSet(address(0), owner);  
 }

• web3.js  
• ethers.js  
• sol-gpt <your Solidity question here>

Type the library name to see available commands.

Explain the current code

This is a Solidity contract named **Owner** that allows setting and changing the ownership. Here's what it does:

1. Sets initial owner: The constructor sets the deployer of this smart contract as its first owner.
2. Changes owner: The `changeOwner()` function lets an authorized (i.e., current) owner change themselves to a new address by calling `changeOwner(newAddress)` from within the same transaction, if they have permission (`isOwner`) modifier.
3. Gets current owner: The `getOwner()` function returns the currently set owner's address.

Type your query

Did you know? You can use the Recorder to record and replay your transactions to any network from the Deploy and Run plugin.

Scam Alert

main

RemixAI Copilot (disabled)

# RemixAI

- Explanations initiated from:
  - ◆ The Robot Icon
  - ◆ **Compiler Errors**
  - ◆ Right clicking on some code

The screenshot shows the Remix IDE interface with the Solidity Compiler tab selected. A tooltip indicates the compiler version is 0.8.26+commit.8a97fa7a. The code editor displays a Solidity contract named 3\_Ballot.sol. A red arrow points from the error message in the terminal pane to the "Ask RemixAI" button.

**SOLIDITY COMPILER**

COMPILER +

0.8.26+commit.8a97fa7a

Include nightly builds

Auto compile

Hide warnings

Advanced Configurations >

Compile 3\_Ballot.sol

Compile and Run script

ParserError: Expected ';' but got 'mapping'

-->

contracts/3\_Ballot.sol:27:5

:

|

27 | mapping(address => Voter) public voters;

| ^~~~~~

Ask RemixAI

1 // SPDX-License-Identifier: GPL-3.0

2

3 pragma solidity >=0.7.0 <0.9.0;

4

5 */\**

6 \* @title Ballot

7 \* @dev Implements voting process along with vote deleg

8 \*/

9 contract Ballot {

10

11     struct Voter {

12         uint weight; // weight is accumulated by delega

13         bool voted; // if true, that person already vo

14         address delegate; // person delegated to

15         uint vote; // index of the voted proposal

16     }

17

18     struct Proposal {

19         // If you can limit the length to a certain num

20         // always use one of bytes1 to bytes32 because

21         bytes32 name; // short name (up to 32 bytes)

22         uint voteCount; // number of accumulated votes

23     }

24

25     address public chairperson

26

27     mapping(address => Voter) public voters;

28

29     Proposal[] public proposals;

30

31     */\**

32     \* @dev Create a new ballot to choose one of 'propo

Type the library name to see available commands.  
Solidity copilot not activated!

Initialize as git repo

SOLIDITY COMPILER

Auto compile Hide warnings Advanced Configurations

Compile 2\_Owner.sol

Compile and Run script CONTRACT Owner (2\_Owner.sol)

Run Remix Analysis Run SolidityScan Publish on IPFS Publish on Swarm Compilation Details ABI Bytecode

ParserError: Expected ';' but got identifier  
contracts/2\_Owner.sol:26:9:  
|  
26 | \_;  
| ^

Ask RemixAI

// SPDX-License-Identifier: GPL-3.0

pragma solidity >=0.7.0 <0.9.0;

import "hardhat/console.sol";

/\*\* \* @title Owner \* @dev Set & change owner \*/

contract Owner {

address private owner;

// event for EVM logging

event OwnerSet(address indexed oldOwner, address indexed newOwner);

// modifier to check if caller is owner

modifier isOwner() {

// If the first argument of 'require' evaluates to 'false', execution terminates and all changes to the state and to Ether balances are reverted.

// This used to consume all gas in old EVM versions, but not anymore.

// It is often a good idea to use 'require' to check if functions are called correctly.

// As a second argument, you can also provide an explanation about what went wrong.

require(msg.sender == owner, "Caller is not owner")

;

/\*\* \* @dev Set contract deployer as owner \*/

constructor() {

console.log("Owner contract deployed by ", msg.sender);

owner = msg.sender; // msg.sender is sender of current call, contract deployer for a const

emit OwnerSet(address(0), owner);

}

• web3.js • eth.js

solc-gpt <your Solidity question here>

Type the library name to see available commands.

Did you know? You can use the Recorder to record and replay your transactions to any network from the Deploy and Run plugin.

Explain the error

The code has a syntax error in the `modifier isOwner()` function. Error occurs because of missing semicolon after require statement. To Fix this, add a semicolon at the end of the 'require' line: Replace:

require(msg.sender == owner, "Caller is not owner");

With:

modifier isOwner() {

// If the first changes to th

// This used to

// It is often a

// As a second a

require(msg.sender == owner, "Caller is not owner");

Type your query

Scam Alert main

RemixAI Copilot (disabled)

# Ai in Remix

- Explanations initiated from:
  - ◆ The Robot Icon
  - ◆ Compiler Errors
  - ◆ **Right clicking on some code**



# Asking the AI Assistant

The screenshot shows the Remix IDE interface with the following details:

- FILE EXPLORER:** Shows a workspace named "Basic - 9" containing files like .deps, .git, contracts (with artifacts, 1\_Storage.sol, 2\_Owner.sol, 3\_Ballot.sol), scripts, tests, .prettierrc.json, and README.txt.
- WORKSPACES:** Basic - 9 is selected.
- CODE EDITOR:** Displays Solidity code for a contract named "Owner". The code includes a modifier `isOwner()` and a constructor that logs the deployer and sets the owner. A tooltip for the modifier explains its purpose.
- AI ASSISTANT:** A large red arrow points to the bottom right corner of the interface, where the AI assistant is located. The assistant's message "I'm here to help you!" is visible.
- COMMAND LINE:** At the bottom, there's a command line interface with a dropdown menu showing options like web3.js, ethers.js, and sol-gpt <your Solidity question here>.
- NOTIFICATIONS:** A "Scam Alert" notification is present in the bottom left.
- RECORDING:** A "Did you know? You can use the Recorder to record and replay your transactions to any network from the Deploy and Run plugin." message is at the bottom center.
- REMIXAI COPILOT:** A note at the bottom right states "RemixAI Copilot (disabled)".

# Asking the AI Assistant

```
, address indexed newOwner);
```

e' evaluates to 'false', execution terminates and all  
r balances are reverted.  
old EVM versions, but not anymore.  
require' to check if functions are called correctly.  
so provide an explanation about what went wrong.  
r is not owner")

```
d by:", msg.sender);  
is sender of current call, contract deployer for a const
```

0  Listen on all tra

What are modifiers for?



Modifiers in Solidity allow us to reuse code and make our contracts more readable. They can be thought of as functions that modify the behavior of other functions.

Modifiers take an arbitrary number of arguments, but they must return a boolean value indicating whether or not the execution should proceed with the modified function call.

Here are some examples:

1. **Access control:** Modifiers like `onlyOwner` and `isManager` can be used to restrict certain actions in your contract based on who is performing them.

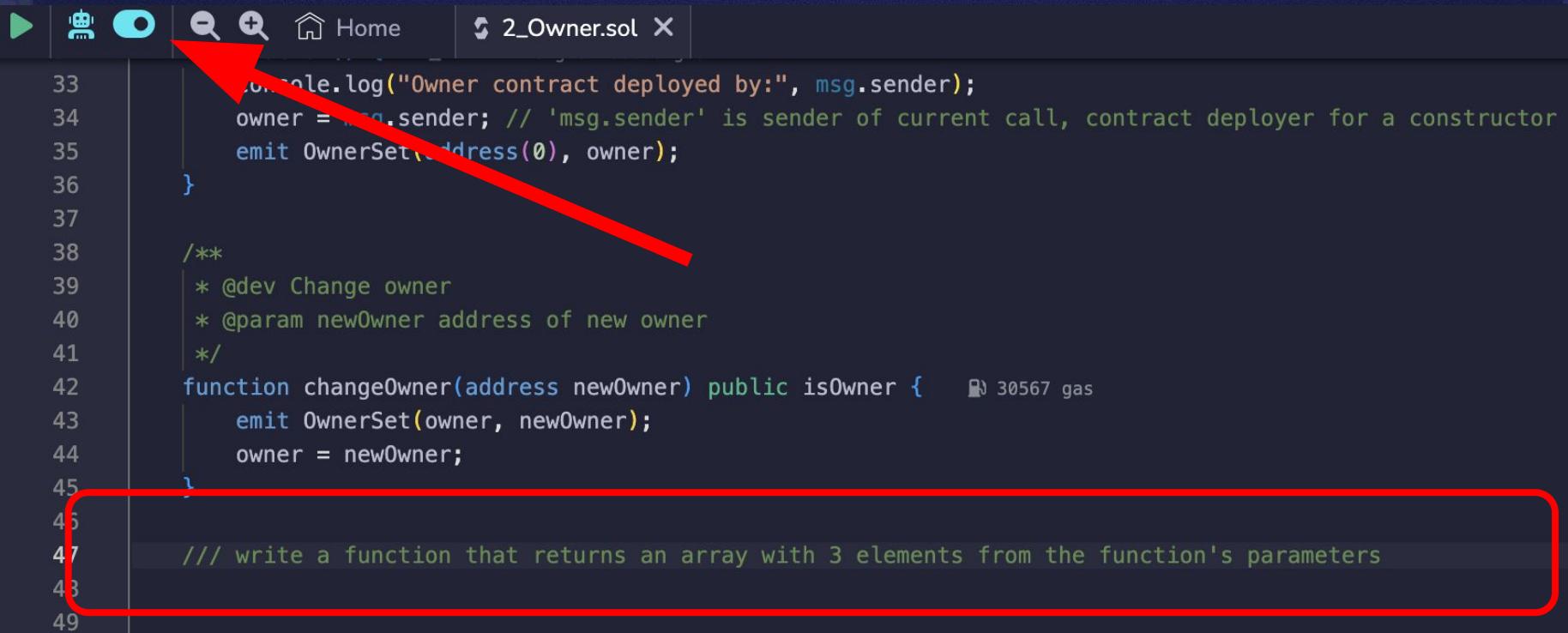
2. **Input validation:** You could write a modifier that checks if an input value falls within specific bounds or meets other criteria before allowing the

Type your query A white arrow pointing right inside a circle.

# Ai in Remix

- Code Explanations
- **Coding assistance on request**
- Coding completion while you type

# Code assistance with ///



```
33     console.log("Owner contract deployed by:", msg.sender);
34     owner = msg.sender; // 'msg.sender' is sender of current call, contract deployer for a constructor
35     emit OwnerSet(address(0), owner);
36 }
37
38 /**
39  * @dev Change owner
40  * @param newOwner address of new owner
41  */
42 function changeOwner(address newOwner) public isOwner {
43     emit OwnerSet(owner, newOwner);
44     owner = newOwner;
45 }
46
47 // write a function that returns an array with 3 elements from the function's parameters
48
49
```

# Code requests with ///

The language model can write a contract - but will the contract be safe?

- Code is run through Slither before it is returned.

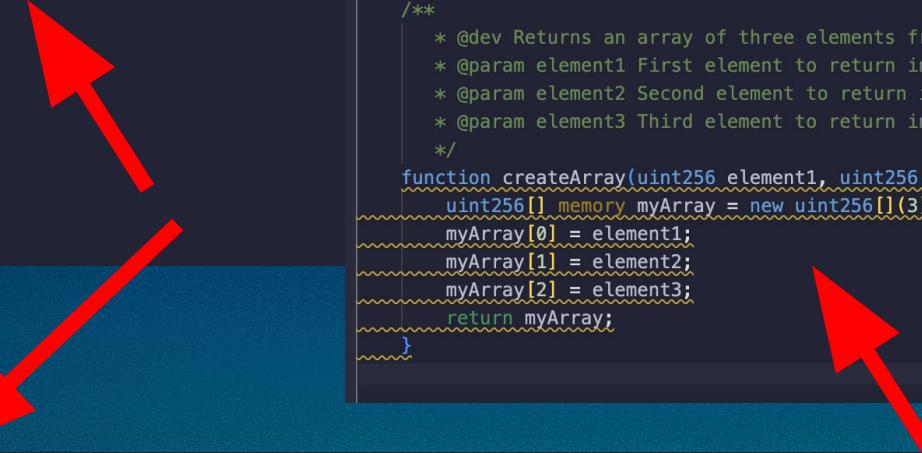
```
/// write a function that returns an array with 3 elements from the function's parameters
```

# RemixAI Copilot tries new answers on each request

```
/*
 * @dev Returns an array of three elements
 */
function returnArray(uint256 a, uint256 b, uint256 c) public view returns (uint256[] memory){
    uint256[] memory arr = new uint256[](3); // allocating array in memory
    arr[0]=a;
    arr[1]=b;
    arr[2]=c;

    return arr;
}

/**
```



```
/// write a function that returns an array with 3 elements from the function's parameters
```

```
/* @dev returns an array with three elements */
function returnArrayFunction (uint x , uint y , uint z) public pure returns (uint[3] memory){
    return [x,y,z];
}
```



→ Coding assistance while you type - AKA  
**Code Completion**

**You have to turn it on to use it  
or  
turn it off to make it so it doesn't bug you**

## SOLIDITY COMPILER

✓ &gt; □



Home

2\_Owner.sol X

COMPILER + ⚙

0.8.26+commit.8a97fa7a

 Include nightly builds Auto compile Hide warnings

Advanced Configurations &gt;

⟳ Compile 2\_Owner.sol

Compile and Run script i ⚙

## CONTRACT

Blowner (2\_Owner.sol)



↗ Run Remix Analysis

```
1 // SPDX-License-Identifier: GPL-3.0
2
3 pragma solidity >=0.7.0 <0.9.0;
4
5 import "hardhat/console.sol";
6
7 /**
8 * @title Owner
9 * @dev Set & change owner
10 */
11 contract Owner {
12     address private owner;
13
14     // event for EVM logging
15     event OwnerSet(address indexed oldOwner, address indexed
16
17
18     // modifier to check if caller is owner
19     modifier isOwner() {
20         // If the first argument of 'require' evaluates to
21         // changes to the state and to Ether balances are re
22         // This used to consume all gas in old EVM versions,
23         // It is often a good idea to use 'require' to check
```

# Code Completion

1 line suggested at a time. Hit tab to accept.

```
modifier onlyOwner() {
```

```
modifier isNotOwner() { require(msg.sender != owner, "Caller is owner");
```

```
modifier isNotOwner() { require(msg.sender != owner, "Caller is already owner");
|   _;
}
```

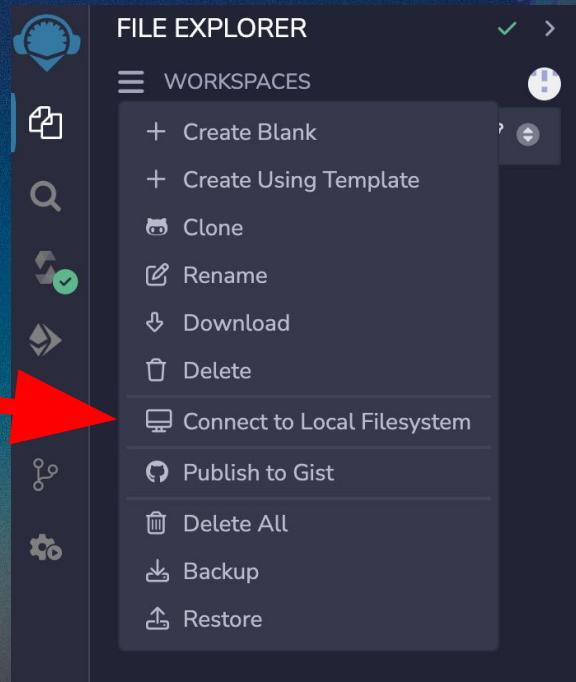
# Saving your files in Remix

Not like Google Docs! No user accounts on a Remix server

Browser Local Storage → Easy but Feeble

Browser Local Storage & Git → push to Git

Remixd → save to your hard drive



# Git in Remix

- git login
- Clone
  - ◆ w/ drop down list of recently cloned repos
- Adding remotes from dropdown list
- Branches with their commits
- Improved source control
- Auto adding for a commit



GIT

✓ &gt; ⌂

⚡ \*main



## SETUP

To ensure that your commits are properly attributed in Git, you need to configure a username and email address. These will be used to identify the author of the commit.

[Login in with github](#)

GitHub token



Git username

Git email

Save



## GIT

✓ > □

Repository Name: mochaTest

Branch Name:  main

Storage : 0.45 MB used (0 %)

Messages : update mocha2

### SOURCE CONTROL

↓ ↑ ⌂ C

### COMMANDS

### COMMITS

↓ ↑ ⌂ C

### BRANCHES

### REMOTES

### CLONE

### GITHUB SETUP

### LOG 1 2



[SUCCESS] Github user loaded...

[ERROR] Please check your GitHub token in  
the GitHub settings.

[SUCCESS] Github user loaded...

GIT

✓ > □

Repository Name: mochaTest

Branch Name: ↗ main

Storage : 0.45 MB used (0 %)

Messages : update mocha2

▼ SOURCE CONTROL

↓ ↑ ⇠ C

message ( commit on main )

✓ Commit

▶ COMMANDS

▶ COMMITS

↓ ↑ ⇠ C

## GIT

Repository Name: mochaTest

Branch Name:  main

Storage : 0.45 MB used (0 %)

Messages : update mocha2

▶ SOURCE CONTROL    

## ▼ COMMANDS

 Pull Push

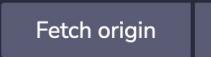
## LOCAL BRANCH

main  | 

## REMOTE BRANCH

main  | 

## REMOTE

origin  |  Force push Fetch origin Fetch main▶ COMMITS    

## GIT

✓ > □

Repository Name: mochaTest  
Branch Name: ⚡ main  
Storage : 0.45 MB used (0 %)  
Messages : update mocha2

▶ SOURCE CONTROL      ↓ ↑ ⇕ C

▶ COMMANDS

▼ COMMITS      ↓ ↑ ⇕ C

- ▶ update mocha2 ryestew May 24 2023 ⓘ
- ▶ mocha-timeout-1...ryestew Apr 27 2023 ⓘ
- ▶ mocha-timeout-6...ryestew Apr 27 2023 ⓘ
- ▶ mocha-timeout-3...ryestew Apr 27 2023 ⓘ
- ▶ mocha-timeout-3...ryestew Apr 27 2023 ⓘ
- ▶ metadata log ryestew Apr 27 2023 ⓘ
- ▶ dot slash ryestew Apr 27 2023 ⓘ
- ▶ cwd it ryestew Apr 27 2023 ⓘ
- ▶ relative path again ryestew Apr 27 2023 ⓘ
- ▶ relative path ryestew Apr 27 2023 ⓘ

[Load more](#)

▶ BRANCHES

Git

Repository Name: mochaTest

Branch Name: main

Storage: 0.45 MB used (0 %)

Messages: update mocha2

SOURCE CONTROL

COMMANDS

COMMENTS

update mocha2 ryestew May 24 2023

mocha2.ts

tests/mocha2.ts

mocha-timeout-1...ryestew Apr 27 2023

mocha-timeout-2...ryestew Apr 27 2023

mocha-timeout-3...ryestew Apr 27 2023

tests/mocha2.ts (c982f0) X

```
1 import { ethers } from 'ethers'
2 const { expect } = require('chai')
3 const fs = require('fs')
4
5 describe("Storage", function () {
6   it("test initial value", async function () {
7     // Make sure contract is compiled and artifacts are generated
8     // console.log('process.cwd(): ', process.cwd())
9     const metadata = JSON.parse(fs.readFileSync('../contracts/artifacts/MyResolver.json'))
10    // console.log('metadata: ', metadata)
11    const signer = (new ethers.providers.Web3Provider(web3Provider)).getSigner()
12    let MyResolver = new ethers.ContractFactory(metadata.abi, metadata.data.bytecode)
13    let myResolver = await MyResolver.deploy();
14
15    console.log('myResolver conytract Address: ' + myResolver.address)
16    await myResolver.deployed()
17    let myAddr = await myResolver.resolve()
18    console.log('myResolver resolve: ' + myAddr)
19    expect(myAddr).to.equal('0xd8dA6BF26964aF9D7eEd9e03E53415D37aA96045')
20  })
21}
```

```
1 import { ethers } from 'ethers'
2 const { expect } = require('chai')
3
4 describe("Storage", function () {
5   it("test initial value", async function () {
6     const signer = await ethers.getSigners();
7     // let MyResolver = new ethers.ContractFactory(metadata.abi, metadata.data.bytecode)
8     const MyResolver = await ethers.getContractFactory("MyResolver");
9
10    let myResolver = await MyResolver.connect(signer[0]).deploy();
11    // const result = await deploy('Storage', [])
12    // let myResolver = await myResolver.deploy();
13
14    await myResolver.deployed()
15    console.log('myResolver conytract Address: ' + myResolver.address)
16
17    let myAddr = await myResolver.resolve()
18    console.log('myResolver resolve: ' + myAddr)
19    expect(myAddr).to.equal('0xd8dA6BF26964aF9D7eEd9e03E53415D37aA96045')
20  })
21}
```

# GIT

✓ > □

Repository Name: mochaTest

Branch Name: ↗ main

Storage : 0.45 MB used (0 %)

Messages : update mocha2

## ▶ SOURCE CONTROL

↓ ↑ ⌂ ⌂

## ▶ COMMANDS

## ▶ COMMITS

↓ ↑ ⌂ ⌂

## ▼ BRANCHES

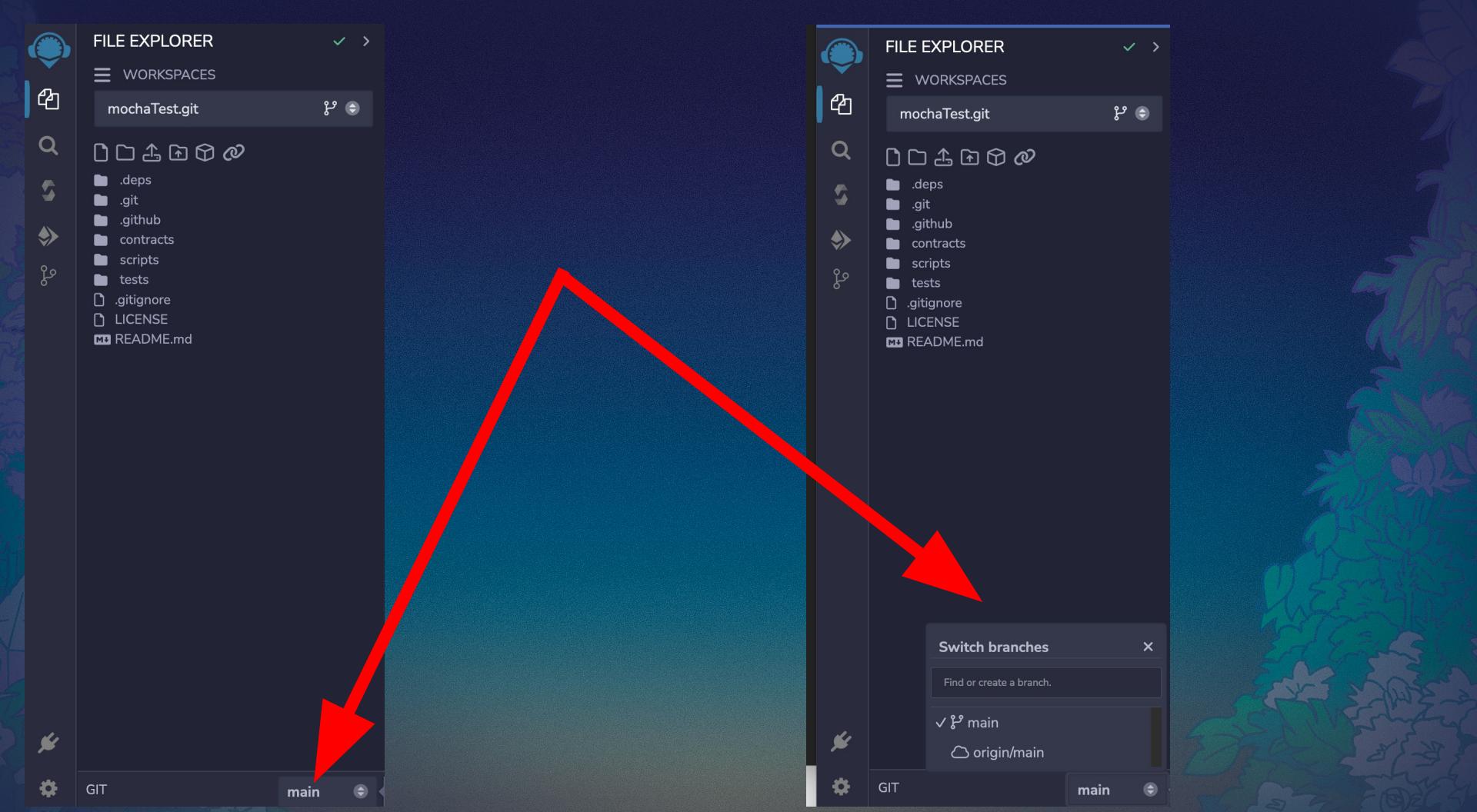
↗ main

○ ⌂ ⌂

### CREATE BRANCH

branch name

create new branch



GIT

✓ > □

► BRANCHES

► REMOTES

▼ CLONE

Fetch Repositories from GitHub

Type to search for a repository... |

url

branch

clone

OPTIONS

--depth 1



Clone all branches

## FILE EXPLORER

### WORKSPACES

Hash Checker - 2



.deps  
circuits  
scripts  
groth16

plonk

ts plonk\_trusted\_setup.ts  
ts plonk\_zkproof.ts

templates

zk

main.zok

proof.json

README.md

verification\_key.json



⚠ Scam Alert

Initialize as git repo

## FILE EXPLORER

### WORKSPACES

Hash Checker - 2



.deps  
circuits  
scripts  
groth16

plonk

ts plonk\_trusted\_setup.ts  
ts plonk\_zkproof.ts

templates

zk

main.zok

proof.json

README.md

verification\_key.json



>

↻

main



# Git

No complicated Git commands like

- **Cherrypicking**
- **Rebasing**

# Remix Guide

The Native IDE for Web3 Development.

Website [Remix Desktop](#)

Search Documentation

Explore. Prototype. Create.

[Start Coding](#) [ZK Semaphore](#) [ERC20](#)

[Uniswap V4 Hooks](#) [NFT / ERC721](#)

[MultiSig](#)

Recent Workspaces

- blank - 2
- blank - 1
- Basic - 9

Files

[New](#) [Open](#) [Gist](#) [Clone](#)

[Connect to Local Filesystem](#)

Featured

WATCH TO LEARN

Video Tips from the Remix Team

Remix has a growing library of videos containing lots of tips for using the tool. Check them out and subscribe to get our latest uploads.

[Watch](#)

Featured Plugins

**SOLIDITY ANALYZERS**  
Analyze your code using Remix, Solhint and Slither.

**LEARNETH TUTORIALS**  
Learn about Remix, Solidity, and other Web3 projects.

**COOKBOOK**  
Find smart contracts, solidity libraries, and discover protocols.

0  Listen on all transactions  Filter with transaction hash or address

# Remix Guide

PLUGIN MANAGER

guide

Connect to a Local Plugin

Inactive Modules 1

REMIX GUIDE ⓘ

Activate

Learn remix with videos

▶ 🔍 ⚡ Home | Remix Guide X

## Remix Guide

Streamlined access to categorized video tutorials for mastering Remix IDE. From fundamentals to advanced techniques, level up your development skills with ease.

Filter the list

Remix Beginner Advanced AI Plugins Solidity EVM no tag

### Remix Basics

- INTRO TO REMIX
- WORKSPACES
- REMIXD
- VERIFYING W/ ETHERSCAN
- ESSENTIAL FEATURES
- REMIX W/ HARDHAT

### Solidity Basics

- HELLO WORLD
- EVENTS
- FUNCTIONS
- PAYABLE FUNCTIONS
- STATE VARIABLES
- GAS & GAS PRICE

### Remix Techniques

- PROXY CONTRACTS
- COMPILE & RUN
- SCRIPTS
- TXN RECORDER
- SOLIDITY STATIC ANALYZERS
- ETH DOC GENERATOR

### Low Level Solidity Videos

- EVM STORAGE
- TRANSIENT STORAGE
- BIT MASKING
- STRUCTS IN STORAGE
- ARRAYS IN STORAGE



# Remix Guide

The screenshot shows the Remix IDE interface with the 'Remix Guide' plugin open. The plugin window displays a video thumbnail for a tutorial titled 'Connecting Remix Online IDE to Your Computer Filesystem'. The thumbnail features a blue gear icon inside a cloud shape, with the text 'Connecting Remix to Your Computer Filesystem' overlaid. Below the thumbnail, the text 'Remix IDE' is visible. At the bottom left of the plugin window, there is a 'Watch on YouTube' button. The main Remix IDE interface in the background shows a sidebar with 'Local Plugin' and 'Development using Remix' sections, and a central workspace with some code snippets.

ER > Remix Guide

Remix Guide

Streamlined access to categorized video tutorials for mastering Remix IDE. From fundamentals to advanced techniques, level up your development skills with ease.

Connecting Remix Online IDE to Your Computer Filesystem

Watch later Share

Connecting Remix to Your Computer Filesystem

Remix IDE

Watch on YouTube

Close

Local Plugin

Development using Remix

Permissions

REMIX W/ HARDHAT

GAS & GAS PRICE

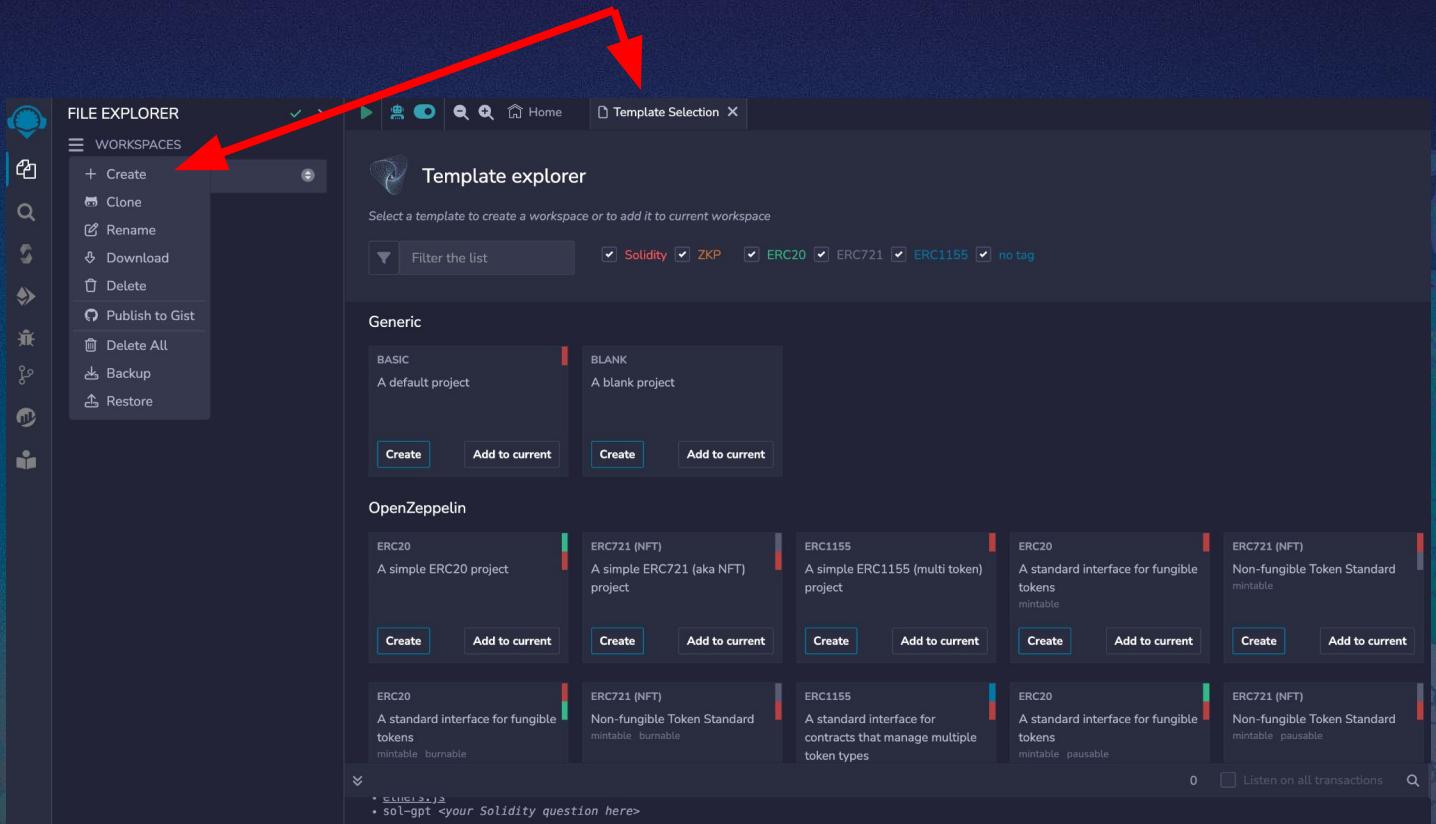
ETH DOC GENERATOR

```
• web3.js
• ethers.js
• sol-gpt <your Solidity question here>
```

Type the library name to see available commands.

# Templates

Click Create to get the Template explorer



# Template explorer has scripts too!

The screenshot shows the Hardhat Template Explorer interface. At the top, there's a navigation bar with icons for play, settings, search, and home, followed by the title "Template Selection". Below the navigation, there are several sections:

- Solidity CREATE2**:
  - ADD CREATE2 SOLIDITY FACTORY**: Factory for deploying a contract using the CREATE2 opcode. Includes "Create" and "Add to current" buttons.
  - ADD CONTRACT DEPLOYER SCRIPT**: Script for deploying a contract using the CREATE2 opcode. Includes "Create" and "Add to current" buttons.
- Contract Verification**:
  - ADD ETHERSCAN SCRIPTS**: Script for verifying a Contract in Etherscan. Includes "Create" and "Add to current" buttons.
- GitHub Actions**:
  - MOCHA CHAI TEST WORKFLOW**, **SOLIDITY TEST WORKFLOW**, and **SLITHER WORKFLOW** tabs.
  - A dropdown menu is open under "GitHub Actions" with the following items:
    - [ethers.js](#)
    - [sol-gpt <your Solidity question here>](#)

At the bottom, there are footer elements: a transaction count of 0, a checkbox for "Listen on all transactions", a magnifying glass icon, and a "Filter with transaction ID" input field.

# Updates in Deploy & Run

DEPLOY & RUN TRANSACTIONS

ENVIRONMENT   
Injected Provider - MetaMask

ACCOUNT   
Sepolia (11155111) network  
0x058...6E26B (86.4647256537)

GAS LIMIT  
 Estimated Gas  
 Custom 3000000

VALUE  
0 Wei

CONTRACT  
Owner - contracts/2\_Owner.sol

evm version: canary

Deploy

Publish to IPFS

At Address Load contract from Address:

Transactions recorded 1

Deployed Contracts 1

OWNER AT 0X463..82863   
Balance: 0 ETH

changeOwner address newOwner

# Cookbook



COOKBOOK.DEV

COOKBOOK.DEV

Cookbook.dev

Copilot

Search



Contracts Protocols

Simple ERC20 Token

OpenZeppelin

★ 10622

ERC20 token with the following features:-  
- Premint your total supply.  
- No minting function. This allows users to comfortably know the future supply of the token.

[View Docs and Stats](#)

Audited

Flash loan Attacker

Aave

★ 5393

This contract is an attacker contract that utilizes flash loans to borrow assets from a lending pool, supply assets to the pool, and execute operations to mint and return tokens with a premium.

[View Docs and Stats](#)

Dividend Paying Token with Buy/Sell Fee

COOKBOOK.DEV

Cookbook.dev

Search



Currently Reading: balance.cairo

Find any smart contract,  
Build your project faster.

Find smart contracts, solidity libraries, and discover protocols.

Search Keywords or Contract Address

Uniswap V4 Hacks Simple ERC20 Token Linear Blockchain

1,000+ Web3 Resources

Learn, Build, Deploy



Hey, I'm Richard. I can help answer any questions about Solidity or Web3 that you might have. Ask away!

How does this contract work?

What's the Solidity version?

How can I deploy this?

Ask a question

Submit

# Updates in Deploy & Run

DEPLOY & RUN TRANSACTIONS

ENVIRONMENT Injected Provider - MetaMask

ACCOUNT 0x058...6E26B (86.46.7256537)

GAS LIMIT Estimated Gas

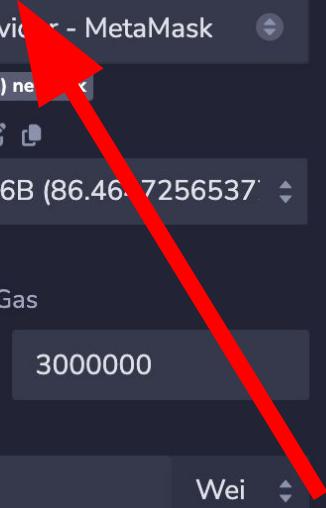
Custom 3000000

VALUE 0 Wei

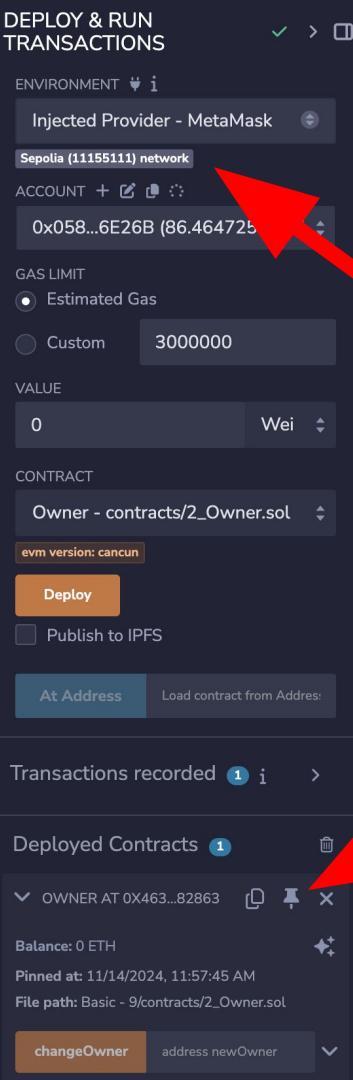
CONTRACT Owner - contracts/2\_Owner.sol

evm version: cancun

Publish to IPFS



# Pinning



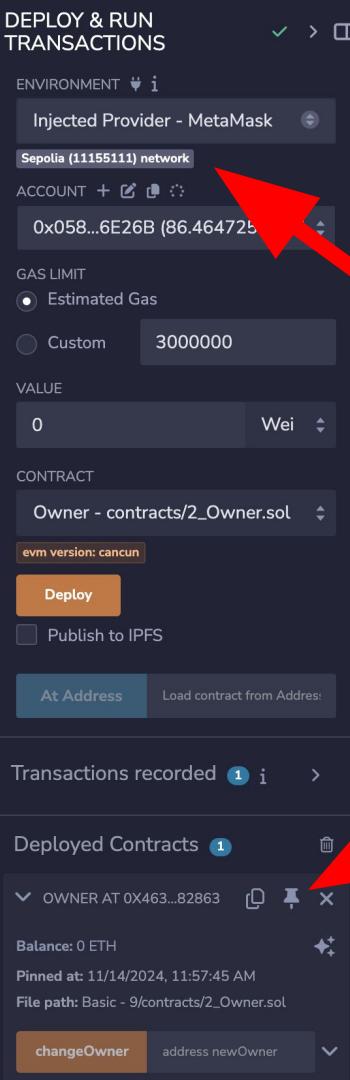
Pinning

# Pinning a contract

Works in the public & private networks.

To see the pinned contract,  
You have to be in the same:

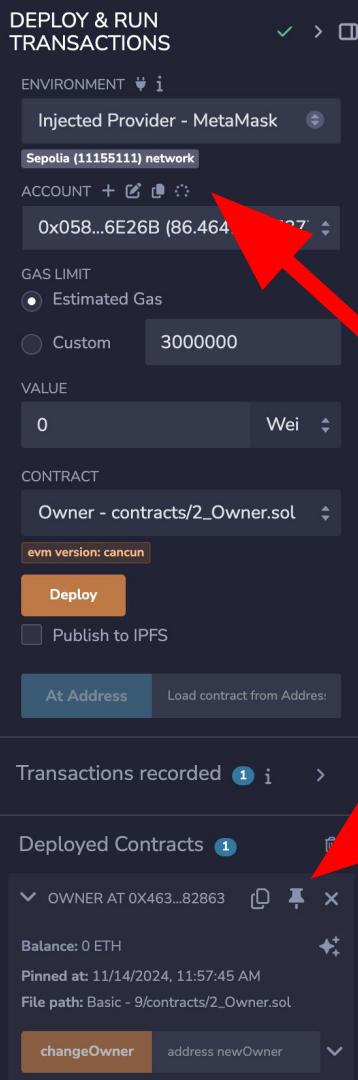
- **Workspace**
- **Network**



# Pinning a contract

No more:

- Refreshing and losing your work
- Forgetting your contact's address



# Message Signing

Now with:

- EIP 712

## DEPLOY & RUN TRANSACTIONS



ENVIRONMENT

Injected Provider - MetaMask

Sepolia (11155111) network

ACCOUNT +

0x058...6E26B (0.4014841082)

GAS LIMIT

Estimated Gas

Custom

3000000

VALUE

0

Wei



Home

MyToken.sol X

```
1 // SPDX-Licenses
2 pragma solidi
3
4 import "@openz
5 import "@openz
6 import "@openz
7 import "@openz
8
9 contract MyTo
10     constructo
11         ERC20(
12             Ownab
13             ERC20I
14         {}
15
16         function m
17             _mint(to, amount);
18         }
19     }
20 }
```

## Sign a message



Enter a message to sign and click 'Sign'

otherwise

**Sign with EIP 712**

**Sign**

**Cancel**

# Remix VM Updates

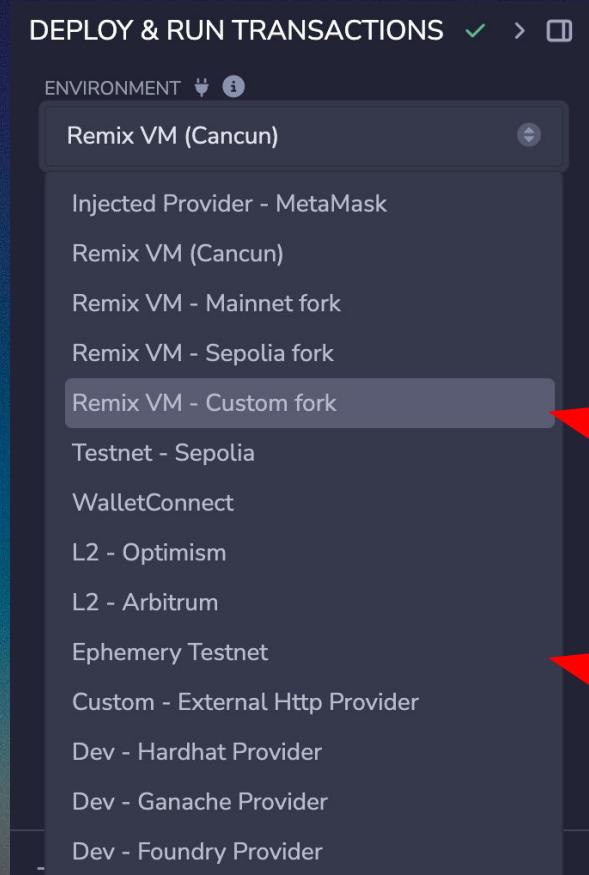
- Saving State
- Forking

Share the state too!

The screenshot shows the Remix IDE interface. On the left is the "DEPLOY & RUN TRANSACTIONS" tab, which includes fields for ACCOUNT (0x5B3...eddC4), GAS LIMIT (Estimated Gas or Custom 3000000), VALUE (0 Wei), CONTRACT (Owner - contracts/2\_Owner.sol), and an EVM version dropdown (cancun). It also has Deploy and Publish to IPFS buttons, and tabs for At Address and Load contract from Address. Below this are sections for Transactions recorded, Pinned Contracts (network: vm-cancun), and Deployed/Unpinned Contracts, with a note that no pinned contracts were found. On the right is the "FILE EXPLORER" tab under WORKSPACES, showing a workspace named "Basic - 2". The file tree includes .deps, .learneth, .states, and a folder "vm-cancun" which is expanded to show state.json, artifacts, contracts, artifacts, 1\_Storage.sol, 2\_Owner.sol, 3\_Ballot.sol, balance.cairo, scripts, tests, .prettierrc.json, and README.txt. A large red arrow points from the text "Share the state too!" towards the "vm-cancun" folder in the file explorer.

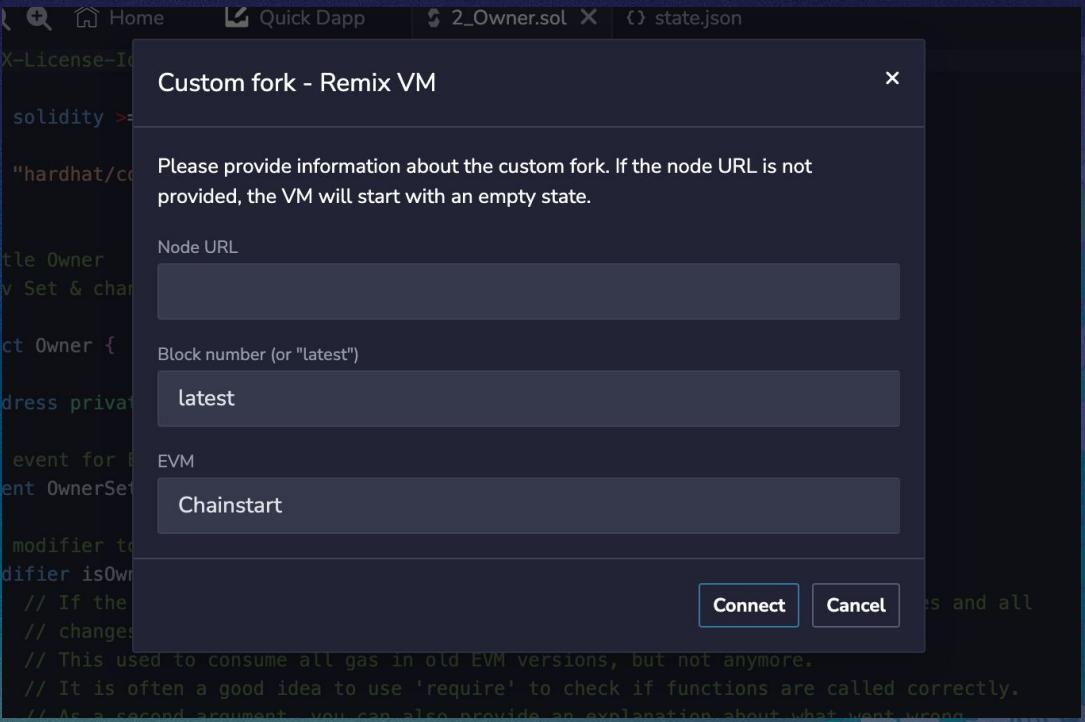
# Remix VM Updates

- Saving State
- Forking



# Remix VM Updates

- Saving State
- Forking



# Remix VM Updates

Customizing the list

DEPLOY & RUN  
TRANSACTIONS

ENVIRONMENT  ⓘ

Remix VM (Cancun) ⚙️

Injected Provider - MetaMask

---

Remix VM (Cancun)

Remix VM - Mainnet fork

Remix VM (Shanghai)

Remix VM (Paris)

Remix VM (London)

Remix VM (Berlin)

---

WalletConnect

Custom - External Http Provider

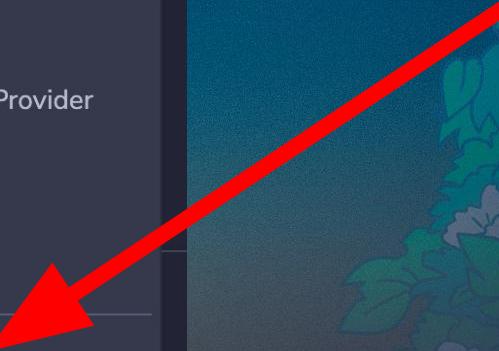
Dev - Hardhat Provider

Dev - Ganache Provider

Dev - Foundry Provider

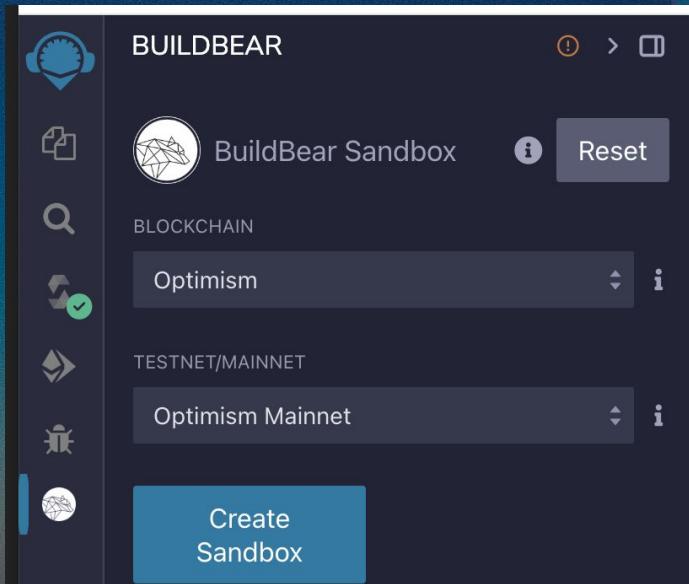
---

Customize this list...



# Beyond the Remix VM → BuildBear

- Create a sandbox on their server
- Deploy w/ Browser Wallet to the sandbox
  - ◆ Private testnet
  - ◆ Faucet
  - ◆ Explorer



# Environments Explorer

If you don't see what you expect in the Environments section, check the Customize this list option.

The screenshot shows the 'Environments Explorer' interface. On the left, there's a sidebar with various icons and sections like 'PUBLICAR Y EJECUTAR TRANSACCIONES', 'ENTORNO', 'REMIX VM (Cancun)', and 'Customize this list...'. A red arrow points from the text in the main content area to the 'Customize this list...' button in the sidebar. The main content area has a title 'Customize the Environments list in Deploy & Run' and instructions: 'Select the providers and chains to include them in the ENVIRONMENT select box of the Deploy & Run Transactions plugin.' It lists several deployment options under 'Deploy using a Browser Extension' and 'Deploy to an In-browser Virtual Machine.'

PUBLICAR Y EJECUTAR TRANSACCIONES

ENTORNO

REMIX VM (Cancun)

Customize this list...

Transacciones grabadas 0

Contratos Publicados 0

Customize the Environments list in Deploy & Run

Select the providers and chains to include them in the ENVIRONMENT select box of the Deploy & Run Transactions plugin.

Filter the list

Deploy using a Browser Extension.

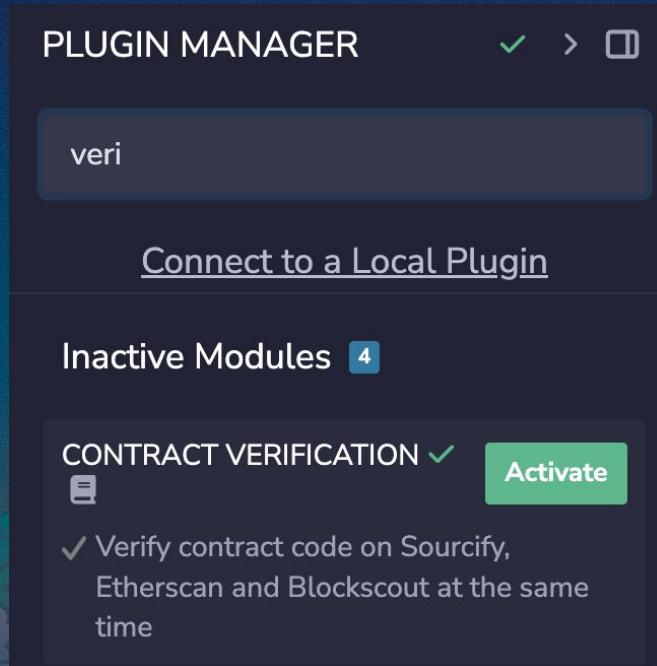
- INJECTED PROVIDER - META... Deploy through the Metamask browser extension.
- L2 - OPTIMISM - META... Deploy to Optimism through the Metamask browser extension.
- L2 - ARBITRUM - META... Deploy to Arbitrum through the Metamask browser extension.
- SEPOLIA TESTNET - META... Deploy to the Sepolia testnet through the Metamask browser extension.
- EPHEMERY TESTNET - META... Deploy to the Ephemery testnet through the Metamask browser extension.
- GNOSIS MAINNET - ME... Deploy to Gnosis through the Metamask browser extension.

Deploy to an In-browser Virtual Machine.

- REMIX VM (CANCUN) Deploy to the in-browser virtual machine running the Cancun fork.
- REMIX VM (SHANGHAI) Deploy to the in-browser virtual machine running the Shanghai fork.
- REMIX VM (PARIS) Deploy to the in-browser virtual machine running the Paris fork.
- REMIX VM (LONDON) Deploy to the in-browser virtual machine running the London fork.
- REMIX VM (BERLIN) Deploy to the in-browser virtual machine running the Berlin fork.

# Verification Plugin

→ Verify on 4 services at once



# Verification Plugin

PLUGIN MANAGER ✓ > □

veri

Connect to a Local Plugin

Inactive Modules 4

CONTRACT VERIFICATION ✓

✓ Verify contract code on Sourcify, Etherscan and Blockscout at the same time

CONTRACT VERIFICATION ✓ > □

Verify Receipts Lookup Settings

Verify compiled contracts on different verification services

Chain Select a chain

Contract Address 0x2738d13E81e...

Contract Name Owner - contracts/2\_Owner.sol

The deployed contract is behind a proxy

Verify on:

Sourcify

Etherscan

Blockscout

Routescan

Verify

# Verification Plugin

CONTRACT VERIFICATION ✓ > ⚙️

Verify Receipts Lookup Settings

Verify compiled contracts on different verification services

Chain

sepol

Ethereum Testnet Sepolia (11155111)

Linea Sepolia Testnet (59141)

Nanon Sepolia Rollup Testnet (27483)

Karak Testnet Sepolia (8054)

Kroma Testnet Sepolia (2358)

Sepolia PGN (Public Goods)

CONTRACT VERIFICATION ✓ > ⚙️

Verify Receipts Lookup Settings

Check the verification statuses of contracts submitted for verification

▼ OWNER AT 0X48E...2818F

Chain: Sepolia (11155111)  
File: contracts/2\_Owner.sol  
Submitted at: 10/22/2024, 10:15:00 PM  
Verified at:

Sourcify ✓ 🔗

Etherscan ✓ 🔗

Blockscout ✓ 🔗

CONTRACT VERIFICATION ✓ > ⚙️

Verify Receipts Lookup Settings

Customize settings for each verification service and chain

Chain

Ethereum Testnet Sepolia (11155111)

**Sourcify - Sepolia**

API URL  
<https://sourcify.dev/server>

Repo URL  
<https://repo.sourcify.dev>

**Etherscan - Sepolia**

API Key  
Add API Key

API URL  
<https://api-sepolia.etherscan.io>

Explorer URL  
<https://sepolia.etherscan.io>

**Blockscout - Sepolia**

# QuickDapp: generate a basic DApp

- Only on public networks
- Choose the functions to show
- Explain the functions
- Choose the subdomain
- Link back to Remix to show your code

# QuickDapp

DEPLOY & RUN TRANSACTIONS

ENVIRONMENT

Injected Provider - MetaMask

Sepolia (11155111) network

ACCOUNT

0x058...6E26B (96.558642177921)

GAS LIMIT

Estimated Gas

Custom 3000000

VALUE

0 Wei

CONTRACT

MyToken - contracts/MyToken.sol

evm version: canary

0x05854cA140caB11e2f5AAb

Publish to IPFS

Load contract from Address

Transactions recorded 2

Pinned Contracts (network: 11155111)

MYTOKEN AT 0X01D...79237

Deployed/Unpinned Contracts

MYTOKEN AT 0XCE5...ED682 (B)



# QuickDapp

## DEPLOY & RUN TRANSACTIONS

Deployed Contracts 1

▼ MYTOKEN AT 0X3AE...B655



Balance: 0 ETH



approve

address spender, uint256



burn

uint256 value



burnFrom

address account, uint256



mint

address to, uint256 amou



permit

address owner, address



renounceOwn...

transfer

address to, uint256 val



transferFrom

address from, address t



transferOwne...

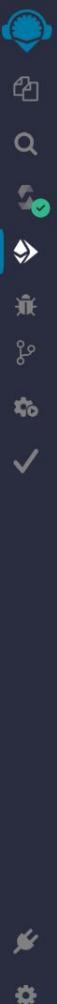
address newOwner



allowance

address owner, address





## DEPLOY & RUN TRANSACTIONS

Deployed Contracts <span>1</span>	
▼	MYTOKEN AT 0X3AE...B655
Balance:	0 ETH
approve	address spender, uint256
burn	uint256 value
burnFrom	address account, uint256
mint	address to, uint256 amount
permit	address owner, address
renounceOwnership	
transfer	address to, uint256 value
transferFrom	address from, address to
transferOwnership	address newOwner
allowance	address owner, address
balanceOf	address account
decimals	
DOMAIN_SEPARATOR	
eip712Domain	
name	
nonces	address owner
owner	

▶ 🔍 🔎 🏠 MyToken.sol Quick Dapp X

A logo is optional  
and should be  
95px x 95px.

Select Logo

Dapp Title

Dapp Instructions

Column A

Column B

Title of function

approve address spender, uint256

Instructions for function

Title of function

burn uint256 value

Instructions for function

Title of function

burnFrom address account, uint256

Instructions for function

Title of function

balanceOf address account

Instructions for function

Title of function

decimals

Instructions for function

Title of function

DOMAIN\_SEPARATOR

Instructions for function

+ Add column

0 Listen on all transactions Filter with transaction hash or address

## QuickDapp Admin

Reset Functions

Delete Dapp

QuickDapp deploys to Surge.sh.  
Surge accounts are free until you  
reach a level of use. The email &  
password you input below will register  
you with a Surge account. The  
subdomain is your choice but it must  
be unique. [More about surge.sh](#)

EMAIL

fred@dkdnealeke.com

PASSWORD

.....

SUBDOMAIN

https:// Unique subdo .surge.sh

SHARE TO (OPTIONAL)

Twitter  Facebook

USE NATSPEC (OPTIONAL)



VERIFIED BY ETHERSCAN (OPTIONAL)

Verified

NO TERMINAL (OPTIONAL)

No

THEMES

Dark - dark



Deploy

👋 I'm here to help you!



# Verify it

CONTRACT VERIFICATION ✓ > □

Verify Receipts Lookup Settings

Verify compiled contracts on different verification services

Chain

Ethereum Testnet Sepolia (11155111)

Contract Address

0x3AeF8068943A54472f5159B5E47!

Contract Name

Owner - contracts/2\_Owner.sol

The deployed contract is behind a proxy

Verify on:

Sourcify  
<https://sourcify.dev/server>

Etherscan  
<https://api-sepolia.etherscan.io>

Blockscout  
<https://eth-sepolia.blockscout.com>

Routescan  
<https://api.routescan.io/v2/network/testne...>

Verify

This is a DApp used for managing a coin called BOB.

Column A	Column B	Column C
Title of function <b>mint</b> address to, uint256 amount	Title of function <b>name</b>	Title of function <b>owner</b>
Instructions for function	Instructions for function	Instructions for function
Title of function <b>approve</b> address spender, uint256 v	Title of function <b>totalSupply</b>	Title of function <b>symbol</b>
Instructions for function	Instructions for function	Instructions for function

Reset Functions    Delete Dapp

QuickDapp deploys to Surge.sh. Surge accounts are free until you reach a level of use. The email & password you input below will register you with a Surge account. The subdomain is your choice but it must be unique. More about [surge.sh](#)

EMAIL

PASSWORD

SUBDOMAIN

SHARE TO (OPTIONAL)  
 Twitter     Facebook

USE NATSPEC (OPTIONAL)

VERIFIED BY ETHERSCAN (OPTIONAL)  
 Verified

NO TERMINAL (OPTIONAL)  
 No Terminal

THEMES

Deploy

If its a verified contract (on etherscan), there will be a link back to Remix with the source code loaded.

## SUBDOMAIN

 herring

.surge.sh

## SHARE TO (OPTIONAL)

 Twitter  Facebook

## USE NATSPEC (OPTIONAL)



## VERIFIED BY ETHERSCAN (OPTIONAL)

 Verified

## NO TERMINAL (OPTIONAL)

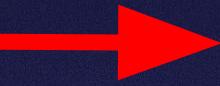
 No Terminal

## THEMES

Dark - dark

**Deploy**

this domain belongs to someone  
else



## SUBDOMAIN

 https:// bobtoken

.surge.sh

## SHARE TO (OPTIONAL)

 Twitter  Facebook

## USE NATSPEC (OPTIONAL)



## VERIFIED BY ETHERSCAN (OPTIONAL)

 Verified

## NO TERMINAL (OPTIONAL)

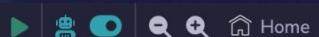
 No Terminal

## THEMES

Dark - dark

**Deploy**

Deployed successfully!  
Click the link below to view your  
dapp  
<https://bobtoken.surge.sh>



Home

MyToken.sol

Quick Dapp X

Column A

Column B

Column C

Start with this one

**mint** address to, uint256 amount

You can't do much with a coin unless there is some of the coin to do something with.

Title of function

**approve** address spender, uint256 v

Instructions for function

Title of function

**name**

Did you forget the name of the coin already - if so click this function.

The Total Supply

**totalSupply**

Instructions for function

The Owner

**owner**

Find out who is the owner.

Title of function

**symbol**

Instructions for function

register you with a Surge account.  
The subdomain is your choice but it must be unique. More about [surge.sh](#)

EMAIL

fifi@ficklenickletickle.com

PASSWORD

.....

SUBDOMAIN

**https://** bobtoken **.surge.sh**

SHARE TO (OPTIONAL)



USE NATSPEC (OPTIONAL)



VERIFIED BY ETHERSCAN (OPTIONAL)



NO TERMINAL (OPTIONAL)



THEMES

Dark - dark



Deploy

## Yet Another Coin Example

This is a DApp used for managing a coin called BOB.

### Start with this one

**mint**

address to, uint256 amount

**name**

Did you forget the name of the coin already - if so click this function.

**approve**

address spender, uint256 value

### The Total Supply

**totalSupply**

### The Owner

**owner**

Find out who is the owner.

**symbol**

MYTOKEN AT 0XCE5...ED682

BALANCE: 0 ETH

EN

Environment

MetaMask

Sepolia (11155111) network

Account

0x058...6E26B (96.5586421779213077)

Gas limit

3000000

Value

0

Wei

QuickDapp by

[View Source Code](#)



## Rooster Coin

This is an example of a coin that needs to crow but to not eat crow.

**mint**

address to, uint256 amount

Input an address and the number of coins.

**transfer**

address to, uint256 value

**transferFrom**

address from, address to, uint256 value

### How many of these are there?

balanceOf

address account

name

### Get the owner's address.

owner

symbol

Do you know what the symbol is?

MYTOKEN AT 0X3AE...B6550

BALANCE: 0. ETH

EN

#### Environment

MetaMask

Sepolia (11155111) network

#### Account

0x058...6E26B (86.4614841082806!)

#### Gas limit

3000000

#### Value

0

Wei

#### Low level interactions

i

CALLDATA

Transact

QuickDapp by



# Remix Desktop (now in Beta)

- Access to the Terminal
- Work offline
- Save your work on the hard drive
- Code in VSCode & do the web3 stuff in Remix
- Coming Soon...
  - ◆ ZKCircuits
  - ◆ Local Vyper compiler

Remix - Ethereum IDE

FILE EXPLORER

Open Folder

Recent Folders

- desktop1 /Users/bcamionette/Documents...
- uniswap /Users/bcamionette/Documents...
- vyper-a /Users/bcamionette/Documents/...
- remix-desktop-beta2 /Users/bcamionette...
- remix-desktop-beta /Users/bcamionette/...
- new-mess /Users/bcamionette/Documents...
- mess /Users/bcamionette/Documents/et...
- hardhat1 /Users/bcamionette/Documents...

REMIX  The Native IDE for Web3 Development.

Website [Remix Desktop](#)

Search Documentation 

Explore. Prototype. Create.

**Start Coding** **ZK Semaphore**

**ERC20** **Uniswap V4 Hooks**

**NFT / ERC721** **MultiSig**

Files

Load from

**Project Template** **Clone a Git Repository** **Gist**

**Output**

Foundry plugin activated  
Hardhat plugin activated  
App is already up to date.

0 Listen on all transactions Filter with transaction hash or address

EN

Featured

 What's New

v0.51.0 RELEASE HIGHLIGHTS

- Integration of SolidityScan to analyze code for vulnerabilities
- 'eth\_signTypedData' supported in remix-simulator
- Home tab updated & status bar introduced

[Read More](#)

Featured Plugins

 SOLIDITY ANALYZERS

Analyze your code using Remix, Solhint and Slither.

 COOKBOOK

Find smart contracts, solidity libraries, and discover protocols.

 SOLIDI

Compile, test, and smart contracts.

Scam Alert 

FILE EXPLORER

REMX

The Native IDE for Web3 Development.

Website Remix Desktop

Search Documentation

Explore. Prototype. Create.

Start Coding ZK Semaphore

ERC20 Uniswap V4 Hooks

NFT / ERC721 MultiSig

Files

Load from

Project Template Clone a Git Repository Gist

Output Foundry plugin activated Hardhat plugin activated App is already up to date.

0 Listen on all transactions Filter with transaction hash or address

EN

Featured

WATCH TO LEARN

Video Tips from the Remix Team

Remix has a growing library of videos containing lots of tips for using the tool. Check them out and subscribe to get our latest uploads.

Watch

Featured Plugins

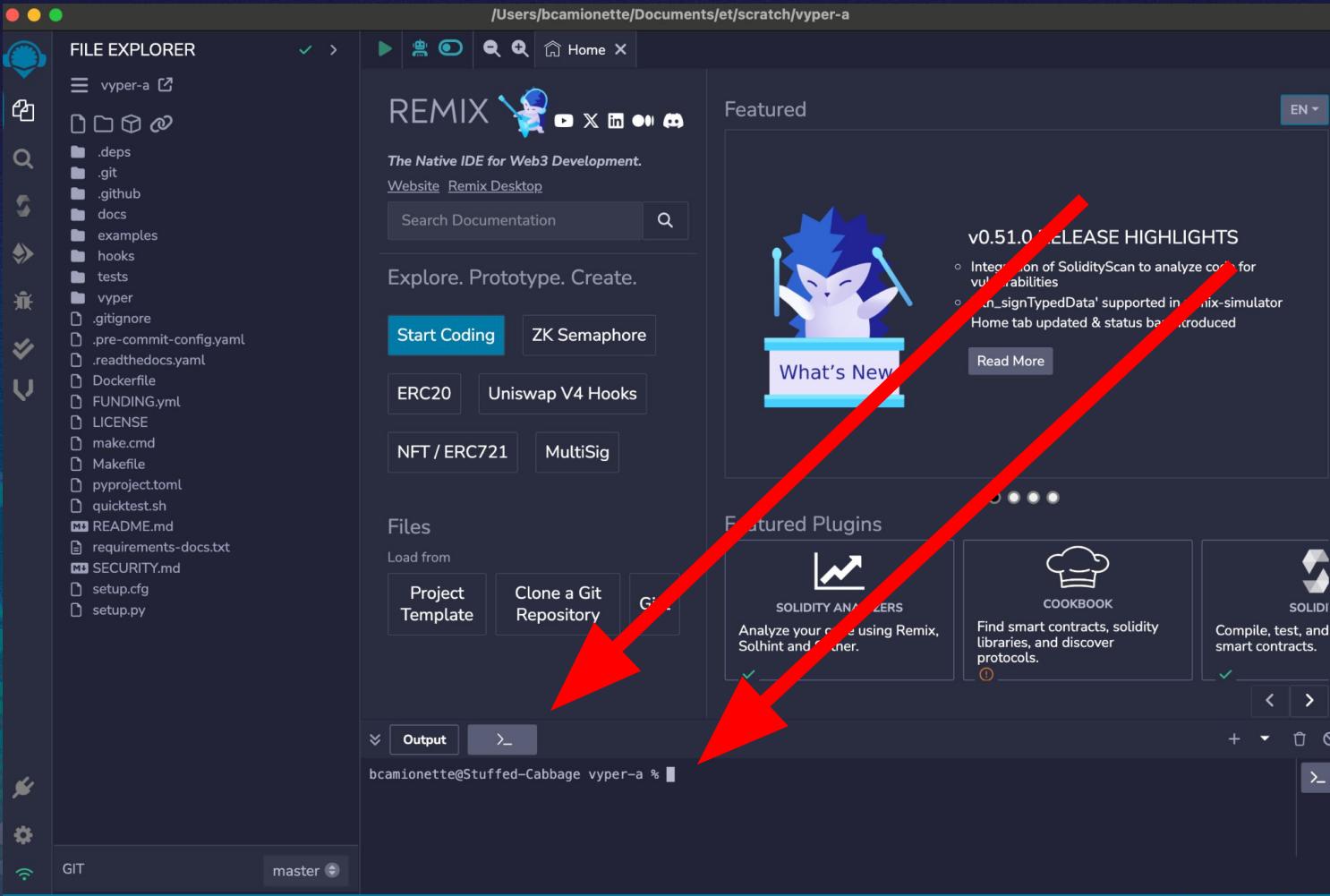
SOLIDITY ANALYZERS Analyze your code using Remix, Solhint and Slither.

COOKBOOK Find smart contracts, solidity libraries, and discover protocols.

SOLIDI Compile, test, and smart contracts.

Scam Alert Remix Copilot

# Access to the Terminal



# Work offline

FILE EXPLORER

desktop1

- .deps
- .states
- contracts
  - artifacts
    - 1\_Storage.sol
    - 2\_Owner.sol
    - 3\_Ballot.sol
    - MyToken.sol
  - scripts
  - tests
- prettierrc.json
- README.txt

2\_Owner.sol

```
// SPDX-License-Identifier: GPL-3.0
pragma solidity >=0.7.0 -<0.9.0;

import "hardhat/console.sol";

/**
 * @title Owner
 * @dev Set & change owner
 */
contract Owner {
    address private owner;

    // event for EVM logging
    event OwnerSet(address indexed oldOwner, address indexed newOwner);

    // modifier to check if caller is owner
    modifier owner() {
        // If the first argument of 'require' evaluates to 'false', execution terminates and changes to the state and to Ether balances are reverted.
        // This used to consume all gas in old EVM versions, but not anymore.
        // It is often a good idea to use 'require' to check if functions are called correctly.
        // As a second argument, you can also provide an explanation about what went wrong.
        require(msg.sender == owner, "Caller is not owner");
    }
}
```

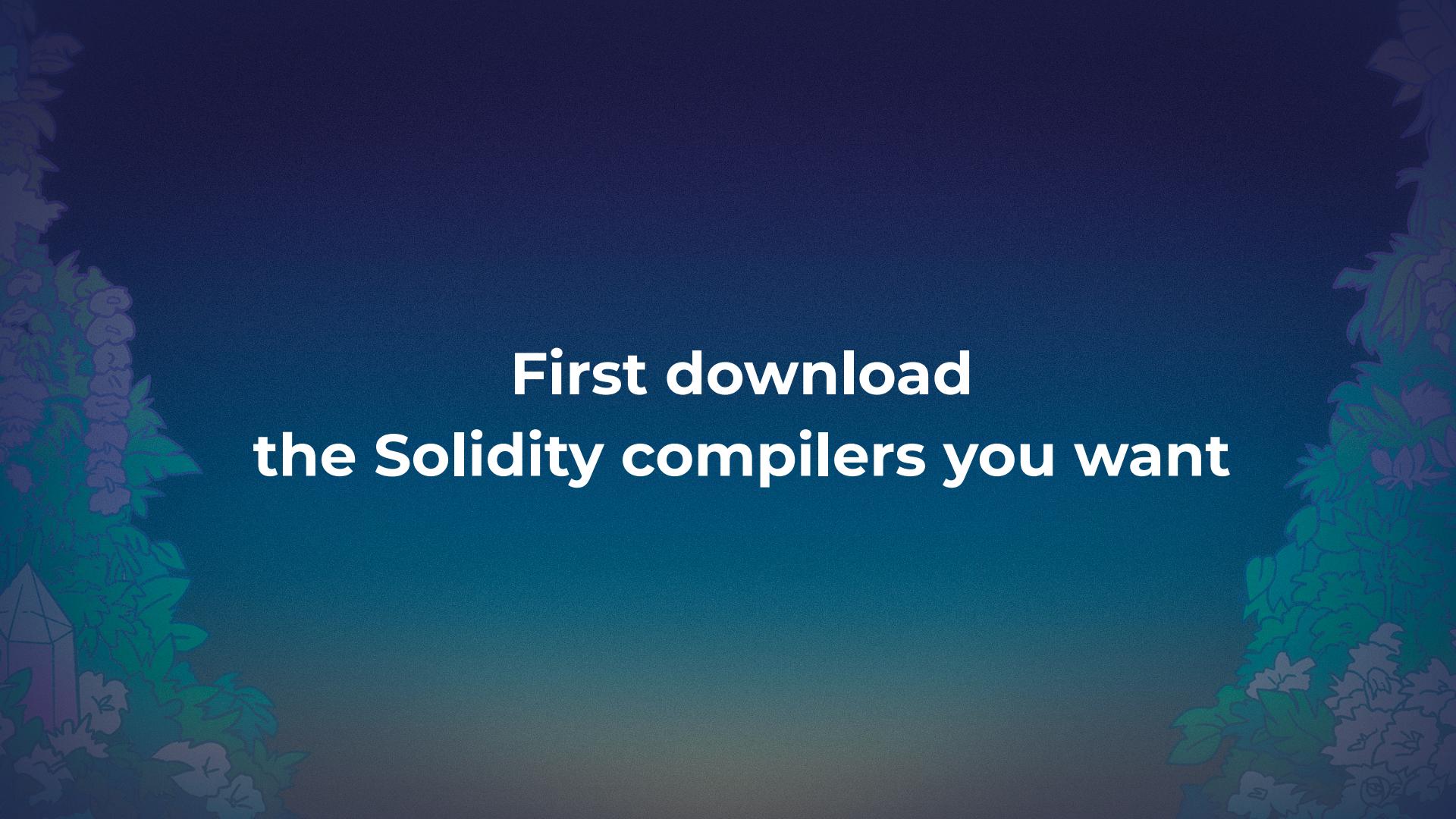
Output

The following libraries are accessible:

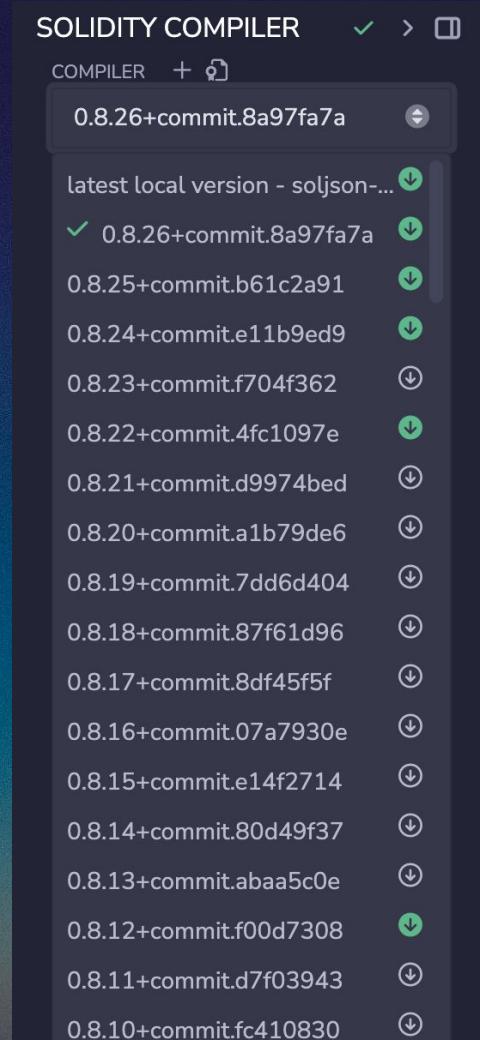
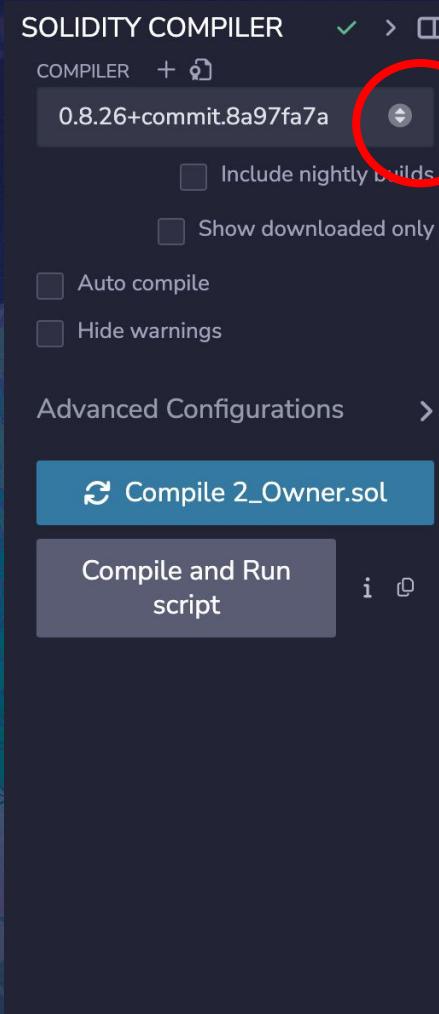
- web3.js
- ethers.js
- sol-gpt <your Solidity question here>

Type the library name to see available commands.  
Solidity copilot not activated!  
Remix Desktop version: 1.0.7-insiders  
Checking for update...  
Foundry plugin activated  
Hardhat plugin activated  
App is already up to date.

Scam Alert Remix Copilot



**First download  
the Solidity compilers you want**



**Now go offline and work**

SOLIDITY COMPILER

COMPILER + ⚡

0.8.26+commit.8a97fa7a

Include nightly builds

Show downloaded only

Auto compile

Hide warnings

Advanced Configurations >

Compile 2\_Owner.sol

Compile and Run script

Output

desktop1

2\_Owner.sol

```
// SPDX-License-Identifier: GPL-3.0
pragma solidity >=0.7.0 <0.9.0;

import "hardhat/console.sol";

/**
 * @title Owner
 * @dev Set & change owner
 */
contract Owner {

    address private owner;

    // event for EVM logging
    event OwnerSet(address indexed oldOwner, address indexed newOwner);

    // modifier to check if caller is owner
    modifier owner() {
        // If the first argument of 'require' evaluates to 'false', execution terminates and
        // changes to the state and to Ether balances are reverted.
        // This used to consume all gas in old EVM versions, but not anymore.
        // It is often a good idea to use 'require' to check if functions are called correctly.
        // As a second argument, you can also provide an explanation about what went wrong.
        require(msg.sender == owner, "Caller is not owner");
    }

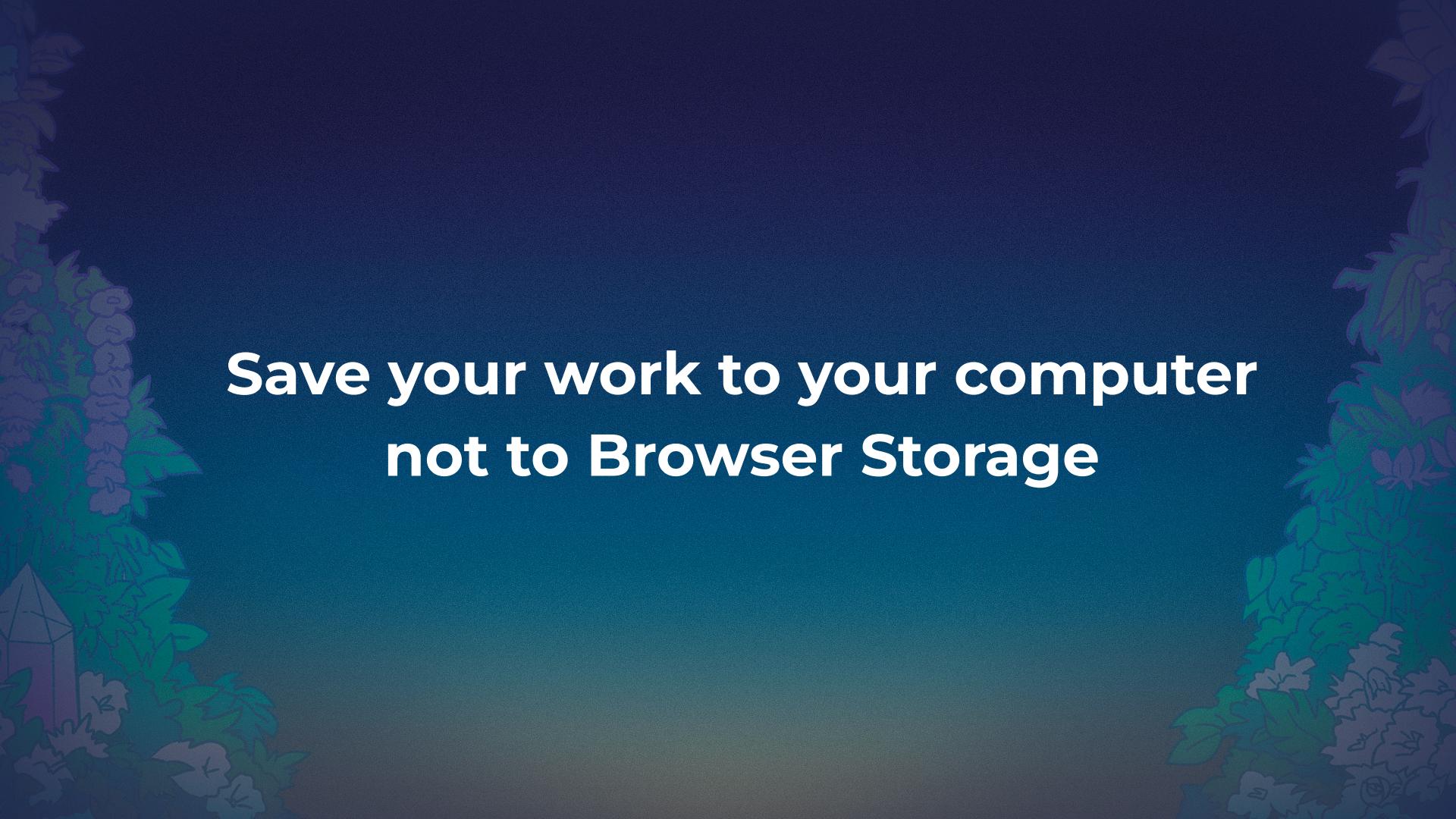
    function setOwner(address newOwner) owner() {
        owner = newOwner;
        console.log("Owner set to %s", owner);
        emit OwnerSet(owner, newOwner);
    }
}
```

The following libraries are accessible:

- web3.js
- ethers.js
- sol-gpt <your Solidity question here>

Type the library name to see available commands.  
Solidity copilot not activated!  
Remix Desktop version: 1.0.7-insiders  
Checking for update...  
Foundry plugin activated  
Hardhat plugin activated  
App is already up to date.

Scam Alert Remix Copilot



**Save your work to your computer  
not to Browser Storage**

# Each Workspace is:

- saved in its own Folder
- its own instance of Remix

Remix-Desktop-Insiders File Edit View Terminal Window Help

desktop1

SOLIDITY COMPILER 0.8.20

SOLIDITY COMPILER 0.8.26+commit.8a97fa7a

FILE EXPLORER

hardhat1

- .deps
- artifacts
- cache
- contracts
  - .deps
  - artifacts
- compiler\_config.json
- Greeter.sol
- node\_modules
- scripts
- test
- tests
- .DS\_Store
- .gitignore
- compiler\_config.json
- hardhat.config.js
- package-lock.json
- package.json
- README.md
- remix-compiler.config.js
- remix-slither-report.json

/Users/bcamionette/Documents/et/scratch/hardhat1

```
// SPDX-License-Identifier: Unlicense
pragma solidity ^0.8.0;

import "hardhat/console.sol";

/**
 * @title Greeter
 * @dev Say helloadsfasd
 */
contract Greeter {
    string private greeting;

    constructor(string memory _greeting) {
        console.log("Deploying a Greeter with greeting = " + _greeting);
    }

    function greet() public view returns (string memory) {
        return greeting;
    }

    function setGreeting(string memory _greeting) public {
        console.log("Changing greeting from " + greeting + " to " + _greeting);
        greeting = _greeting;
    }
}
```

Output

receiving compilation result from Hardhat. Select a file to populate the contract interaction interface.

synced with Hardhat: contracts/Greeter.sol

Scam Alert Remix Copilot

FILE EXPLORER

uniswap

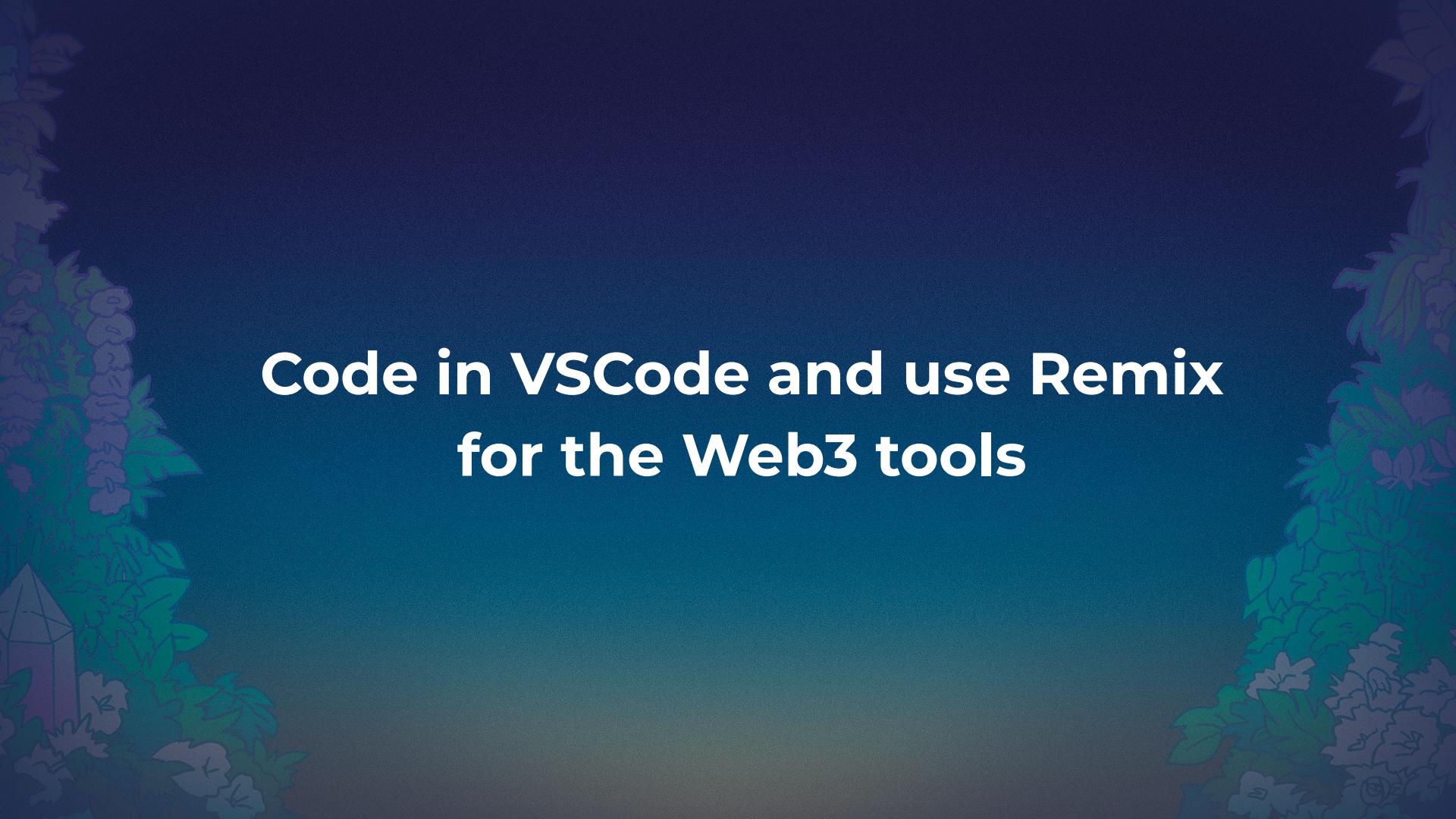
- .workspaces
- artifacts
- interfaces
  - IERC20.sol
  - IUniswapV2Callee.sol
  - IUniswapV2ERC20.sol
  - IUniswapV2Factory.sol
  - IUniswapV2Pair.sol
- libraries
- deployment.json
- UniswapV2ERC20.sol
- UniswapV2ERC201.sol
- UniswapV2Factory-freddddd.sol
- UniswapV2Pair.sol

Output

App is already up to date.

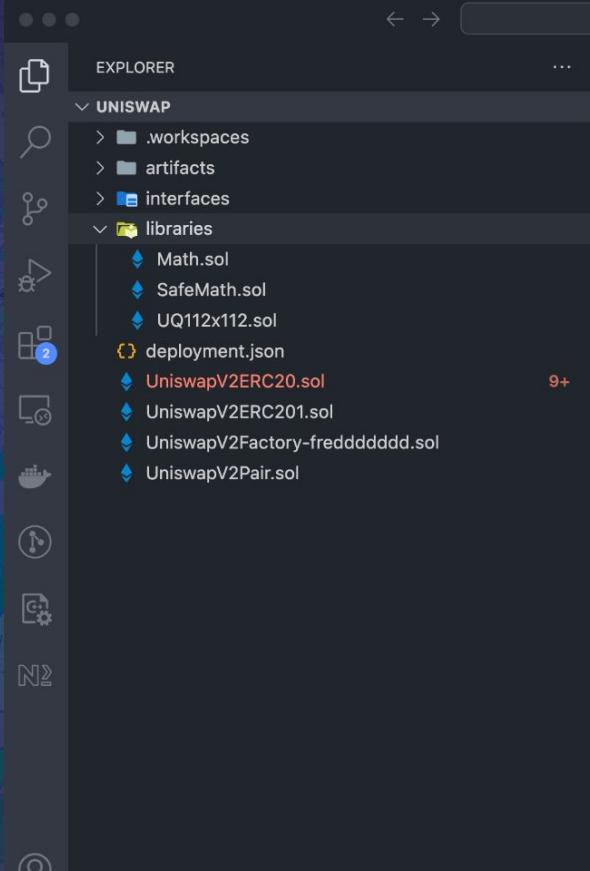
Checking for update...

App is already up to date.



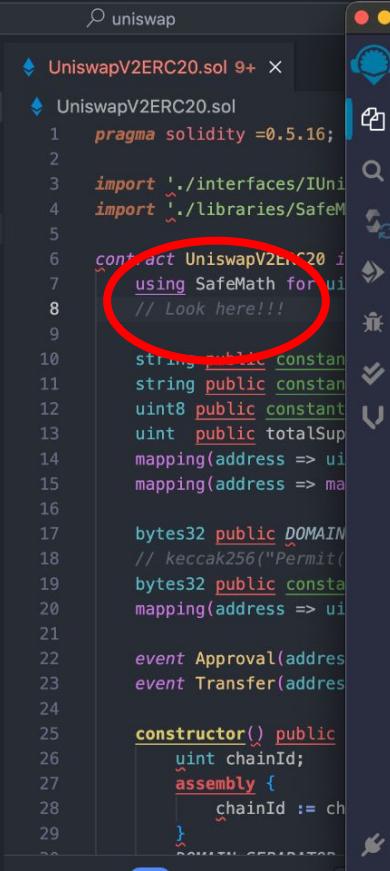
**Code in VSCode and use Remix  
for the Web3 tools**

# VSCode



The screenshot shows the VSCode interface with the following details:

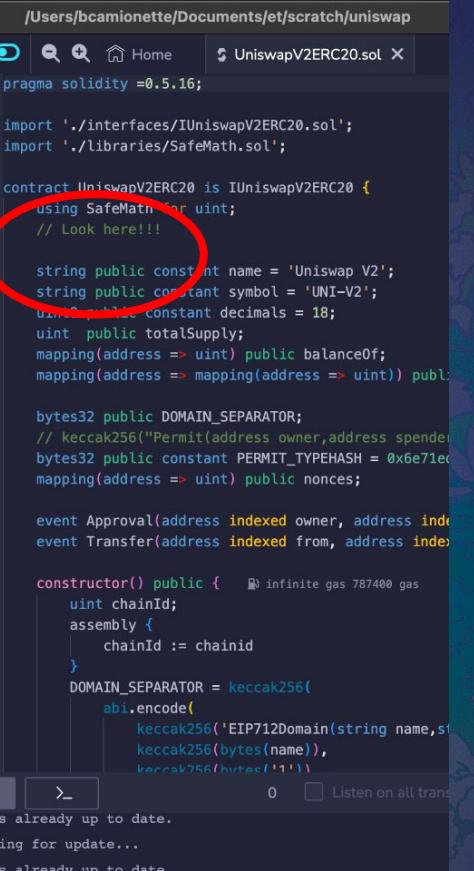
- EXPLORER** sidebar: Shows a folder named "UNISWAP" containing ".workspaces", "artifacts", "interfaces", and "libraries". The "libraries" folder is expanded, showing files: Math.sol, SafeMath.sol, UQ112x112.sol, deployment.json, UniswapV2ERC20.sol, UniswapV2ERC201.sol, UniswapV2Factory-freddddd.sol, and UniswapV2Pair.sol.
- CODE EDITOR**: The current file is "UniswapV2ERC20.sol". A red circle highlights the line "using SafeMath for ui".
- OUTPUT**: Shows the status "App is already up to date." and "Checking for update...".



The screenshot shows the VSCode interface with the following details:

- EXPLORER** sidebar: Shows a folder named "uniswap" containing ".workspaces", "artifacts", "interfaces", and "libraries". The "libraries" folder is expanded, showing files: IERC20.sol, IUniswapV2Callee.sol, IUniswapV2ERC20.sol, IUniswapV2Factory.sol, IIUniswapV2Pair.sol, deployment.json, UniswapV2ERC20.sol, UniswapV2ERC201.sol, UniswapV2Factory-freddddd.sol, and UniswapV2Pair.sol.
- CODE EDITOR**: The current file is "UniswapV2ERC20.sol". A red circle highlights the line "using SafeMath for ui".
- OUTPUT**: Shows the status "App is already up to date." and "Checking for update...".

# Remix

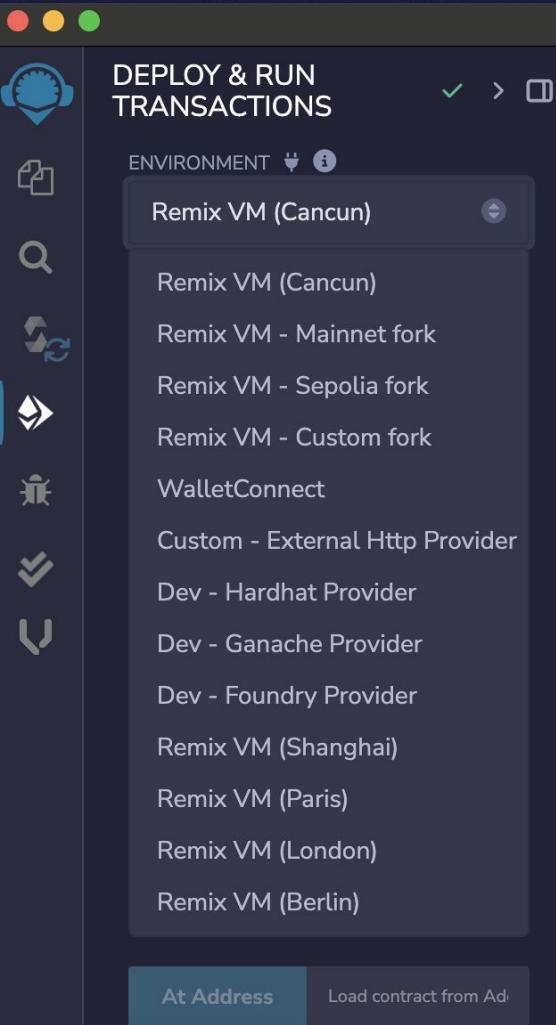


The screenshot shows the Remix IDE interface with the following details:

- FILE EXPLORER**: Shows a file tree with the same structure as the VSCode Explorer, including ".workspaces", "artifacts", "interfaces", and "libraries".
- CODE EDITOR**: The current file is "UniswapV2ERC20.sol". A red circle highlights the line "using SafeMath for ui".
- OUTPUT**: Shows the status "App is already up to date.", "Checking for update...", and "App is already up to date."

# No Browser Wallet

So use WalletConnect  
or  
Custom External Http Provider

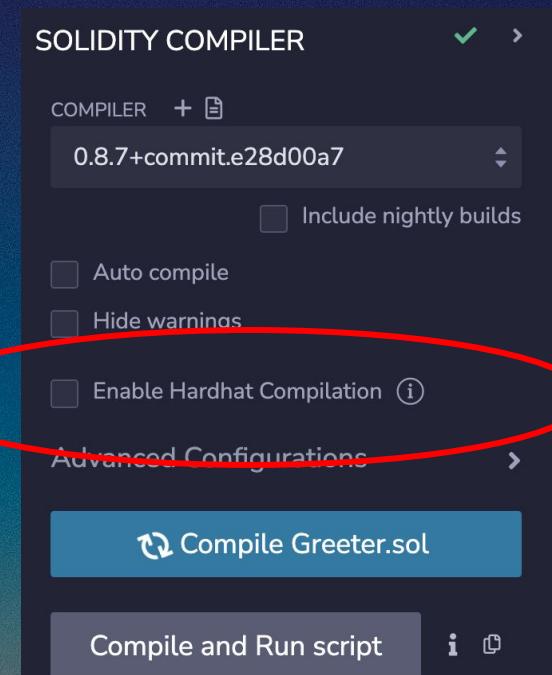


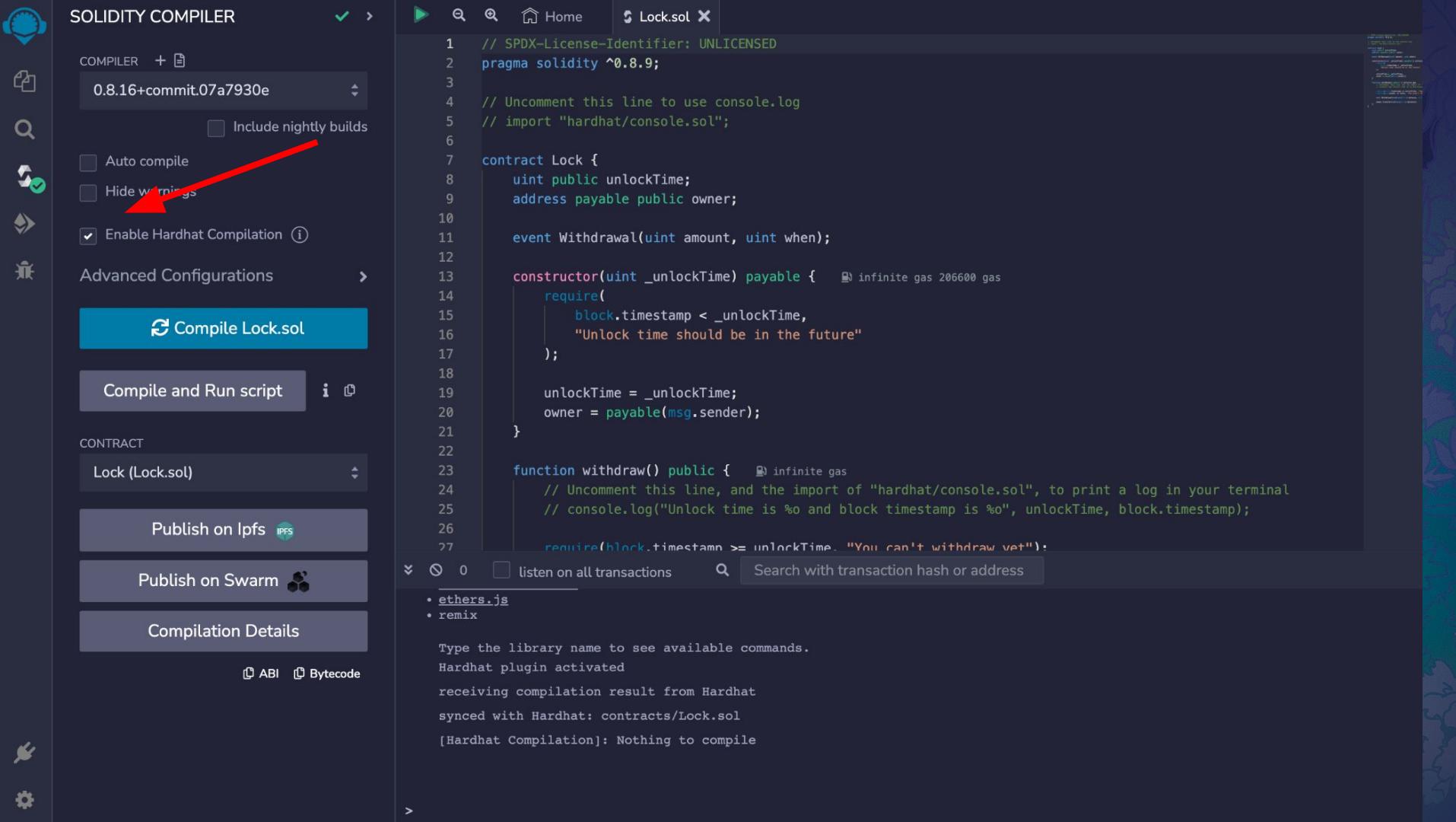
# Using Hard Hat or Foundry & Remix Desktop

# Working with a Hardhat Project

## Compiling

Share the Hardhat project folder with Remix via Remixd.





The image shows the Solidity Compiler interface in a dark-themed code editor. A red arrow points to the "Hide warnings" checkbox in the compiler settings sidebar.

```
// SPDX-License-Identifier: UNLICENSED
pragma solidity ^0.8.9;

// Uncomment this line to use console.log
// import "hardhat/console.sol";

contract Lock {
    uint public unlockTime;
    address payable public owner;

    event Withdrawal(uint amount, uint when);

    constructor(uint _unlockTime) payable {
        require(
            block.timestamp < _unlockTime,
            "Unlock time should be in the future"
        );
        unlockTime = _unlockTime;
        owner = payable(msg.sender);
    }

    function withdraw() public {
        // Uncomment this line, and the import of "hardhat/console.sol", to print a log in your terminal
        // console.log("Unlock time is %o and block timestamp is %o", unlockTime, block.timestamp);

        require(block.timestamp >= unlockTime, "You can't withdraw yet");
    }
}
```

**COMPILER**

- 0.8.16+commit.07a7930e
- Include nightly builds
- Auto compile
- Hide warnings
- Enable Hardhat Compilation ⓘ

**Advanced Configurations**

**Compile Lock.sol**

**Compile and Run script**

**CONTRACT**

Lock (Lock.sol)

**Publish on Ipfs**

**Publish on Swarm**

**Compilation Details**

ABI Bytecode

0 listen on all transactions

Search with transaction hash or address

- ethers.js
- remix

Type the library name to see available commands.  
Hardhat plugin activated  
receiving compilation result from Hardhat  
synced with Hardhat: contracts/Lock.sol  
[Hardhat Compilation]: Nothing to compile

# Working with a Hardhat Project

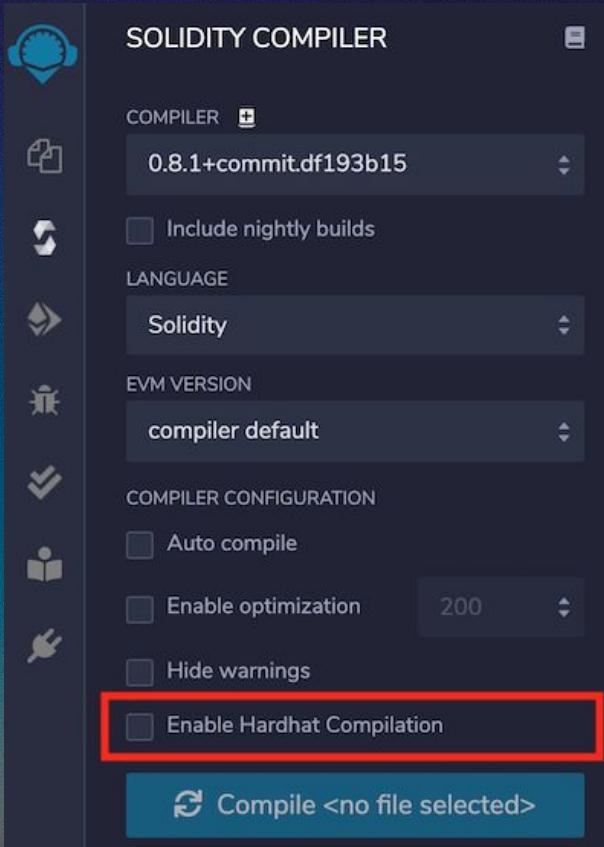
A file named `remix-compiler.config.js`

will be created in the root directory of the project.

This file holds the compiler configuration from Remix.

It is passed to Hardhat for compilation.

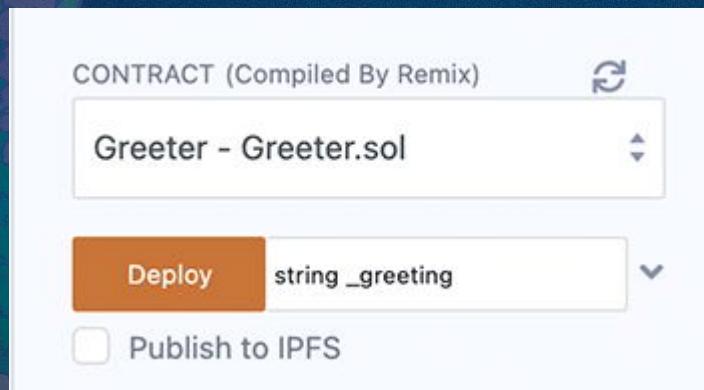
The compilation result will be shown in the Remix IDE terminal



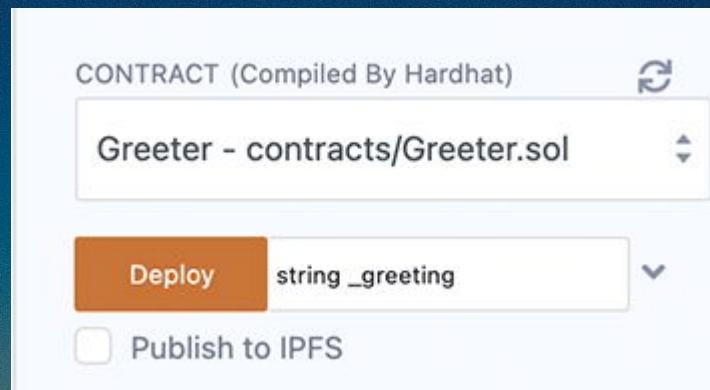
# Deploy & Run: Grabbing the H.H. or Foundry compilation result

When you compile a file outside of Remix, hit the refresh symbol to bring it in.

Compile a contract in Remix you'll see:



Compile a contract in HardHat (and hit refresh) , you'll see:



# Coming soon to desktop...

- The official Desktop release
- ZK Circuits & Generating Proofs
- Local Vyper compiler

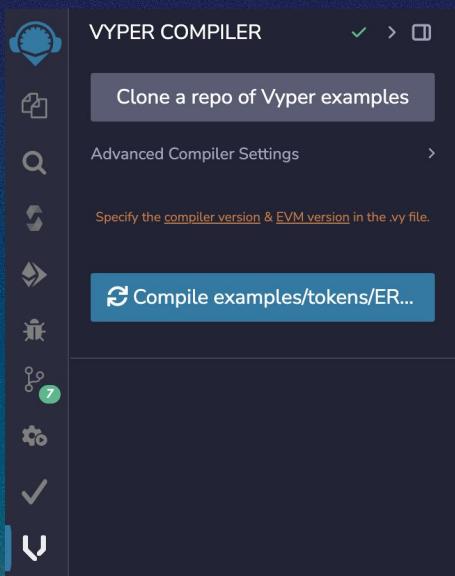
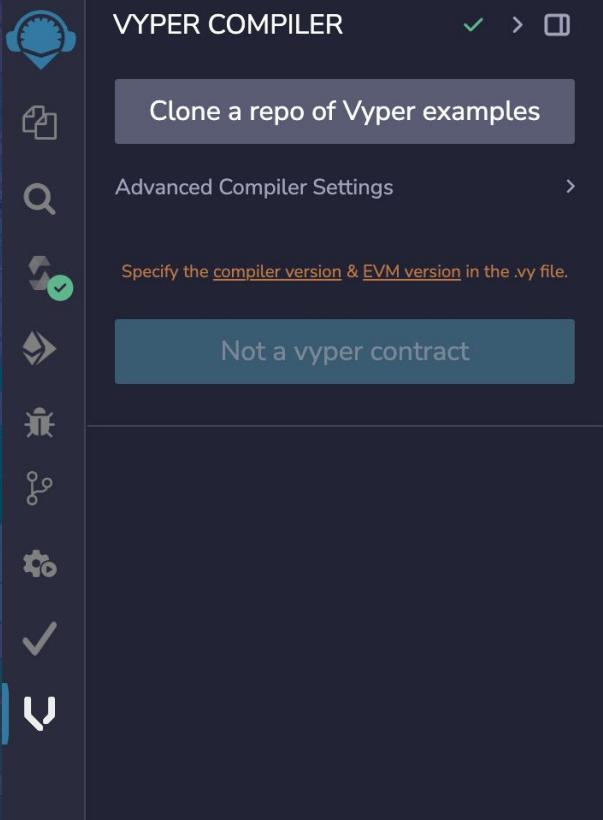
# Remix Desktop

NOW OUT IN BETA

[github.com/remix-project-org](https://github.com/remix-project-org)



# Try Vyper



This screenshot shows the Vyper Compiler interface with a workspace. The left sidebar is identical to the previous screenshots. The main area shows a file named "ERC20.vy" with the same code as the previous screenshot. The code is displayed in a monospaced font with line numbers on the left. The interface includes a navigation bar at the top with icons for back, forward, search, and home, along with tabs for "Quick Dapp" and the current file "ERC20.vy".

```
1 #pragma version 0.4.0
2 #####
3 ## THIS IS EXAMPLE CODE, NOT MEANT TO BE USED IN PRODUCTION! CAVEAT ETC.
4 # @dev example implementation of an ERC20 token
5 # @author Takayuki Jimba (@yudetamago)
6 # https://github.com/ethereum/EIPs/blob/master/EIPS/eip-20.md
7
8 from ethereum.ercs import IERC20
9 from ethereum.ercs import IERC20Detailed
10
11 implements: IERC20
12 implements: IERC20Detailed
13
14 name: public(String[32])
15 symbol: public(String[32])
16 decimals: public(uint8)
17
18 # NOTE: By declaring 'balanceOf' as public, vyper automatically generates
19 #       method to allow access to account balances.
20 #       The _KeyType will become a required parameter for the getter
```

# Try Arbitrum Stylus!

ARBITRUM

Arbitrum Stylus [docs](#) [issues](#) [GitHub](#)

 [Connect to MetaMask](#)

Network  
Arbitrum One

Operating System  
linux

Compiler Version  
0.5.5

Account  
0x05854ca140cab11e2f5aab284c6a1

Balance  
0

Project  
Project Name [Create](#)

Select a Template  
hello-world [Create](#)

Target Project [Edit](#)

Contract Verification [i](#)

[Compile](#)

# Zero Knowledge Proofs In Remix

**ZKP in REMIX**

→ Circos is in Remix!

# ZKP in REMIX

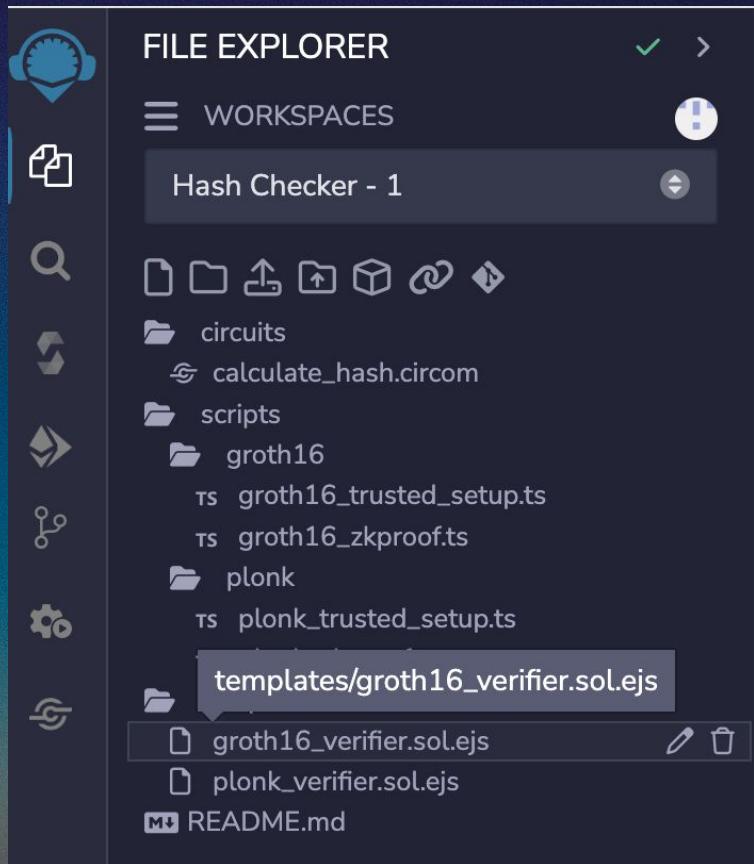
## → Circom ZKP workspace templates

The screenshot shows the REMIX interface with a dark theme. At the top, there are icons for file operations (New, Open, Save, Find, Home) and a "Template Selection" button. Below this, the title "Circom ZKP" is displayed. The interface is organized into sections:

- SEMAPHORE**: Run a ZK Semaphore circom circuit. Buttons: **Create**, **Add to current**.
- HASH CHECKER**: Run a ZK Hash checker circom circuit. Buttons: **Create**, **Add to current**.
- RATE-LIMITING NULLIFIER**: Run a Rate Limiting Nullifier circom circuit. Buttons: **Create**, **Add to current**.
- Generic ZKP**:
  - ADD SINDRI ZK SCRIPTS**: Use the Sindri API to compile and generate proof. Buttons: **Create**, **Add to current**.

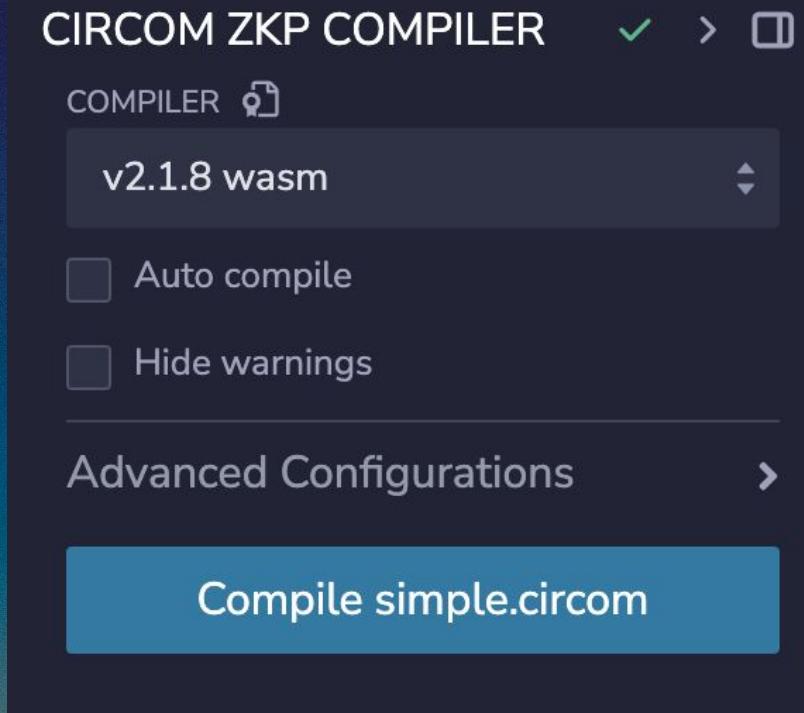
# ZKP in REMIX

- Circom ZKP Hash Checker template
- Use scripts or the GUI



# Circom Compiler

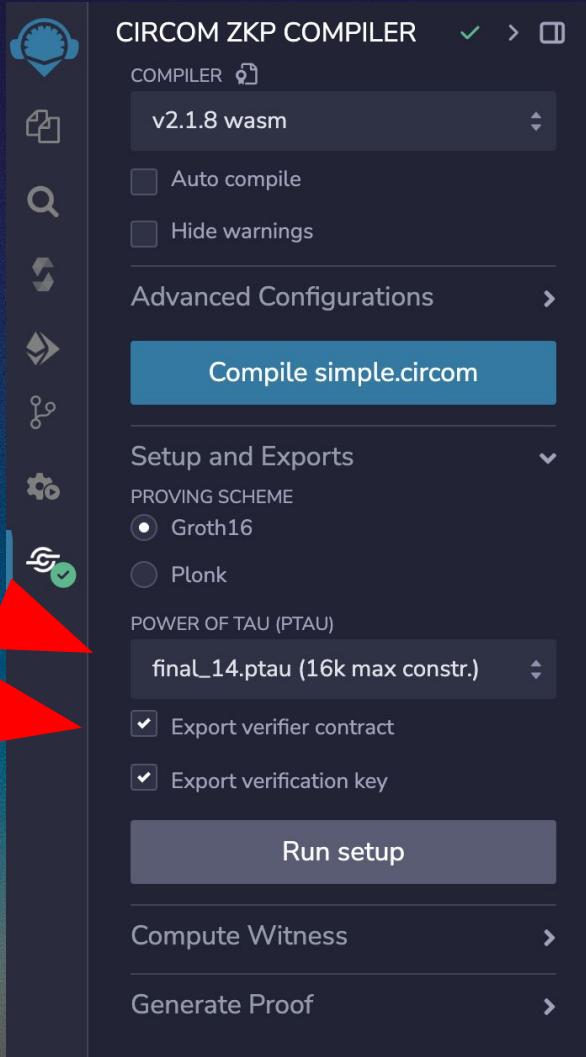
Step by step with a GUI



# Circom Compiler

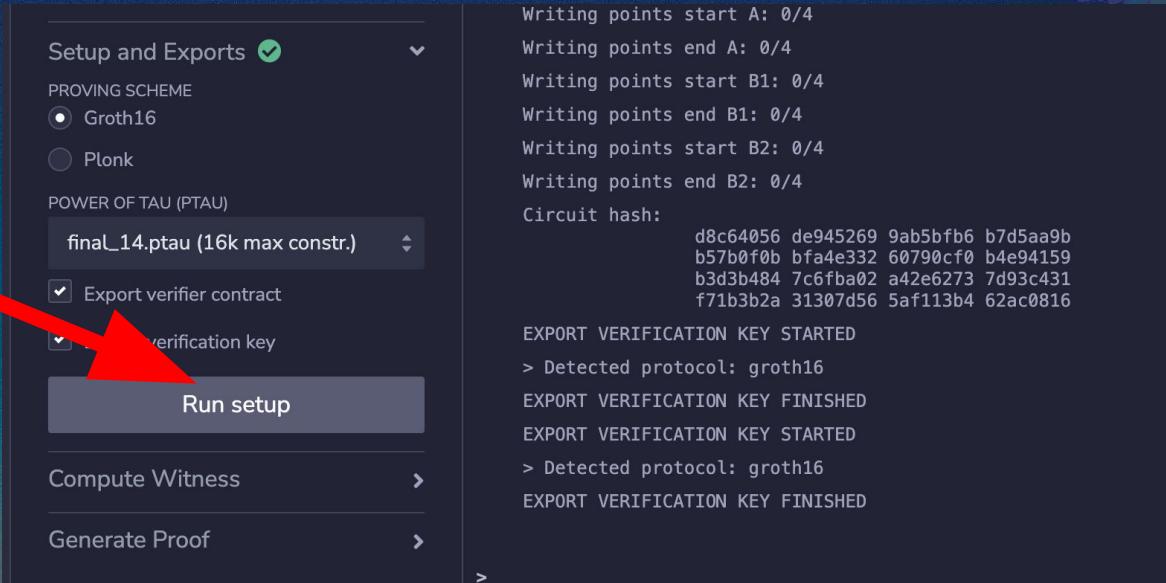
Choose the lowest number of constraints

Create the verifier .sol file



# Circom Compiler

Running the setup and the result is printed in the terminal.



The screenshot shows the Circom Compiler interface with a red arrow pointing to the "Run setup" button. The interface includes sections for "Setup and Exports" (with a green checkmark), "PROVING SCHEME" (Groth16 selected), "POWER OF TAU (PTAU)" (final\_14.ptau selected), and options for "Export verifier contract" and "Export verification key". The "Run setup" button is highlighted with a red arrow. To the right, the terminal output shows the process of generating a verification key, including circuit hashing and protocol detection for Groth16.

```
Writing points start A: 0/4
Writing points end A: 0/4
Writing points start B1: 0/4
Writing points end B1: 0/4
Writing points start B2: 0/4
Writing points end B2: 0/4
Circuit hash:
d8c64056 de945269 9ab5fb6 b7d5aa9b
b57b0f0b bfa4e332 60790cf0 b4e94159
b3d3b484 7c6fba02 a42e6273 7d93c431
f71b3b2a 31307d56 5af113b4 62ac0816
EXPORT VERIFICATION KEY STARTED
> Detected protocol: groth16
EXPORT VERIFICATION KEY FINISHED
EXPORT VERIFICATION KEY STARTED
> Detected protocol: groth16
EXPORT VERIFICATION KEY FINISHED
```

# Circom Compiler

## Compute the Witness



```
pragma circom 2.0.0;

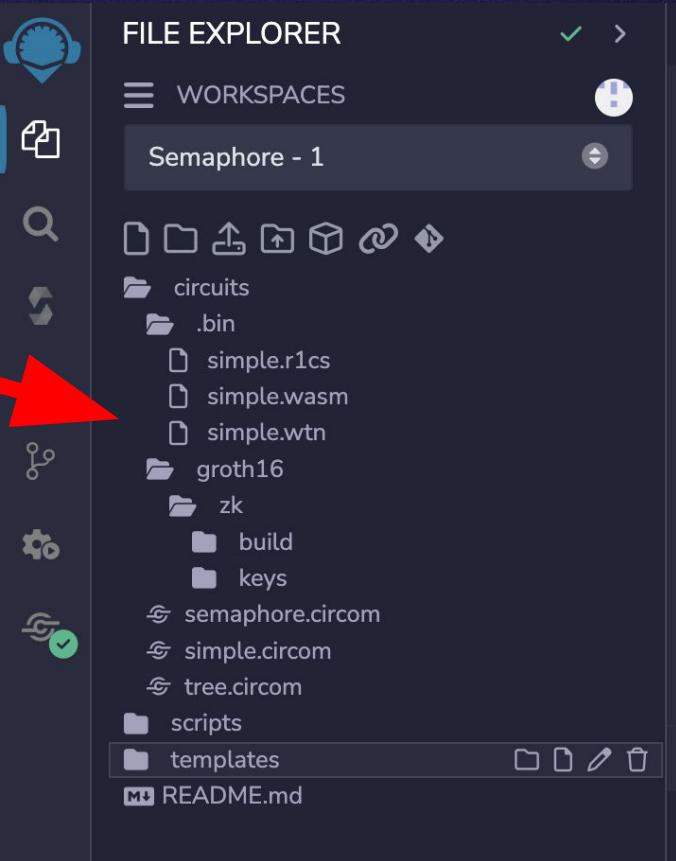
template Multiplier2() {
    signal input a;
    signal input b;
    signal output c;
    c <= a*b;
}

component main = Multiplier2();
```

The screenshot shows the Circom ZKP Compiler interface. On the left, there's a sidebar with various icons. In the center, under the "Compute Witness" section, there are fields for "SIGNAL INPUT A" (containing "3") and "SIGNAL INPUT B" (containing "4"). Below these fields is a checkbox labeled "Export witness as JSON". At the bottom of this section is a large blue "Compute" button. To the right of the "Compute" button is a "Generate Proof" button. The right side of the interface features a code editor with the above Circom code, a terminal window showing the process of writing points and generating a circuit hash, and a status bar at the bottom.

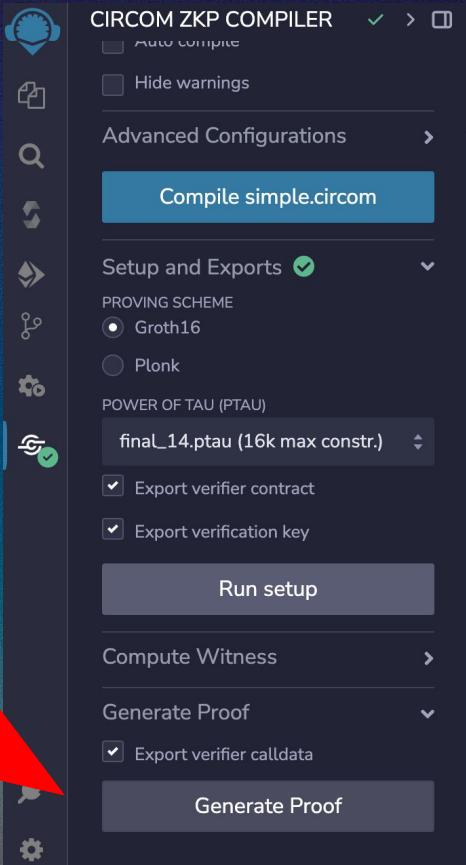
# Circom Compiler

Witness file is generated



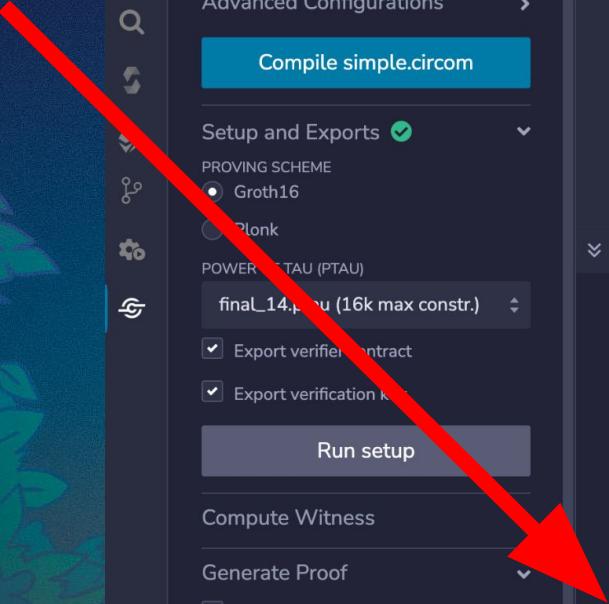
# Circom Compiler

Generate the Proof



# Circom Compiler

Check the terminal



```
pragma circom 2.0.0;
template Multiplier2() {
    signal input a;
    signal input b;
    signal output c;
    c <== a*b;
}

component main = Multiplier2();
```

```
Multiexp start: multiexp B1: 0/4
Multiexp end: multiexp B1: 0/4
Reading B2 Points
Multiexp start: multiexp B2: 0/4
Multiexp end: multiexp B2: 0/4
Reading C Points
Multiexp start: multiexp C: 0/2
Multiexp end: multiexp C: 0/2
Reading H Points
Multiexp start: multiexp H: 0/4
Multiexp end: multiexp H: 0/4
OK!
zk proof validity true
```

⚠ circuit-compiler is modifying circuits/groth16/zk/build/proof.json

# Circom Compiler

Play with the Circom code

FILE EXPLORER

WORKSPACES

Semaphore - 1

.deps

https

- raw.githubusercontent.com
- iden3
- circuits
- poseidon.circom

circuits

- .bin
- simple.r1cs
- simple.wasm
- simple.wtn
- groth16
- zk
- build
- proof.json
- verifierCalldata.json
- keys

semaphore.circom

simple.circom

tree.circom

scripts

semaphore.circom

```
1 pragma circom 2.0.0;
2
3 include "circomlib/circuits/poseidon.circom";
4 include "./tree.circom";
5
6 template CalculateSecret() {
7     signal input identityNullifier;
8     signal input identityTrapdoor;
9     signal output out;
10
11     component poseidon = Poseidon(2);
12
13     poseidon.inputs[0] <== identityNullifier;
14     poseidon.inputs[1] <== identityTrapdoor;
15
16     out <== poseidon.out;
17 }
18
19 template CalculateIdentityCommitment() {
20     signal input secret;
21
22     signal output out;
```

Multexp start: multexp B1: 0/4  
Multexp end: multexp B1: 0/4  
Reading B2 Points  
Multexp start: multexp B2: 0/4  
Multexp end: multexp B2: 0/4  
Reading C Points  
Multexp start: multexp C: 0/2

# Circom Compiler

Advanced config for prime numbers



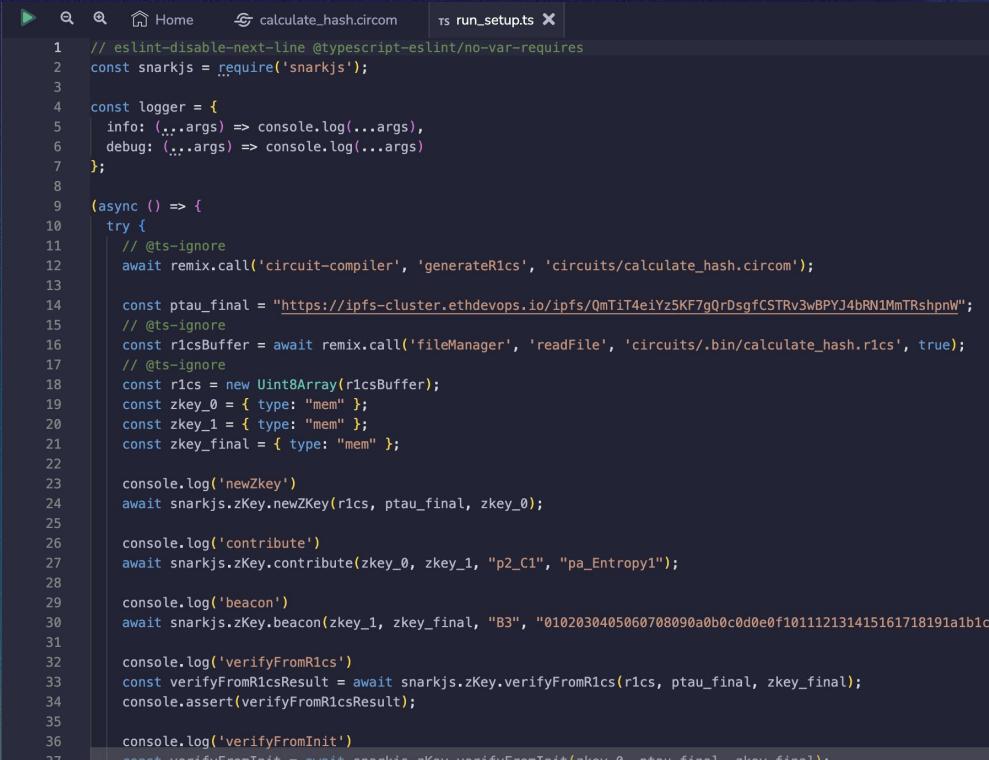
## Advanced Configurations

### PRIME

- ✓ bn128
- bls12381
- goldilocks
- grumpkin
- pallas
- vesta
- secq256r1

# ZKP in REMIX

- For circuits too large for the browser - use Sindri
- More coming in Remix Desktop (any day now)



The screenshot shows a code editor window with a dark theme. The file is named `ts run_setup.ts`. The code is written in TypeScript and performs the following steps:

- Imports `snarkjs` and sets up a logger.
- Attempts to call the `circuit-compiler` to generate R1CS files from a CIRCOM file.
- Downloads the generated R1CS file from a specified IPFS URL.
- Creates a `Uint8Array` from the downloaded R1CS buffer.
- Creates three `ZKey` objects: `zkey_0`, `zkey_1`, and `zkey_final`.
- Logs "newZkey" and uses `snarkjs.zKey.newZKey` to initialize `zkey_final` with `ptau_final` and `zkey_0`.
- Logs "contribute" and uses `snarkjs.zKey.contribute` to add `zkey_0` and `zkey_1` to `zkey_final` with inputs `p2_C1` and `pa_Entropy1`.
- Logs "beacon" and uses `snarkjs.zKey.beacon` to generate a beacon with `zkey_1`, `zkey_final`, and input `B3`.
- Logs "VerifyFromR1cs" and uses `snarkjs.zKey.verifyFromR1cs` to verify the beacon against the R1CS circuit.
- Logs "VerifyFromInit" and asserts the verification result.

# Adding a Sindri Script

The screenshot shows the Sindri interface for adding ZKP scripts. At the top, there's a navigation bar with icons for play, robot, and search, followed by a "Home" button and a "Template Selection" dropdown menu.

**Circom ZKP**

- SEMAPHORE**  
Run a ZK Semaphore circom circuit.  
[Create](#)   [Add to current](#)
- HASH CHECKER**  
Run a ZK Hash checker circom circuit.  
[Create](#)   [Add to current](#)
- RATE-LIMITING NULLIFIER**  
Run a Rate Limiting Nullifier circom circuit.  
[Create](#)   [Add to current](#)

**Generic ZKP**

- ADD SINDRI ZK SCRIPTS**  
Use the Sindri API to compile and generate proof.  
[Create](#)   [Add to current](#)

# Scripts in Remix

# Want to use Ethers6?

SCRIPT CONFIGURATION ✓ > □

▼ Default ✓

Description: Default project configuration.  
To use ethers v6 and zkSync-ethers v6,  
use the respective configurations

Dependencies:

- ethers (v^5)
- zokrates-js (v^1.1.3)
- web3 (v1.5.3)
- zkSync-ethers (v^5.10.0)
- starknet (v^5.19.5)
- snarkjs (v0.7.0)
- circomlibjs (v^0.0.8)
- ffjavascript (v^0.2.62)
- big-integer (v^1.6.48)
- @zk-kit/incremental-merkle-tree (v^1.1.0)
- sindri (v0.0.1-alpha.27)
- @semaphore-protocol/data (v^3.11.0)
- @semaphore-protocol/group (v^3.11.0)
- @semaphore-protocol/identity (v^3.11.0)
- @semaphore-protocol/proof (v^3.11.0)

▶ ZkSync-ethers v6 □

▶ Ethers 6 □

# Coming soon in REMIX

- Account Abstraction
- Hash Generator
- More LearnEth
- More Videos



# Thanks!!

Rob Stupay  
@ryestew

## Remix

[remix-project.org](http://remix-project.org)   [@EthereumRemix](https://twitter.com/EthereumRemix)  
[medium.com/remix-ide](https://medium.com/remix-ide)  
[remix-ide.readthedocs.io](https://remix-ide.readthedocs.io)

Scan QR to join our discord



Section 1

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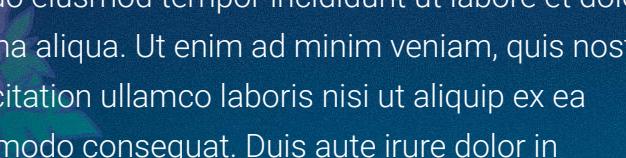
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Section 3

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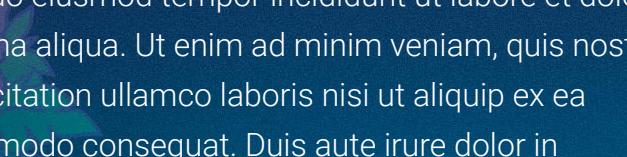
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Section 4

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# Here's the timeline.

## Event 1



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## Event 3



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# 99.99%

“Number rules the universe.”  
— Pythagoras

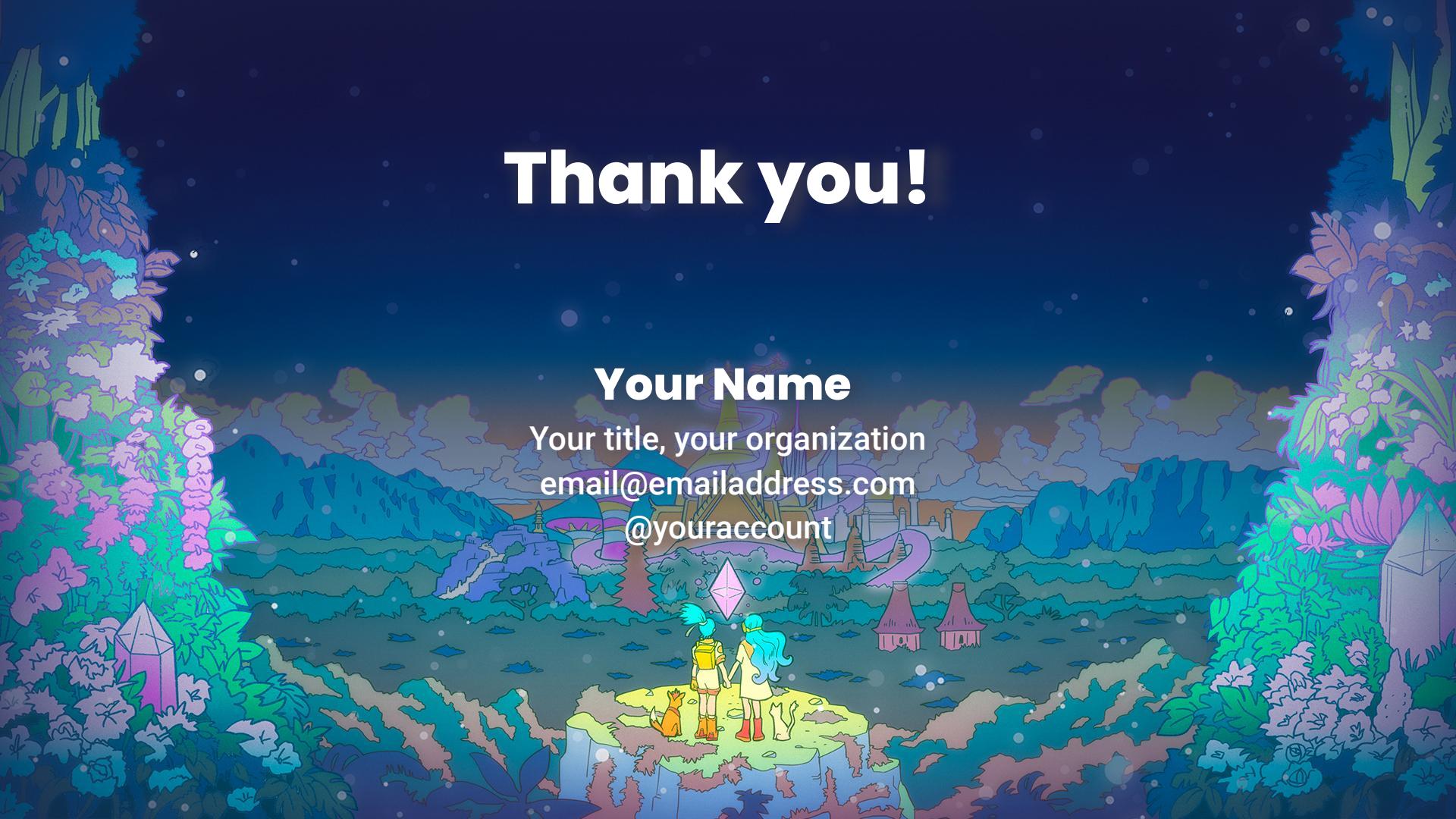
# Thank you!

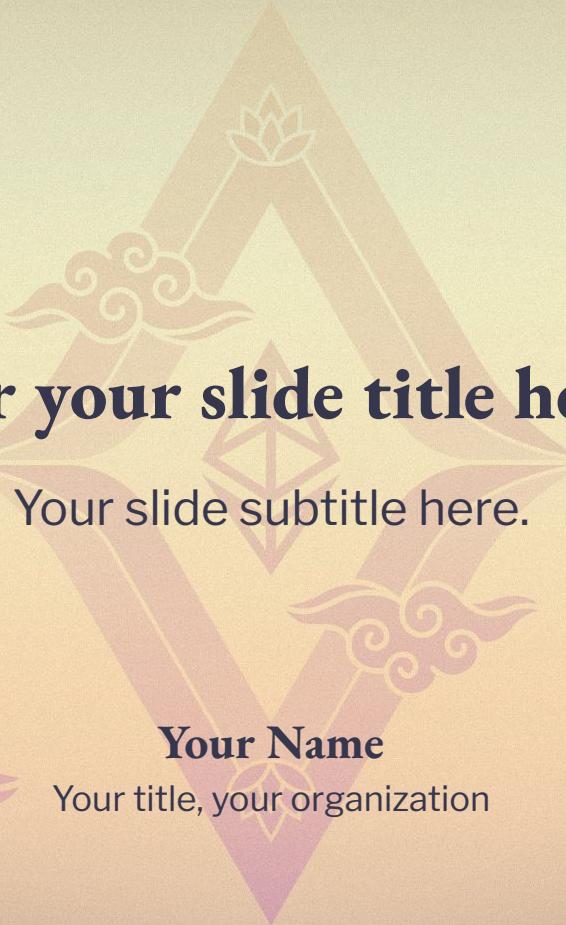
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Your title, your organization

[email@emailaddress.com](mailto:email@emailaddress.com)

@youraccount





**Enter your slide title here**

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**Your Name**

Your title, your organization





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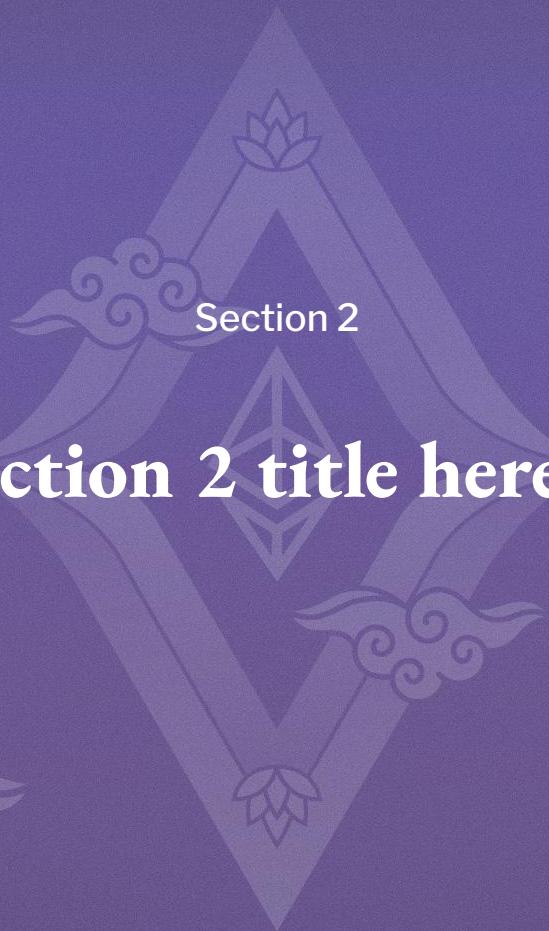
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Section 2

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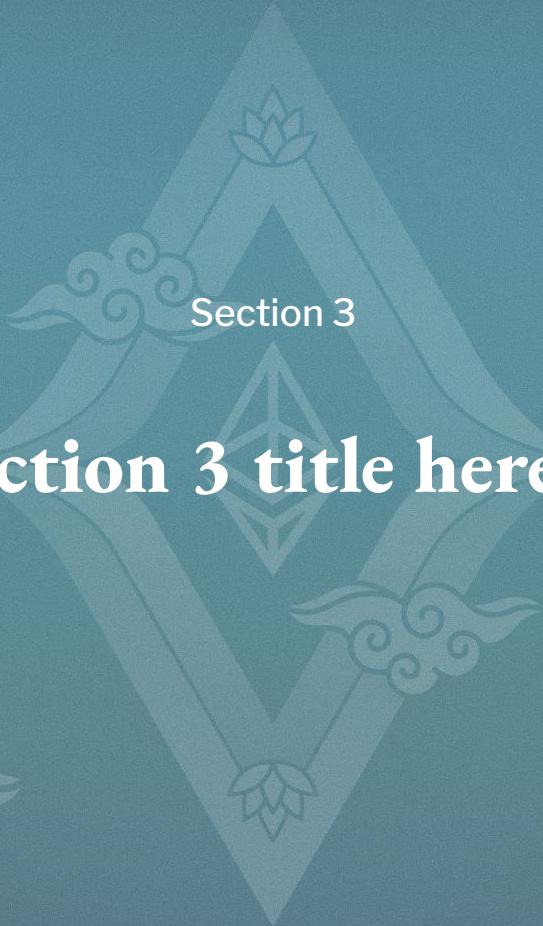




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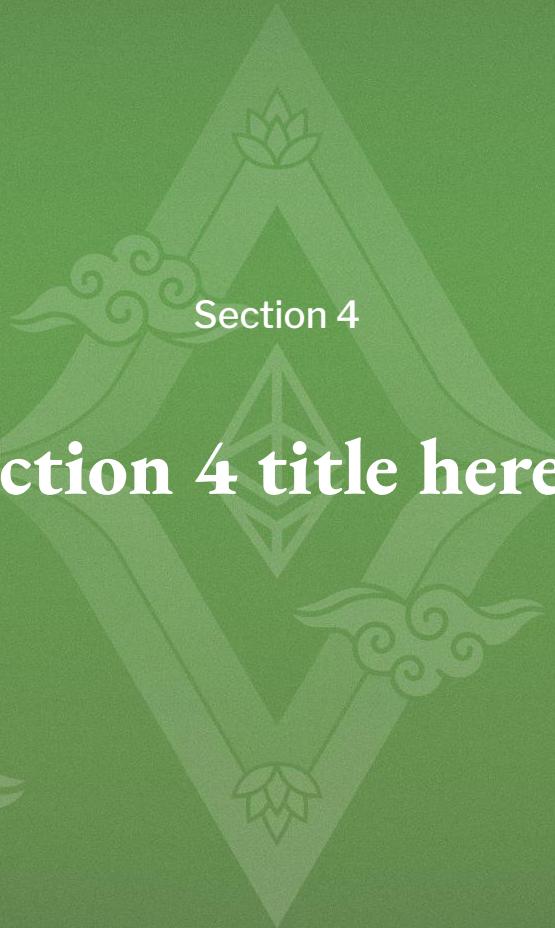
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“Number rules the universe.”

— Pythagoras





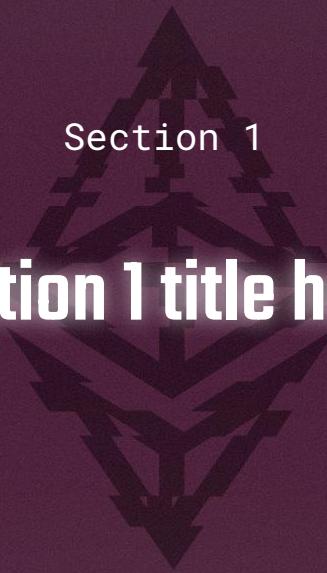


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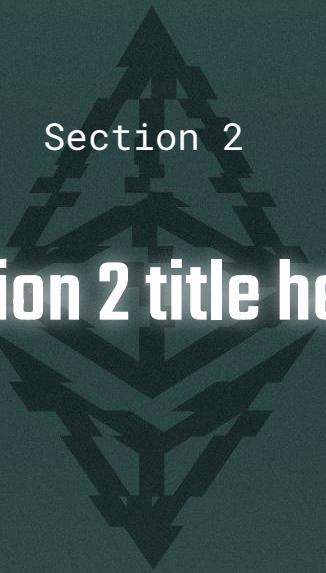
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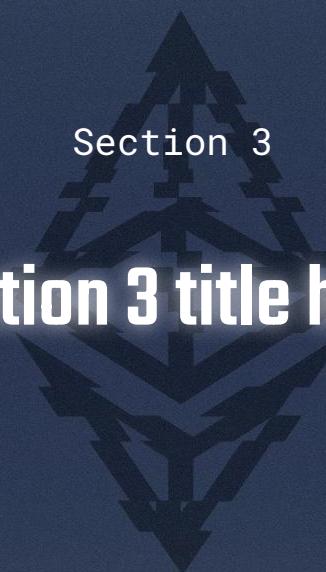
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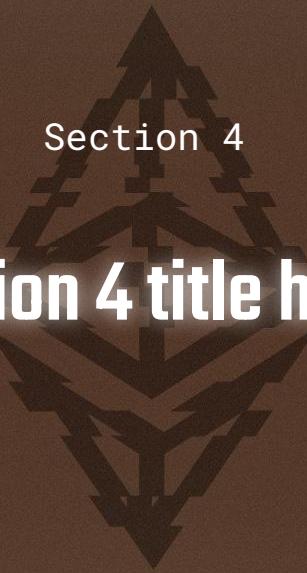


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# Here's the timeline.

Event 1



A horizontal timeline is shown with three circular markers. From left to right, the markers are purple, blue, and brown. Below each marker is a block of placeholder text.

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Event 2

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# 99.99%

“Number rules the universe.”  
– Pythagoras



Your title, your organization  
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