

Run the testrpc with:

testrpc

```
oscar@ubuntu:~/coursetro-eth$ testrpc
EthereumJS TestRPC v6.0.3 (ganache-core: 2.0.2)

Available Accounts
=====
(0) 0x6448d08ac19fce7c55824069c6775ff11a4c9e08
(1) 0x29042cddb28bba3b4d1b90cc725dec9da1865e82
(2) 0x05ac142112aa2f488fb0cdb000ca4191846e7939
(3) 0x71bce3a6db60e4e64f9182eea4b7b6d30b9fec44
(4) 0x8ddf0a7006c619eef507d360dcf65157b3dc9fa7
(5) 0x3061cb29ab0c0f3a7b640214176094405d77811c
(6) 0xf61c2c3f3d682953dfd4e1dcefdbe853bc7814b9
(7) 0x7be43383d60caed3305833073e257cee35dc4cba
(8) 0x0de76a28942a28e3765859f0e2c4f2c631eafddc
(9) 0x00b05366e3cbc9f95d50d63c0389f50e23782093

Private Keys
=====
(0) 565a1f1676937c28e4cd0c658a4ef145afb01c8eeca72afe7b4b81021754bd0f
(1) 357d24bb83b1ec5bdfd4fd0371f2943c7cdd31a07d949ab6ea28284ff913fd26
(2) 5df23845883125bf47e9e9c165a8c5cf8b7f487e4f4d7e0f3eadfbc0b881a7d5
(3) ddf5e579a8125bfd298e07b5a8d48bbdeaca1d1a1e3fd67d1f2a2606df00912b
(4) 78f3452a8b351786ba6d017be20450fb333c4aed6b57ce08bfce8eed32cbc7
(5) a9dc654189f4fc6e3f1155d0d3423eed3f08c446ed974113c4b2d4b8cd389
(6) 970d75575a55538e4bbfab87e6fb2b077dc4881edab0ce918eddfbe3a4d30964
(7) 81f1f2e47fb991468ebdc5ac195eacd8fab21171f0e36a283a2424529f59040f
(8) dab07392a25ed07b6fb8127a6d6543a5b11cc8346a709821e8151f1e9ccfedd
(9) 07eb6af2ad561dc6f3d9cdec5705451fe9bea9cd5e098536dac75537fe14ae5c

HD Wallet
=====
Mnemonic:      kit calm purity economy smoke clock maple local cereal work dream buzz
Base HD Path:  m/44'/60'/0'/0/{account_index}

Listening on localhost:8545
```

Create a .sol file on REMIX with:

pragma solidity ^0.5.0;

// Base Contract

contract Owned {

address owner;

constructor() public {

owner = msg.sender;

}

modifier onlyOwner {

require(msg.sender == owner);

\_;

}

}

// Derived Contract

```
contract Courses is Owned {
```

```
    struct Instructor {  
        uint age;  
        bytes16 fName;  
        bytes16 lName;  
    }
```

```
    // Mapping Instructor struct to an Ethereum address.  
    mapping (address => Instructor) instructors;  
    address[] public instructorAccts;
```

```
    event instructorInfo(  
        // Each reference of first and last name, is no longer a type of  
        // string, but bytes16 instead.  
        bytes16 fName,  
        bytes16 lName,  
        uint age  
    );
```

```
    function setInstructor(address _address, uint _age, bytes16 _fName,  
        bytes16 _lName) onlyOwner public {  
        Courses.Instructor memory instructor = instructors[_address];  
  
        instructor.age = _age;  
        instructor.fName = _fName;  
        instructor.lName = _lName;  
  
        instructorAccts.push(_address) -1;  
        emit instructorInfo(_fName, _lName, _age);  
    }
```

```
    // Return a list of addresses from instructorAccts  
    function getInstructors() view public returns(address[] memory) {  
        return instructorAccts;  
    }
```

```
    // Retrieve a specific instructor based on a provided address  
    function getInstructor(address _address) view public  
        returns (uint, bytes16, bytes16) {  
        return (instructors[_address].age, instructors[_address].fName,  
            instructors[_address].lName);  
    }
```

```

// Count how many instructors
function countInstructors() view public returns (uint) {
    return instructorAccts.length;
}
}

```

Compile this .sol file to get the **ABI code**

**SOLIDITY COMPILER**

COMPILER: 0.5.17+commit.d19bba13

Include nightly builds: ☒

LANGUAGE: Solidity

EVM VERSION: compiler default

COMPILER CONFIGURATION

Auto compile: ☐

Enable optimization: ☐ 200

Hide warnings: ☐

Compile lab7.sol

CONTRACT: Courses (lab7.sol)

Publish on Swarm

Publish on Ipfs

Compiler: Copy

ABI Bytecode

```

28 address[] public INSTRUCTORACCTS;
29
30 event instructorInfo(
31     // Each reference of first and last name, is no longer a type of
32     // string, but bytes16 instead.
33     bytes16 fName,
34     bytes16 lName,
35     uint age
36 );
37
38 function setInstructor(address _address, uint _age, bytes16 _fName,
39     bytes16 _lName) onlyOwner public {
40     Courses.Instructor memory instructor = instructors[_address];
41
42     instructor.age = _age;
43     instructor.fName = _fName;
44     instructor.lName = _lName;
45
46     instructorAccts.push(_address) -1;
47     emit instructorInfo(_fName, _lName, _age);
48 }
49
50 // Return a list of addresses from instructorAccts
51 function getInstructors() view public returns(address[] memory) {
52     return instructorAccts;
53 }
54
55 // Retrieve a specific instructor based on a provided address
56 function getInstructor(address _address) view public
57     returns (uint, bytes16, bytes16) {
58     return (instructors[_address].age, instructors[_address].fName,
59         instructors[_address].lName);
60 }
61
62 // Count how many instructors
63 function countInstructors() view public returns (uint) {
64     return instructorAccts.length;
65 }
66 }

```

listen on network

Search with transaction hash or...

Check transactions details and start debugging.

Execute JavaScript scripts:

- Input a script directly in the command line interface
- Select a Javascript file in the file explorer and then run 'remix.execute()' or 'remix.executeCurrent()' in the command line interface
- Right click on a JavaScript file in the file explorer and then click 'Run'

The following libraries are accessible:

Search the Metamask and add it in browser

Firefox Browser ADD-ONS

Explore Extensions Themes

Register or log in

**Add MetaMask?** This extension will have permission to:

- Access your data for all websites
- Input data to the clipboard
- Display notifications to you

[Learn more](#)

Cancel Add

**MetaMask**

Terminal: danfinlay, kumavis

Ethereum Browser Extension

This add-on is not actively monitored for security by Mozilla. Make sure you trust it before installing.

[Learn more](#)

256,688 Users

1,737 Reviews

4.3 Stars

Rating	Count
5 stars	1,224
4 stars	198
3 stars	94
2 stars	35
1 star	186

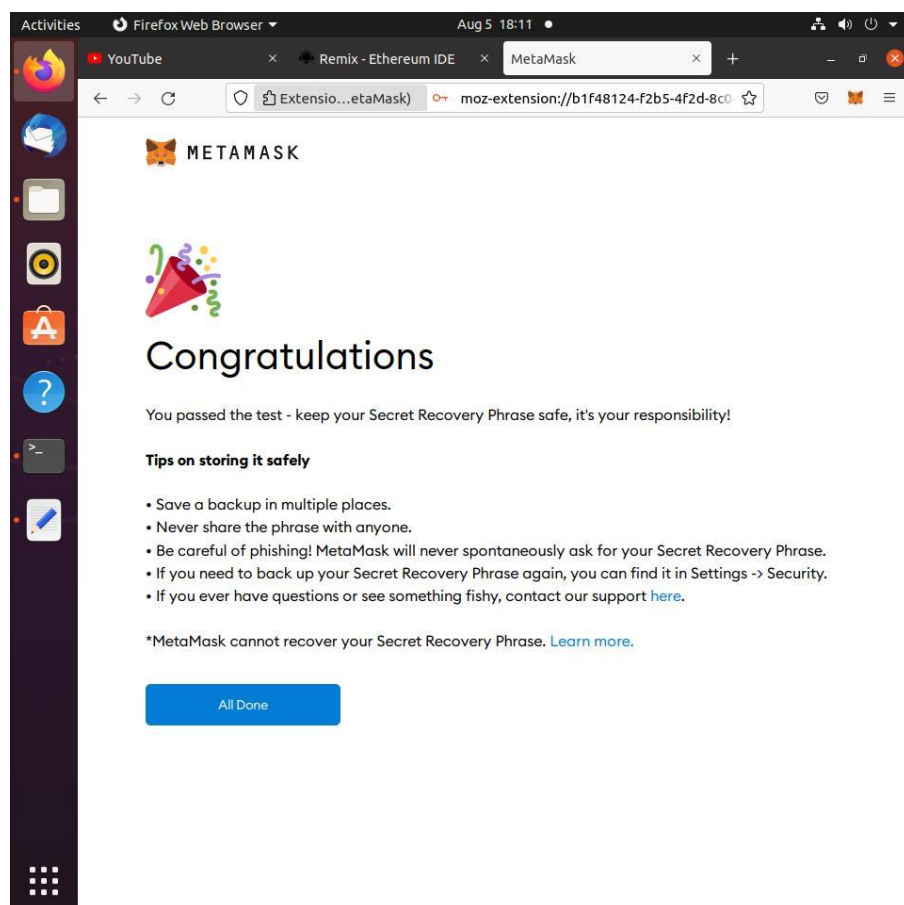
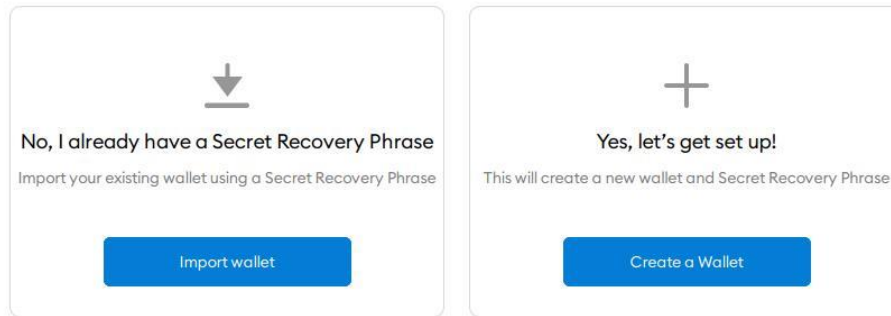
Rate your experience

Screenshots

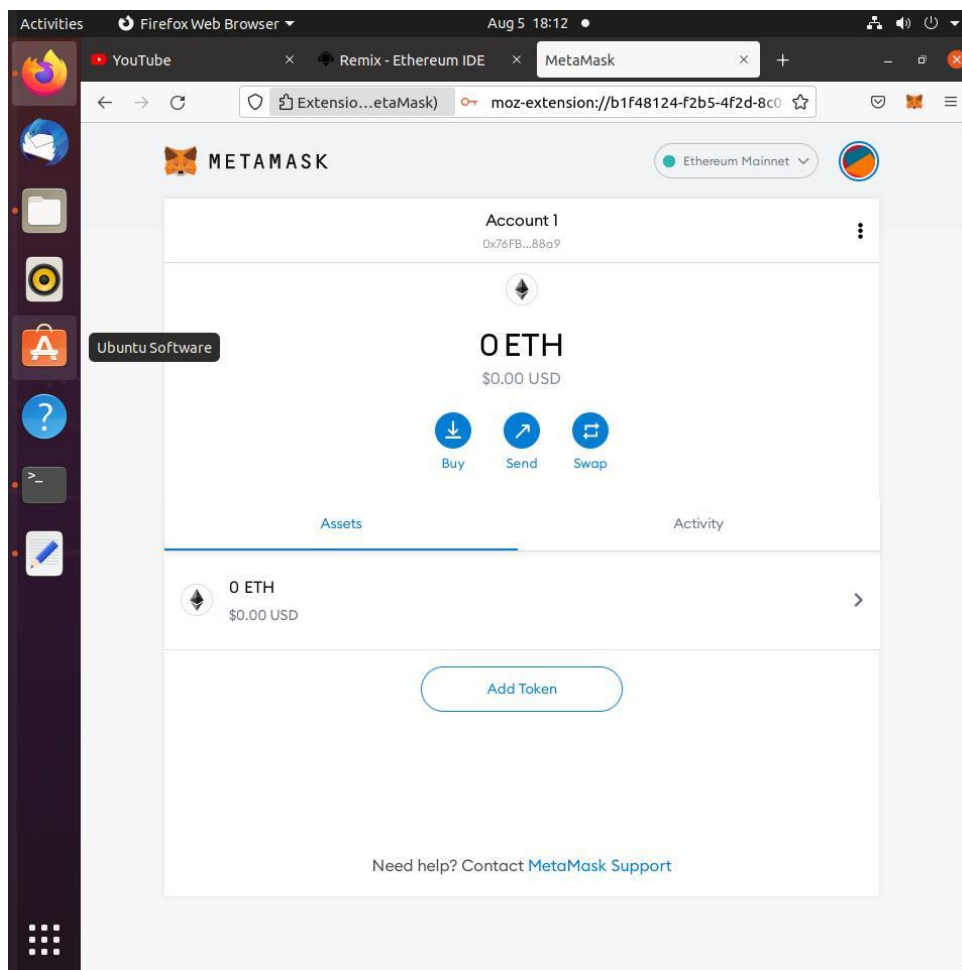
Follow the steps to create a account



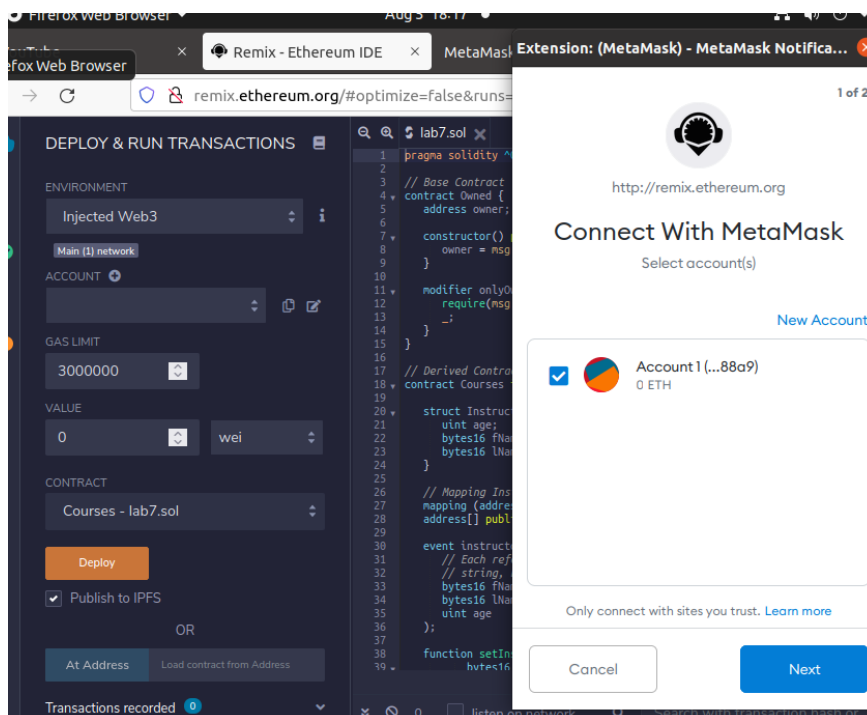
## New to MetaMask?



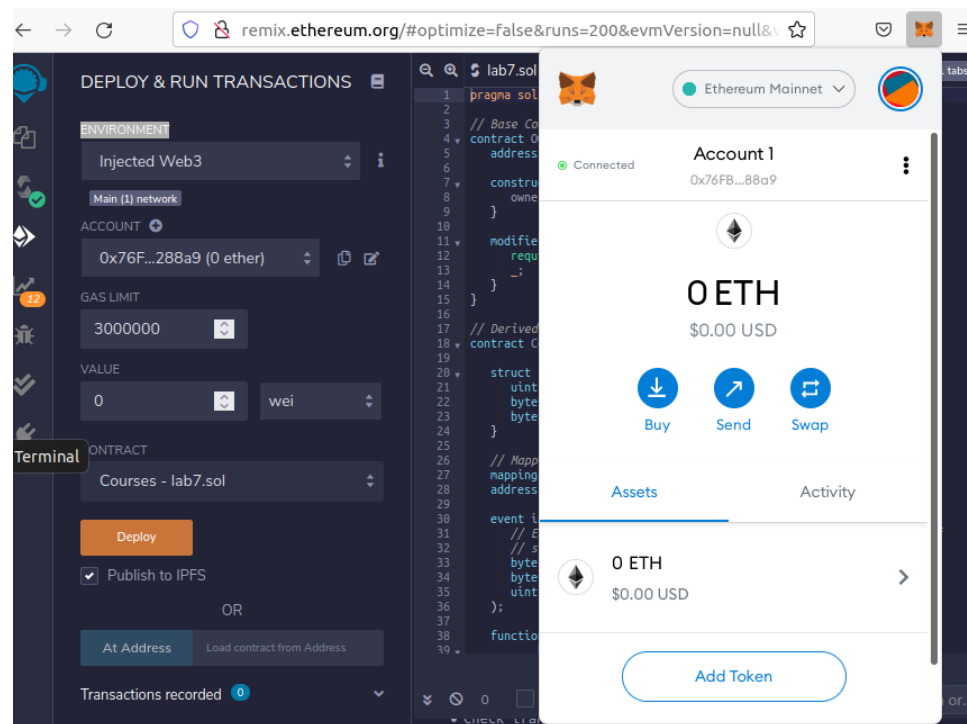
After Login, page is look like as below picture:



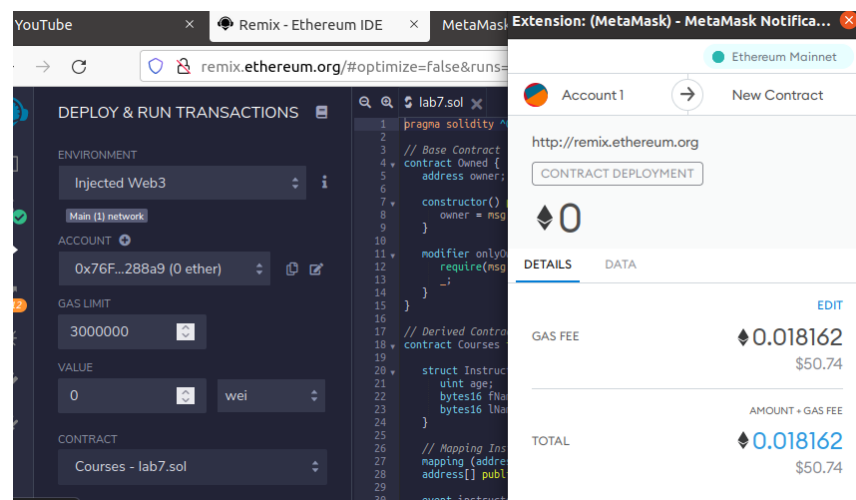
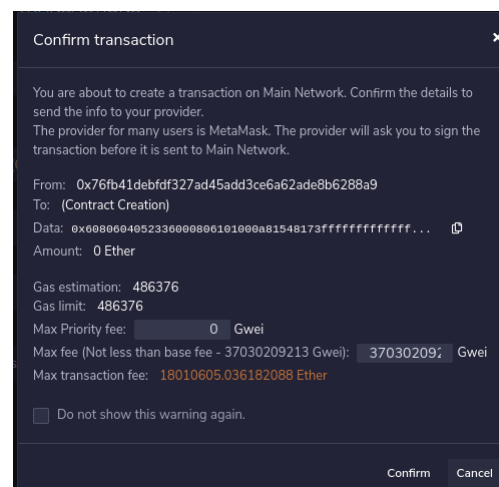
Go to REMIX IDE's Deploy & run transactions, select 'Injected Web3', and if the MetaMask is opening, we should see this:



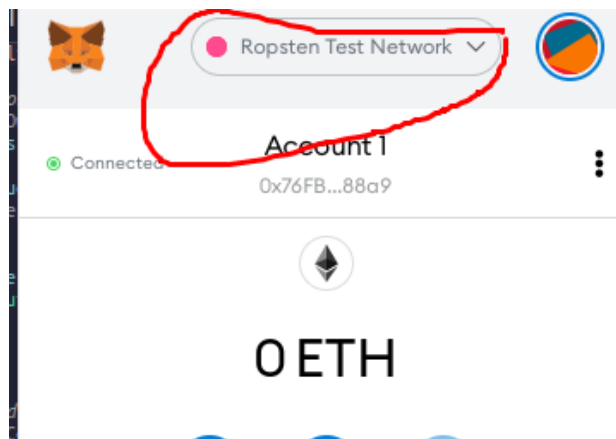
Then make it connected:



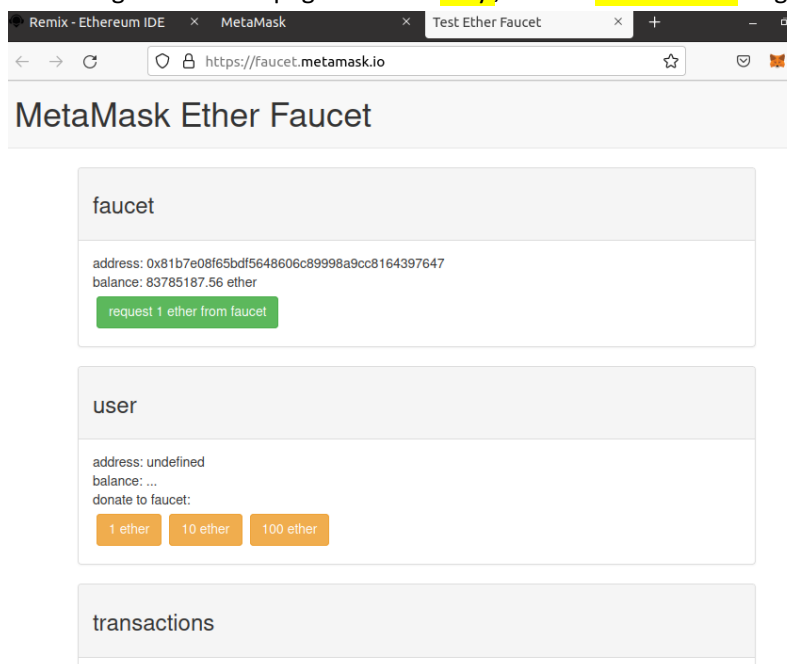
Click the Deploy and continue:



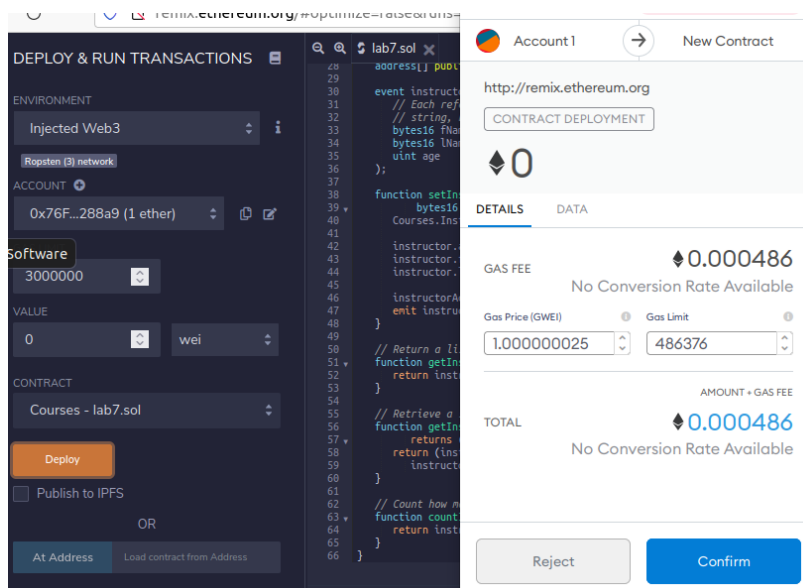
Remember to change the circle part:



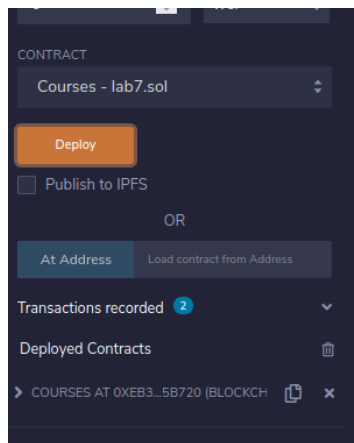
Then we go MetaMask page and click 'Buy', choose 'Test Faucet' to get the testing ether



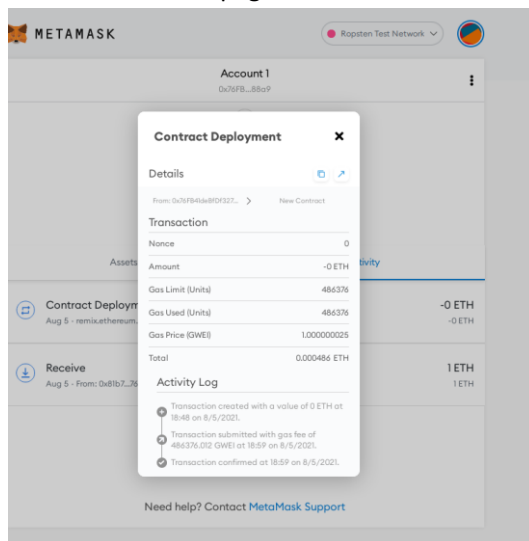
Click the Deploy and Confirm



We will see this (click to copy the address):



On the MetaMask page we can see the transaction details:



Open the terminal and install lite-server for run with:

`npm install lite-server --save-dev`

```
oscar@ubuntu:~/coursetro-eth$ npm install lite-server --save-dev
npm WARN deprecated debug@4.1.1: Debug versions >=3.2.0 <3.2.7 || >=4 <4.3.1 have
a low-severity ReDoS regression when used in a Node.js environment. It is reco
mmended you upgrade to 3.2.7 or 4.3.1. (https://github.com/visionmedia/debug/iss
ues/797)
npm WARN optional SKIPPING OPTIONAL DEPENDENCY: fsevents@~2.3.2 (node_modules/ch
okidar/node_modules/fsevents):
npm WARN notsup SKIPPING OPTIONAL DEPENDENCY: Unsupported platform for fsevents@
2.3.2: wanted {"os":"darwin","arch":"any"} (current: {"os":"linux","arch":"x64"}
)
npm WARN coursetro-eth@1.0.0 No description
npm WARN coursetro-eth@1.0.0 No repository field.

+ lite-server@2.6.1
added 194 packages from 252 contributors and audited 201 packages in 16.731s

6 packages are looking for funding
  run `npm fund` for details

found 1 low severity vulnerability
  run `npm audit fix` to fix them, or `npm audit` for details
oscar@ubuntu:~/coursetro-eth$
```



Open the package.json file and add with:

```
"scripts": {  
  "dev": "lite-server"  
},
```



```
1 {  
2   "name": "coursetro-eth",  
3   "version": "1.0.0",  
4   "description": "",  
5   "main": "index.js",  
6   "scripts": {  
7     "test": "echo \\\"Error: no test specified\\\" && exit 1"  
8   },  
9   "author": "",  
10  "license": "ISC",  
11  "dependencies": {  
12    "web3": "^0.20.6"  
13  },  
14  "devDependencies": {  
15    "lite-server": "^2.6.1"  
16  },  
17  "scripts": {  
18    "dev": "lite-server"  
19  }  
20 }
```

Create an .html file with (enter your ABI code and Address that copied before):

```
<!DOCTYPE html>  
<html lang="en">  
<head>  
  <meta charset="UTF-8">  
  <meta name="viewport" content="width=device-width, initial-scale=1.0">  
  <meta http-equiv="X-UA-Compatible" content="ie=edge">  
  <title>Document</title>  
  <link rel="stylesheet" type="text/css" href="main_lab5.css">  
  <script src="./node_modules/web3/dist/web3.min.js"></script>  
</head>  
<body>  
  
  <div class="container">  
  
    <h1>Coursetro Instructor</h1>  
    <span id="countIns"></span>  
  
    <h2 id="instructor"></h2>  
    <span id="insTrans"></span>  
    <hr>  
  
    
```

```

<label for="fName" class="col-lg-2 control-label">First Name</label>
<input id="fName" type="text">

<label for="lName" class="col-lg-2 control-label">Last Name</label>
<input id="lName" type="text">

<label for="age" class="col-lg-2 control-label">Instructor Age</label>
<input id="age" type="text">

<button id="button">Update Instructor</button>

</div>

<script src="https://code.jquery.com/jquery-3.2.1.slim.min.js"></script>
<script>
var web3;
if (typeof web3 !== 'undefined') {
    web3 = new Web3(web3.currentProvider);
} else {
    // set the provider you want from Web3.providers
    web3 = new Web3(new Web3.providers.HttpProvider("http://localhost:8545"));
    if(!web3.isConnected()) {
        console.log('not-connected');
    } else {
        console.log('connected');
    }
}

////////////////////////////////////
// Default account should be accounts[0]
// web3.eth.defaultAccount = web3.eth.accounts[2];
////////////////////////////////////
web3.eth.defaultAccount = web3.eth.accounts[0];

////////////////////////////////////
// The following highlighted area must be converted into one line.
// Please refer index.html
////////////////////////////////////
// var CoursetroContract = web3.eth.contract('PASTE ABI CODE HERE');
var CoursetroContract = web3.eth.contract();

```

```

console.log('created CoursetroContract');
// var Coursetro = CoursetroContract.at('PASTE CONTRACT ADDRESS HERE');
console.log('Creating Coursetro');
// //////////////////////////////////////
// The following highlighted area must be customized for your smart
// contract.
// //////////////////////////////////////
var Coursetro = CoursetroContract.at("");
console.log(Coursetro);

// Replace the Coursetro.getInstructor() lines with this line:
// var instructorEvent = Coursetro.Instructor();
var instructorEvent = Coursetro.instructorInfo({}, 'latest');

// Watch the event
instructorEvent.watch(function(error, result) {
    if (result) {
        if (result.blockHash != $("#insTrans").html())
            $("#loader").hide();

        $("#insTrans").html('Block hash: ' + result.blockHash);
        $("#instructor").html(web3.toAscii(result.args.fName) + ' '
            + web3.toAscii(result.args.lName)
            + ' (' + result.args.age + ' years old)');
    } else {
        $("#loader").hide();
    }
});

Coursetro.countInstructors((err, res) => {
    if (res)
        $("#countIns").html(res.c + ' Instructors');
})

// if the button "Update Instructor" is pressed.
$("#button").click(function() {
    $("#loader").show();
    Coursetro.setInstructor(web3.eth.defaultAccount, $("#age").val(),
        $("#fName").val(), $("#lName").val(), (err, res) => {
        if (err) {
            $("#loader").hide();
        }
    });
});

```

```

});
</script>
</body>
</html>

```

We open this .html with `npm run dev` and do a transaction to our address:

The screenshot shows a web application interface with a form on the left and a transaction confirmation modal on the right.

**Form Fields:**

- First Name: quangg
- Last Name: Zhouy
- Instructor Age: 25
- Update Instructor button

**Transaction Confirmation Modal:**

- Network: Ropsten Test Network
- Account: Account 1 (0xc1a0...A35e)
- CONTRACT INTERACTION
- Gas Fee: 0.000021 ETH
- Gas Price (GWEI): 1.000000024
- Gas Limit: 21000
- TOTAL: 0.000021 ETH
- Buttons: Reject, Confirm

**Console Output:**

```

ronous XMLHttpRequest on the main thread is deprecated because of its detrimental effects to the end    web3.min.js:1:4017
s experience. For more help http://xhr.spec.whatwg.org/

cted                                                    index_lab7.html:51:21
ed CoursetroContract                                  index_lab7.html:206:1
ing Coursetro                                          index_lab7.html:208:1
ect { _eth: {...}, transactionHash: null, address: "0xc1a0335a05A8dfbdfF5CF6d192f8C5DeA52dA35e", abi:  index_lab7.html:214:1
structor: (...), allEvents: (...), ... }

```