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.

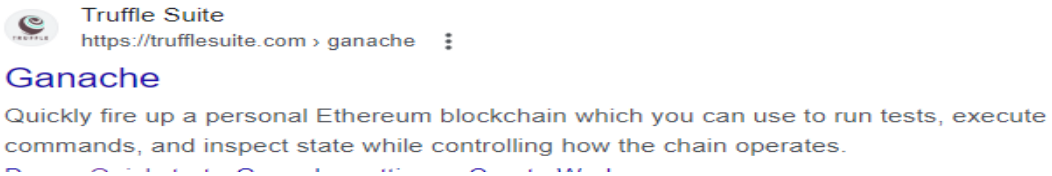
Two versions of Ganache are available: a user interface (UI) and a command line interface (CLI). Thanks to the user-friendly Ganache UI, developers can quickly communicate with the local blockchain. In addition to offering real-time data on accounts, balances, transactions and events, it also has tools 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.

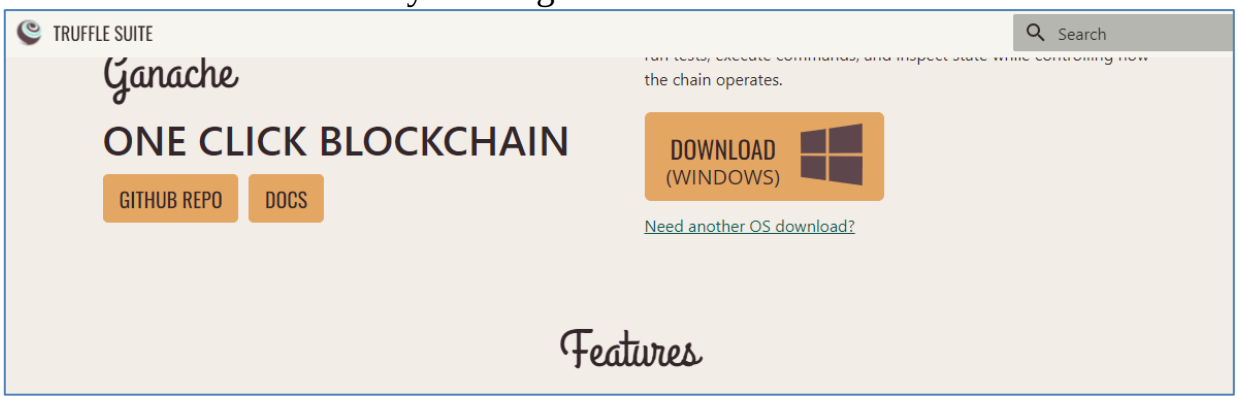
Regardless, the essential functionality of the Ganache UI and CLI is the same, and developers can choose the version that best suits their tastes and workflow

Step to install the Ganache :

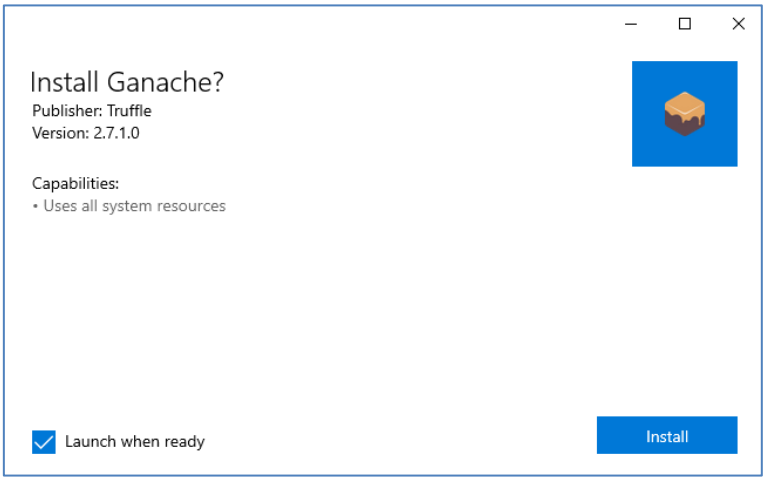
1) Enter the Ganeche in google search :

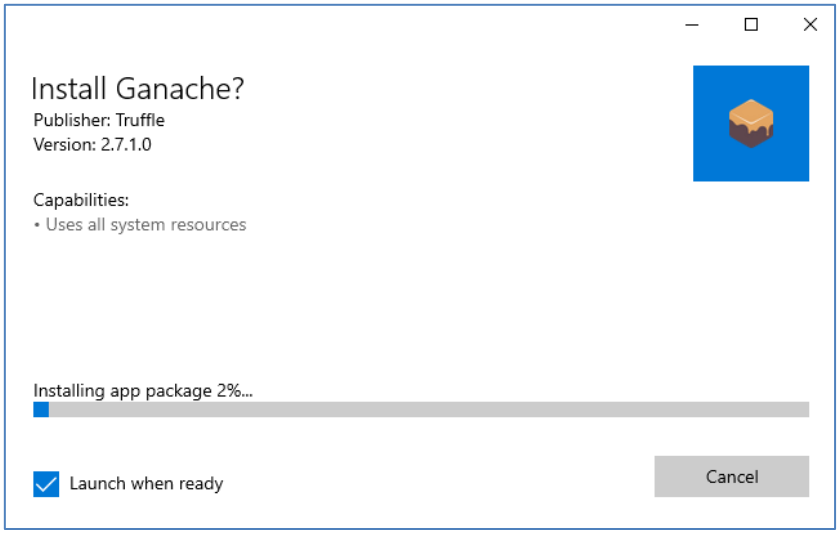


2) Download the software `by clicking Download Windows

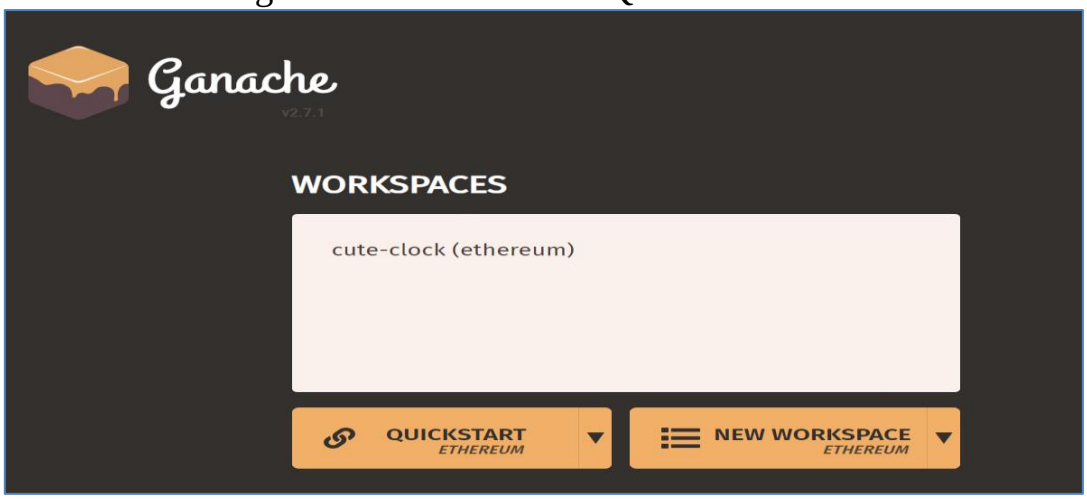


1) Open the Downloaded files



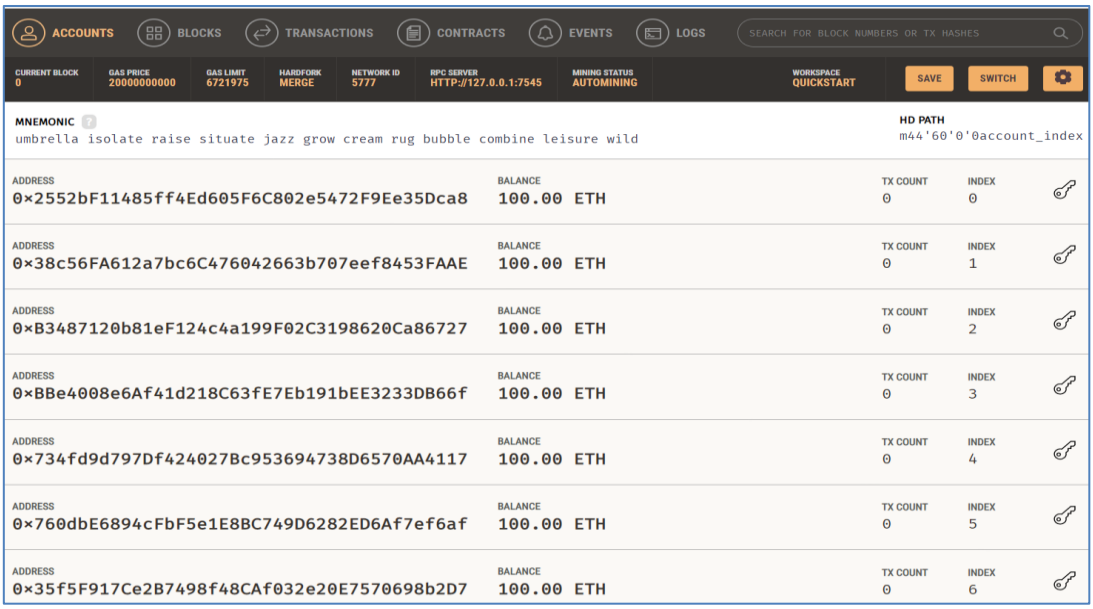


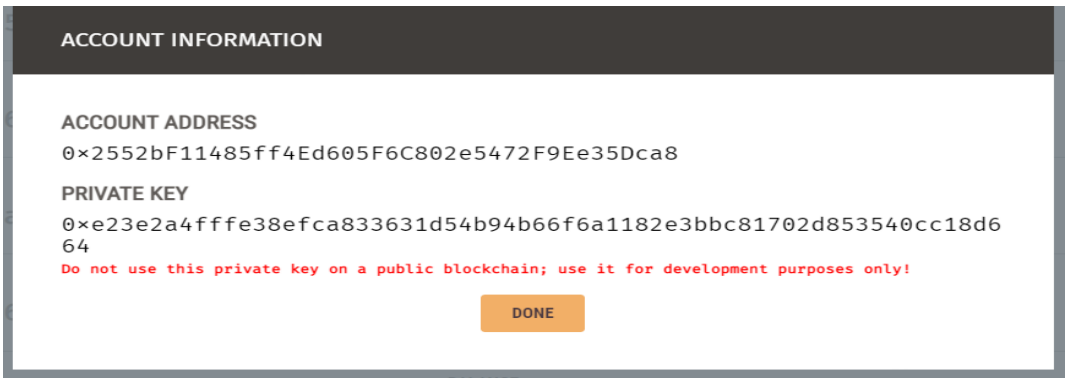
4 After launching the Ganache click on Quikstart



5)Accounts –

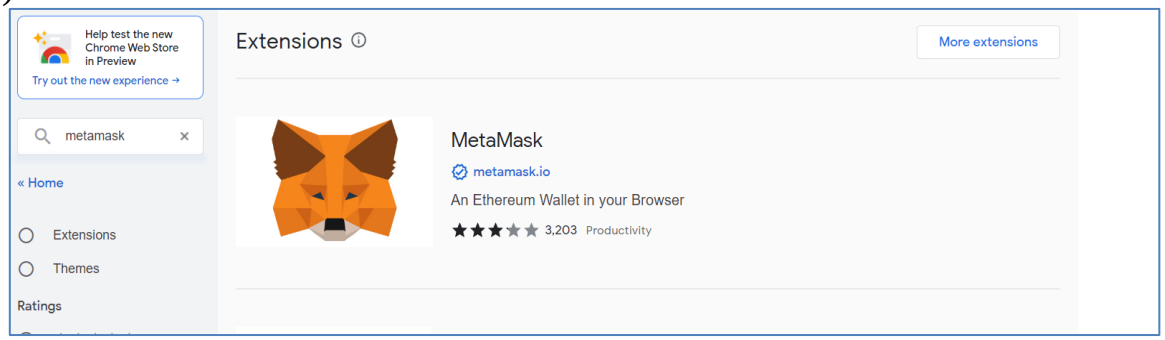
a. you can see the private Key & Account details as below

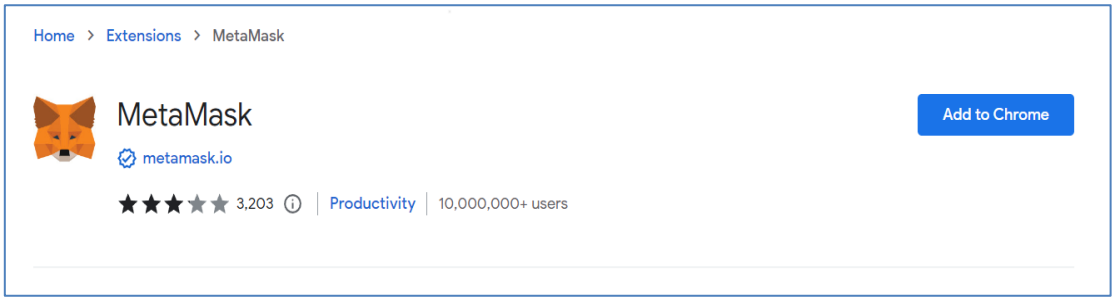


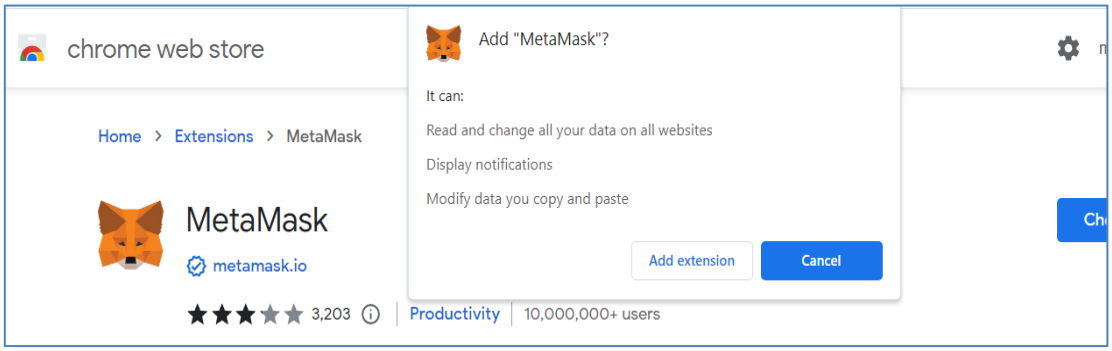


Set up install the MetaMask Extension

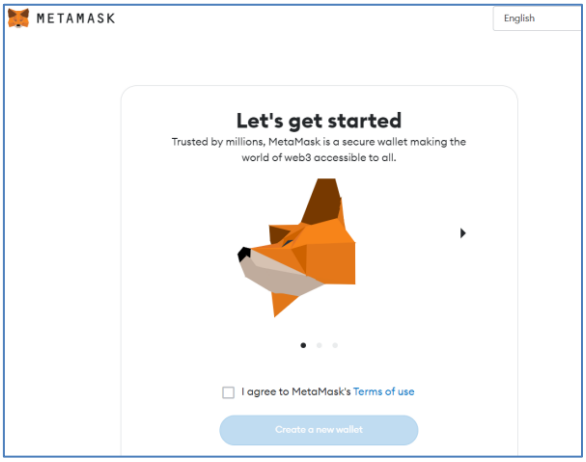
1) Click on below link :
   https://chrome.google.com/webstore/category/extensions
2) Search for Metamask :



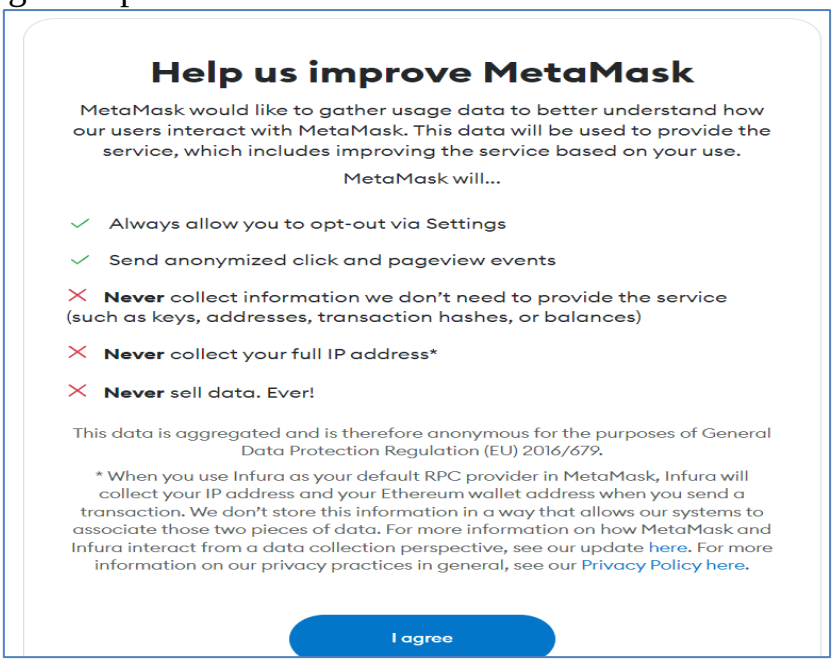




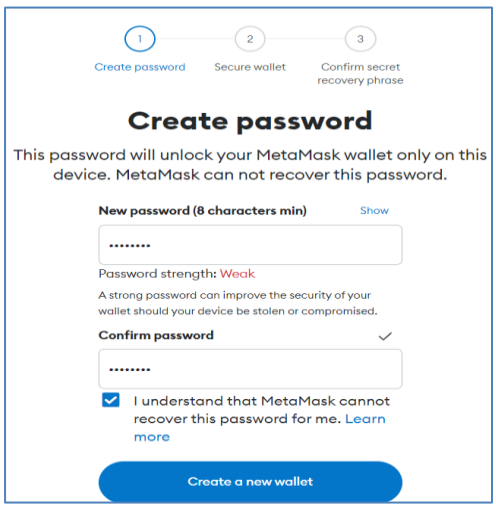
4 Once installation complete this page will displayed click on Get Started Button . & click on Wallet button .

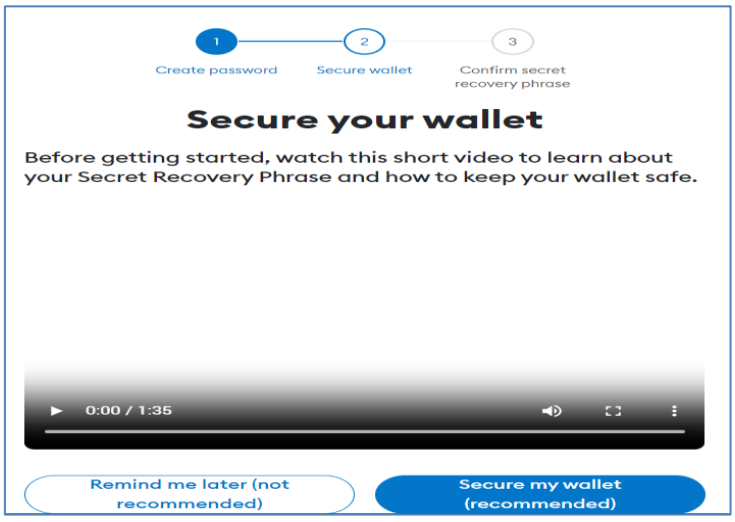


5 Click of I agree & proceed further



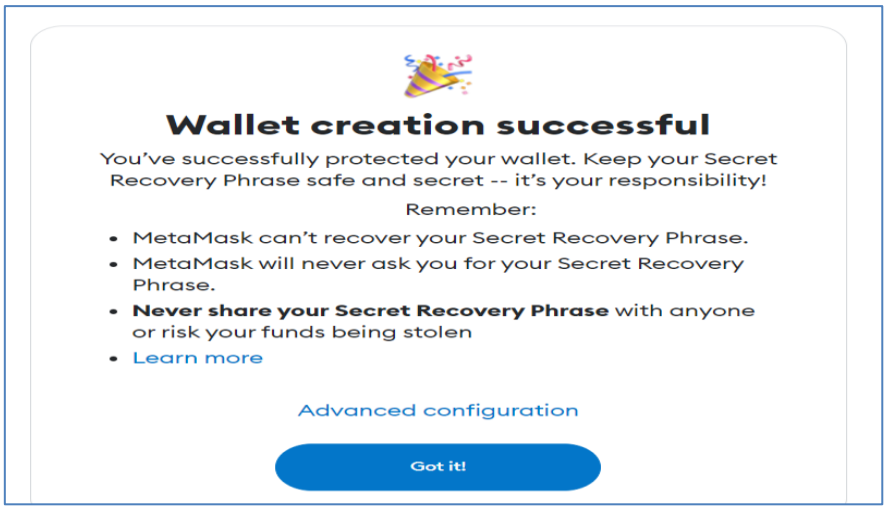
6 Create a password for your wallet. This password is to be entered every time the browser is launched and wants to use MetaMask. A new password needs to be created if chrome is uninstalled or if there is a switching of browsers. In that case, go through the Import Wallet button. This is because MetaMask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



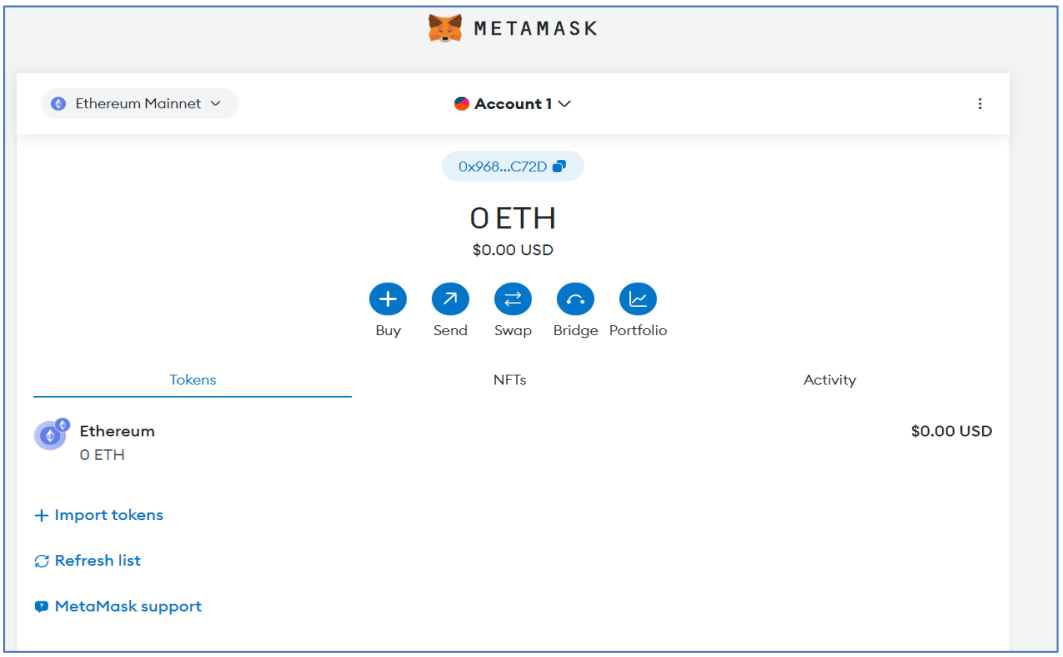


7 Click on the dark area which says Click here to reveal secret words to get your secret phrase.

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.

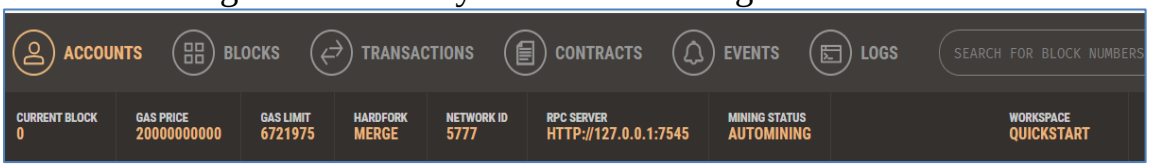


9 One can see the balance and copy the address of the account by clicking on the Account 1 area.



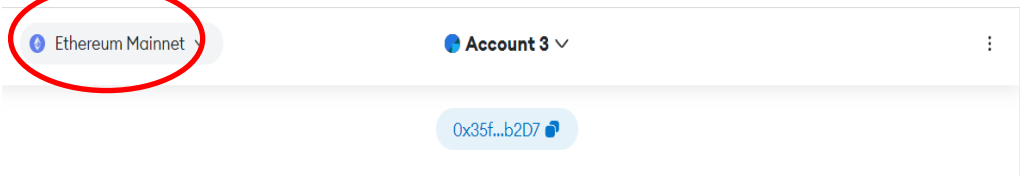
How to use Ganache with Metamask :

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

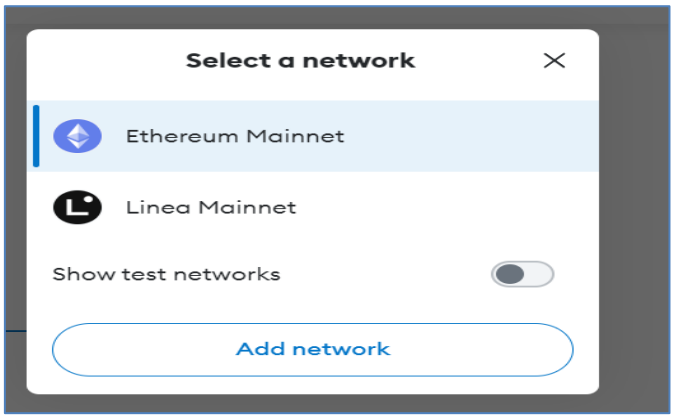


RPC Server: HTTP://127.0.0.1:7545
Chain ID :1337

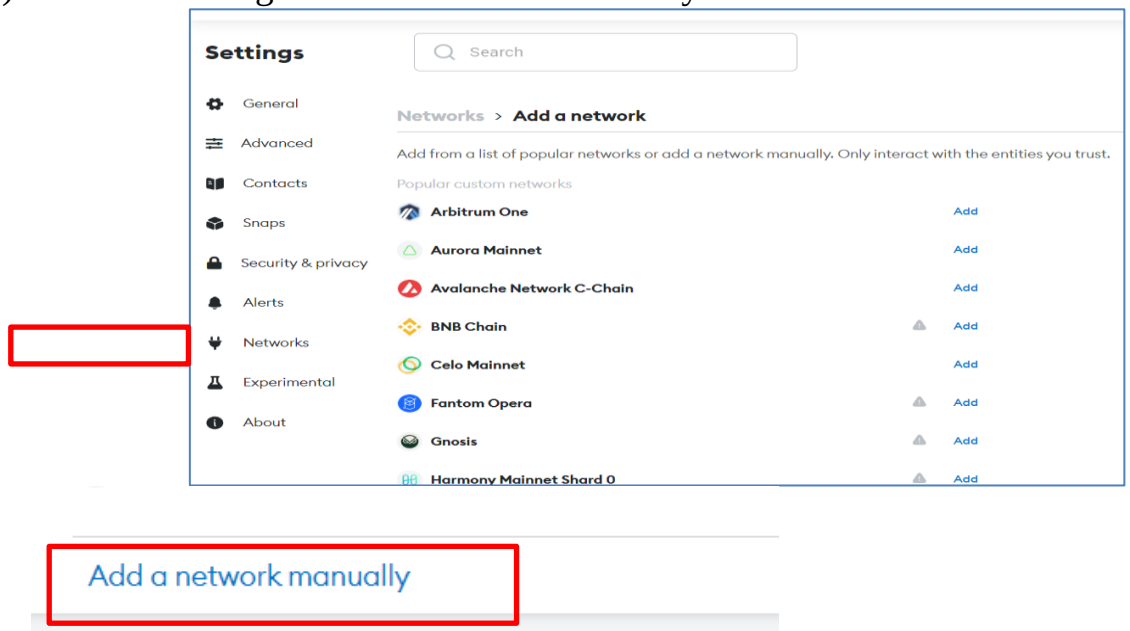
2) Click on Add network :



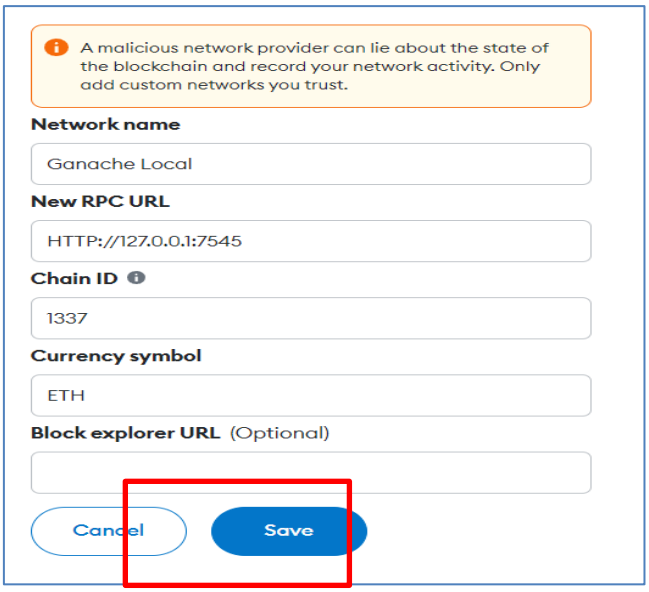
3)



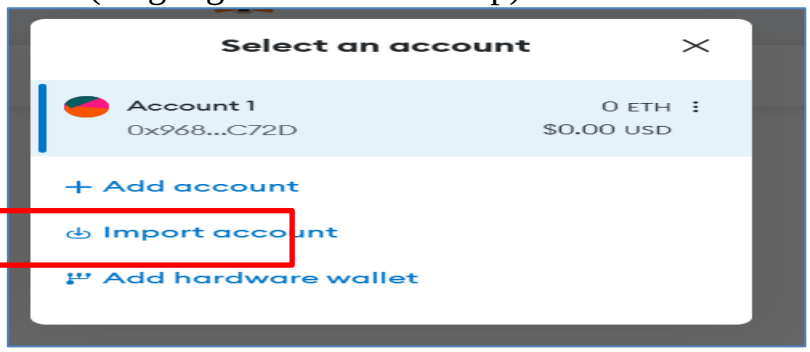
4) Click on Setting & Add a Network manually



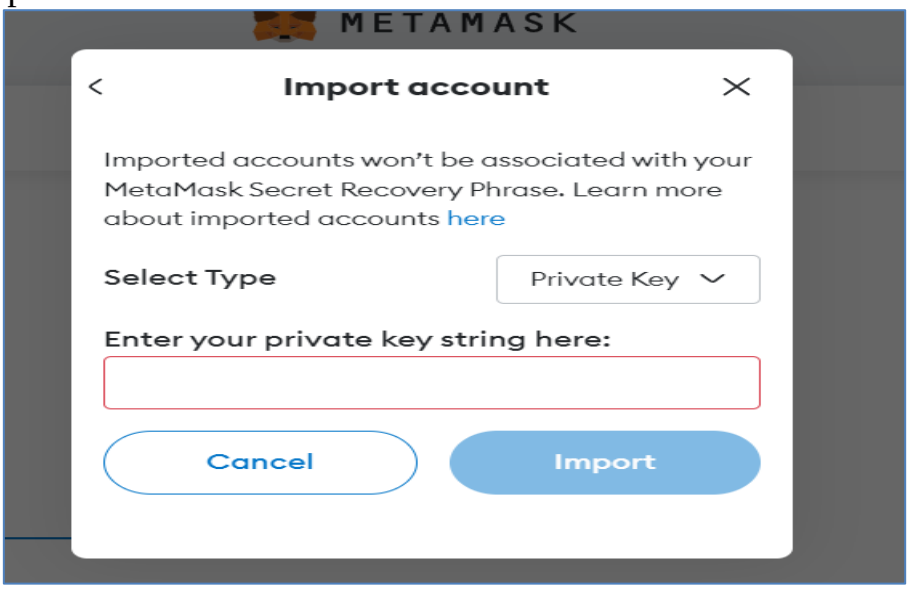
5) **Enter the details as below & Save**



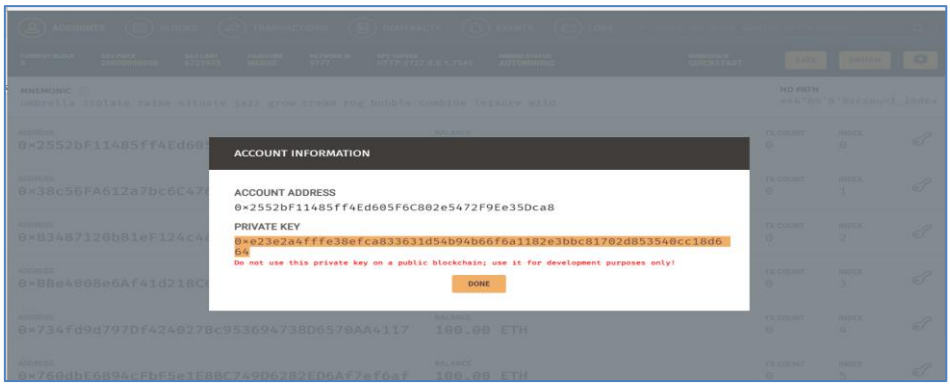
6) Click on Account: (Highlighted in above Snap)



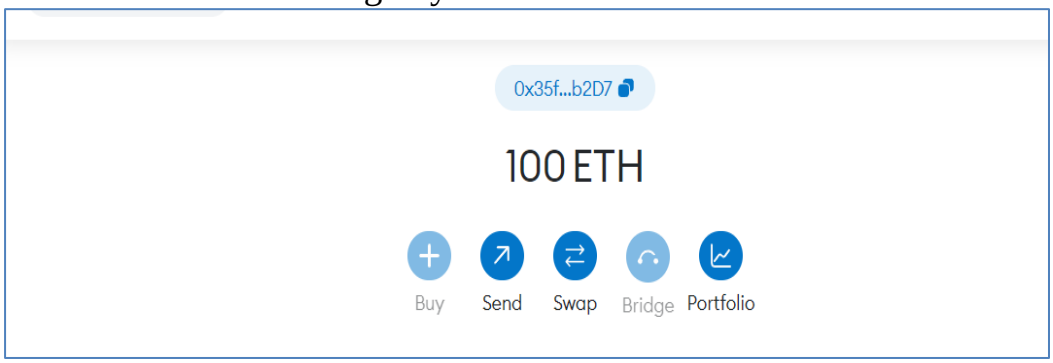
7) Click on Import Account :



Enter the private Key from Ganache tool-

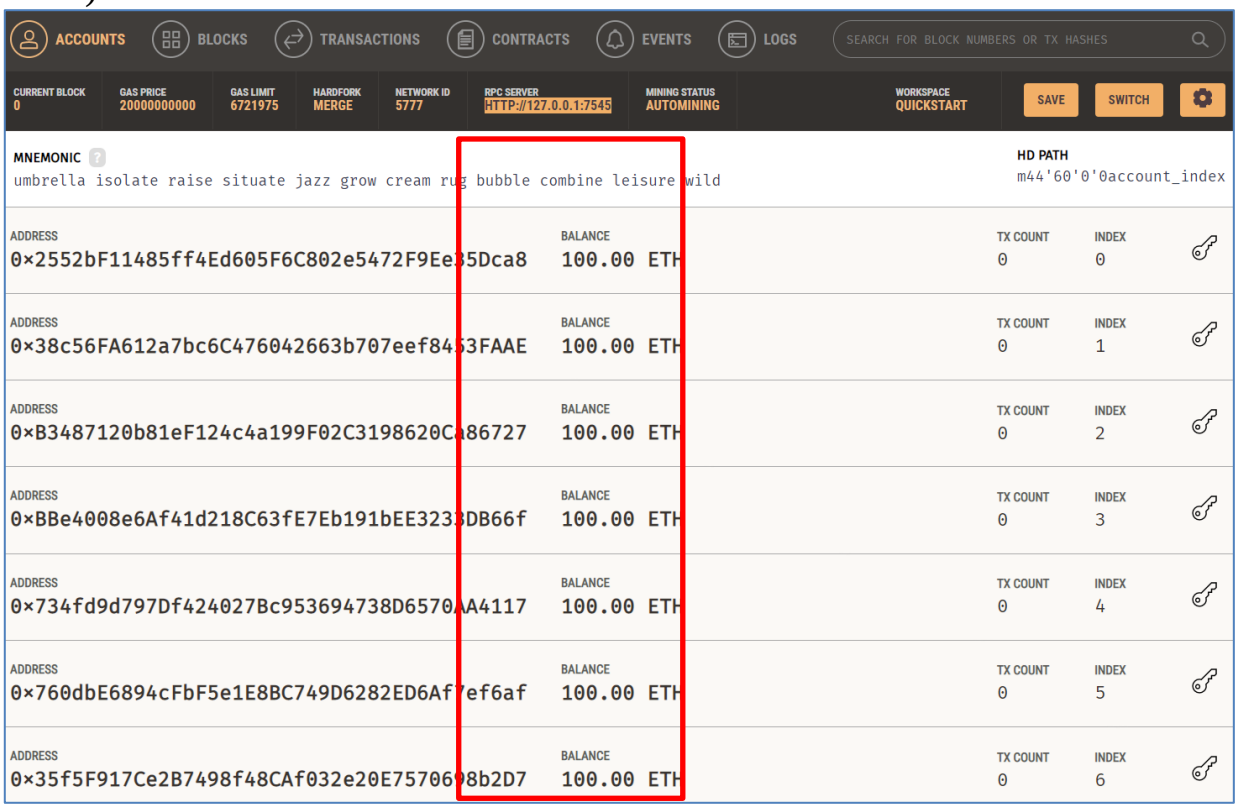


8) Balance is now reflecting in your Metamast –

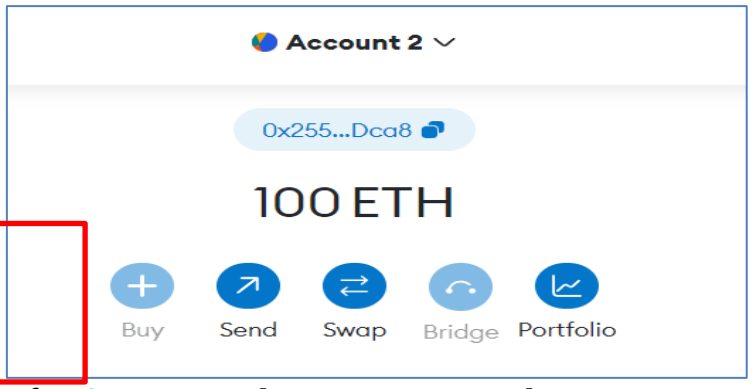


Step to do transaction in MetaMask

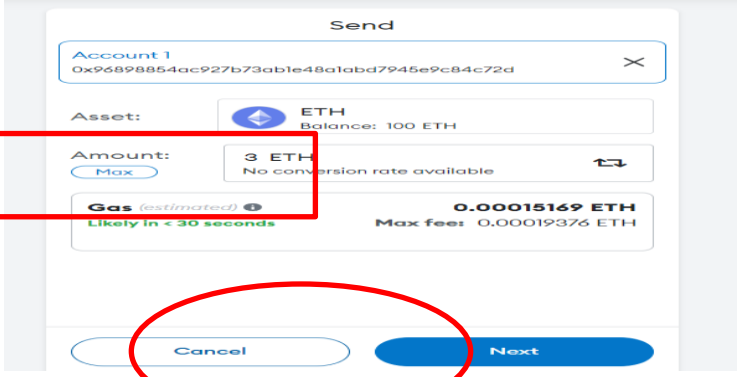
1) Check the balance in Ganache :



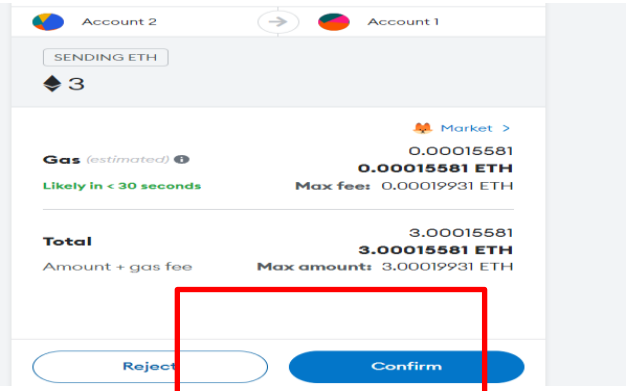
2) After adding Account & Select Account from where you need to send the balance



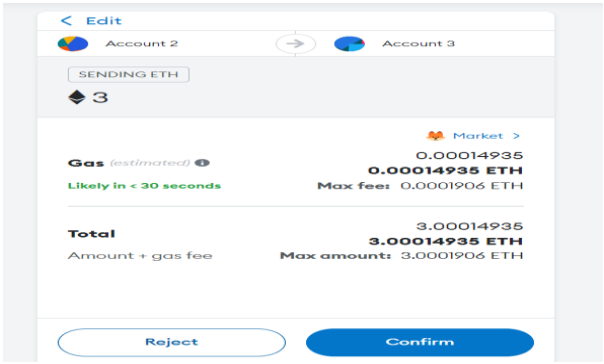
3) Enter the details for Account and amount you need to sent in our case we are transferring 3 ETH



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

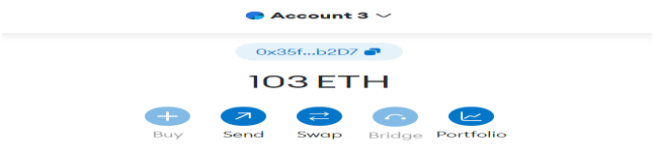


b. Second Transaction from Account 2 -> Account 3

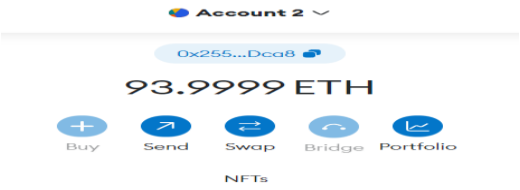


4) Transaction details:

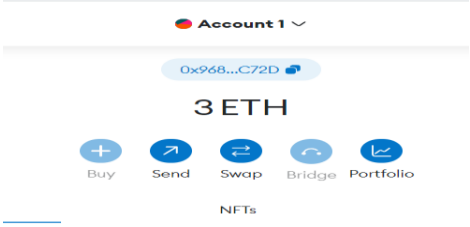
- Account 3 balance:



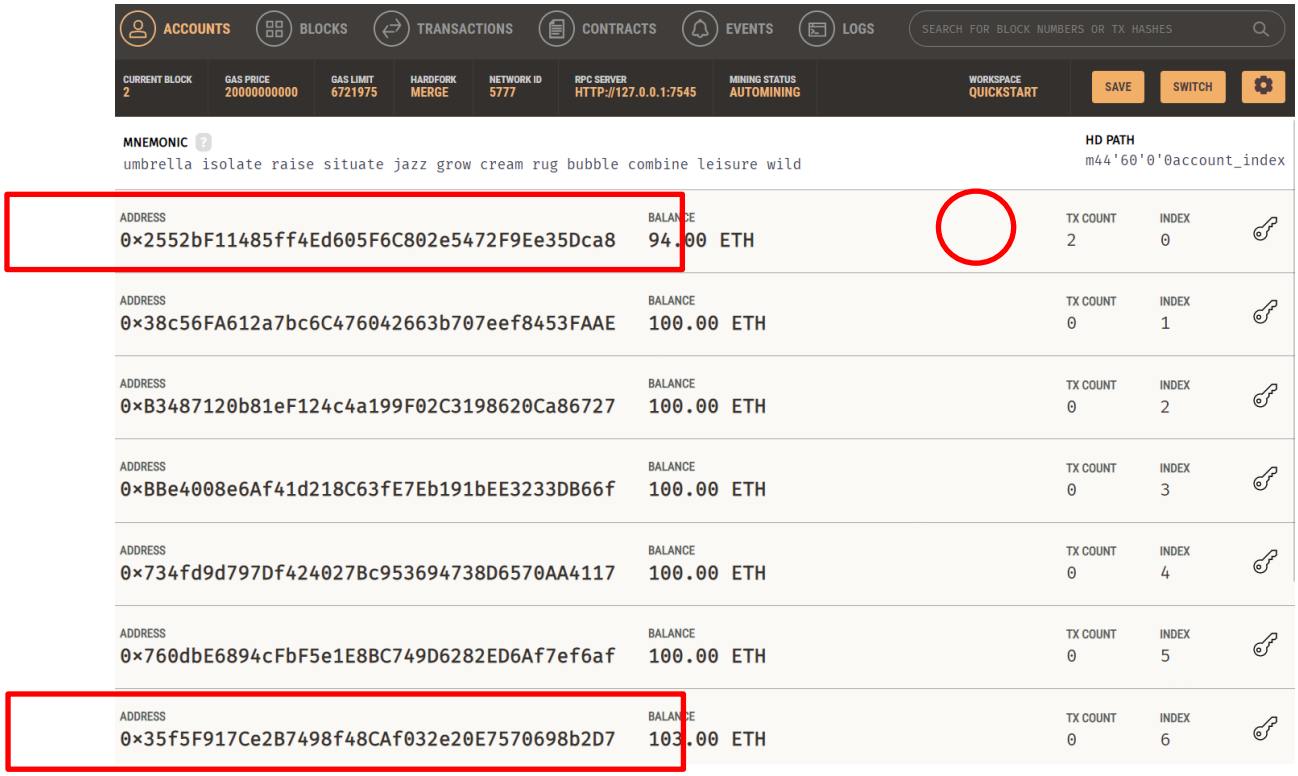
- Account 2 Balance:



- Account 1 balance:



- You check transaction in ganache:



● 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.