

## **Task:To-Do-List:**

Blockchain-Based To-Do List DApp

Objective: Create a DApp to store and manage to-do lists.

Key Features:

Smart contract to add, delete, and view tasks.

DApp frontend to interact with the contract.

Tasks are stored immutably on the blockchain.

Objectives:

Solidity events, state management, and frontend-backend interaction.

Tools:

Solidity, Truffle, Ganache, web3.js, and React/HTML.

## **Steps:**

**Step 1: We need to install the Ganache from the browser**

**Step 2:Installation of Truffle**

```
npm install -g truffle
```

**Step 3:Creating the Solidity Smart Contract**

Open cmd and perform:

```
mkdir BlockchainTodo
```

```
cd BlockchainTodo
```

```
truffle init
```

It redirects to the VScode.....

### **ToDoList.sol:**

```
pragma solidity ^0.8.0;
```

```
contract ToDoList {  
    uint public taskCount = 0;
```

```
    struct Task {  
        uint id;  
        string description;  
        bool completed;  
    }  
}
```

```
mapping(uint => Task) public tasks;
```

```
function createTask(string memory _description) public {  
    taskCount++;
```

```

        tasks[taskCount] = Task(taskCount, _description, false);
    }

    function completeTask(uint _id) public {
        Task storage task = tasks[_id];
        task.completed = true;
    }

    function deleteTask(uint _id) public {
        delete tasks[_id];
    }
}

```

**Compile the SmartContract: truffle compile**

## **Step 4: Deploy the Smart Contract**

**migrations/2\_deploy\_contracts.js:**

```
const ToDoList = artifacts.require("ToDoList");
```

```

module.exports = function (deployer) {

    deployer.deploy(ToDoList);

};

```

**Deploy the contract to the Ganache blockchain: truffle migrate**

**truffle-config.js:**

```

module.exports = {

    networks: {

        development: {

            host: "127.0.0.1",

            port: 7545,

            network_id: "**",

            gas: 6721975,

```

```
      gasPrice: 200000000000,
    }
  },
  compilers: {
    solc: {
      version: "0.8.0",
    }
  },
};
```

## Step 5: Create the Frontend

### index.html:

```
<!DOCTYPE html>

<html lang="en">

<head>

  <meta charset="UTF-8">

  <meta name="viewport" content="width=device-width, initial-scale=1.0">

  <title>Blockchain-Based To-Do List</title>

  <script src="https://cdn.jsdelivr.net/npm/web3@latest/dist/web3.min.js"></script>

  <script defer src="app.js"></script>

</head>

<body>

  <h1>Blockchain-Based To-Do List</h1>

  <form id="taskForm">

    <input type="text" id="taskInput" placeholder="Enter a task" required>

    <button type="submit">Add Task</button>

  </form>
```

```
<ul id="taskList"></ul>

</body>

</html>
```

### **app.js:**

```
const web3 = new Web3("http://127.0.0.1:7545"); // Ganache RPC URL
```

```
const contractABI = [

  {

    "anonymous": false,

    "inputs": [

      {

        "indexed": false,

        "internalType": "uint256",

        "name": "id",

        "type": "uint256"

      },

      {

        "indexed": false,

        "internalType": "bool",

        "name": "completed",

        "type": "bool"

      }

    ],

    "name": "TaskCompleted",

    "type": "event"

  },
```

```
{  
  "anonymous": false,  
  "inputs": [  
    {  
      "indexed": false,  
      "internalType": "uint256",  
      "name": "id",  
      "type": "uint256"  
    },  
    {  
      "indexed": false,  
      "internalType": "string",  
      "name": "description",  
      "type": "string"  
    },  
    {  
      "indexed": false,  
      "internalType": "bool",  
      "name": "completed",  
      "type": "bool"  
    }  
  ],  
  "name": "TaskCreated",  
  "type": "event"  
},  
{
```

```
"anonymous": false,

"inputs": [

  {

    "indexed": false,

    "internalType": "uint256",

    "name": "id",

    "type": "uint256"

  }

],

"name": "TaskDeleted",

"type": "event"

},

{

  "inputs": [],

  "name": "taskCount",

  "outputs": [

    {

      "internalType": "uint256",

      "name": "",

      "type": "uint256"

    }

  ],

  "stateMutability": "view",

  "type": "function",

  "constant": true

},
```

```
{
  "inputs": [
    {
      "internalType": "uint256",
      "name": "",
      "type": "uint256"
    }
  ],
  "name": "tasks",
  "outputs": [
    {
      "internalType": "uint256",
      "name": "id",
      "type": "uint256"
    },
    {
      "internalType": "string",
      "name": "description",
      "type": "string"
    },
    {
      "internalType": "bool",
      "name": "completed",
      "type": "bool"
    }
  ],
}
```

```
"stateMutability": "view",

"type": "function",

"constant": true

},

{

  "inputs": [

    {

      "internalType": "string",

      "name": "_description",

      "type": "string"

    }

  ],

  "name": "createTask",

  "outputs": [],

  "stateMutability": "nonpayable",

  "type": "function"

},

{

  "inputs": [

    {

      "internalType": "uint256",

      "name": "_id",

      "type": "uint256"

    }

  ],

  "name": "completeTask",
```



```

    "outputs": [],
    "stateMutability": "nonpayable",
    "type": "function"
  },
  {
    "inputs": [
      {
        "internalType": "uint256",
        "name": "_id",
        "type": "uint256"
      }
    ],
    "name": "deleteTask",
    "outputs": [],
    "stateMutability": "nonpayable",
    "type": "function"
  }
];

const contractAddress = "0x828CeEA29b95579DD37D13F13182793A394D1De1";

const todoList = new web3.eth.Contract(contractABI, contractAddress);

async function loadTasks() {
  const taskCount = await todoList.methods.taskCount().call();

  const taskList = document.getElementById("taskList");

  taskList.innerHTML = "";

```

```

for (let i = 1; i <= taskCount; i++) {

    const task = await todoList.methods.tasks(i).call();

    const taskItem = document.createElement("li");

    taskItem.textContent = `${task.description} - ${task.completed ? "Completed" : "Incomplete"}`;

    taskList.appendChild(taskItem);

}

}

async function addTask(description) {

    const accounts = await web3.eth.getAccounts();

    await todoList.methods.createTask(description).send({ from: accounts[0] });

    loadTasks(); // Reload tasks

}

document.getElementById("taskForm").addEventListener("submit", async (e) => {

    e.preventDefault();

    const taskInput = document.getElementById("taskInput").value;

    await addTask(taskInput);

});

window.addEventListener("load", loadTasks);

```

### Modification/Adding:

- Copy the contract address from the console and paste it in the app.js file,i.e

```
const contractAddress = "0x828CeEA29b95579DD37D13F13182793A394D1De1";
```

- After Compiling the task ToDOList.json file is created in the Build/contracts folder
- From that file we need to copy the Abi code into app.js file.

### Step 6: Run the Application

- In the terminal we need to execute the command : http-server src  
It will provides the port and we need to follow the port so that the index.html will be executed.

- Add a task in the text box and click on the add task button in the html page so that block will be added in Ganache.

### **Step 7: Verify on Ganache**

- Transaction is added.

## Outputs:

### ToDoList:

### truffle compile

```
C:\Users\DL D bhAVYASRI\BlockchainToDo>truffle compile

Compiling your contracts...
=====
> Compiling .\contracts\ToDoList.sol
> Artifacts written to C:\Users\DL D bhAVYASRI\BlockchainToDo\build\contracts
> Compiled successfully using:
   - solc: 0.8.0+commit.c7dfd78e.Emscripten.clang
```

### truffle migrate

```
C:\Users\DL D bhAVYASRI\BlockchainToDo>truffle migrate

Compiling your contracts...
=====
> Compiling .\contracts\ToDoList.sol
> Artifacts written to C:\Users\DL D bhAVYASRI\BlockchainToDo\build\contracts
> Compiled successfully using:
   - solc: 0.8.0+commit.c7dfd78e.Emscripten.clang

Starting migrations...
=====
> Network name:    'development'
> Network id:     5777
> Block gas limit: 6721975 (0x6691b7)

2_deploy_todolist.js
=====

Replacing 'ToDoList'
-----
> transaction hash: 0x323c7fab3a8838d633c2abe60326e558d0838ede917d78e653b4202030ab20c5
> Blocks: 0
> contract address: 0xc88e860a7816ba697ff76c6EAF821318407363d9
> block number: 1
> block timestamp: 1734493619
> account: 0x9c09050C4650A439F7b308d15A21f310d2620f48
> balance: 99.98854224
> gas used: 572888 (0x8bdd8)
> gas price: 20 gwei
> value sent: 0 ETH
> total cost: 0.01145776 ETH

> Saving artifacts
-----
> Total cost: 0.01145776 ETH

Summary
=====
> Total deployments: 1
> Final cost: 0.01145776 ETH
```

### npx http-server:

```
C:\Users\DL0\h4wv\ASRI\BlockchainToDo>http-server src
Starting up http-server, serving src

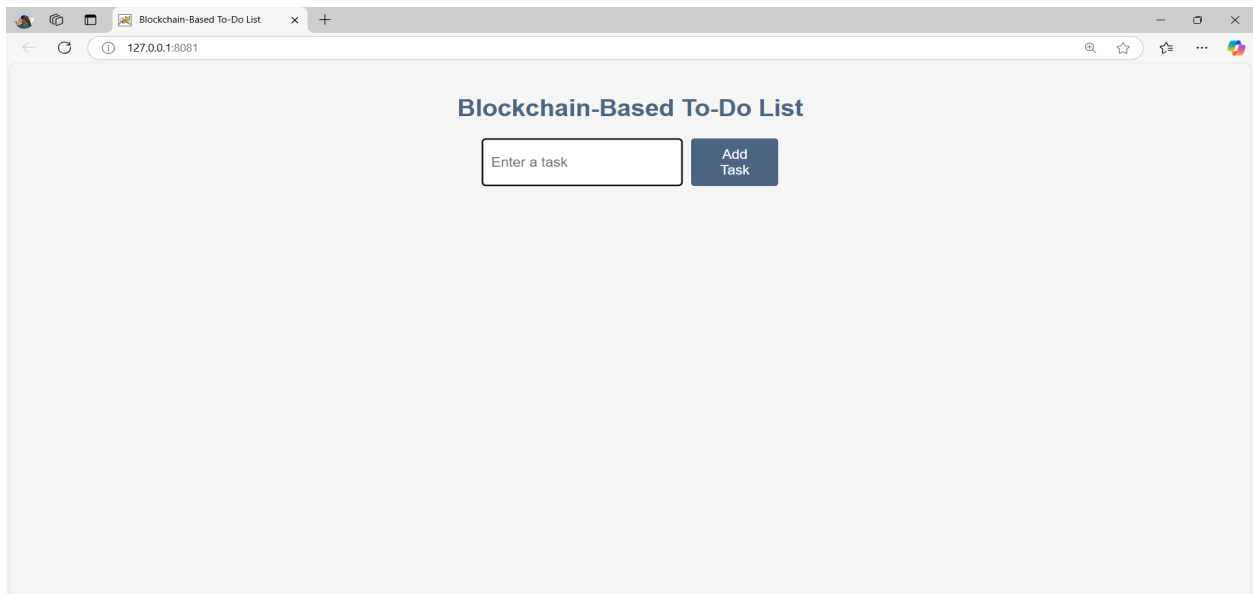
http-server version: 14.1.1

http-server settings:
CORS: disabled
Cache: 3600 seconds
Connection Timeout: 120 seconds
Directory Listings: visible
AutoIndex: visible
Serve GZIP Files: false
Serve Brotli Files: false
Default File Extension: none

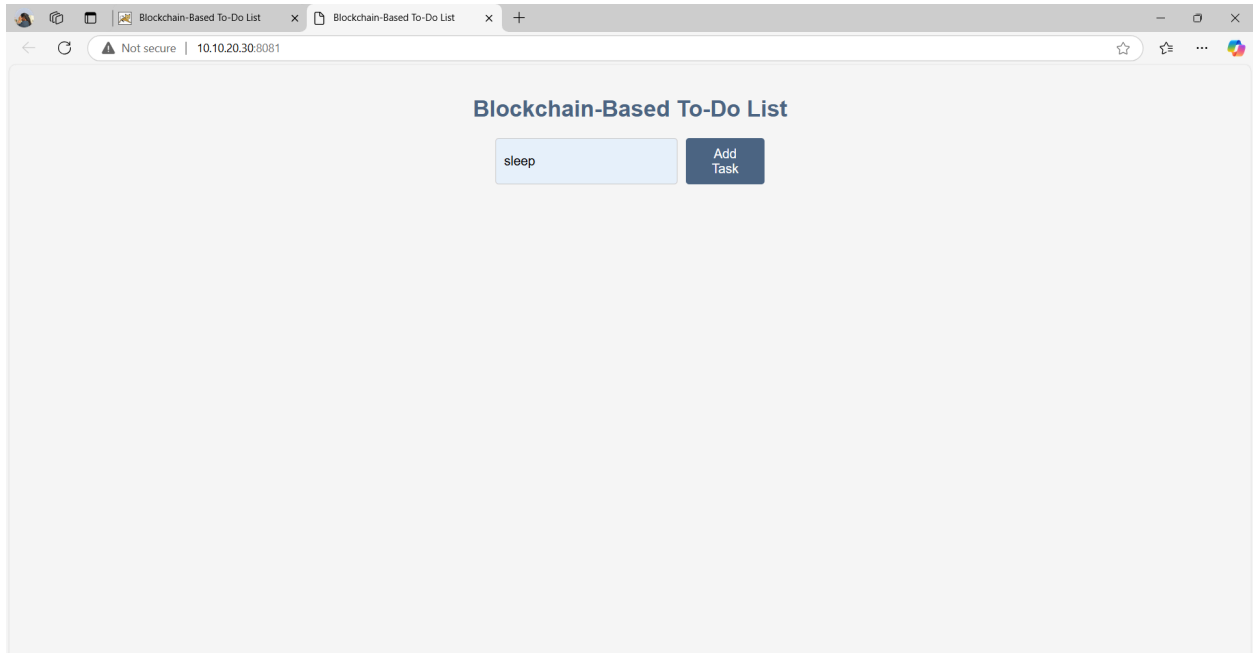
http://10.10.20.30:8081
http://127.0.0.1:8081
Hit CTRL-C to stop the server

[2024-12-18T03:47:47.167Z] "GET /favicon.ico" Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/131.0.0.0 Safari/537.36 Edg/131.0.0.0"
(node:11616) [DEP0066] DeprecationWarning: OutgoingMessage.prototype.headers is deprecated
(Use 'node --trace-deprecation ...' to show where the warning was created)
[2024-12-18T03:47:47.176Z] "GET /favicon.ico" Error (404): "Not found"
> []
```

index.html



Adding task:



## Checking Balance:

Ganache

ACCOUNTS BLOCKS TRANSACTIONS CONTRACTS EVENTS LOGS

SEARCH FOR BLOCK NUMBERS OR TX HASHES

CURRENT BLOCK 15 GAS PRICE 20000000000 GAS LIMIT 6721975 HARDFORK MERGE NETWORK ID 5777 RPC SERVER HTTP://127.0.0.1:7545 MINING STATUS AUTOMINING WORKSPACE GREASY-QUARTZ SWITCH

MNEMONIC wise clump agree join organ nature example water mule play very walnut HD PATH m44'60'0'0account\_index

ADDRESS	BALANCE	TX COUNT	INDEX	
0x3dB21Fd93a68D1b814AD84Bb045d974696f27ae4	99.90 ETH	15	0	
0x8537F29F77892106a66d179ec0F10aaA3515c2a8	100.00 ETH	0	1	
0x043D4E5beCf4009e2377Ad023A7946402BC6f848	100.00 ETH	0	2	
0x5427c201AE791Ed56Ac16436fe8DEfcA4bC104cD	100.00 ETH	0	3	
0x558EC4ed9D3963c229bb394feaf84241833E91e6	100.00 ETH	0	4	
0x42470a5DAF03c021B4354a8a75629f3A617Be852	100.00 ETH	0	5	
0xA9CF1312ae2bDBF33c4DeB0ae6b1f20bd77e5D7D	100.00 ETH	0	6	

28°C Mostly cloudy 11:59 AM 18-12-2024

Ganache

ACCOUNTS

BLOCKS

TRANSACTIONS

CONTRACTS

EVENTS

LOGS

SEARCH FOR BLOCK NUMBERS OR TX HASHES

CURRENT BLOCK  
9

GAS PRICE  
200000000000

GAS LIMIT  
6721975

HARDFORK  
MERGE

NETWORK ID  
5777

RPC SERVER  
HTTP://127.0.0.1:7545

MINING STATUS  
AUTOMINING

WORKSPACE  
QUICKSTART

SAVE

SWITCH

BLOCK 9	MINED ON 2024-12-18 10:50:12	GAS USED 21000	1 TRANSACTION
BLOCK 8	MINED ON 2024-12-18 10:49:25	GAS USED 21000	1 TRANSACTION
BLOCK 7	MINED ON 2024-12-18 09:51:46	GAS USED 21532	1 TRANSACTION
BLOCK 6	MINED ON 2024-12-18 09:39:48	GAS USED 21532	1 TRANSACTION
BLOCK 5	MINED ON 2024-12-18 09:34:15	GAS USED 21508	1 TRANSACTION
BLOCK 4	MINED ON 2024-12-18 09:18:44	GAS USED 21532	1 TRANSACTION
BLOCK 3	MINED ON 2024-12-18 09:18:07	GAS USED 21520	1 TRANSACTION
BLOCK 2	MINED ON 2024-12-18 09:17:20	GAS USED 572888	1 TRANSACTION
BLOCK 1	MINED ON 2024-12-18 09:16:59	GAS USED 572888	1 TRANSACTION
BLOCK 0	MINED ON 2024-12-18 09:16:34	GAS USED 0	NO TRANSACTIONS

Ganache

ACCOUNTS

BLOCKS

**TRANSACTIONS**

CONTRACTS

EVENTS

LOGS

SEARCH FOR BLOCK NUMBERS OR TX HASHES

CURRENT BLOCK 15	GAS PRICE 20000000000	GAS LIMIT 6721975	HARDFORK MERGE	NETWORK ID 5777	RPC SERVER HTTP://127.0.0.1:7545	MINING STATUS AUTOMINING	WORKSPACE GREASY-QUARTZ	SWITCH	⚙️
<b>0xbf9e125e7ae030834f68d5d4bbb9e3cfc6a19b5aac9cc30bff0b41db9167ef9e</b>									
FROM ADDRESS 0x3d821fd93a6801b814AD84Bb045d974696f27ae4						CREATED CONTRACT ADDRESS 0x828CeEA29b95579D037D13F182793A394D1De1	GAS USED 572888	VALUE 0	
TX HASH <b>0x35b71b0bb9ee548b1b2d435d336b562856fe97c775beb4a0bb8e5a6fc4262078</b>									
FROM ADDRESS 0x3d821fd93a6801b814AD84Bb045d974696f27ae4						CREATED CONTRACT ADDRESS 0x740165C27b7307f4D2d6DAc3685E2107c11b6787	GAS USED 737120	VALUE 0	
<b>0xf5e6848fd184d40ef92fe8ace1bb9ebc16bd09b2ce08498095f530a5594a3d8</b>									
FROM ADDRESS 0x3d821fd93a6801b814AD84Bb045d974696f27ae4						CREATED CONTRACT ADDRESS 0xe60D715d69711061874c1994D33684321E28Ce19	GAS USED 597939	VALUE 0	
<b>0xe7675872e321fdaaba7f65b415e79a09fed475690a0c8357fc2c1fb77afc0104</b>									
FROM ADDRESS 0x3d821fd93a6801b814AD84Bb045d974696f27ae4						CREATED CONTRACT ADDRESS 0xe59D5E2E638cfD6b594AB48c236C47AcF5Deb257	GAS USED 572888	VALUE 0	
<b>0x84824c8b9aa5987e566312ea37a1e885010c087ccb71b8edda27abe1f769278c</b>									
FROM ADDRESS 0x3d821fd93a6801b814AD84Bb045d974696f27ae4						CREATED CONTRACT ADDRESS 0x1448a2CECF169c852051a1d738928ab36D969515	GAS USED 572888	VALUE 0	

Transaction after todolist is added in html page:

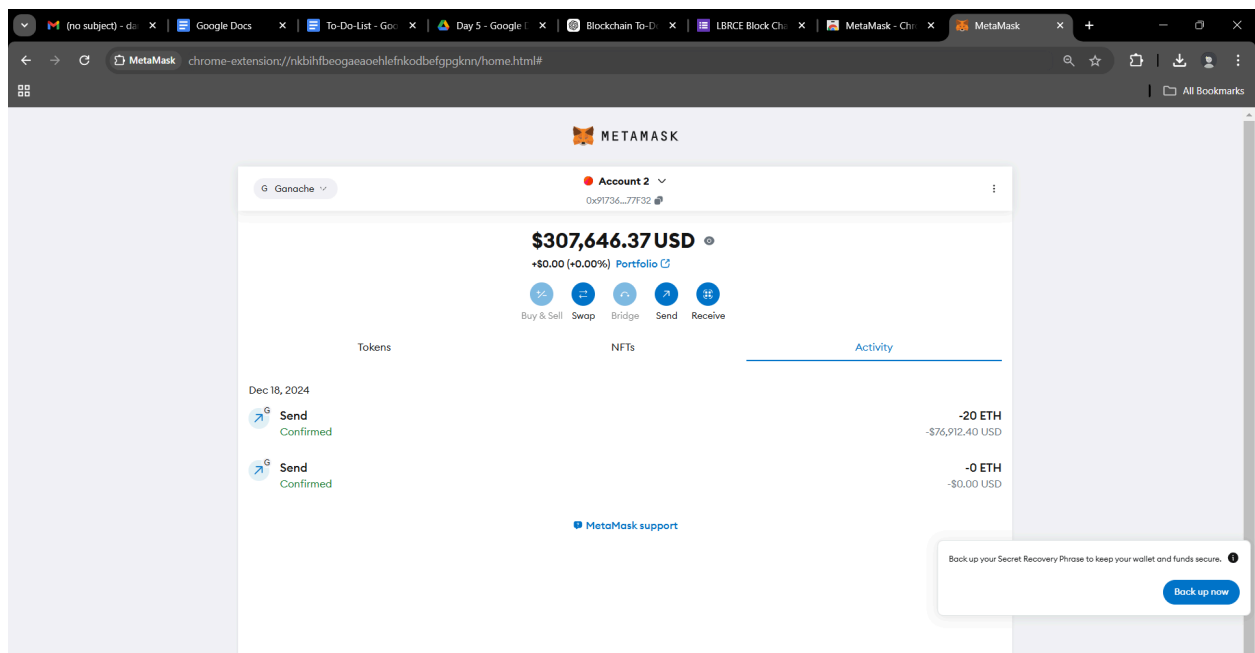
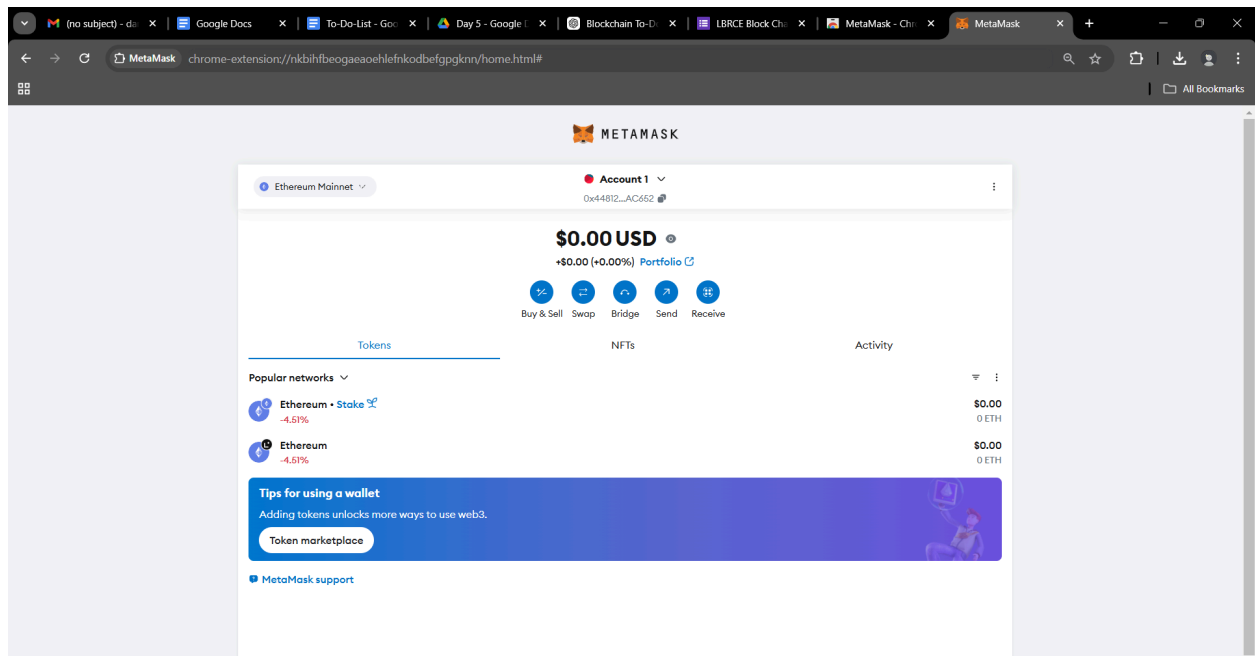
Ganache				
ACCOUNTS	BLOCKS	TRANSACTIONS	CONTRACTS	EVENTS
LOGS	SEARCH FOR BLOCK NUMBERS OR TX HASHES			
CURRENT BLOCK 15	GAS PRICE 20000000000	GAS LIMIT 6721975	HARDFORK MERGE	NETWORK ID 5777
RPC SERVER HTTP://127.0.0.1:7545	MINING STATUS AUTOMINING	WORKSPACE GREASY-QUARTZ	SWITCH	
TX HASH 0x2ff47a6aede968c019364ae6656012d6165ba4f25701e49f93997543acd977cc		CONTRACT CALL		
FROM ADDRESS 0x3dB21Fd93a68D1b814AD84Bb045d974696f27ae4	TO CONTRACT ADDRESS 0x828CeEA29b95579DD37D13F13182793A394D1De1	GAS USED 90000	VALUE 0	
TX HASH 0x86b45f4044dc6feac4c8fc30c4d826b66dc7f87042a8cb34855edaf99841e8f3		CONTRACT CALL		
FROM ADDRESS 0x3dB21Fd93a68D1b814AD84Bb045d974696f27ae4	TO CONTRACT ADDRESS 0x828CeEA29b95579DD37D13F13182793A394D1De1	GAS USED 90000	VALUE 0	
TX HASH 0xa12f16598038f7481aa6aa339ef5a3c6c5038d8a7c2db52eac4b4e4d5578b1ab		CONTRACT CALL		
FROM ADDRESS 0x3dB21Fd93a68D1b814AD84Bb045d974696f27ae4	TO CONTRACT ADDRESS 0x828CeEA29b95579DD37D13F13182793A394D1De1	GAS USED 90000	VALUE 0	
TX HASH 0x3d7bdb56071822d6c12efc1e9cd6cc382ea1671082c0bdf0b5480feea8756b46		CONTRACT CALL		
FROM ADDRESS 0x3dB21Fd93a68D1b814AD84Bb045d974696f27ae4	TO CONTRACT ADDRESS 0x828CeEA29b95579DD37D13F13182793A394D1De1	GAS USED 90000	VALUE 0	
TX HASH 0xfe5b3912891875cf9e756008b74cf7cafce87a25762e60c08d8a4ddc2fbbaf1		CONTRACT CALL		
FROM ADDRESS 0x3dB21Fd93a68D1b814AD84Bb045d974696f27ae4	TO CONTRACT ADDRESS 0x828CeEA29b95579DD37D13F13182793A394D1De1	GAS USED 90000	VALUE 0	

Contracts in Ganache:

Ganache				
ACCOUNTS	BLOCKS	TRANSACTIONS	CONTRACTS	EVENTS
LOGS	SEARCH FOR BLOCK NUMBERS OR TX HASHES			
CURRENT BLOCK 9	GAS PRICE 20000000000	GAS LIMIT 6721975	HARDFORK MERGE	NETWORK ID 5777
RPC SERVER HTTP://127.0.0.1:7545	MINING STATUS AUTOMINING	WORKSPACE QUICKSTART	SAVE	SWITCH
BlockchainToDo C:\Users\DL D bHAVVASRI\BlockchainToDo				
NAME ToDoList	ADDRESS 0xF89Ed1ca0e04F137256B398acF62e56762834ACf	TX COUNT 0	DEPLOYED	



## Metamask:



Ganache

ACCOUNTS

BLOCKS

TRANSACTIONS

CONTRACTS

EVENTS

LOGS

SEARCH FOR BLOCK NUMBERS OR TX HASHES

CURRENT BLOCK  
17

GAS PRICE  
20000000000

GAS LIMIT  
6721975

HARDFORK  
MERGE

NETWORK ID  
5777

RPC SERVER  
HTTP://127.0.0.1:7545

MINING STATUS  
AUTOMINING

WORKSPACE  
GREASY-QUARTZ

SWITCH

MNEMONIC

wise clump agree join organ nature example water mule play very walnut

HD PATH  
m44'60'0'0account\_index

ADDRESS 0x3dB21Fd93a68D1b814AD84Bb045d974696f27ae4	BALANCE 99.90 ETH	TX COUNT 16	INDEX 0	
ADDRESS 0x8537F29F77892106a66d179ec0F10aaA3515c2a8	BALANCE 60.00 ETH	TX COUNT 1	INDEX 1	
ADDRESS 0x043D4E5beCf4009e2377Ad023A7946402BC6f848	BALANCE 100.00 ETH	TX COUNT 0	INDEX 2	
ADDRESS 0x5427c201AE791Ed56Ac16436fe8DEfcA4bC104cD	BALANCE 140.00 ETH	TX COUNT 0	INDEX 3	
ADDRESS 0x558EC4ed9D3963c229bb394feaf84241833E91e6	BALANCE 100.00 ETH	TX COUNT 0	INDEX 4	