Documentation for private blockchain

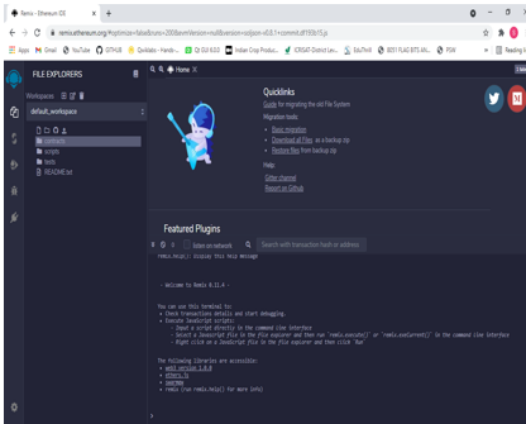
REMIXD

DEFAULT WORKSPACE MODE(1)

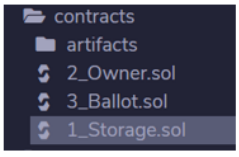
Step 1 : open the web Browser and visit the url which is mentioned below:

https://remix.ethereum.org/

(It will open the online remix ide into your web browser)

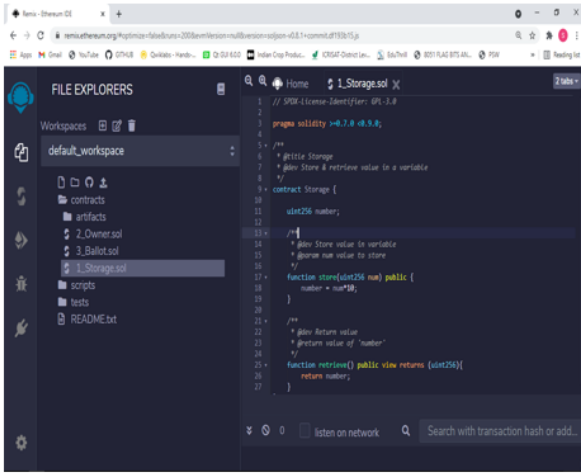


Step 2 : Here we have the contract section which has 3 types of Artifacts:

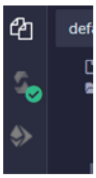


Choose any of the option as per the requirement.

Here I choose the Storage.sol file for my calculator program



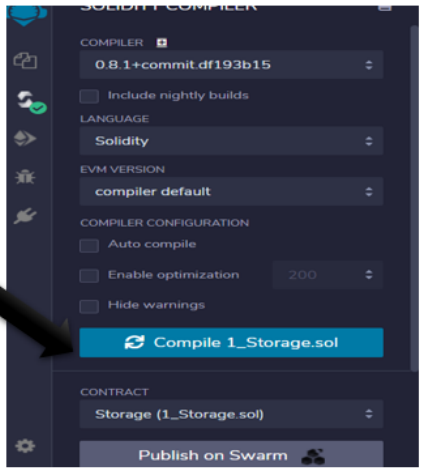
Step 3 : Now we have to create functions as per the requirement and save file using (ctrl+s)



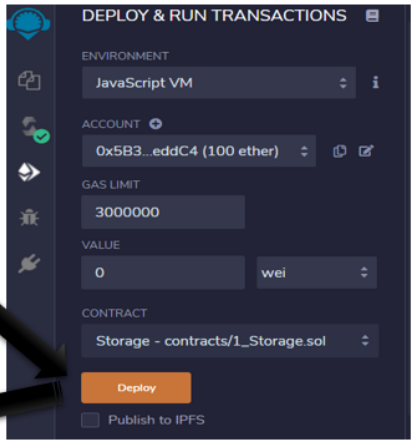
If there is no error then it shows a green signal on the left side of the panel, it means you are now able to compile your program.

```
pragma solidity >=0.7.0 <0.9.0;

/**
 * @title Storage
 * @dev Store & retrieve value in a variable
 */
contract Storage {

    uint256 number;

    /**
     * @dev Store value in variable
     * @param num value to store
     */
    function add(uint256 num ,uint256 num2) public {
        number = num + num2;
    }
     function sub(uint256 num ,uint256 num2) public {
        number = num - num2;
    }
     function mul(uint256 num ,uint256 num2) public {
        number = num * num2;
    }
     function div(uint256 num ,uint256 num2) public {
        number = num / num2;
    }

    /**
     * @dev Return value
     * @return value of 'number'
     */
    function retrieve() public view returns (uint256){
        return number;
    }
```

Step 4 : Now we compile our program using this compile option (Compile program_name)



Step 5 : In next Step we deploy our program by clicking this option (Deploy)

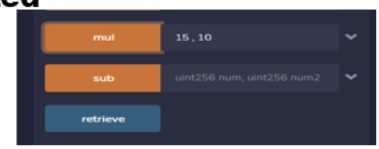


After deployment a contract is created

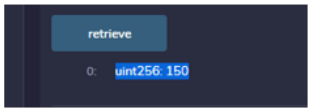
Step 6 : In the deployed Contract section we will see our functions which we have created

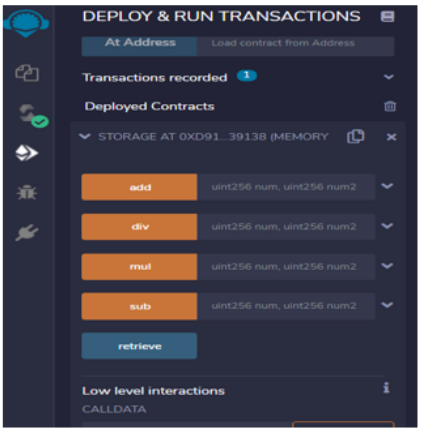
Test:

Input



Output



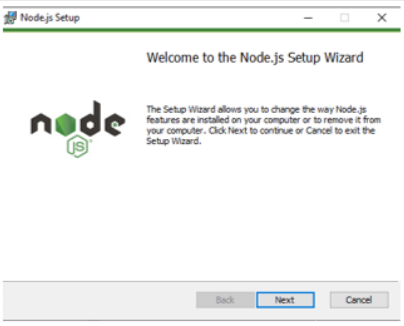


NODE JS WITH REMIXD

npm install -g @remix-project/remixd

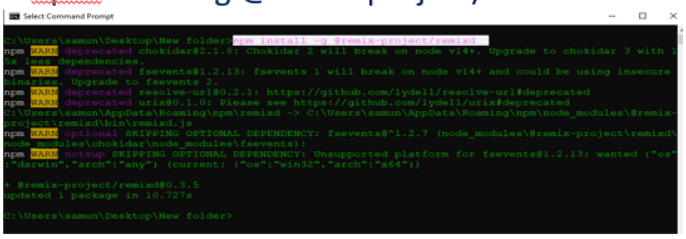
LOCALHOST MODE(1)

Step 1 :install Nodejs in your PC



Step 2: Then install remixd using command in your folder:

npm install -g @remix-project/remixd



Warning: Do not use any space for the folder name otherwise it will create an error during **step 3 and 4**

Step 3 :run this command to share your folder with the remix ide.

remixd -s <mention folder path> –remix-ide https://remix.ethereum.org

```
C:\Users\samun>remixd -s C:\Users\samun\Desktop\remixd_demo --remix-ide https://remix.ethereum.org
[WARN] You may now only use IDE at https://remix.ethereum.org to connect to that instance
[WARN] Any application that runs on your computer can potentially read from and write to all files i
n the directory.
[WARN] Symbolic links are not forwarded to Remix IDE

Sat Apr 24 2021 19:58:33 GMT+0530 (India Standard Time) remixd is listening on 127.0.0.1:65520
setup notifications for C:\Users\samun\Desktop\remixd_demo
```

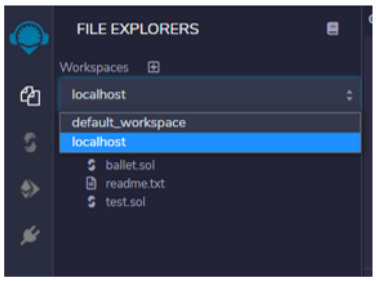
---

remixd -s <mention folder path> --remix-ide https://remix.ethereum.org

Step 4 : Choose the localhost option from the work space.

Step 5: create a file then either write the command or copy the code skeleton from the default_workspace

Repeat step 2 to step 6 from Default Workspace Mode in order to run program in localhost mode.



STARTING PRIVATE BLOCKCHAIN USING GETH

geth --rpc --rpcport "8545" --datadir=./chaindata/TestChain --rpcapi admin,eth,net,web3,personal,miner,txpool --nodiscover --rpccorsdomain "*" --allow-insecure-unlock

```
PS C:\Users\Ashok\Workspace> cd .\blockchain\
PS C:\Users\Ashok\Workspace\blockchain> geth --rpc --rpcport "8545" --datadir ./chaindata --rpcapi admin,eth,net,web3,personal,miner,txpool --rpccorsdo
main "*" --allow-insecure-unlock
INFO [04-28|16:07:01.514] Starting Geth on Ethereum mainnet...
INFO [04-28|16:07:01.514] Bumping default cache on mainnet         provided=1024 updated=4096
INFO [04-28|16:07:01.527] Maximum peer count                       ETH=50 LES=0 total=50
WARN [04-28|16:07:01.530] The flag --rpc is deprecated and will be removed June 2021, please use --http
WARN [04-28|16:07:01.534] The flag --rpcport is deprecated and will be removed June 2021, please use --http.port
```

INTERACTING WITH THIS GETH CONSOLE

geth attach http://localhost:8545

WEB3 .JS

To work with web3.js make sure you installed nodejs

To check node version : node -v

To check npm version : npm -v

```
PS C:\Users\Ashok\Workspace\web3-intro> ls
PS C:\Users\Ashok\Workspace\web3-intro> node -v
v14.16.1
PS C:\Users\Ashok\Workspace\web3-intro> npm -v
6.14.12
PS C:\Users\Ashok\Workspace\web3-intro>
```

START NEW PROJECT IN NODEJS :

npm init -y

```
PS C:\Users\Ashok\Workspace\web3-intro> npm init -y
Wrote to C:\Users\Ashok\Workspace\web3-intro\package.json:

{
  "name": "web3-intro",
  "version": "1.0.0",
  "description": "",
  "main": "index.js",
  "scripts": {
    "test": "echo \"Error: no test specified\" && exit 1"
  },
  "keywords": [],
  "author": "",
  "license": "ISC"
}


PS C:\Users\Ashok\Workspace\web3-intro>
```

INSTALLING WEB3 MODULE :

Npm install web3 --save

```
PS C:\Users\Ashok\Workspace\web3-intro> npm install web3 --save
npm WARN deprecated mkdirp-promise@5.0.1: This package is broken and no longer maintained. 'mkdirp' itself supports promises now, please switch t
o that.
npm WARN deprecated request@2.88.2: request has been deprecated, see https://github.com/request/request/issues/3142
npm WARN deprecated har-validator@5.1.5: this library is no longer supported
[..................] \ fetchMetadata: sill resolveWithNewModule core-util-is@1.0.2 checking installable status
```

This will install web3 dependencies of the project

INTERACTING WITH NODE :

Run node then inside node run following
Let Web3 = require('web')

```
PS C:\Users\Ashok\Workspace\web3-intro> node
Welcome to Node.js v14.16.1.
Type ".help" for more information.
> let Web3 = require('web3')
undefined
>
```

We can check what are things available to this Web3 variable by typing Web3 to console.

CONNECT WITH LOCAL BLOCKCHAIN :

Let web3 = new Web3(http://localhost:8545”)

```
  }
}
> let web3 = new Web3("http://localhost:8545
```

web3.eth.getAccounts()

web3.eth.getAccounts().then(console.log)

This is function in eth module return accounts

```
> web3.eth.getAccounts()
Promise { <pending> }
> web3.eth.getAccounts().then(console.log)
Promise { <pending> }
> [
  '0xA991a0a1Aa60494eaB796a0E3cB141240F27A11d',
  '0xD53eF242f9df505FDA63f44c9b436452AEa1bB23',
  '0xaC53fc0719c1e8157422442C4cbc9be6E2c45A83',
  '0xb90dE1650396834c38a7677D54081Bda7c926A83',
  '0x14DB9B75cd94e106e37ACF1e3a0ebcE99DbDbeDf'
]
```

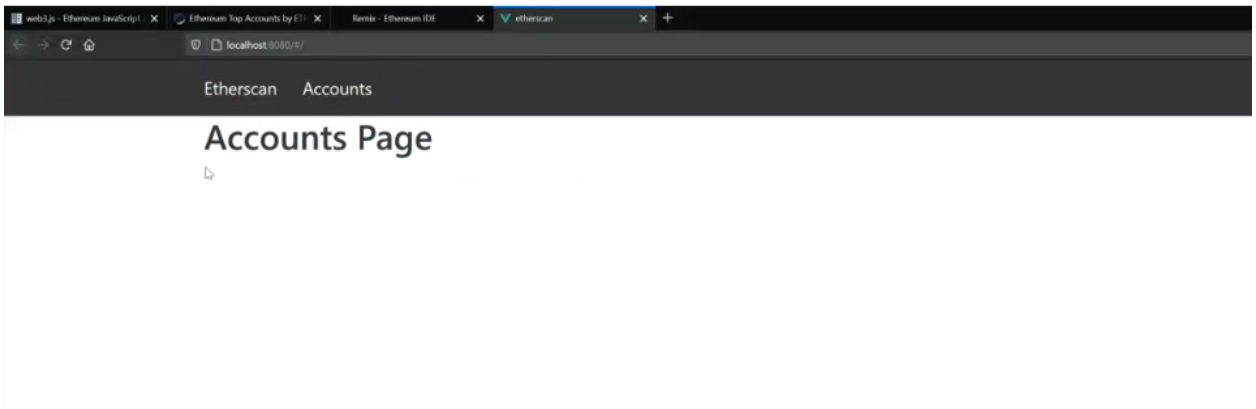
Creating new directory etherscan and creating project in it

```
    Directory: C:\Users\Ashok\Workspace\etherscan


Mode                LastWriteTime         Length Name
----                -------------         ------ ----
d-----        28-04-2021     16:11                node_modules
d-----        28-04-2021     16:10                public
d-----        28-04-2021     16:10                src
-a----        28-04-2021     16:10             30 .browserslistrc
-a----        28-04-2021     16:10            351 .eslintrc.js
-a----        28-04-2021     16:10            231 .gitignore
-a----        28-04-2021     16:10             73 babel.config.js
-a----        28-04-2021     16:10         533540 package-lock.json
-a----        28-04-2021     16:10            652 package.json
-a----        28-04-2021     16:10            321 README.md
```

Starting server:

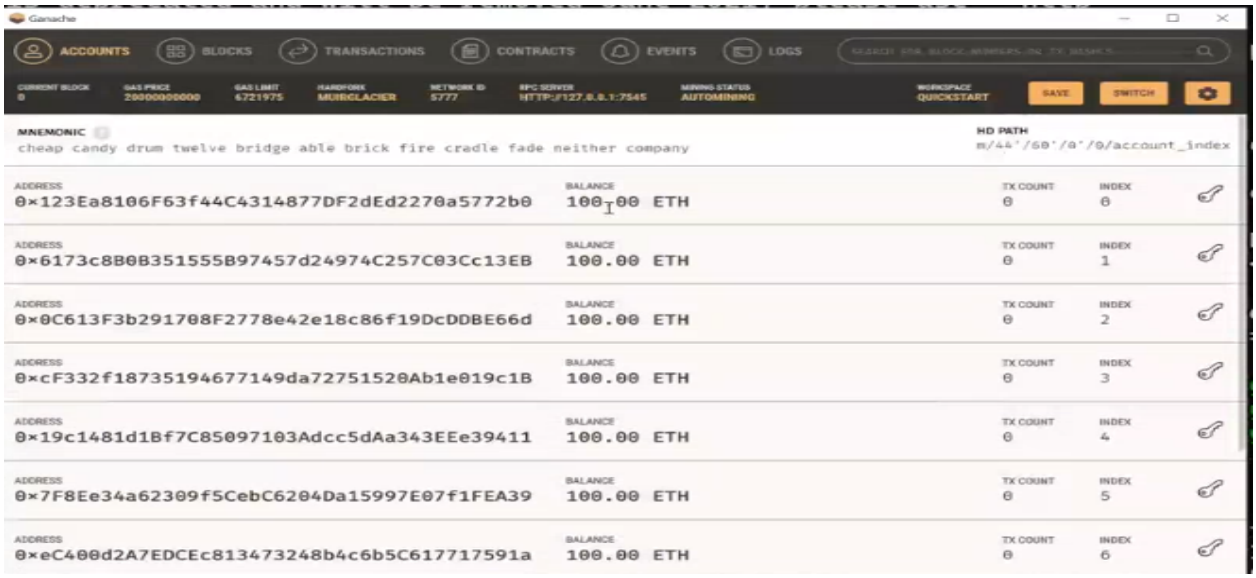
```
PS C:\Users\Ashok\Workspace\etherscan> npm run serve

> etherscan@0.1.0 serve C:\Users\Ashok\Workspace\etherscan
> vue-cli-service serve

 INFO  Starting development server...
```

We can see our application is running :



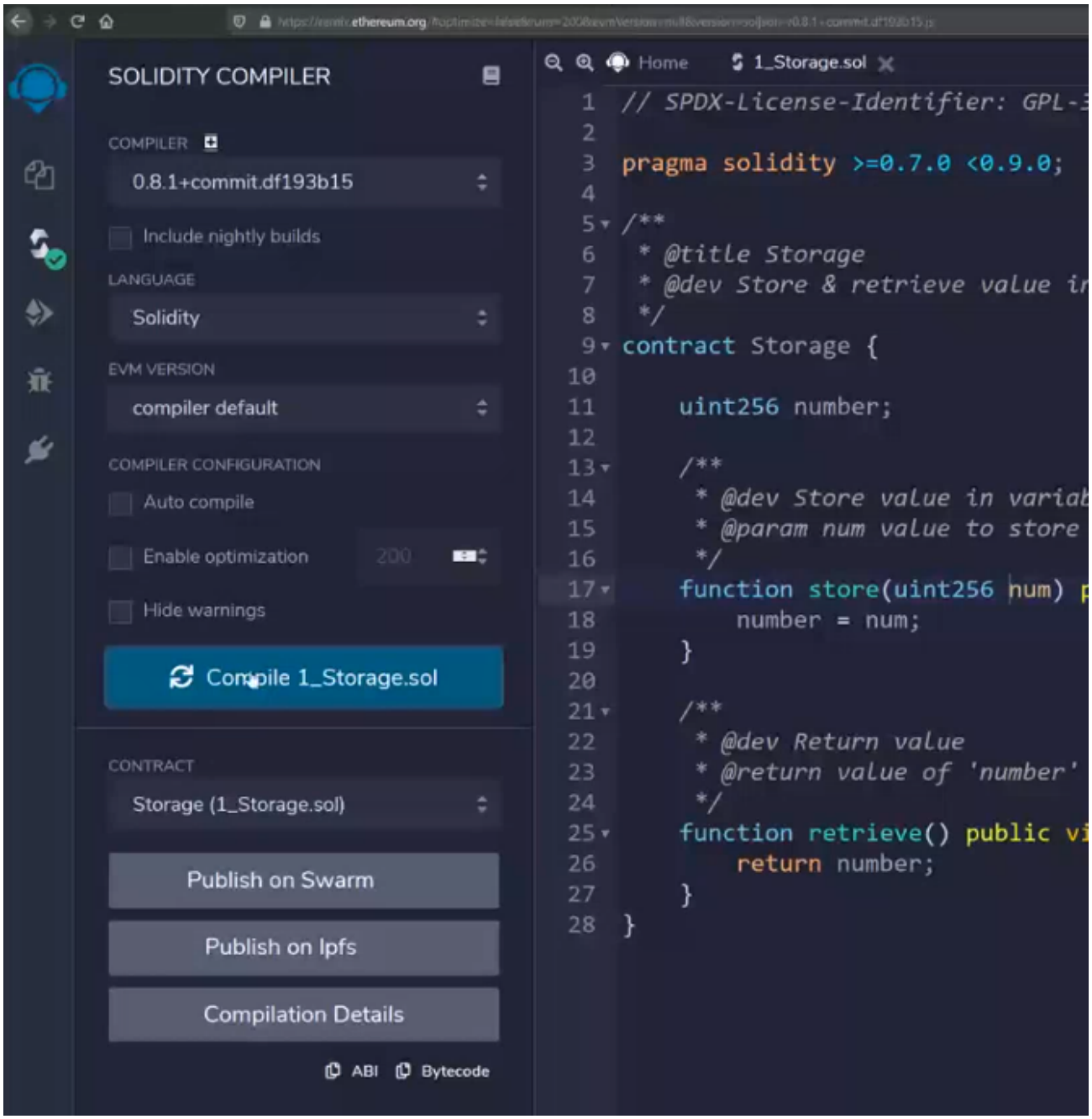
INSTALLING GANACHE TO START BLOCKCHAIN LOCALLY :

https://www.trufflesuite.com/ganache

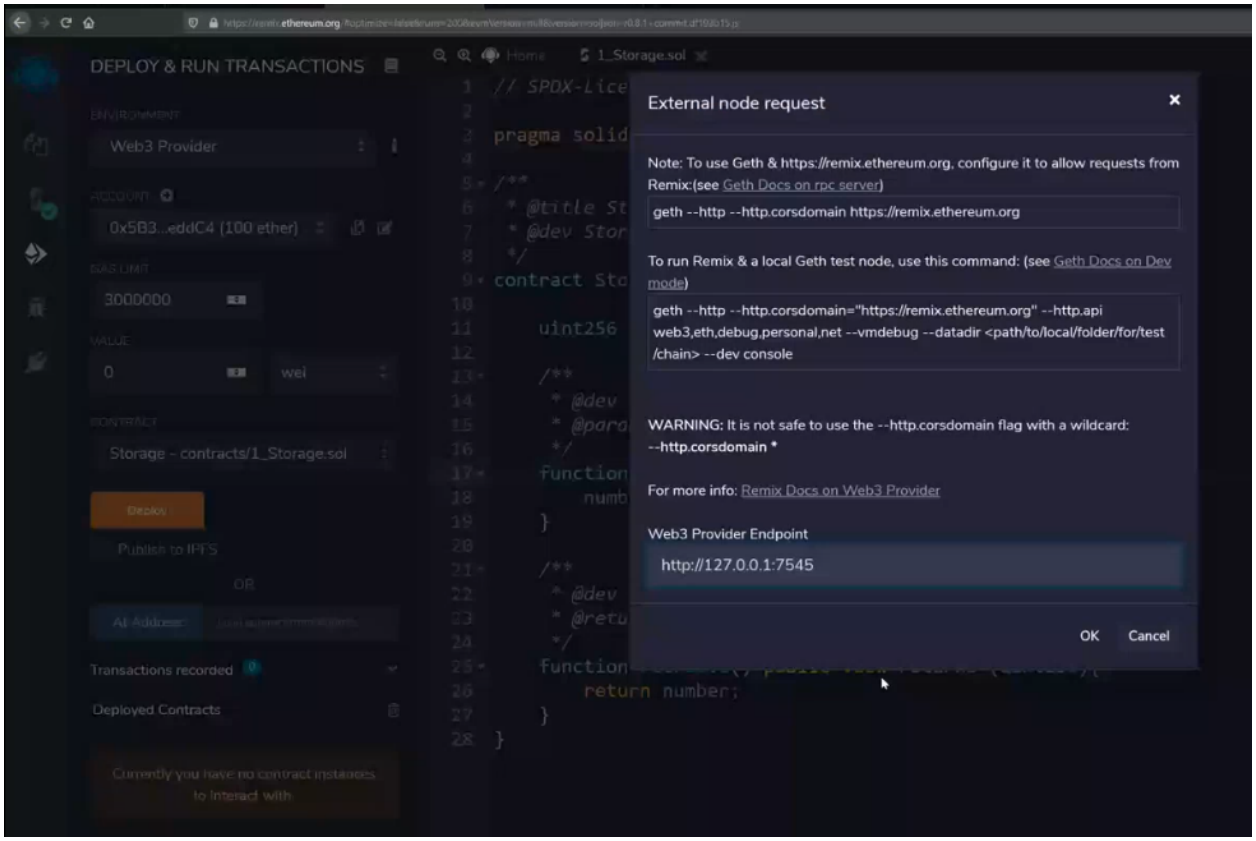


IT COME WITH SOME ACCOUNTS

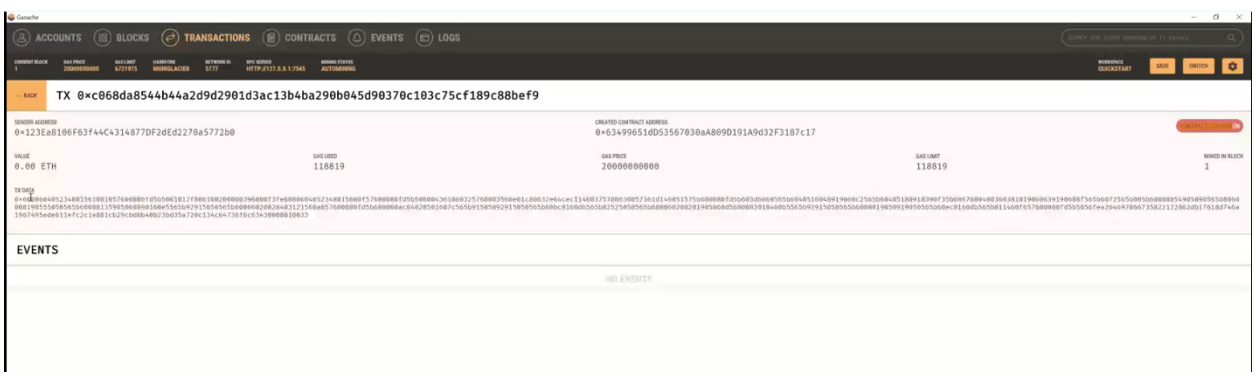
COMPILE THE SOLIDITY FILE FIRST :



CHOOSE WEB3 PROVIDER IN DEPLOYMNET AND CHANGE PORT TO 7545



WE CAN SEE DEPLOYED CONTRACT IN TRANSACTION OF GANACHE :



INSTALLING TRUFFLE :

It ease the development of smart contracts

Npm install -g truffle

```
npm install -g truffle
```

Once we have installed truffle create new project in new directory

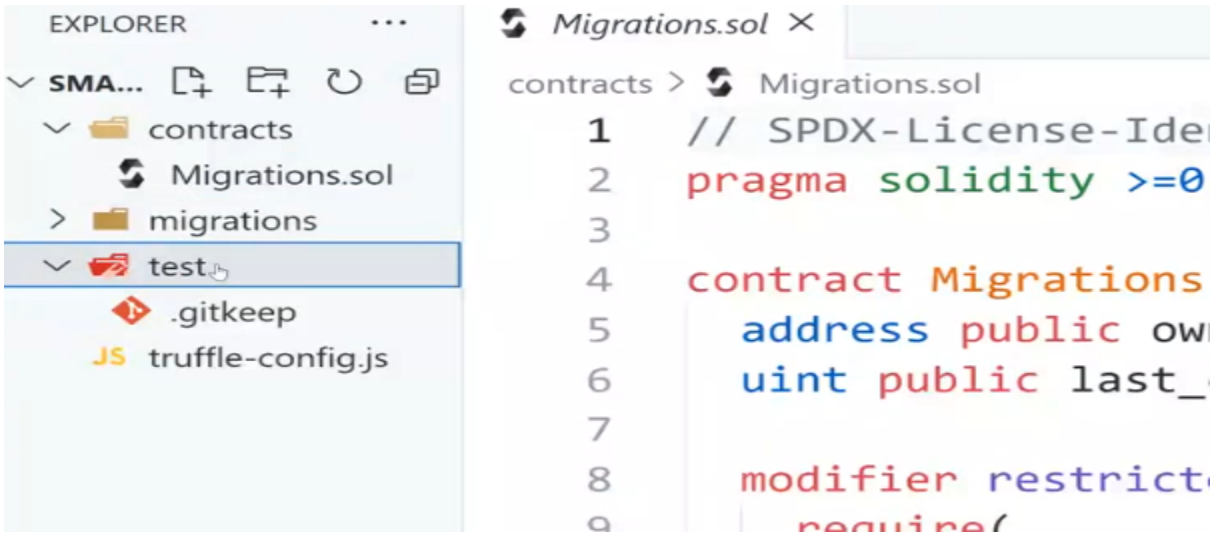
```
PS C:\Users\Ashok\Workspace\etherscan> truffle.cmd^C
PS C:\Users\Ashok\Workspace\etherscan> cd ..
PS C:\Users\Ashok\Workspace> ls


    Directory: C:\Users\Ashok\Workspace


Mode                LastWriteTime         Length Name
----                -------------         ------ ----
d-----        26-04-2021     07:41                blockchain
d-----        28-04-2021     16:11                etherscan
d-----        28-04-2021     16:53                web3-intro


PS C:\Users\Ashok\Workspace> mkdir smartcontract


    Directory: C:\Users\Ashok\Workspace


Mode                LastWriteTime         Length Name
----                -------------         ------ ----
d-----        28-04-2021     17:46                smartcontract
```

To initialize new project

```
GETH    GETH CONSOLE    Windows PowerShell
PS C:\Users\Ashok\Workspace\smartcontract> truffle.cmd init
```

```
PS C:\Users\Ashok\Workspace\smartcontract> truffle.cmd init

Starting init...
================

> Copying project files to C:\Users\Ashok\Workspace\smartcontract

Init successful, sweet!
```

It has three file :



- First one is main solidity file
- Truffle-config.js is configuration file for truffle

We can also compile solidity file without remixd with the help of solc :

We need to install solc

```
PS C:\Users\Ashok\Workspace\smartcontract\contracts> npm install solc
```

```
PS C:\Users\Ashok\Workspace\smartcontract\contracts> solcjs.cmd .\Migrations.sol --abi
PS C:\Users\Ashok\Workspace\smartcontract\contracts> ls


    Directory: C:\Users\Ashok\Workspace\smartcontract\contracts


Mode                LastWriteTime         Length Name
----                -------------         ------ ----
-a----        26-10-1985     13:45            419 Migrations.sol
-a----        28-04-2021     17:49            456 __Migrations_sol_Migrations.abi


PS C:\Users\Ashok\Workspace\smartcontract\contracts>
```

We used command to compile sol file and it gave abi file

```
PS C:\Users\Ashok\Workspace\smartcontract\contracts> cat .\__Migrations_sol_Migrations.abi
[{"inputs":[],"name":"last_completed_migration","outputs":[{"internalType":"uint256","name":"","type":"uint256"}],"stateMutability":"view","type"
:"function"},{"inputs":[],"name":"owner","outputs":[{"internalType":"address","name":"","type":"address"}],"stateMutability":"view","type":"funct
ion"},{"inputs":[{"internalType":"uint256","name":"completed","type":"uint256"}],"name":"setCompleted","outputs":[],"stateMutability":"nonpayable
","type":"function"}]
PS C:\Users\Ashok\Workspace\smartcontract\contracts>
```

This is what we have to pass in web3 js

```
PS C:\Users\Ashok\Workspace\smartcontract\contracts> solcjs.cmd .\Migrations.sol --bin
PS C:\Users\Ashok\Workspace\smartcontract\contracts>
```

This gives binary file which is used to deploy on our blockchain

```
    Directory: C:\Users\Ashok\Workspace\smartcontract\contracts


Mode                LastWriteTime         Length Name
----                -------------         ------ ----
-a----        26-10-1985     13:45            419 Migrations.sol
-a----        28-04-2021     17:49            456 __Migrations_sol_Migrations.abi
-a----        28-04-2021     17:51           1892 __Migrations_sol_Migrations.bin
```

We can see we have abi as well as bin file