

Experiment No: 07

● **Aim:** To study installation tools Ganache & Metamask & Concept of blockchain.

● **Theory:**

Programming languages like Solidity, which is used to build smart contracts on the Ethereum blockchain network, are frequently used in blockchain development. Ganache helps developers test and debug their applications before deploying them on a live blockchain network. Also, developers must be well-versed in blockchain technology, including its underlying architecture and concepts like consensus algorithms, cryptography and decentralized governance.

Ganache in blockchain technology

Ganache is a software tool developers widely use to create a local blockchain network for testing and development purposes. Developers may effectively test different scenarios and troubleshoot their blockchain apps by simulating a blockchain network on their local PC with Ganache. Ganache supports the quick development of distributed applications using Ethereum and File coin.

The tool is first installed on the developer's computer, and a new workspace must be created before using Ganache for blockchain project development. Developers can link their blockchain project to Ganache once the workspace has been built, enabling them to test and debug their application on the simulated blockchain network.

Ganache provides a range of useful features, including the creation of new accounts, the ability to send transactions and the capability to debug smart contracts. By effectively locating and fixing bugs in their smart contract code, developers can use Ganache as a debugging tool to speed up the development process. The debugger feature allows developers to comb through their code line-by-line and see the values of variables at each step, making it easier to find and fix bugs.

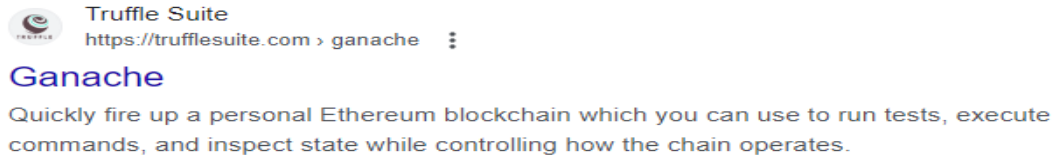
Two versions of Ganache are available: a user interface (UI) and a command line interface (CLI). Thanks to the user-friendly Ganache UI, developers can quickly communicate with the local blockchain. In addition to offering real-time data on accounts, balances, transactions and events, it also has tools for testing and debugging smart contracts. In addition, the interface includes a built-in block explorer tool that lets users examine the specifics of each block and transaction.

On the other hand, developers can communicate with the local blockchain via the terminal using the Ganache CLI. It is a more versatile and compact choice for people who prefer using command-line tools. Developers may automate testing and deployment operations by integrating the CLI with other development tools and scripts.

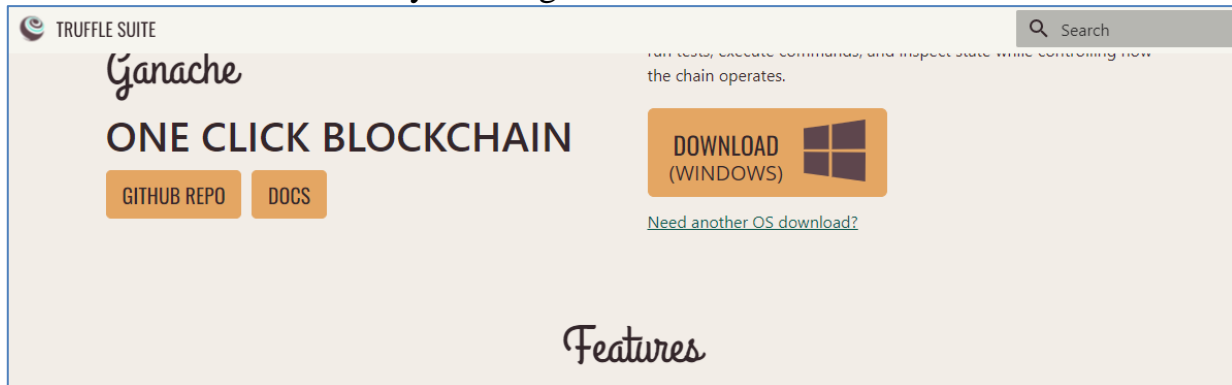
Regardless, the essential functionality of the Ganache UI and CLI is the same, and developers can choose the version that best suits their tastes and workflow

Step to install the Ganache :

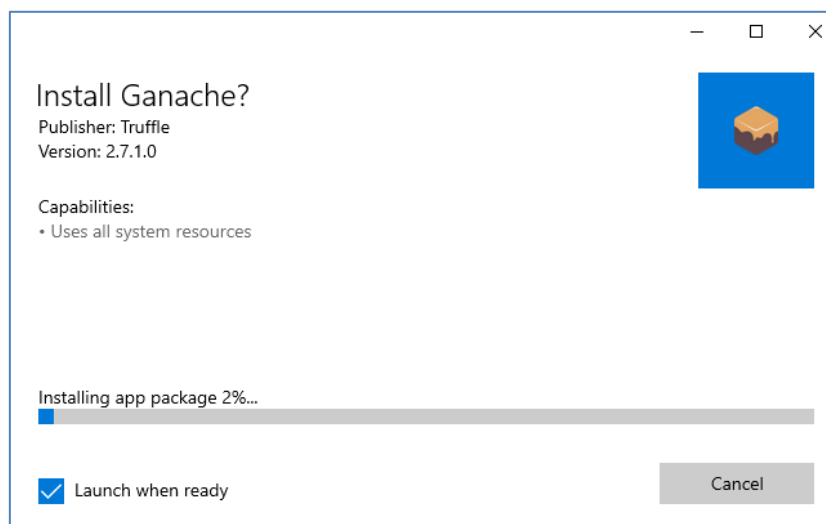
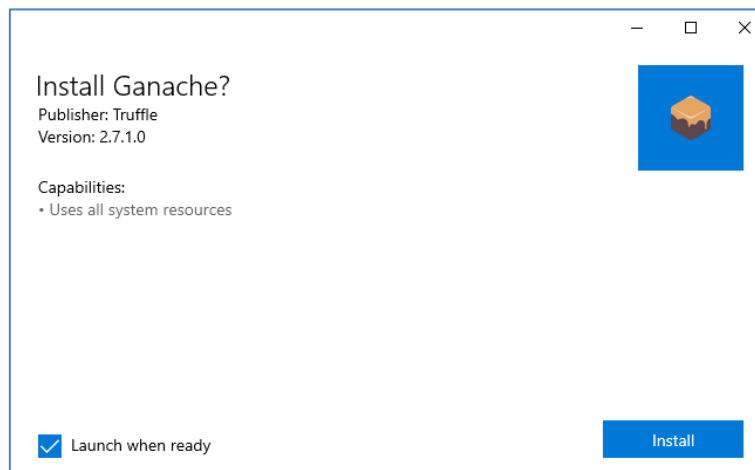
- 1) Enter the Ganache in google search :



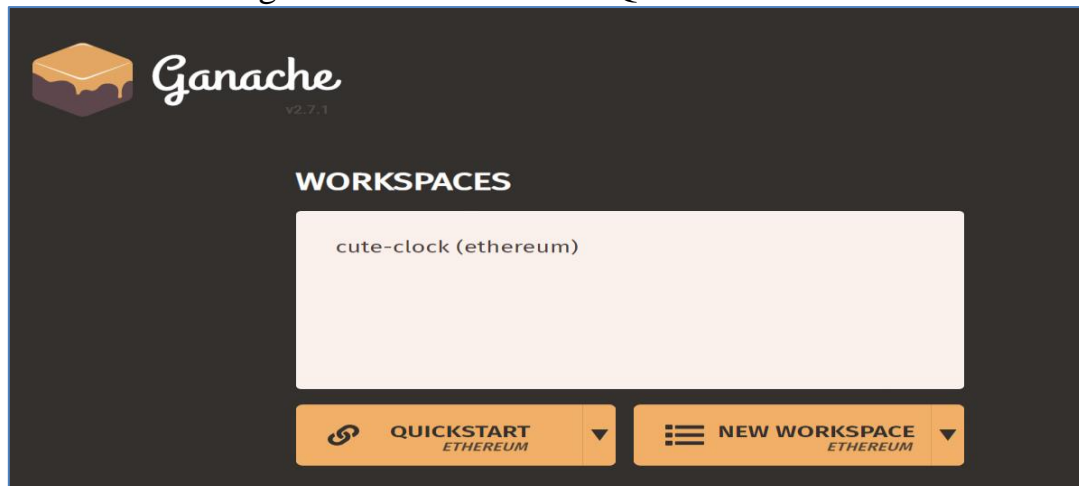
- 2) Download the software `by clicking Download Windows



- 1) Open the Downloaded files



4 After launching the Ganache click on Quikstart



5)Accounts –

a. you can see the private Key & Account details as below

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

umbrella isolate raise situate jazz grow cream rug bubble combine leisure wild

HD PATH

m44'60'0'0account_index

ADDRESS

0x2552bF11485ff4Ed605F6C802e5472F9Ee35Dca8

BALANCE

100.00 ETH

TX COUNT

0

INDEX

0

ADDRESS

0x38c56FA612a7bc6C476042663b707eef8453FAAE

BALANCE

100.00 ETH

TX COUNT

0

INDEX

1

ADDRESS

0xB3487120b81eF124c4a199F02C3198620Ca86727

BALANCE

100.00 ETH

TX COUNT

0

INDEX

2

ADDRESS

0xBBe4008e6Af41d218C63fE7Eb191bEE3233DB66f

BALANCE

100.00 ETH

TX COUNT

0

INDEX

3

ADDRESS

0x734fd9d797Df424027Bc953694738D6570AA4117

BALANCE

100.00 ETH

TX COUNT

0

INDEX

4

ADDRESS

0x760dbE6894cFbF5e1E8BC749D6282ED6Af7ef6af

BALANCE

100.00 ETH

TX COUNT

0

INDEX

5

ADDRESS

0x35f5F917Ce2B7498f48CAf032e20E7570698b2D7

BALANCE

100.00 ETH

TX COUNT

0

INDEX

6

ACCOUNT INFORMATION

ACCOUNT ADDRESS
 0x2552bF11485ff4Ed605F6C802e5472F9Ee35Dca8

PRIVATE KEY
 0xe23e2a4fffe38efca833631d54b94b66f6a1182e3bbc81702d853540cc18d664
 Do not use this private key on a public blockchain; use it for development purposes only!

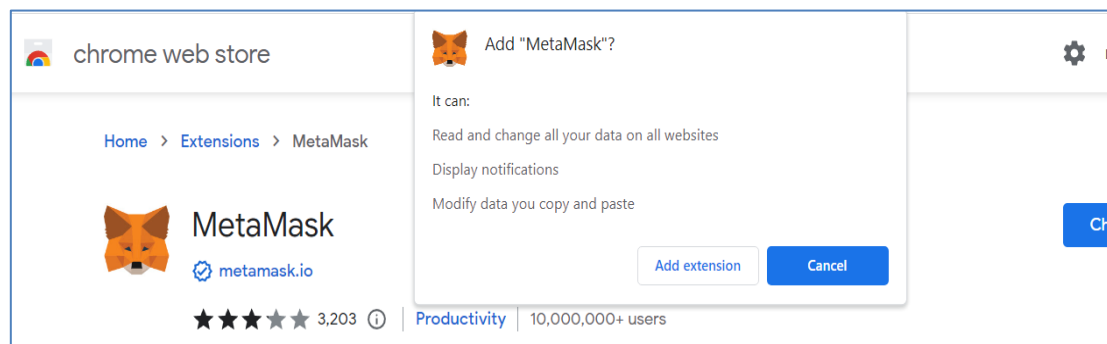
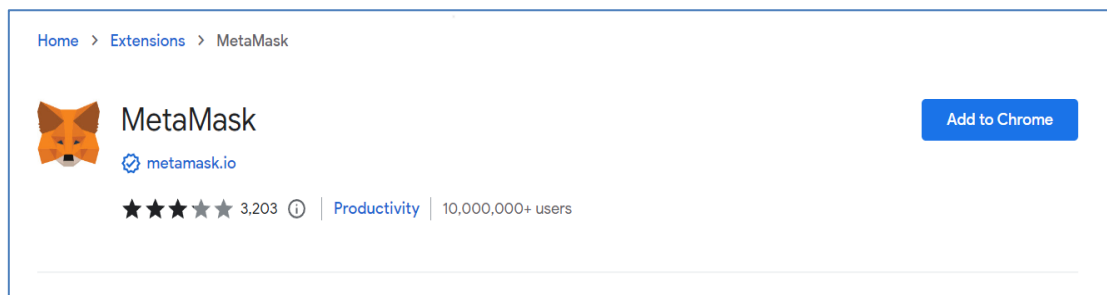
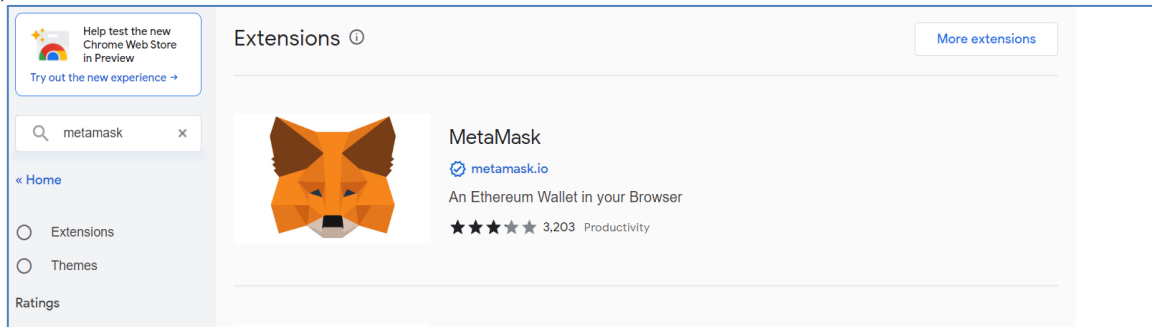
DONE

Set up install the MetaMask Extension

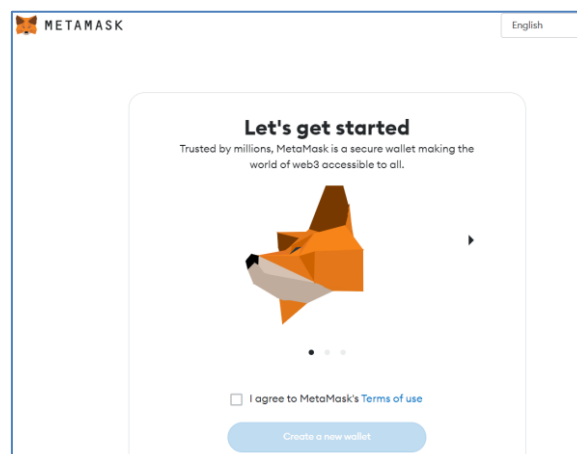
1) Click on below link :

<https://chrome.google.com/webstore/category/extensions>

2) Search for Metamask :



4 Once installation complete this page will displayed click on Get Started Button .
& click on Wallet button .



5 Click of I agree & proceed further

Help us improve MetaMask

MetaMask would like to gather usage data to better understand how our users interact with MetaMask. This data will be used to provide the service, which includes improving the service based on your use.

MetaMask will...

- ✓ Always allow you to opt-out via Settings
- ✓ Send anonymized click and pageview events
- ✗ **Never** collect information we don't need to provide the service (such as keys, addresses, transaction hashes, or balances)
- ✗ **Never** collect your full IP address*
- ✗ **Never** sell data. Ever!

This data is aggregated and is therefore anonymous for the purposes of General Data Protection Regulation (EU) 2016/679.

* When you use Infura as your default RPC provider in MetaMask, Infura will collect your IP address and your Ethereum wallet address when you send a transaction. We don't store this information in a way that allows our systems to associate those two pieces of data. For more information on how MetaMask and Infura interact from a data collection perspective, see our update [here](#). For more information on our privacy practices in general, see our [Privacy Policy here](#).

[I agree](#)

6 Create a password for your wallet. This password is to be entered every time the browser is launched and wants to use MetaMask. A new password needs to be created if chrome is uninstalled or if there is a switching of browsers. In that case, go through the Import Wallet button. This is because MetaMask stores the keys in the browser. Agree to Terms of Use

1 Create password
2 Secure wallet
3 Confirm secret recovery phrase

Create password

This password will unlock your MetaMask wallet only on this device. MetaMask can not recover this password.

New password (8 characters min) [Show](#)

.....

Password strength: Weak

A strong password can improve the security of your wallet should your device be stolen or compromised.

Confirm password ✓

.....

☒ I understand that MetaMask cannot recover this password for me. [Learn more](#)

[Create a new wallet](#)

1 Create password
2 Secure wallet
3 Confirm secret recovery phrase

Secure your wallet

Before getting started, watch this short video to learn about your Secret Recovery Phrase and how to keep your wallet safe.

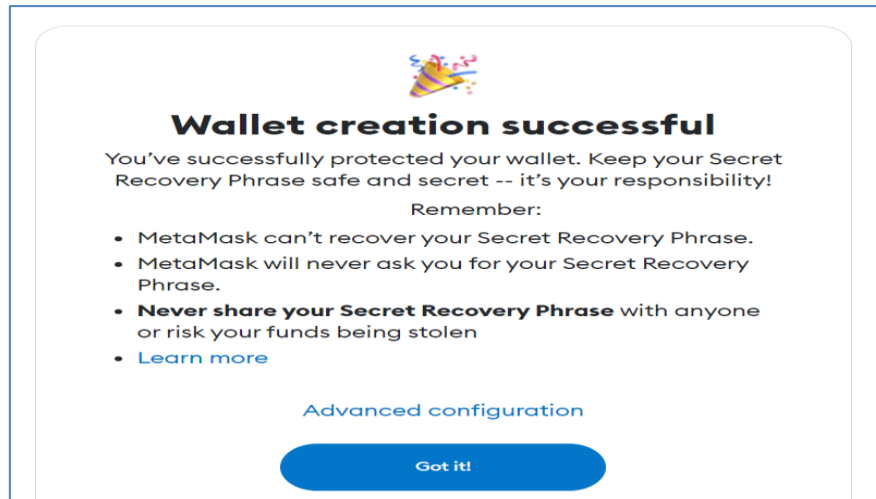
▶ 0:00 / 1:35

[Remind me later \(not recommended\)](#)

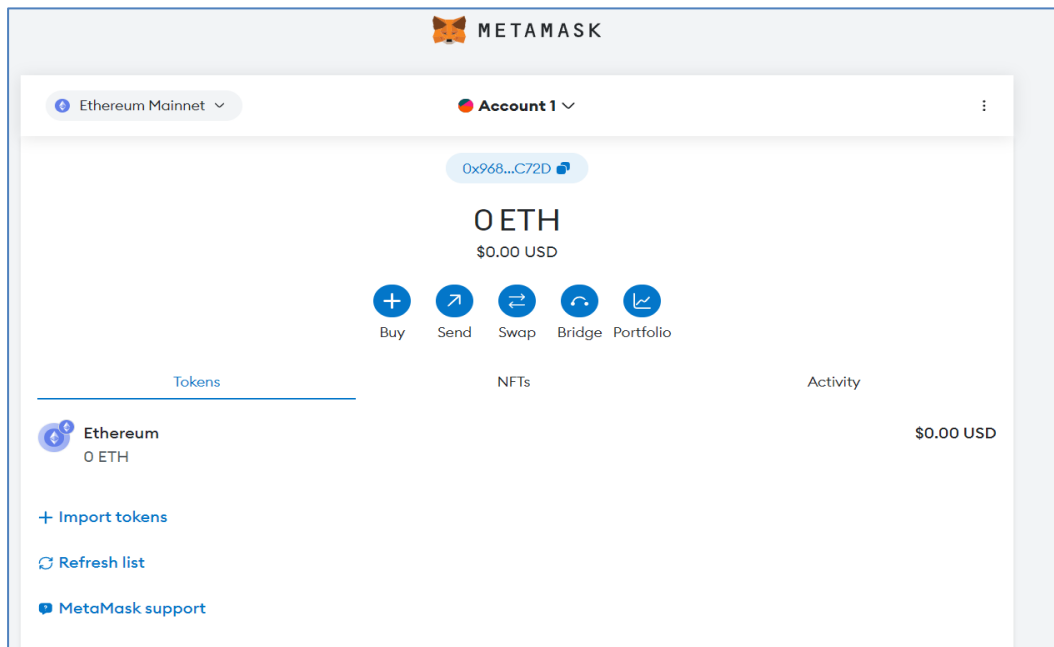
[Secure my wallet \(recommended\)](#)

7 Click on the dark area which says Click here to reveal secret words to get your secret phrase.

8 This is the most important step. Back up your secret phrase properly. Do not store your secret phrase on your computer. Please read everything on this screen until you understand it completely before proceeding. The secret phrase is the only way to access your wallet if you forget your password. Once done click the Next button.




- 9 One can see the balance and copy the address of the account by clicking on the Account 1 area.




How to use Ganache with Metamask :


- 1) To connect with Ganache you have to create customer RPC
With Following details which you can take from ganache




ACCOUNTS




BLOCKS




TRANSACTIONS



CONTRACTS



EVENTS



LOGS

SEARCH FOR BLOCK NUMBERS

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

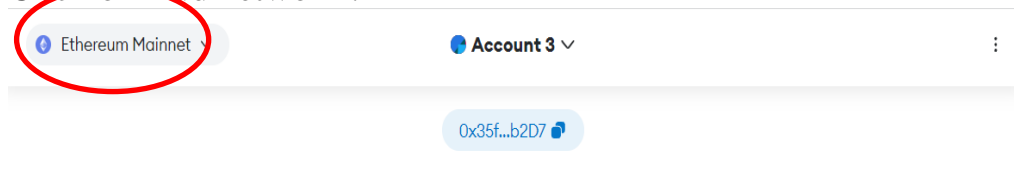
WORKSPACE

QUICKSTART

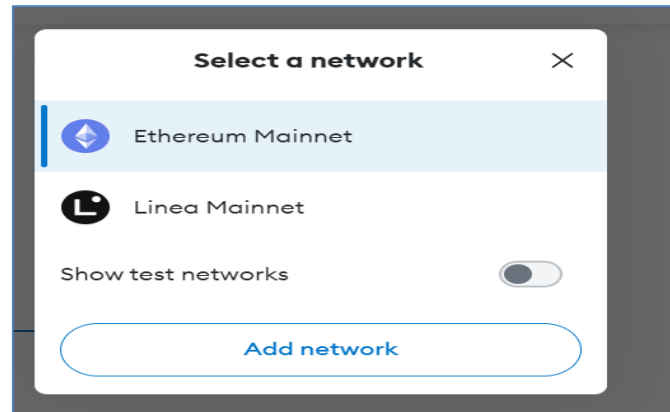
RPC Server: [HTTP://127.0.0.1:7545](http://127.0.0.1:7545)

Chain ID :1337

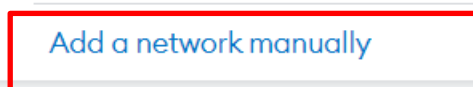
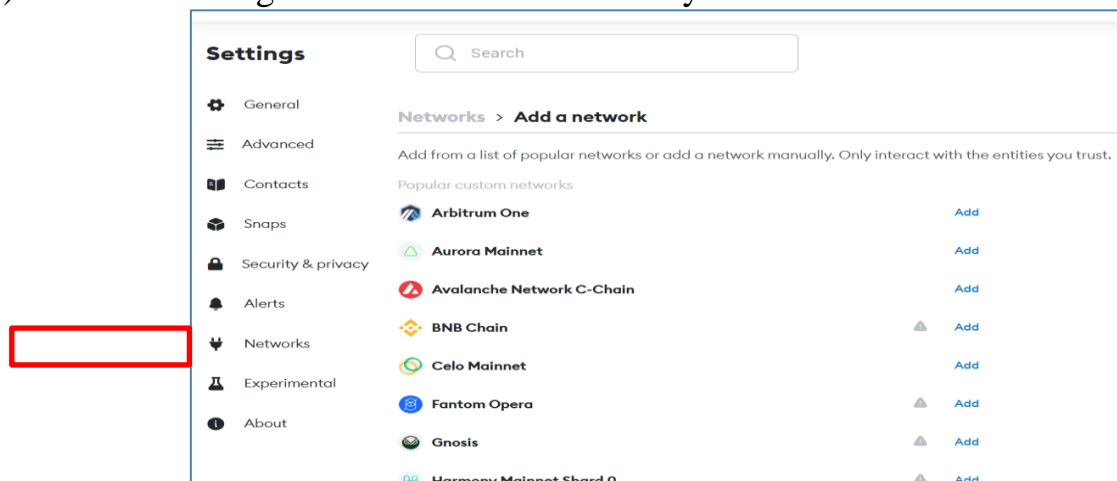
2) Click on Add network :



3)



4) Click on Setting & Add a Network manually



5) Enter the details as below & Save

i A malicious network provider can lie about the state of the blockchain and record your network activity. Only add custom networks you trust.

Network name

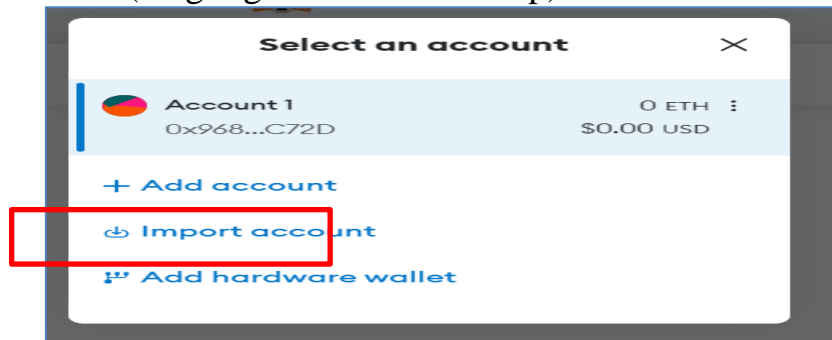
New RPC URL

Chain ID i

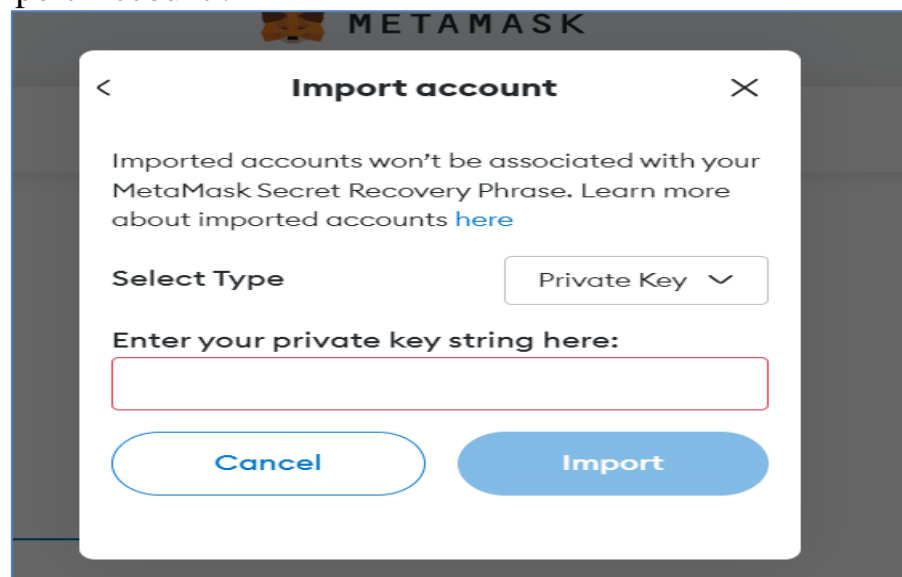
Currency symbol

Block explorer URL (Optional)

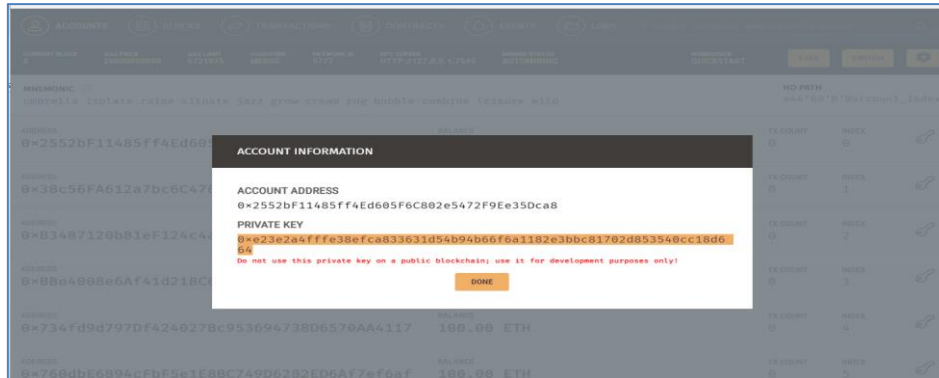
6) Click on Account: (Highlighted in above Snap)



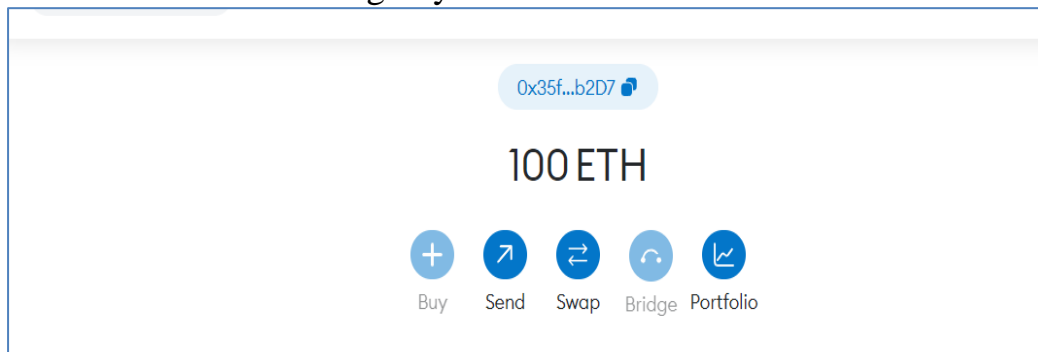
7) Click on Import Account :



Enter the private Key from Ganache tool-



8) Balance is now reflecting in your Metamast –

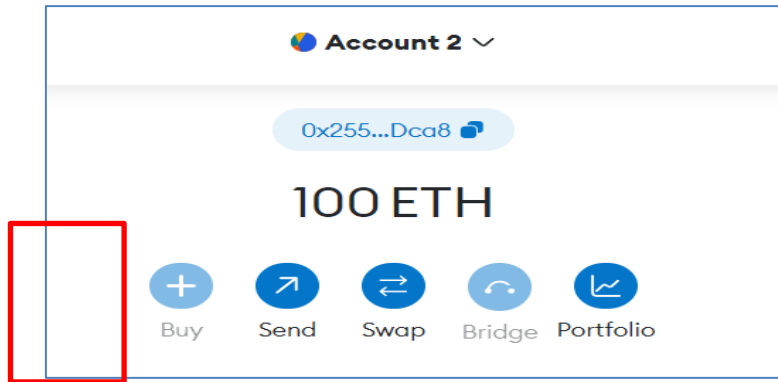


Step to do transaction in MetaMask

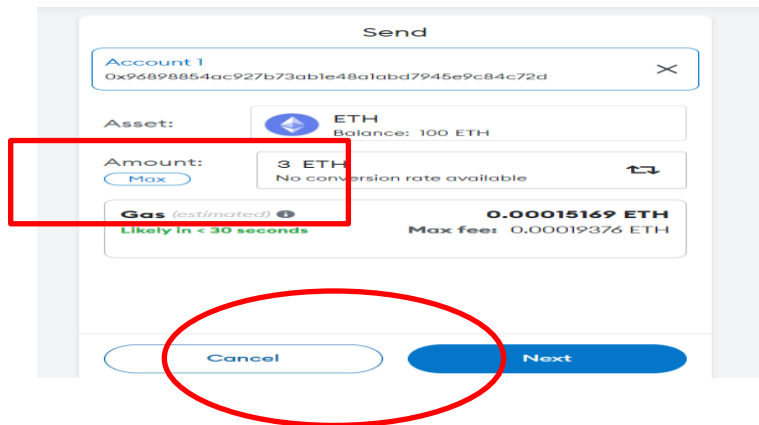
1) Check the balance in Ganache :

ACCOUNTS									
BLOCKS									
TRANSACTIONS									
CONTRACTS									
EVENTS									
LOGS									
SEARCH FOR BLOCK NUMBERS OR TX HASHES									
CURRENT BLOCK	GAS PRICE	GAS LIMIT	HARDFORK	NETWORK ID	RPC SERVER	MINING STATUS	WORKSPACE	SAVE	SWITCH
0	20000000000	6721975	MERGE	5777	HTTP://127.0.0.1:7545	AUTOMINING	QUICKSTART		
<p>MNEMONIC ? umbrell isolate raise situat jazz grow cream rug bubble combine leisure wild HD PATH m44'60'0'0account_index</p>									
ADDRESS	BALANCE				TX COUNT	INDEX			
0x2552bF11485ff4Ed605F6C802e5472F9Ee35Dca8	100.00 ETH				0	0			
ADDRESS	BALANCE				TX COUNT	INDEX			
0x38c56FA612a7bc6C476042663b707eef8453FAAE	100.00 ETH				0	1			
ADDRESS	BALANCE				TX COUNT	INDEX			
0xB3487120b81eF124c4a199F02C3198620C386727	100.00 ETH				0	2			
ADDRESS	BALANCE				TX COUNT	INDEX			
0xBBE4008e6Af41d218C63fE7Eb191bEE3233DB66f	100.00 ETH				0	3			
ADDRESS	BALANCE				TX COUNT	INDEX			
0x734fd9d797Df424027Bc953694738D6570AA4117	100.00 ETH				0	4			
ADDRESS	BALANCE				TX COUNT	INDEX			
0x760dbE6894cFbF5e1E8BC749D6282ED6Af7ef6af	100.00 ETH				0	5			
ADDRESS	BALANCE				TX COUNT	INDEX			
0x35f5F917Ce2B7498f48CAf032e20E7570698b2D7	100.00 ETH				0	6			

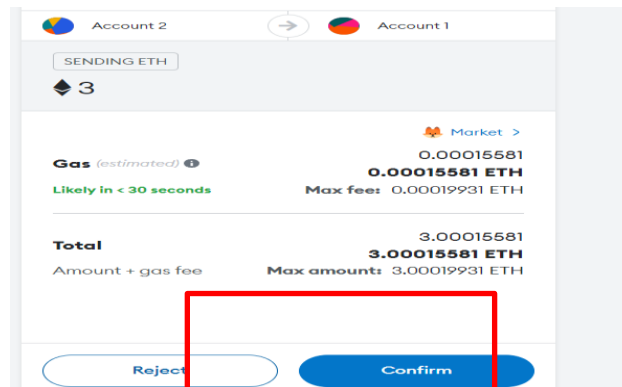
2) After adding Account & Select Account from where you need to send the balance



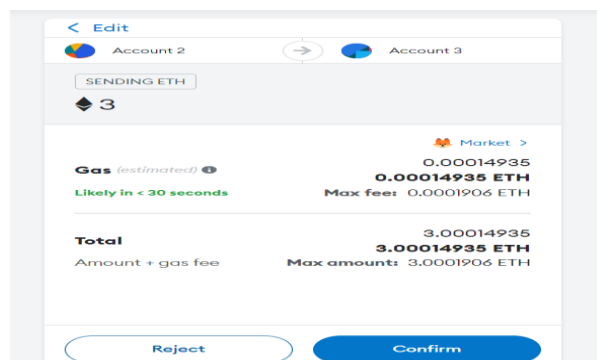
3) Enter the details for Account and amount you need to sent in our case we are transferring 3 ETH



a. 1st Transaction from Account 2 –>Account 1

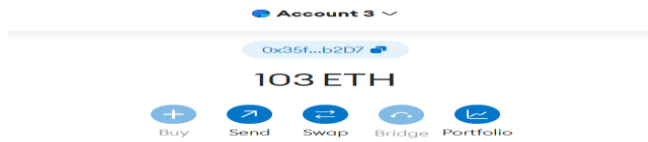


b. Second Transaction from Account 2 -> Account 3

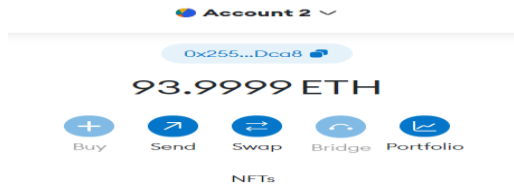


4) Transaction details:

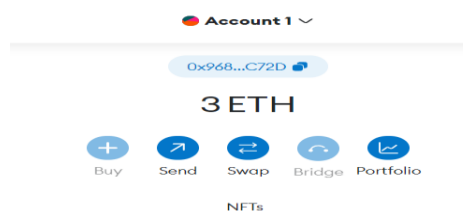
- Account 3 balance:



- Account 2 Balance:



- Account 1 balance:



- You check transaction in ganache:

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

MNEMONIC

umbrella isolate raise situate jazz grow cream rug bubble combine leisure wild

HD PATH
m44'60'0'0account_index

ADDRESS	BALANCE		TX COUNT	INDEX	
0x2552bF11485ff4Ed605F6C802e5472F9Ee35Dca8	94.00 ETH		2	0	
ADDRESS	BALANCE		TX COUNT	INDEX	
0x38c56FA612a7bc6C476042663b707eef8453FAAE	100.00 ETH		0	1	
ADDRESS	BALANCE		TX COUNT	INDEX	
0xB3487120b81eF124c4a199F02C3198620Ca86727	100.00 ETH		0	2	
ADDRESS	BALANCE		TX COUNT	INDEX	
0xBBe4008e6Af41d218C63fE7Eb191bEE3233DB66f	100.00 ETH		0	3	
ADDRESS	BALANCE		TX COUNT	INDEX	
0x734fd9d797Df424027Bc953694738D6570AA4117	100.00 ETH		0	4	
ADDRESS	BALANCE		TX COUNT	INDEX	
0x760dbE6894cFbF5e1E8BC749D6282ED6Af7ef6af	100.00 ETH		0	5	
ADDRESS	BALANCE		TX COUNT	INDEX	
0x35f5F917Ce2B7498f48CAf032e20E7570698b2D7	103.00 ETH		0	6	

● Conclusion:

The study of installation tools like Ganache and Metamask, along with the concept of blockchain, is a fundamental step in understanding and working with blockchain technology.