Lab 1: Blockchain and It's Transaction

Objectives:

- To know about different types of blockchain and how their transaction is managed using crypto wallet. Also we will discuss the some blockchain explorer

Submission:

- Three checkpoints.

Introduction:

In this lab, we will discuss different types of blockchain, how their transactions can be managed from a user perspective using a crypto wallet. In addition we will discuss some blockchain explorers of ethereum and bitcoin so that the students can get a real life idea of what really happens when a transaction is completed.

We know there are primarily two types of blockchain. To interact with a blockchain, a user needs an account which is identified by an address. To use and manage the accounts we need a crypto wallet. This wallet basically holds the account information and balance, and also helps users to maintain multiple accounts easily and efficiently. To clear your immigration about the crypto wallet and account you can assume this with a physical wallet(crypto wallet) where you store multiple credit/atm cards accounts).

There are primarily two types of crypto wallets such as custodial and non custodial wallets. In this lab we will use a non custodial wallet called metamask which can be used as a browser extension.

Section-1 : Setting up metamask

To install MetaMask,

1. First, open Google Chrome. Click the extension icon at the top-right corner of the browser and then click manage extensions(Figure 1.a). This will bring the existing extension of your browser. Click the hamburger menu button(menu button with three lines) at the top-left corner of your browser and click open chrome web store(Figure 1.b & 1.c). The steps are mentioned below:

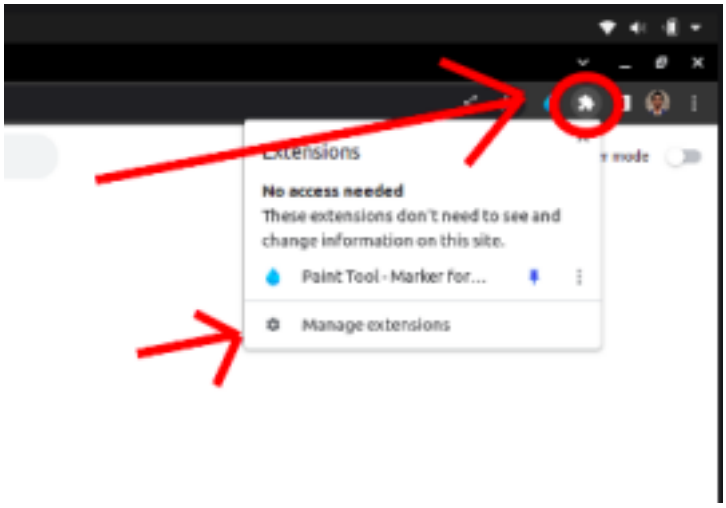


Fig: 1.a

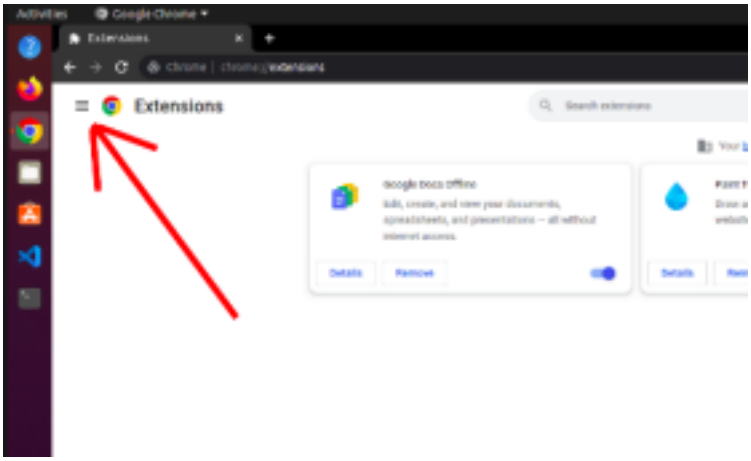
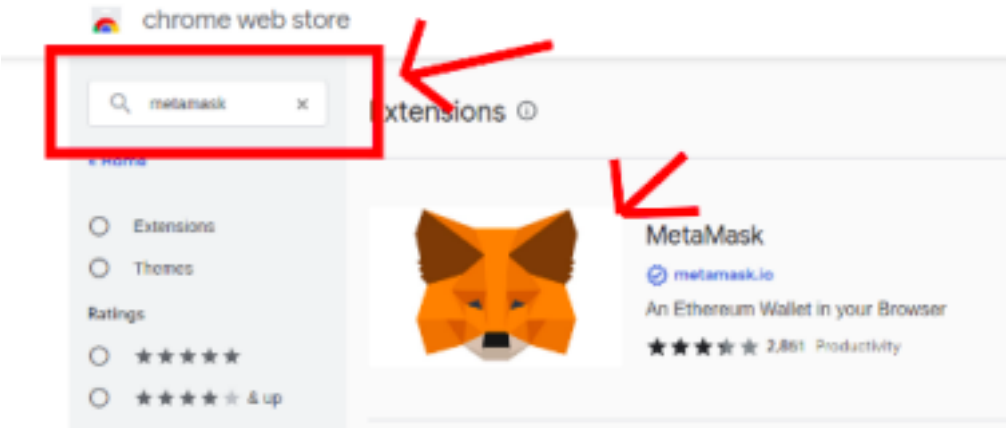


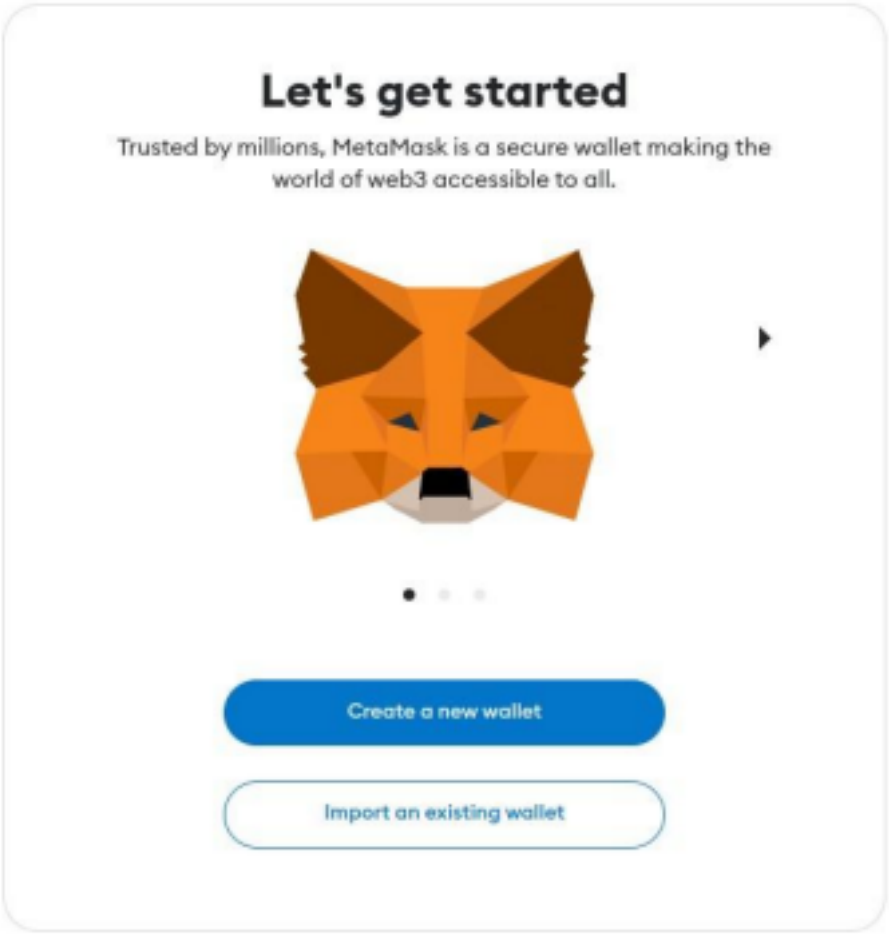
Fig: 1.b

Fig: 1.c

2. Now, search metamask and click the metamask wallet shown below:

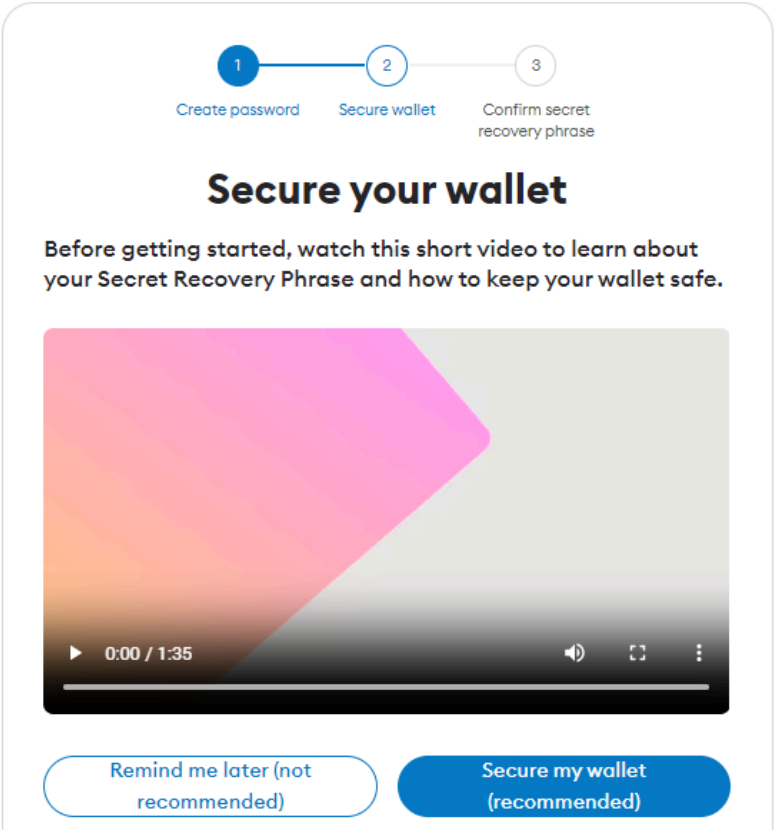


3. Next click **Add to Chrome** and this will start downloading and install the file. After installation, you will see an image like below. We are assuming that you do not have any wallet. Therefore click the **Create New Wallet** button.



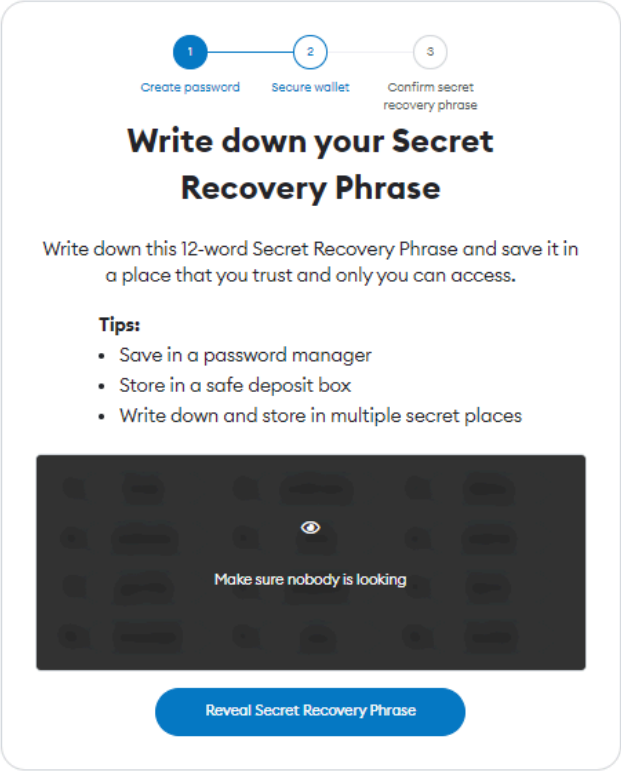
4. A new page will appear. Where you have to provide your credential and after writing them, click **create**.

5. A new page will appear.

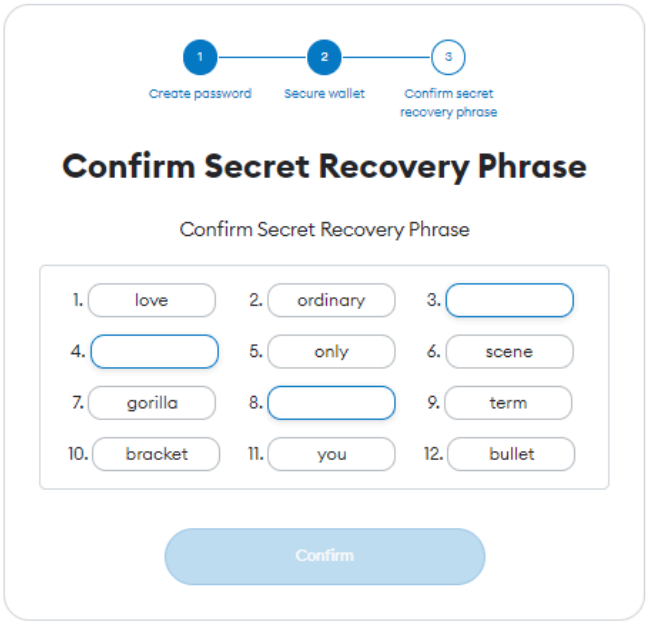


Click **Secure my wallet(recommended)** and you will find a page with some secret phrase (also known as **mnemonic phrase / seed phrase / master key**) containing 12 words mentioned in the picture below. This secret phrase is very important for **non custodial wallets** like metamask. You must copy and store this phrase in a safe place. If you lose it, you will not be able to retrieve your wallet again. Also Make sure that you store this secret phrase in a safe place because if someone gets this phrase he/she can access your account and do whatever they want.

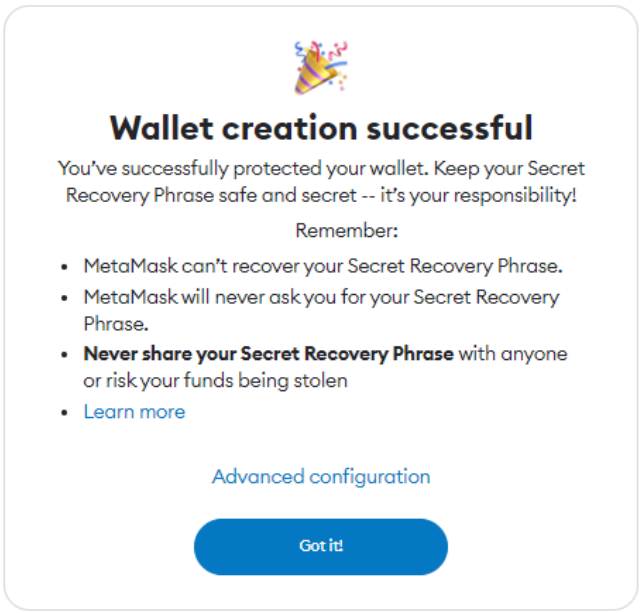
5.1. Press **Reveal Secret Recovery Phrase**. Take a screenshot of that page.



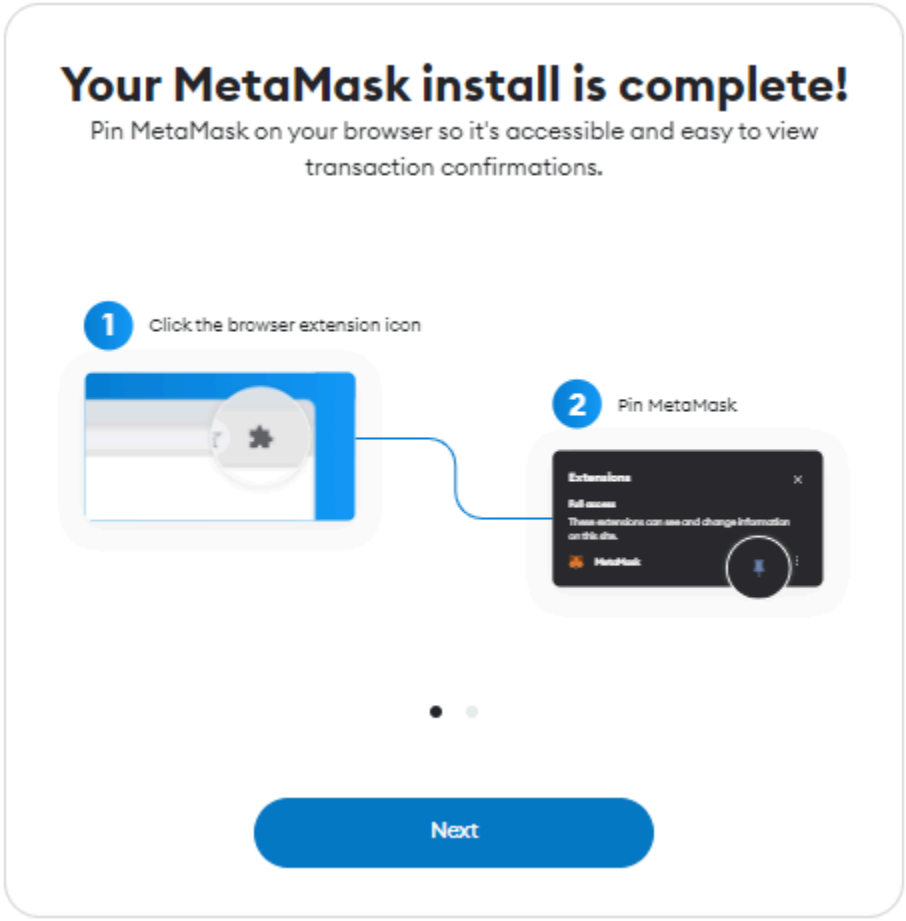
6. On the next page, confirm your secret phrase only then the **confirm** button will automatically be active. (You must type the phrases). Press the confirm button to go to the next page.



7. Our wallet has been created.

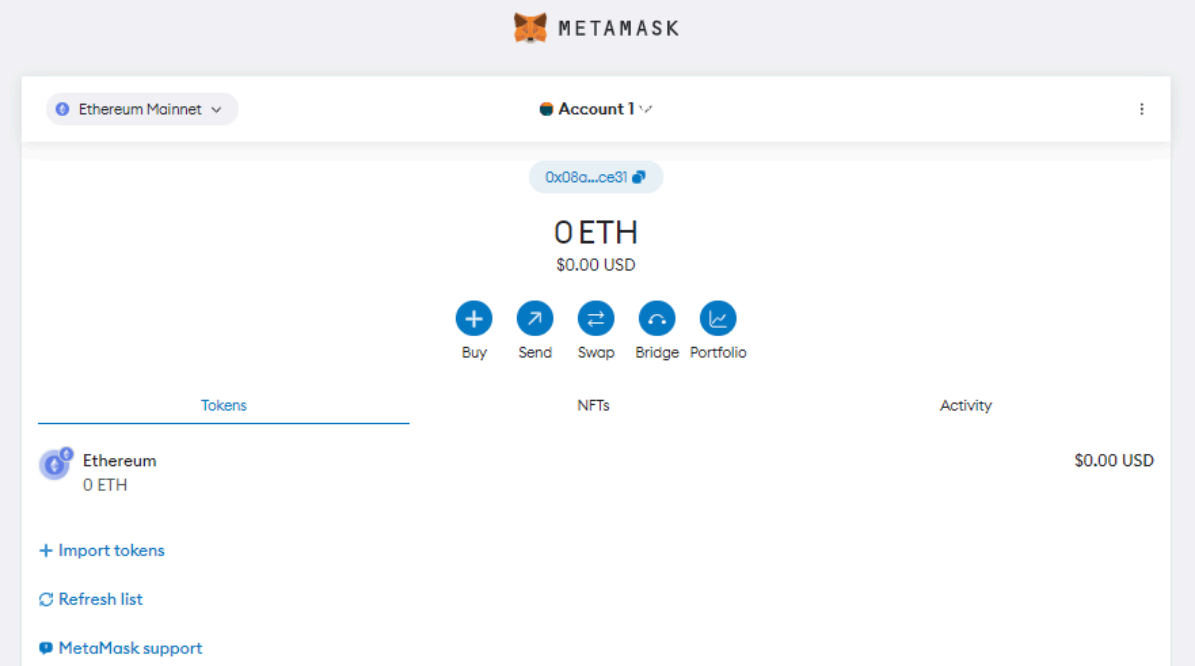


8. Finally, pin the extension from the existing browser extension list similarly mentioned in the picture below(Optional but recommended for this lab):

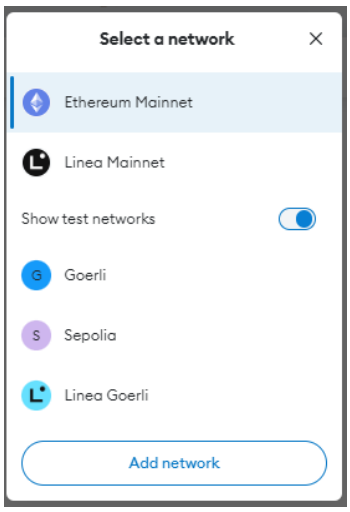


Section-2 : Using the test network

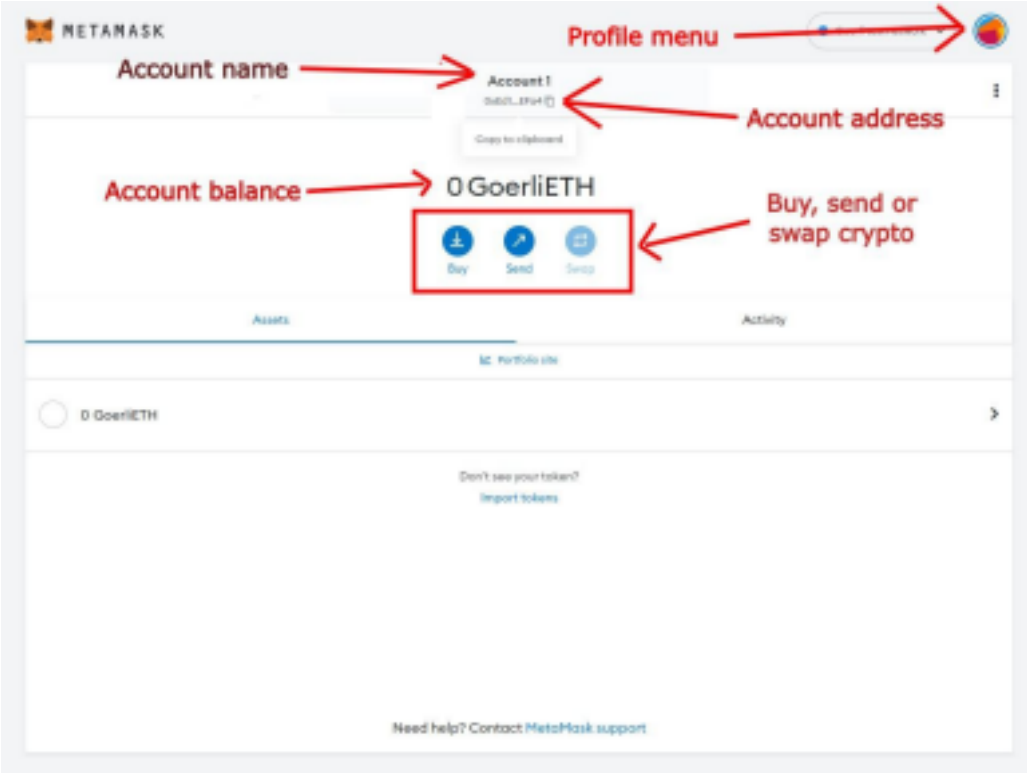
1. After successfully setting up the wallet, you will see a panel like the image below. Initially you will have two networks to interact with which is ethereum mainnet and Linea mainnet. However, we will interact with a test network. Therefore, click the option "**Ethereum Mainnet**" at the top-right corner.



2. You will find a toggle button and you should click "**show test networks**". This will bring you some test networks in the wallet like the image below. You can add more networks in the wallet. However, in this lab, we will try to interact with the Sepolia or Linea Goerli test network. First, click "Sepolia" option.



3. These are the basic options of the metamask wallet. We will interact with these options. However, the swap feature is not available in the test network, therefore we will interact with other available options here.

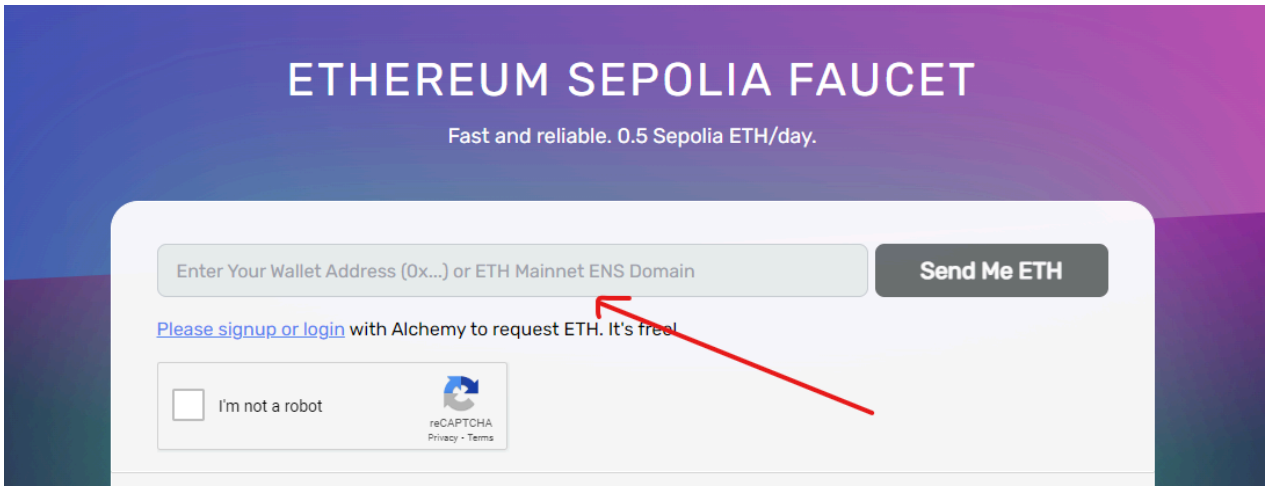


Section-3 : Interaction with the wallet.

In this section, we will fetch/buy some dummy cryptocurrency from the faucet and try to use the balance by sending it to another person/account.

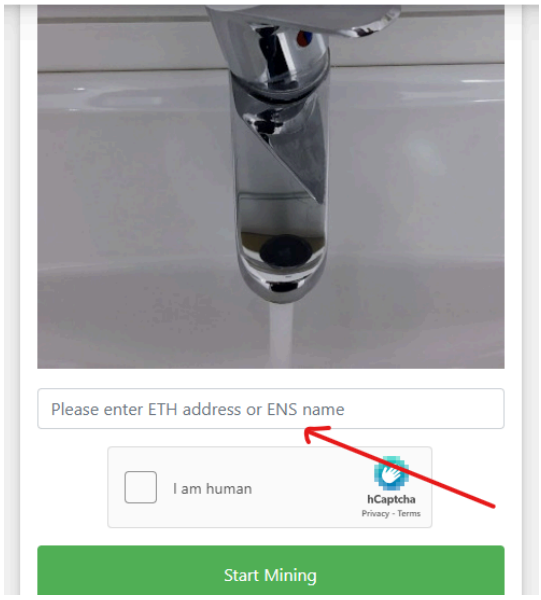
In the crypto world, faucets are some applications or websites that provide users a small amount of crypto reward/currency/balance. In ethereum, the currency they use is called ether or ETH. For bitcoin, the currency name is bitcoin of btc. Similar to that, the sepolia test network uses the currency called SepoliaETH. Now, let's get some balance/cryptocurrency or to be more specific SepoliaETH since we are using sepolia test network.

1. Now visit https://sepoliafaucet.com/



2. Create an account. After logging in, paste your account address in the marked section to get Sepolia ETH.

3. In case, the previous link is not working, go to https://sepolia-faucet.pk910.de/

4. 

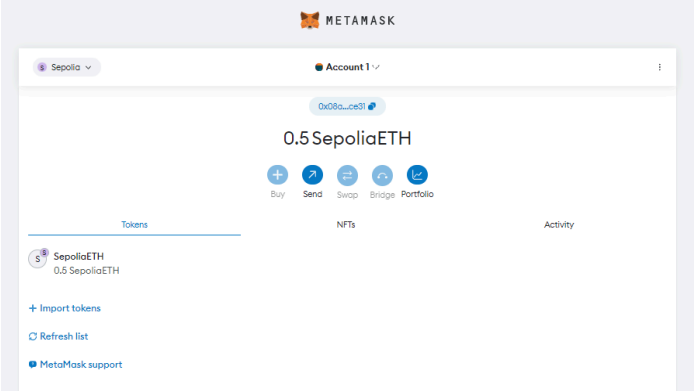
5. Paste your account address and press “Start Mining”

6. It will take some time depending on the hardware of your machine to generate the Sepolia eths.

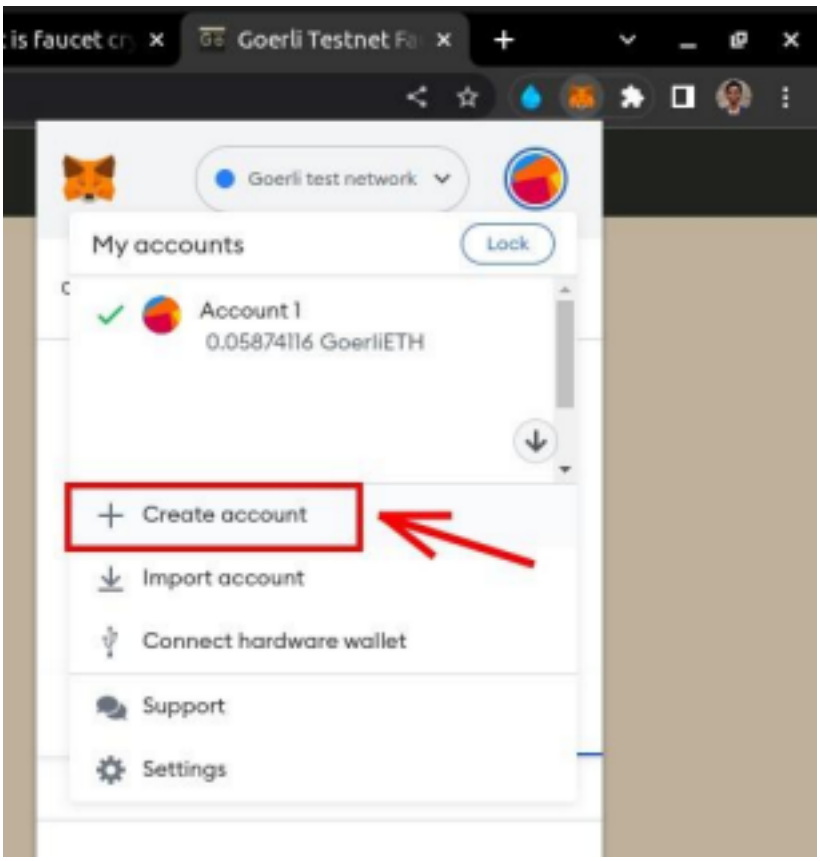
7. Wait until you have generated 0.05ETH

8. And then stop mining and claim the reward. Which will be visible in your metamask.

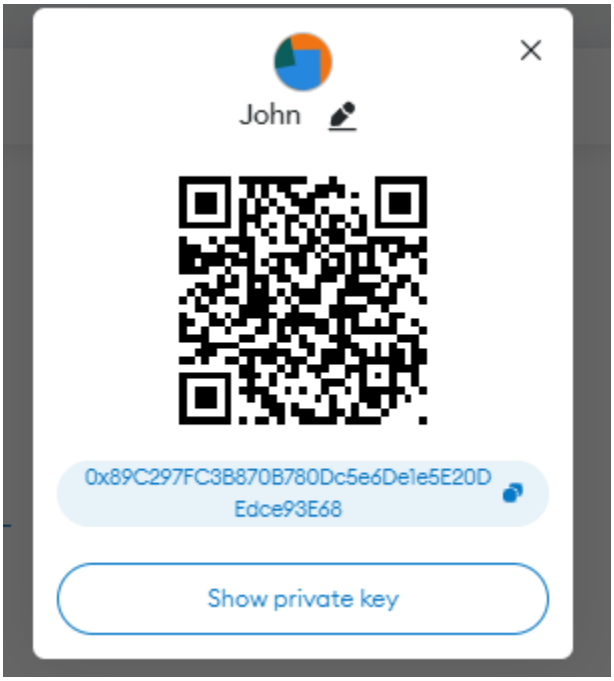
9. Now, visit metamask you should be able to see 0.05 sepoliaETH into your account. Make sure you are in the **Sepolia testnet**.



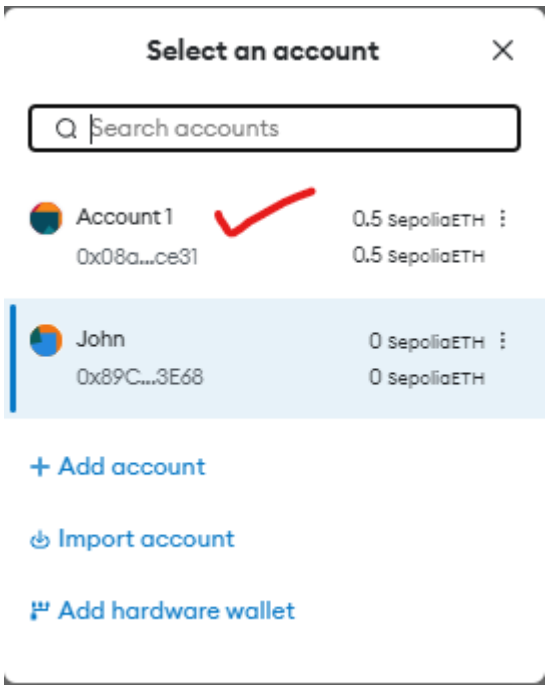
5. Now, we will send some cryptocurrency. But to whom ? Who is the receiver ? Users use their account address to send/receive the cryptocurrency in blockchain. This can be considered as their identity like we use email addresses for sending/receiving email. Therefore, now we will create another account from the same wallet and send crypto from one account to another. You can create and manage multiple accounts from one wallet. Therefore, to create a new account, click the profile icon in metamask and then click create new account. You can set the account name as you want. For this lab, I named it as “**John**”.



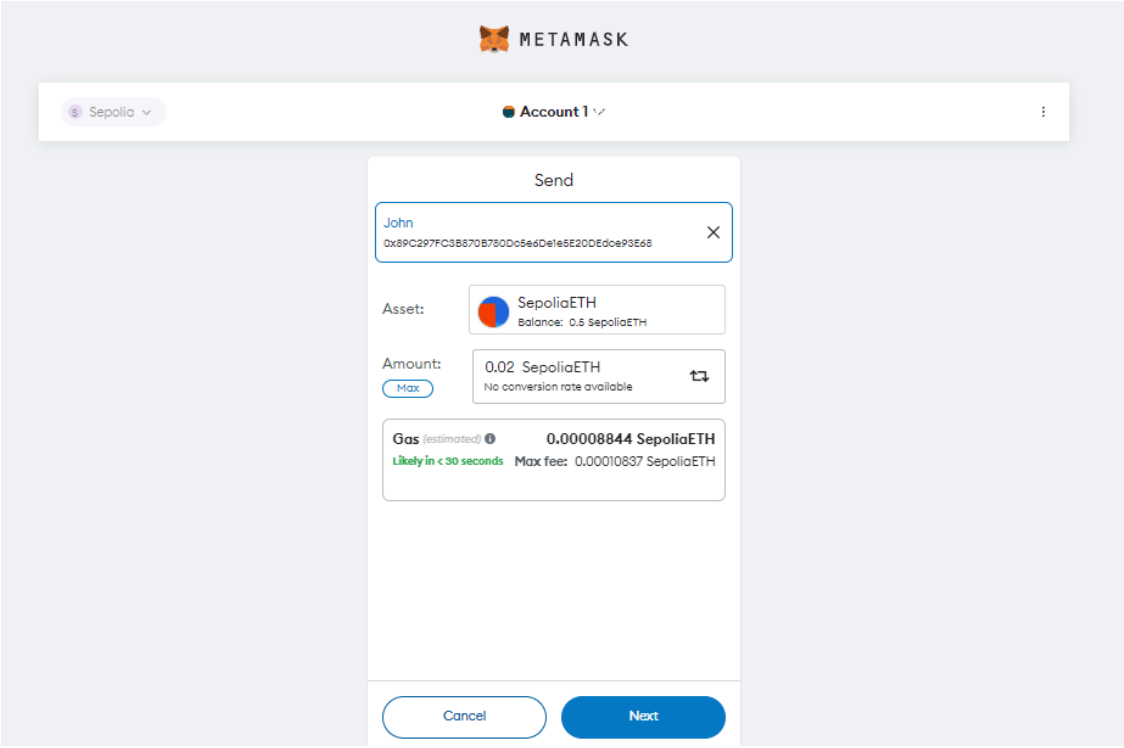
5. After creating a new account, you will see the initial balance of that new account is zero. Now, we will send some crypto to this new account from Account 1. To do this, first copy the address of the newly created account.



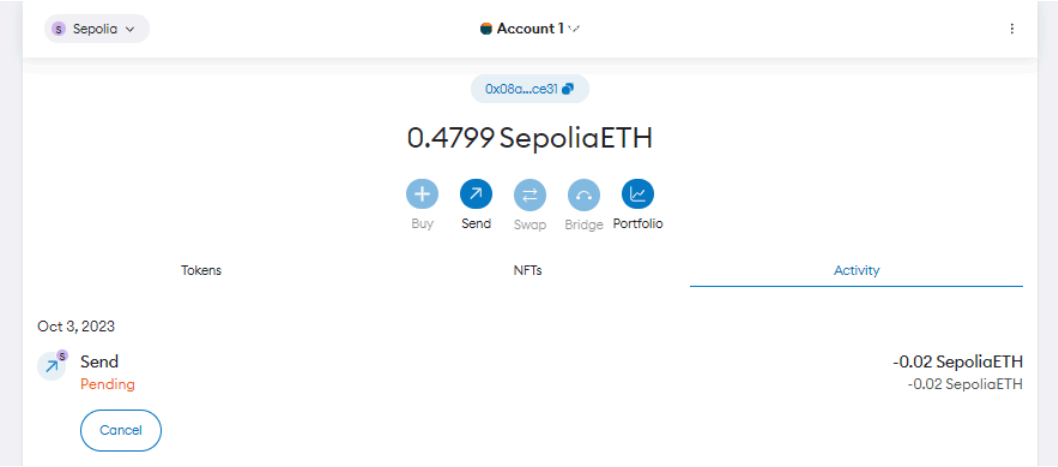
6. Next, switch to Account 1 from the profile menu by clicking the account 1 option.



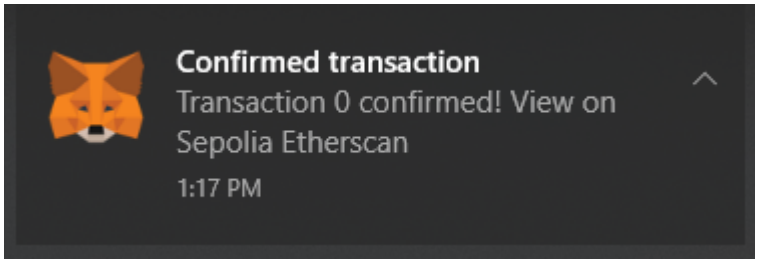
7. Now, click the **send** button, and then paste the account address, set an amount to transfer and click next. Here, I am sending **0.02 GoETH** to Jhon(account 2).



8. After clicking next, You will see a prompt to confirm transactions with related fees. This fee will be deducted from your account in addition to the **0.02 SepoliaETH,** that you are going to send Jhon. In ethereum, we pay some transaction fees(gas) for transactions. After confirmation, you should see a pending transaction in the wallet.



9. After a few seconds, the transaction will be completed and you will get a notification.



10. . Now check the balance of both of your accounts. You should see Account 1 has some less balance than before and Jhon(account 2) has balance **0.02 SepoliaETH.**

> ***Checkpoint 1:*** **Now, you have to send some amount of cryptocurrency to your friends. For this, get the account address of your group member/friend and then send some crypto to that account. After that, tell your friend/group member to send you some crypto. After completing it, show the result to your teacher.**

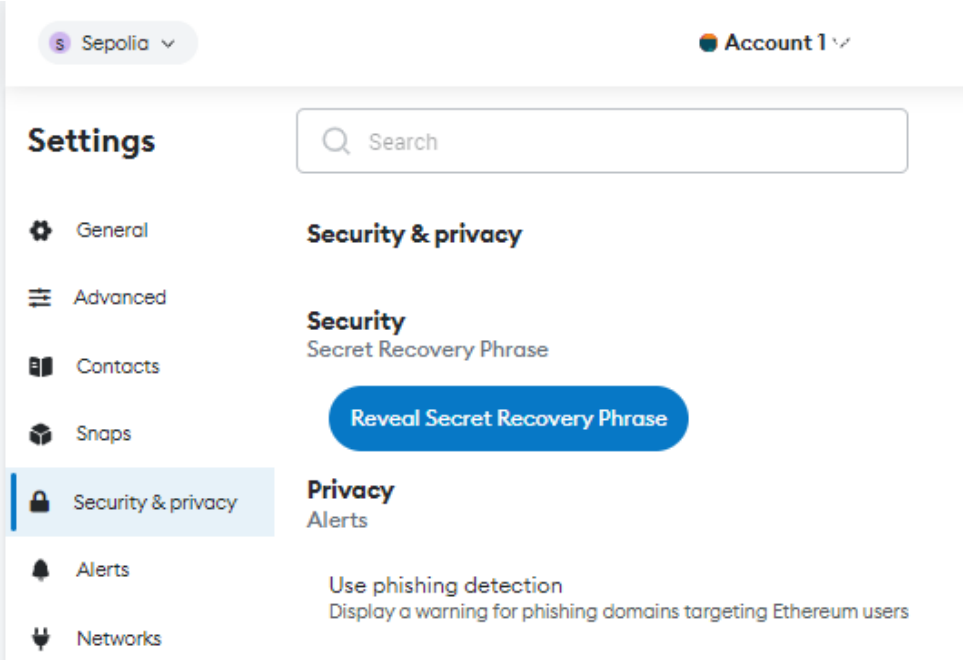
Section-4 : Backup and Retrieve Wallet and Accounts

In this section, we will discuss how we can backup our wallet and accounts so that we can access them in future.

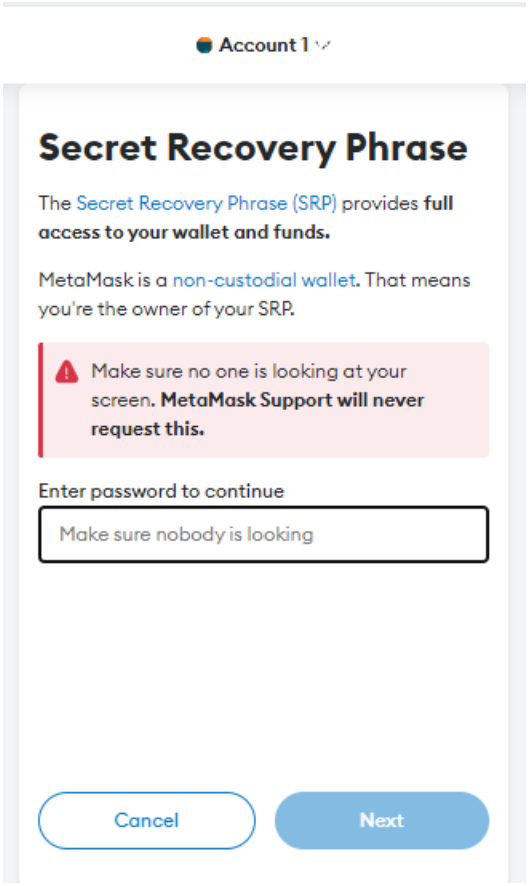
In metamask, we already have seen the secret phrase. We know this secret phrase is essential to retrieve our wallet if we somehow lost the wallet. In addition, Each account in a wallet contains a public key and a private key. In section 3, we sent and received some crypto using an address. This address is basically the public key of that respective account. Therefore we will see how we can export these secret keys/phrases and use it in future to retrieve wallet/account.

4.1 Export Secret Phrase / seed phrase / master key of wallet

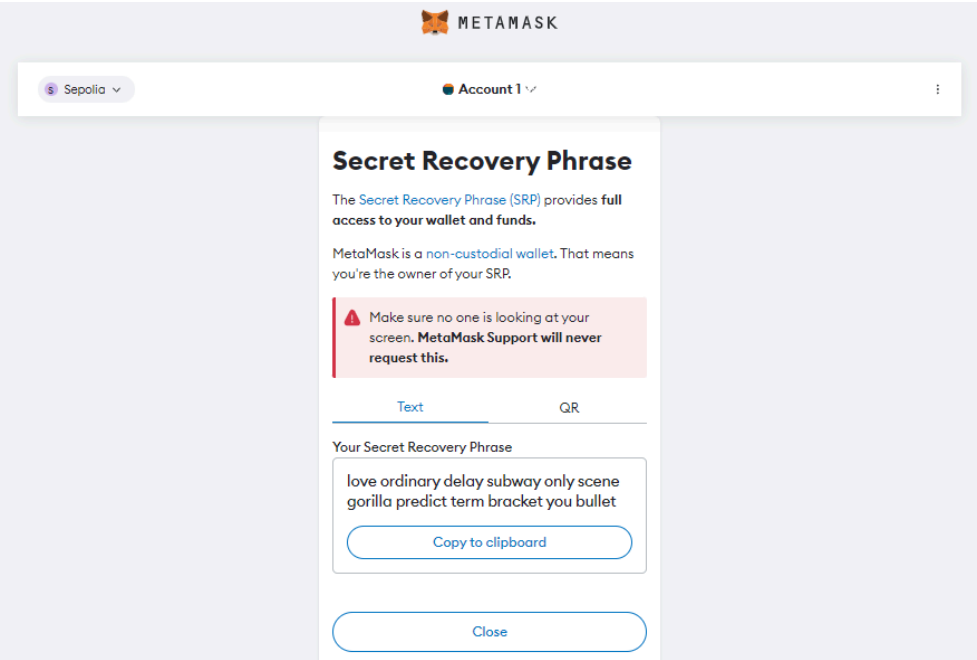
1. To export your wallet secret phrase, go to the “**settings > security and privacy**” under the metamask profile menu. You will see an option to recover the secret phrase key.



2. Click it and it will prompt you to enter your password.



3. Once you enter your password, you will see your secret phrase like below:

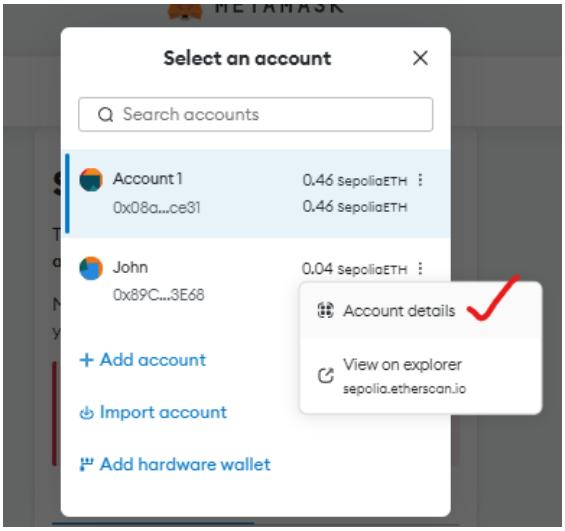


2. Click the "**Copy To Clipboard**" and paste the value also if you want. Now you can store this secret phrase in a secure storage.

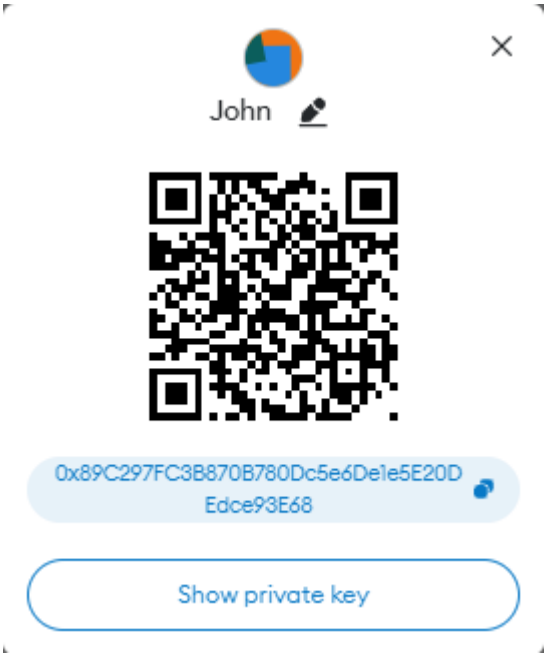
4.2 Export private key of account

In a metamask wallet, we can hold multiple accounts. You may want to backup your account so that you can access it from another wallet. To backup the account:

1. open metamask and click the menu button with three dots. This will bring some options and Select "**Account Details**"



2. Then click "**Show private key**" . This will prompt you to enter your password. After entering a password, you will see your private key for that respective account.



3. Copy this private key and store it in a safe place. If you lost this private key and somehow lost access to your wallet also, you will not be able to retrieve this account anymore.

Checkpoint 2: **Now, remove metamask and try to install it again. But this time try using import your wallet from the phrase that you stored in the previous section. Show this to your teacher.**

Checkpoint 3: **What did you see when you imported the wallet ? Only one account is there right ? What happens to others ? Are those deleted forever ? The answer is no. You can retrieve the accounts using its private key as we mentioned earlier. Therefore, now try to retrieve the account by importing instead of creating one from the metamask. Give it a try. If you can do it successfully, please show this to your teacher.**

Section-4 : Exploring transactions

In this section, you will learn about public blockchain explorers such as etherscan.io and bitaps.com. Your teacher will discuss these during the lab.