Connecting our Ethereum private blockchain and interacting with it.

Tools:

1. A private blockchain: Setup and provided by the university.
2. MetaMask: Wallet.
3. Remix Ethereum: Online Solidity compiler.

Outline

- We show how to connect to the private blockchain, and interact with it.
- You must use either a university's DICE machine to connect to the blockchain or via VPN to Informatics, see here http://computing.help.inf.ed.ac.uk/openvpn
- Steps:

1. Install MetaMask. Create an account (i.e. an address and public-private key) via MetaMask.

2. Send us your account address, so we can give you some Ether.

3. Get familiar with Solidity and remix compiler:

    - Write smart contracts, debug and compile them online.

4. Send/deploy the latest version of the contract to the blockchain and interact with the deployed contract.

Step 1:
Install Metamask

- It is an extension for Firefox and Google Chrome.

- Allows us to create our public/private keys and connect to the blockchain.

- We recommend using MetaMask for Firefox or Chrome

    - Download it from:

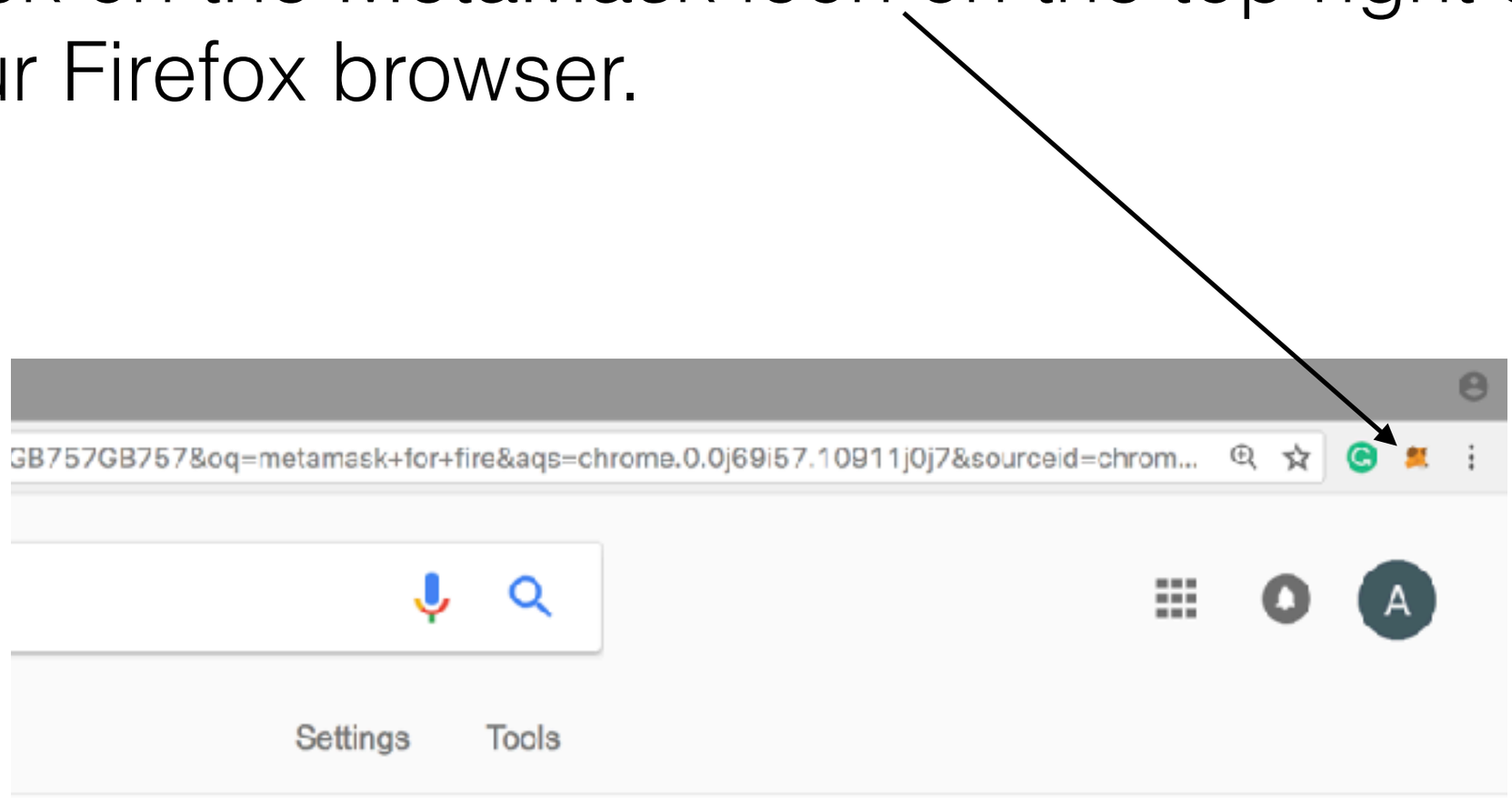
      https://addons.mozilla.org/en-US/firefox/addon/ether-metamask/

      https://metamask.io/

- Follow the instructions to install it.

Step1.1:
Set Up an Account in MetaMask

- Click on the MetaMask icon on the top right side of your Firefox browser.



Step1.2:
Create an Account in MetaMask

- Follow the instructions to create an account.
- After you provide a password, an account (i.e. an address, public and secret keys) will be created for you.

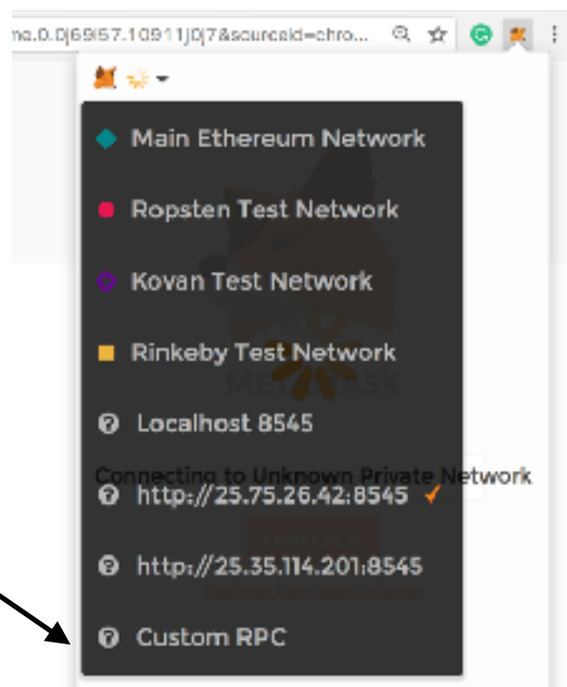
Step1.3:

Connect MetaMask to the Private Blockchain

3.1. Click the MetaMask icon again.

3.2. Client on the black triangle.

3.3. Select to the last option: Custom RPC



Step1.3:

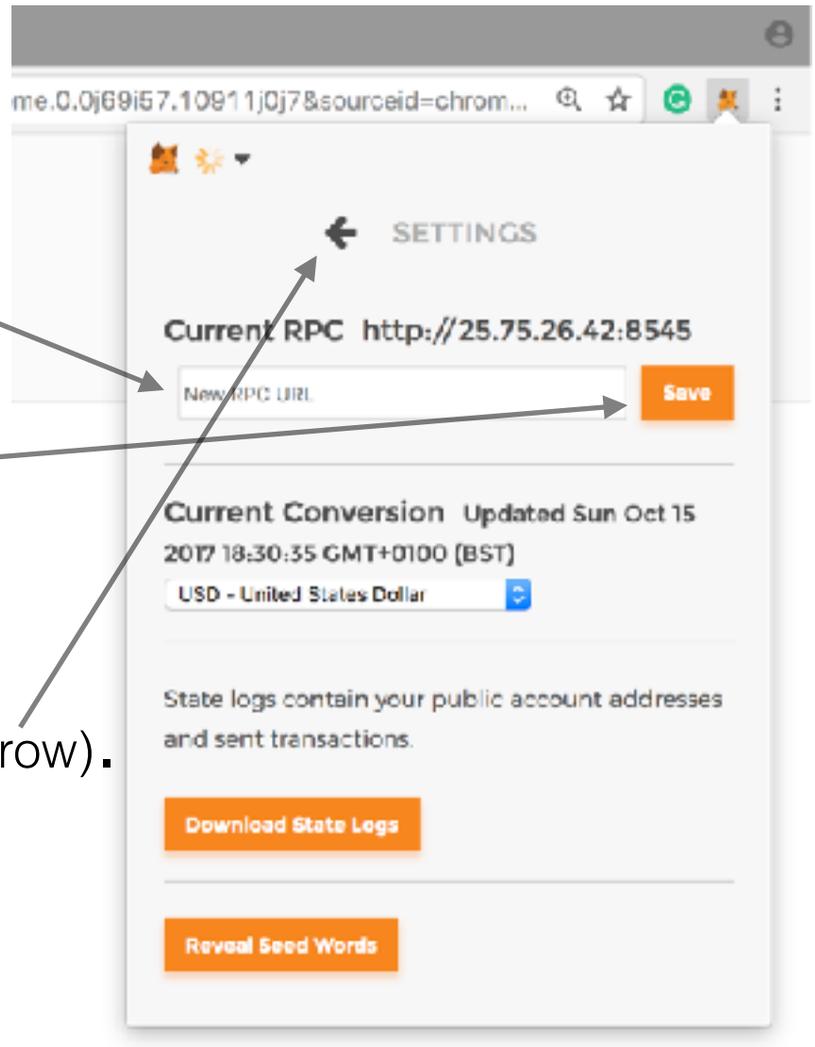
Connect MetaMask to the Private Blockchain

3.1. In the box on the top, insert the following link:

http://129.215.32.117:8545

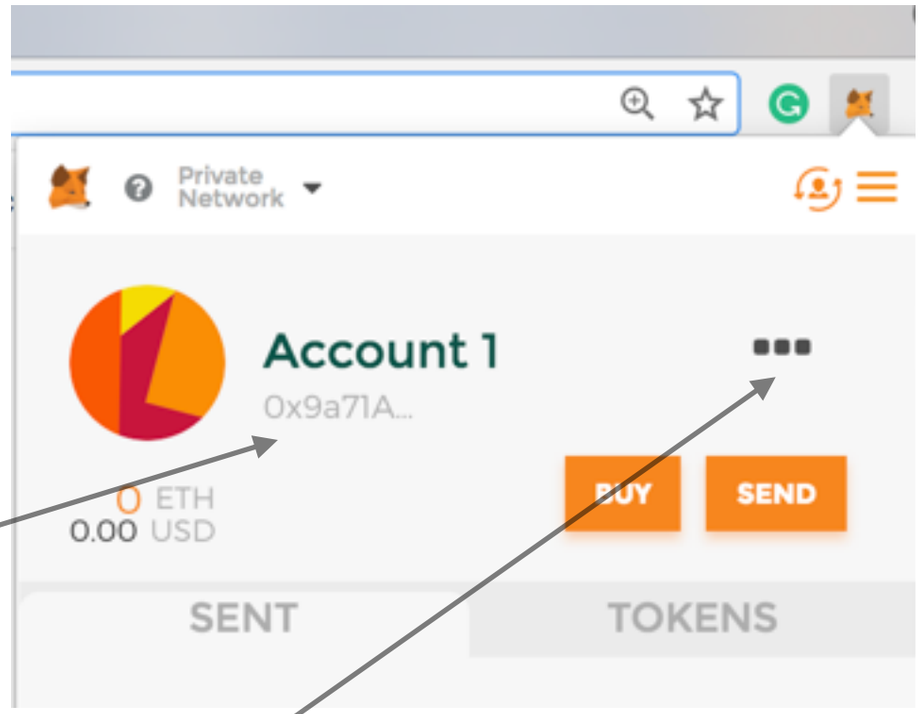
3.2. Save it.

3.3. Return to the main page (click on the arrow).



Step1.3:
Your Address

- When you're successfully connected to the chain, this page would appear.



- This is your address; you can copy and send it to those who want to pay you.

Step 2:
Send us Your Account Address

- You need some Ether to send a transaction to a blockchain.

- We have created some Ether. Our Ether has not value outside of the private chain.

- Email your account address to this email address:

  blockchain.lab.2017@gmail.com

- So we can send some Ether to you.

Step 3:
Getting Familiar with Remix Ethereum:
Online Solidity Compiler

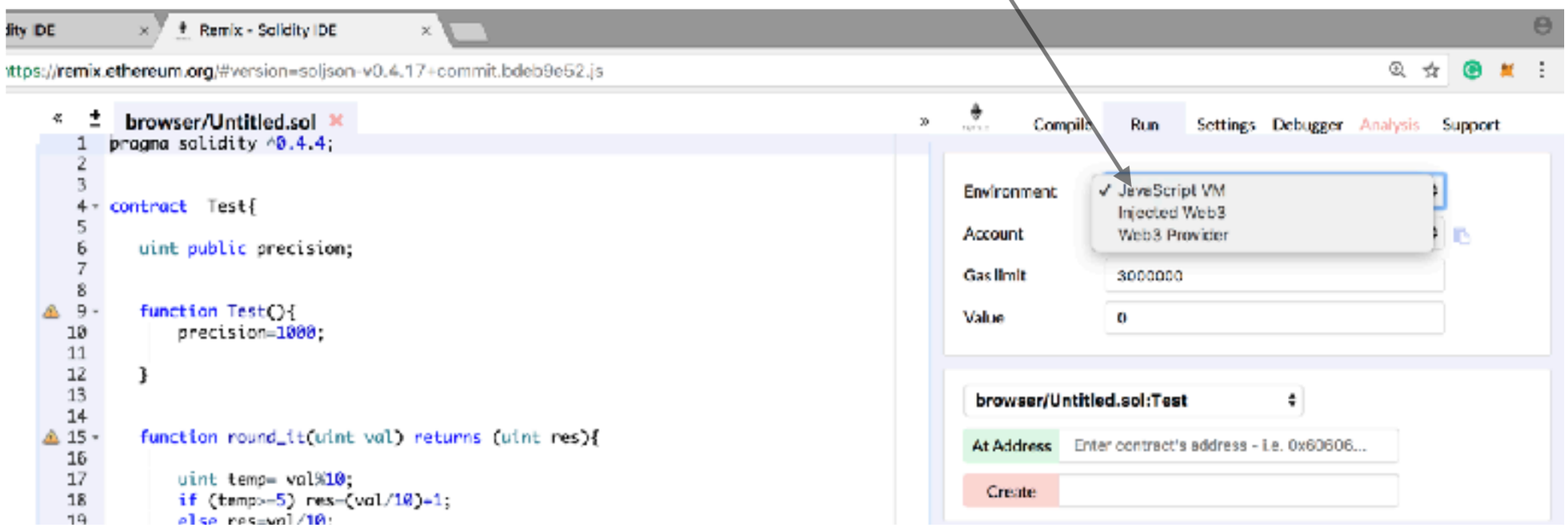
- You can write, debug, deploy (i.e. send to a blockchain) your smart contract via remix Ethereum: remix.ethereum.org

- Also, you can interact with your deployed contract using remix.

Step 3:
Getting familiar with Remix Ethereum:
Online Solidity Compiler

- Before you deploy your smart contract to the private chain, run and debug it online.

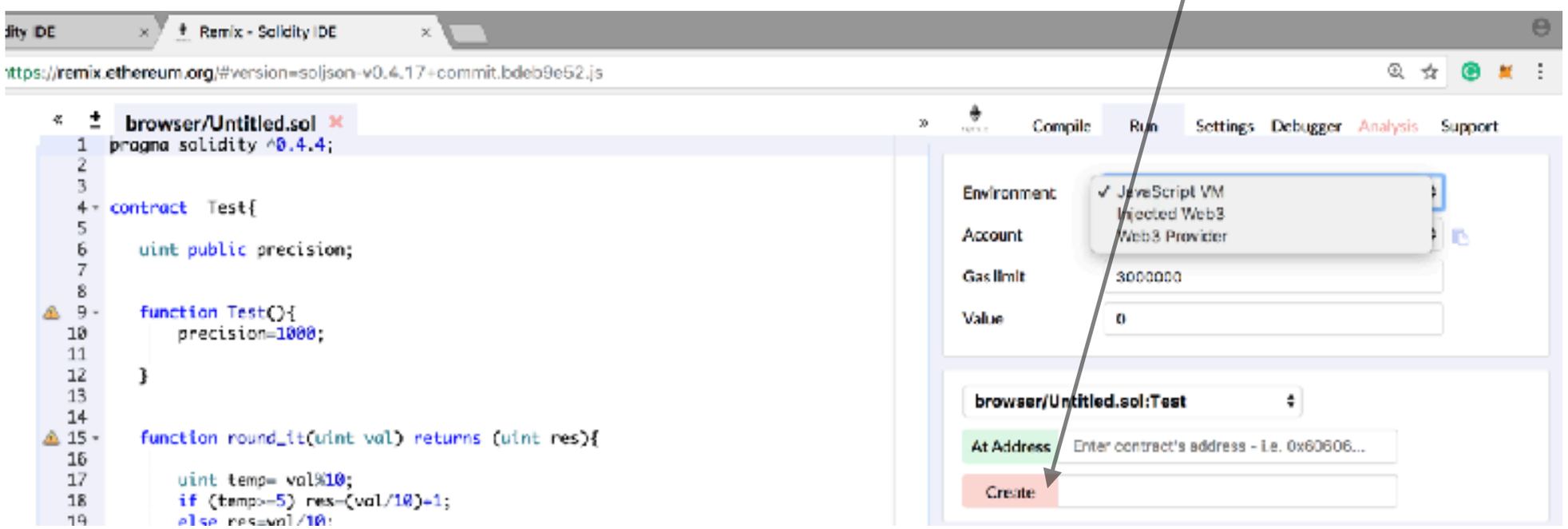
- In the case where you want to run it online, you should set environment to: JavaScript VM.



Step 3:
Getting familiar with Remix Ethereum:
Online Solidity Compiler

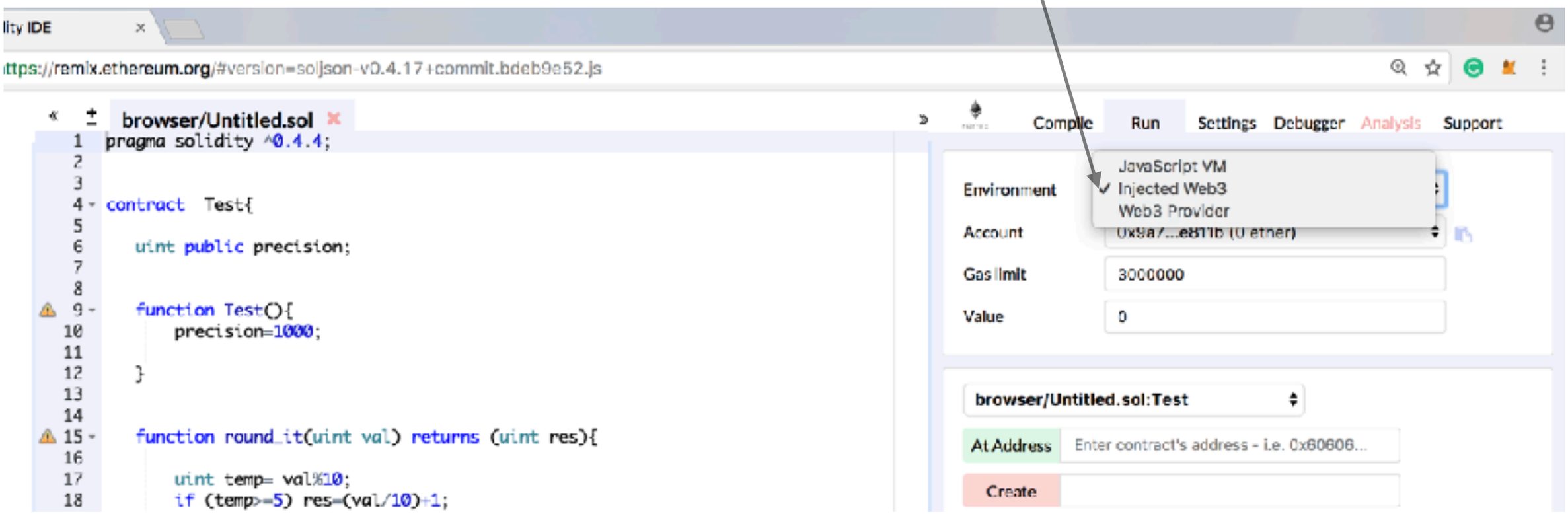
- To compile your smart contract, click on Create button.

- After compiling the contract, remix creates a user interface for the functions you defined in the contract and you can pass parameters to it.



Step 4.1:
Deploying Smart Contract to the Private Chain
Configurations

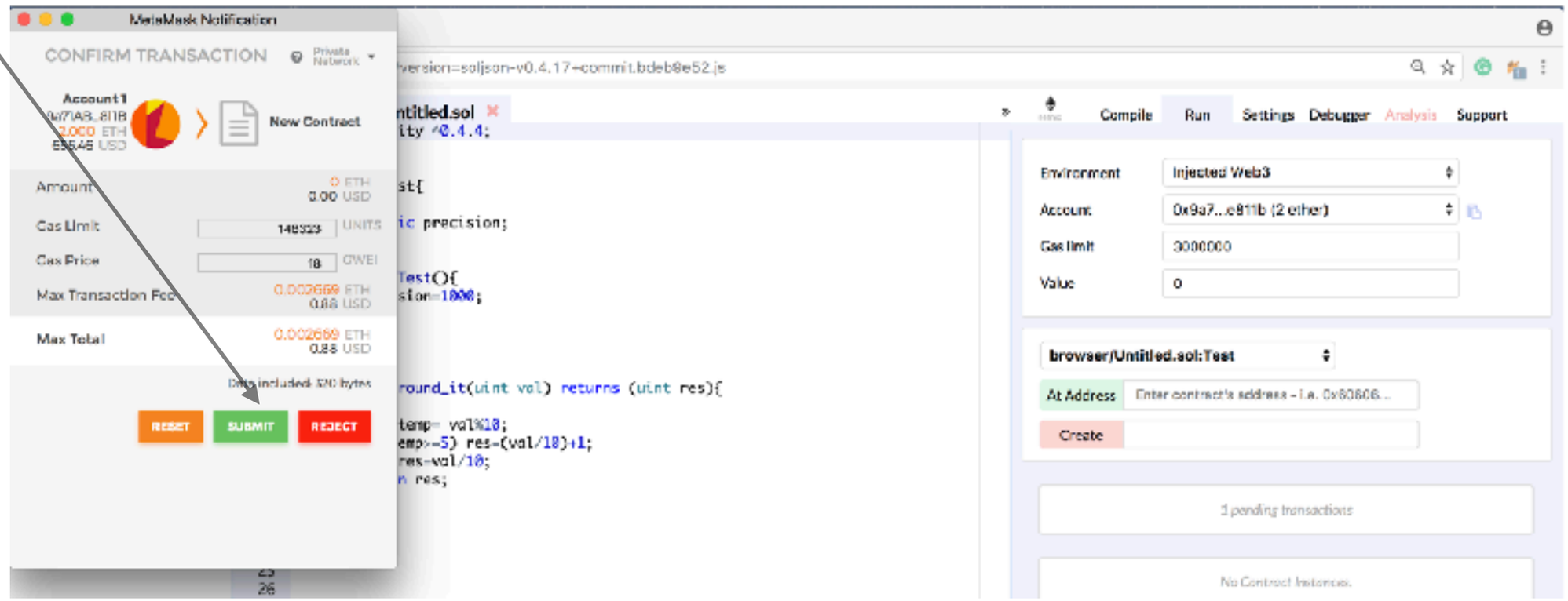
- First, you need to connect Metamask to the blockchain, as we described in the earlier slides.
- In remix, set the environment to: Injected Web3.



Step 4.2:
Deploying Smart Contract to the Private Chain

Deploying a Contract to the Blockchain

- Click on Create button.
- Next, MetaMask page will appear and by clicking on submit, you send your contract to the blockchain.



Step 4.3:
Deploying Smart Contract to the Private Chain

Saving the Deployed Contract's Address

- When, your contract is successfully submitted/deployed, remix provides the contract address on the blockchain.

- You can copy the address from here.

- You need the contract code and the address next time you want to interact with your deployed contract.

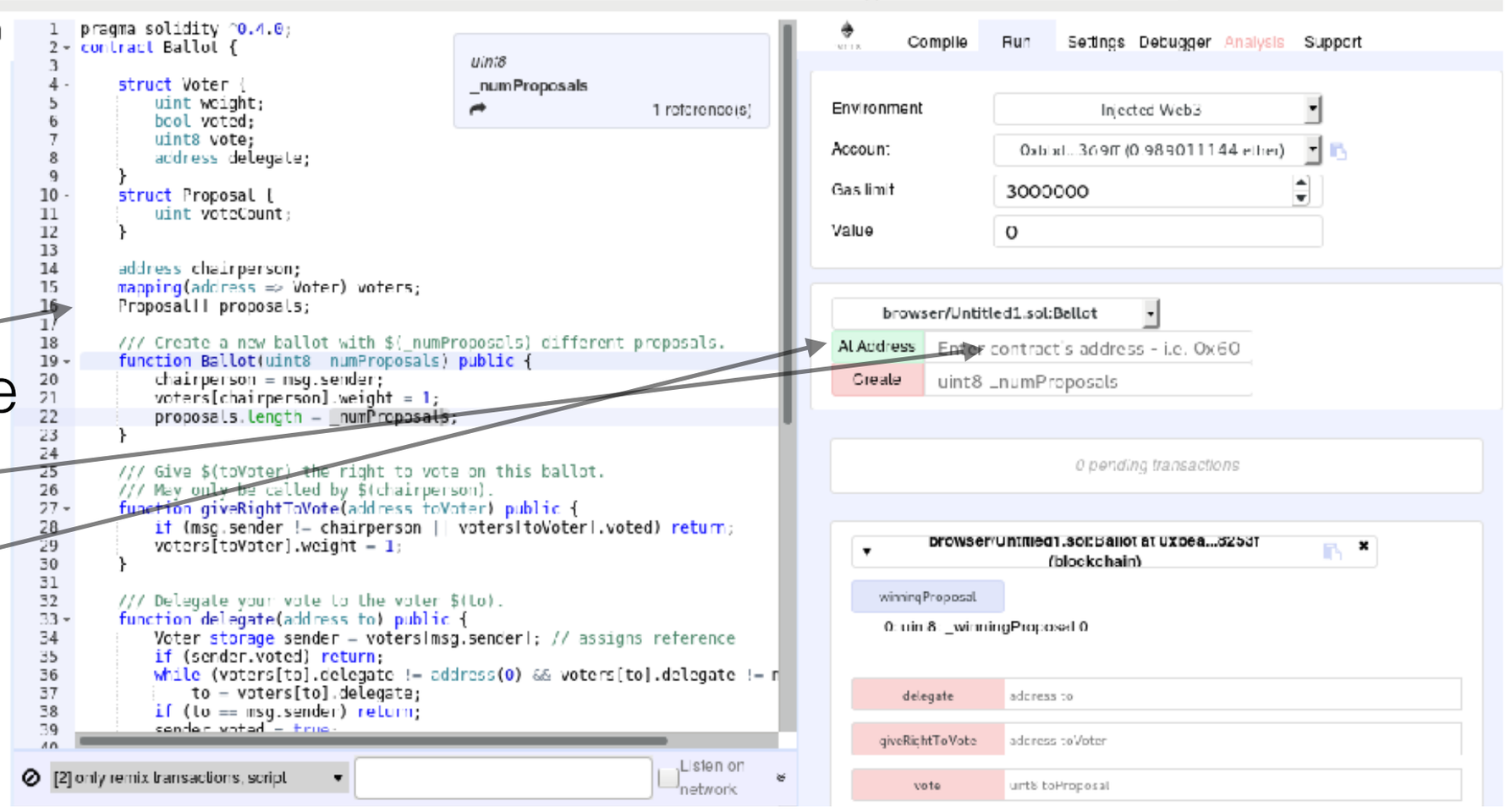
Step 4.3:
Deploying Smart Contract to the Private Chain

Interacting with a Deployed Contract

1. Log in to MetaMask and connect to the blockchain (as previously explained)

2. In remix, set the environment to: Injected Web3.

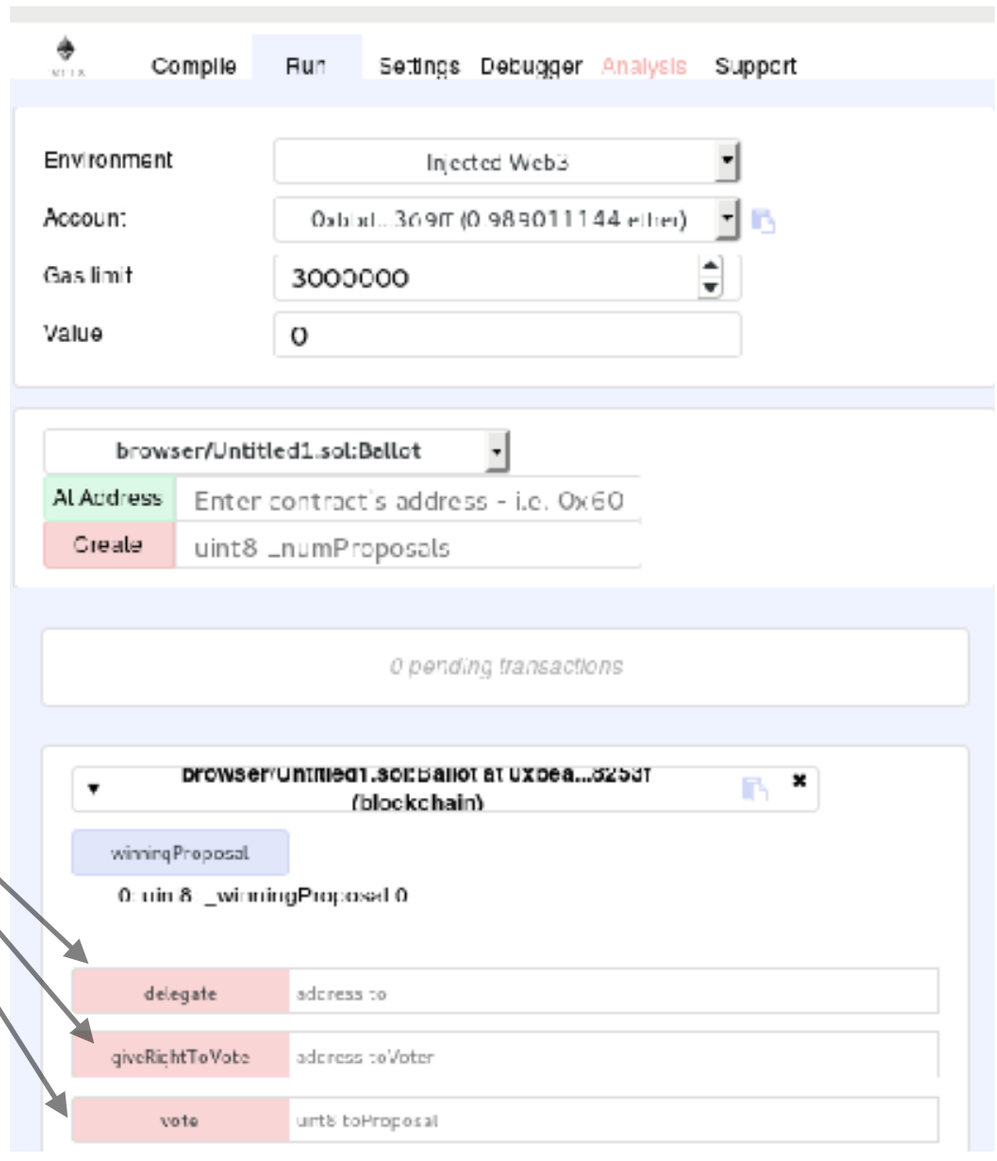
3. In remix, insert the contract code and the deployed contract address and click on: At Address.



Step 4.3:
Deploying Smart Contract to the Private Chain

Interacting with a Deployed Contract

4- All the public/external functions in the contract are provided and you can pass arguments on them and invoke them.



- The invocation of a function, that changes the contract state, will results in new transaction.