

AIM: Implement the Blockchain platform Ganache

Theory:

1. What is a Ganache?

Ganache is a development tool and personal blockchain for Ethereum that is used primarily by blockchain developers and smart contract developers. It provides a local Ethereum blockchain environment that allows developers to create, test, and experiment with Ethereum-based applications and smart contracts in a safe and controlled environment. Here are some key aspects and features of Ganache:

1. Local Ethereum Blockchain: Ganache creates a private, local Ethereum blockchain on your development machine. This blockchain is isolated from the main Ethereum network, meaning any transactions or interactions you perform in Ganache won't affect the actual Ethereum blockchain.

2. Preloaded Accounts: When you start Ganache, it comes with a set of preloaded Ethereum accounts. Each account has a balance of test Ether (ETH) that you can use for testing and deploying smart contracts. These accounts are useful for simulating various scenarios in your Ethereum development work.

3. User-Friendly Interface: Ganache provides a user-friendly graphical interface that displays information about the accounts, transactions, and blocks on your local blockchain. It makes it easy to monitor and debug your smart contract interactions.

4. Block Explorer: Ganache includes a built-in block explorer that allows you to view transaction details, contract executions, and other blockchain data within your local environment.

2. List the steps involved in connecting Ganache Environment with a Metamask and Remix IDE for performing transactions.

To connect a Ganache environment with Metamask and Remix IDE for performing transactions and interacting with smart contracts, follow these steps:

1. Install Ganache: Download and install Ganache from the official website (<https://www.trufflesuite.com/ganache>).

2. Launch Ganache: Start Ganache after installation. It will create a local Ethereum blockchain environment with preconfigured accounts and Ether balances.

3. Install Metamask: If you haven't already, install the Metamask extension in your web browser (<https://metamask.io/>).

4. Configure Metamask: Open Metamask and create a new wallet or import an existing one.

Click on the Metamask extension icon, and if it's not already set to the Main Ethereum Network, switch to the "Custom RPC" option.

- Configure Metamask to connect to your Ganache network:

- Enter the RPC URL provided by Ganache (usually "http://localhost:7545" or another URL specified in Ganache).
- Set the Chain ID to match the Ganache network (usually 1337 or a custom ID).
- Save the configuration.

5. Import Ganache Accounts into Metamask: In Ganache, you'll see a list of accounts with their private keys. Import these accounts into Metamask for testing by copying the private keys.

- Open Metamask, click on your account icon, and select "Import Account."
- Paste the private key of one of the Ganache accounts and add it to Metamask.

6. Install Remix IDE: If you haven't already, access the Remix IDE (<https://remix.ethereum.org/>), which is an online Solidity development environment.

7. Connect Remix IDE to Ganache: In the Remix IDE, click on the "Deploy & run transactions" tab on the left panel.

- In the "Environment" dropdown, select "Web3 Provider."
- A connection dialog will appear; ensure that it points to the same RPC URL and Chain ID as your Ganache configuration.
- Click "OK" to connect Remix to Ganache.

8. Interact with Smart Contracts: Once deployed, you can interact with your smart contracts directly from Remix.

Use the Metamask-connected account within Remix to send transactions, call contract functions, and test your smart contract's functionality.

Conclusion:

Ganache is an essential tool for Ethereum developers because it enables them to develop and test smart contracts and decentralized applications (DApps) without the cost and risk associated with using the live Ethereum network. It's a valuable tool for building, debugging, and refining Ethereum-based projects before deploying them to the Ethereum mainnet or testnets.

OUTPUT:

```
student@student-OptiPlex-3020:~/Downloads$ sudo apt-get install fuse libfuse2
[sudo] password for student:
Reading package lists... Done
Building dependency tree
Reading state information... Done
fuse is already the newest version (2.9.9-3).
libfuse2 is already the newest version (2.9.9-3).
0 upgraded, 0 newly installed, 0 to remove and 425 not upgraded.
student@student-OptiPlex-3020:~/Downloads$ ./ganache-2.7.1-linux-x86_64.AppImage
10:23:07.718 > Checking for update
10:23:10.218 > Update for version 2.7.1 is not available (latest version: 2.7.1, downg
rade is disallowed).
listen to truffle
listen to truffle
```

ACCOUNTS

BLOCKS

TRANSACTIONS

CONTRACTS

EVENTS

LOGS

SEARCH FOR BLOCK NUMBERS OR TX HASHES

CURRENT BLOCK
0

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

MNEMONIC

verify kingdom coin disorder crew moral split boring stadium together power concert

HD PATH
m44'60'0'0account_index

ADDRESS	BALANCE	TX COUNT	INDEX	
0x9745Ee2aFBF69f445ff23C4525363f061a09B88D	100.00 ETH	0	0	
ADDRESS	BALANCE	TX COUNT	INDEX	
0xe5ABf05d3BED344AB80C812f278eAd371d9A7C26	100.00 ETH	0	1	
ADDRESS	BALANCE	TX COUNT	INDEX	
0x6fc6a3c23c8465C5D4317456A472D8c25468B8A3	100.00 ETH	0	2	
ADDRESS	BALANCE	TX COUNT	INDEX	
0xf160ee0e58acb4aA14701816b8cE695428675803	100.00 ETH	0	3	
ADDRESS	BALANCE	TX COUNT	INDEX	
0xA293a125E18E26922c1c4b587050881451cc4283	100.00 ETH	0	4	
ADDRESS	BALANCE	TX COUNT	INDEX	
0x6CF5a6110DC03503A6aC05a5A1BCC137D51a34Ed4	100.00 ETH	0	5	

Search for a previously add

✓

Ethereum Mainnet

✓

Linea Mainnet

Test networks

✓

Goerli test network

✓

Sepolia test network

✓

Linea Goerli test network...

✓

Ganache

Network name

Ganache

New RPC URL

HTTP://127.0.0.1:7545

Chain ID

1337

Currency symbol

ETH

Block explorer URL (Optional)

Cancel

Save

ACCOUNT INFORMATION

ACCOUNT ADDRESS

0x9745Ee2aFBF69f445ff23C4525363f061a09B88D

PRIVATE KEY

0x730e29b71ad23e8b8dd90cb3de0440048406108598688c8c1db2b0bbdbf12a65

Do not use this private key on a public blockchain; use it for development purposes only!

Import account

Imported accounts won't be associated with your MetaMask Secret Recovery Phrase. Learn more about imported accounts [here](#)

Select Type

Private Key

Enter your private key string here:

.....

Cancel

Import

Y & RUN TRANSACTIONS ✓ >

ed Provider - MetaMask

777) network

000

Wei

StorageWithStructs - data.sol

port, paris

oy

lish to IPFS

address

Load contract from Address

ctions recorded

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// An array to store products

Product[] public products;

// Adds a new user to the mapping

function createUser(address userAddress, string memory name, uint price) public {

address internal userAddress;

data.sol 24:24

Estimated execution cost: infinite gas

given address

public view returns (Product) {

// Adds a new product to the array

function addProduct(string memory name, uint price) public {

products.push(Product(name, price));

}

// Gets all products

function getAllProducts() public view returns (Product[] memory) {

return products;

}

}

listen on all transactions

Search with transaction hash or address

https://remix.ethereum.org

Connect with MetaMask

Select the account(s) to use on this site

New account

☒

Account 1 (0x39f...d3bd)

0 ETH

Only connect with sites you trust. [Learn more](#)

Cancel

Next

G Ganache

Account 2

0x974...B88D

100 ETH

+

↗

↔

↶

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Buy

Send

Swap

Bridge

Portfolio


Tokens


NFTs


Activity

Ethereum

100 ETH

 Ganache

 Account 2





New contract


https://remix.ethereum.org

CONTRACT DEPLOYMENT

DETAILS

DATA

 Site suggested > 

Gas *(estimated)* 

0.00380944

0.00380944 ETH

Very likely in < 15 seconds

Max fee: 0.00380944 ETH

Total

0.00380944






0.00380944 ETH

Amount + gas fee

Max amount: 0.00380944 ETH

Reject

Confirm

ADDRESS 0x9745Ee2aFBF69f445ff23C4525363f061a09B88D	BALANCE 100.00 ETH	TX COUNT 2	INDEX 0	
ADDRESS 0xe5ABf05d3BED344AB80C812f278eAd371d9A7C26	BALANCE 100.00 ETH	TX COUNT 0	INDEX 1	
ADDRESS 0x6fc6a3c23c8465C5D4317456A472D8c25468B8A3	BALANCE 100.00 ETH	TX COUNT 0	INDEX 2	
ADDRESS 0xf160ee0e58acb4aA14701816b8cE695428675803	BALANCE 100.00 ETH	TX COUNT 0	INDEX 3	
ADDRESS 0xA293a125E18E26922c1c4b587050881451cc4283	BALANCE 100.00 ETH	TX COUNT 0	INDEX 4	

ACCOUNTS

BLOCKS

TRANSACTIONS

CONTRACTS

EVENTS

LOGS

SEARCH FOR BLOCK NUMBERS OR TX HASHES

CURRENT BLOCK 2

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

BLOCK 2	MINED ON 2023-10-04 10:48:10	GAS USED 90033	1 TRANSACTION
BLOCK 1	MINED ON 2023-10-04 10:46:37	GAS USED 846542	1 TRANSACTION
BLOCK 0	MINED ON 2023-10-04 10:23:39	GAS USED 0	NO TRANSACTIONS

<div><div>← BACK</div><div>BLOCK 2</div></div>			
GAS USED	GAS LIMIT	MINED ON	BLOCK HASH
90033	6721975	2023-10-04 10:48:10	0x259bf2f287e38dca07e56bbf2e7df1dbecacca05190d82cc4381c58c0c9f9c28
TX HASH			
0x72416e87538ebdb034b7d19e28a172c14cd175a783d5fb83337563a87e8e4fee			
FROM ADDRESS		TO CONTRACT ADDRESS	GAS USED
0x9745Ee2aFBF69f445ff23C4525363f061a09B8D0		0xe19fbdd7A0e93506ae5D18AEc0BD066A84557c141	90033
			VALUE
			0

TX HASH

0x72416e7853ebdb034b7d19e28a172c14cd175a783d5fb83337563a87e8e4fee

FROM ADDRESS

0x9745Ee2aFB69f445f23c4525363f061a09b88D

TO CONTRACT ADDRESS

0xe19Fbbd7A0e93506ae5D18AEc0BD66A84557c141

GAS USED

90633

VALUE

0

CONTRACT CALL

CURRENT BLOCK	GAS PRICE	GAS LIMIT	HARDFORK	NETWORK ID	RPC SERVER	MINING STATUS	WORKSPACE	SAVE	SWITCH	⚙️
2	20000000000	6721975	MERGE	5777	HTTP://127.0.0.1:7545	AUTOMINING	QUICKSTART			

0x974...B88D

99.9966 ETH

+

Buy

↗

Send

↔



Swap

↻

Bridge

📈

Portfolio

Oct 4, 2023		
	Add Product Confirmed	-0 E -0 E
	Add Product Confirmed	-0 E -0 E