BCT

PRACTICAL 1

Problem Statement : Installation of MetaMask and study spending Ether per transaction.

Objective : To get familiar with the installation and usage of the MetaMask cryptocurrency wallet and explore the process of making Ethereum transactions to understand how Ether is spent for each transaction.

Hardware Requirements:

- PC or Laptop with at least **4 GB RAM** (8 GB recommended for smooth browser performance)
- Processor: **Intel i3** or equivalent (i5 or higher recommended)
- Stable **internet connection** for blockchain interaction
- Optional: **Smartphone** if using MetaMask mobile app

Software Requirements:

- **Operating System:** Windows 10/11, macOS, or Linux
- **Browser:** Google Chrome, Firefox, Brave, or Edge (latest version)
- **MetaMask Extension/App** installed
- Optional: **Ethereum test network (e.g., Ropsten, Goerli) access** for practicing transactions without real Ether

Theory:

Blockchain Meaning:

A blockchain is a digital ledger or database where encrypted blocks of digital asset data are stored and chained together, forming a chronological single source of truth for the data. Digital assets are distributed, not copied or transferred. Digital assets are decentralized, allowing for real-time accessibility, transparency, and governance amongst more than one party. Blockchain ledgers are transparent- any changes

made are documented, preserving integrity and trust. Blockchain ledgers are public and constructed with inherent security measures, making it a prime

technology for almost every sector.

Concept Of Blockchain-

What Is a Block?

Every chain consists of multiple blocks and each block has three basic elements:

The data in the block. The nonce-"number used only once." A nonce in the blockchain is a whole number that's randomly generated when a block is created, which then generates a block header

The hash--- a hash in the blockchain is a number permanently attached to the nonce. For Bitcoin hashes, these values must start with a huge number of zeroes (ie., be extremely small).

When the first block of a chain is created, a nonce generates the cryptographic hash. The data in the block is considered signed and forever tied to the nonce and hash unless it is mined.

A simple analogy for how blockchain technology operates can be compared to how a Google Does document works. When you create a Google Doc and share it with a group of people, the document is simply distributed instead of copied or transferred. This creates a decentralized distribution chain that gives everyone access to the base document at the same time. No one is locked out awaiting changes from another party, while all modifications to the document are being recorded in real-time, making changes completely transparent.

A significant gap to note however is that, unlike Google Docs, original content and data on the blockchain cannot be modified once written, adding to its level of security.

Of course, blockchain is more complicated than a Google Doc, but the analogy is apt because it illustrates critical ideas of the technology.

Blockchain is a type of DLT in which transactions are recorded with an immutable cryptographic signature called a hash. This means if one block in one chain was changed, it would be immediately apparent it had been tampered with. If hackers wanted to corrupt a blockchain system, they would have to change every

block in the chain, across all of the distributed versions of the chain.

Blockchains such as Bitcoin and Ethereum are constantly and continually growing as blocks are being added to the chain, which significantly adds to the security of the ledger.

How to use MetaMask: A step by step guide

MetaMask is one of the most popular browser extensions that serves as a way of storing your Ethereum and other ERC-20 Tokens. The extension is free and secure, allowing web applications to read and interact with Ethereum's blockchain.

Step 1. Install MetaMask on your browser.

To create a new wallet, you have to install the extension first. Depending on your browser, there are different marketplaces to find it. Most browsers have MetaMask on their stores, so it's not that hard to see it, but either way, here they are Chrome , Firefox, and Opera

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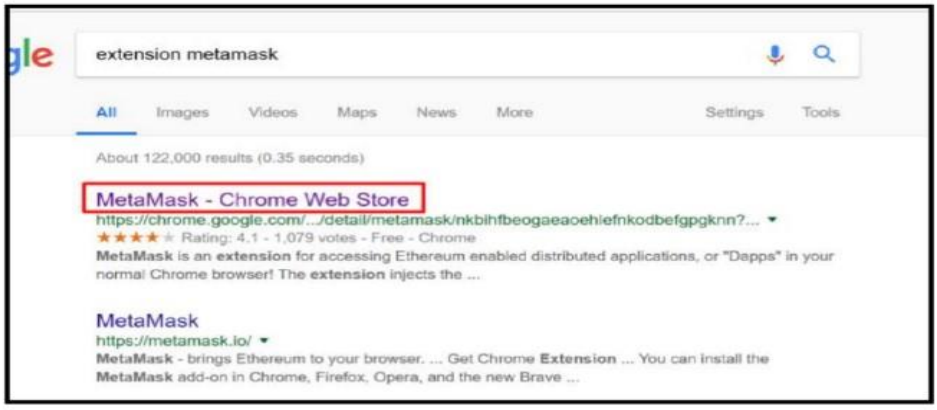
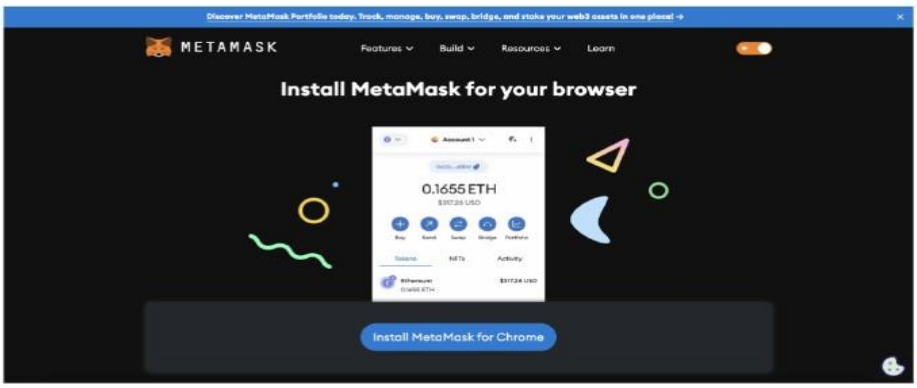
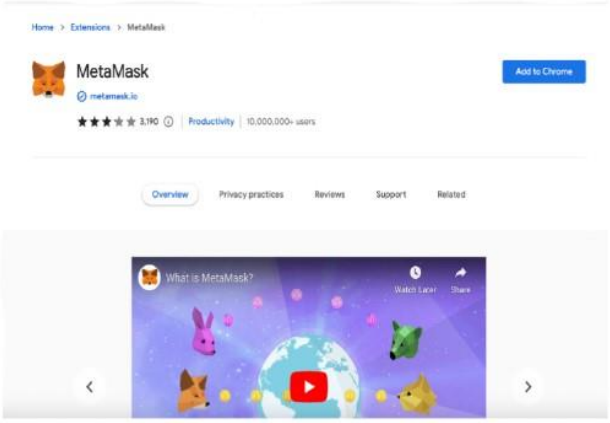




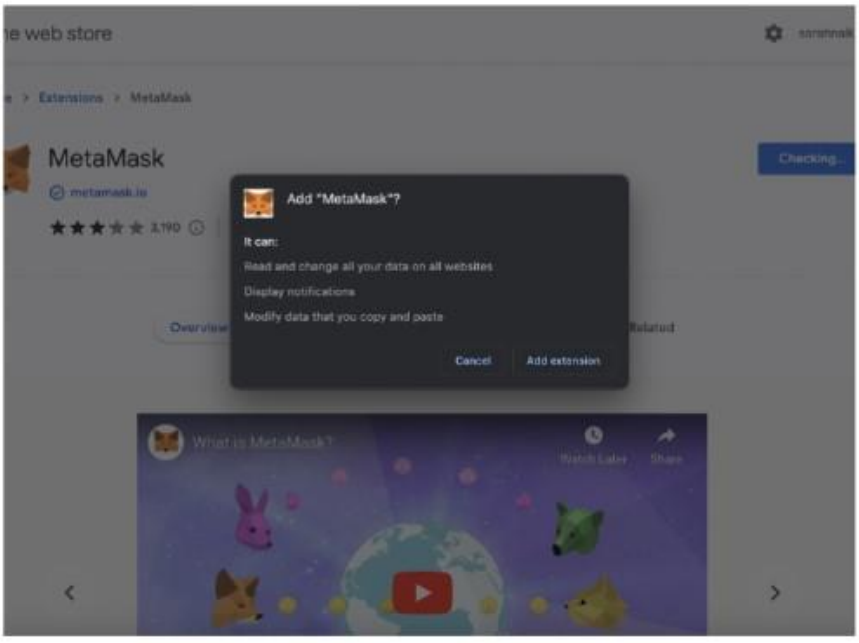
Step 2:

Add Extension: A pop-up will appear asking for confirmation to add the MetaMask extension. Click "Add Extension" to proceed.



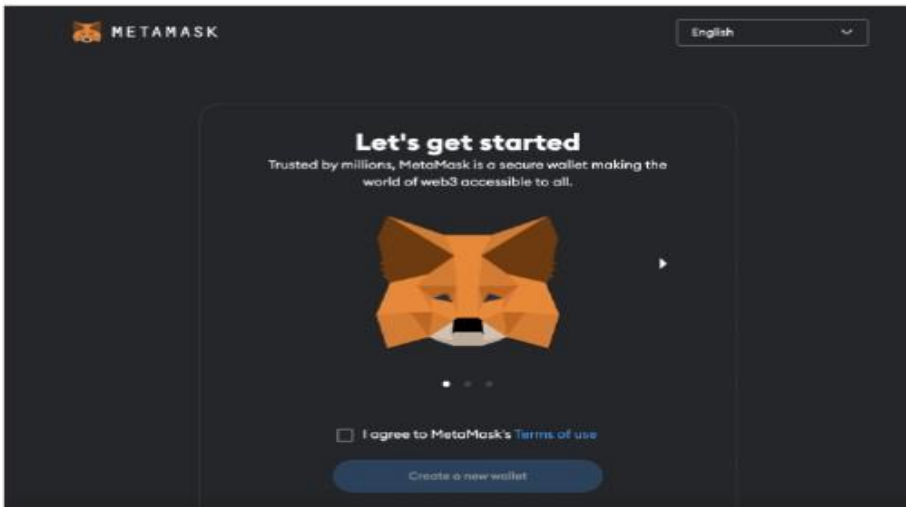
Step 3:

Setup MetaMask: After installation, the MetaMask fox icon should appear in your browser's extension bar. Click on it to start the setup process.



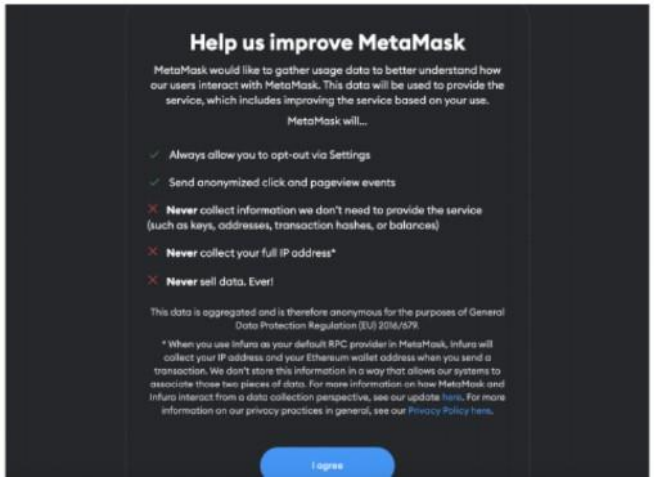
Step 4:

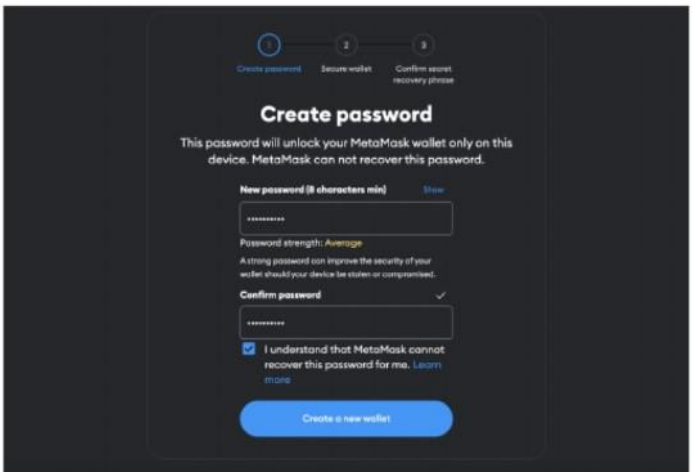
Create a New Wallet: You'll be prompted to create a new wallet. Follow the on-screen instructions, which will include setting a password and securing your seed phrase

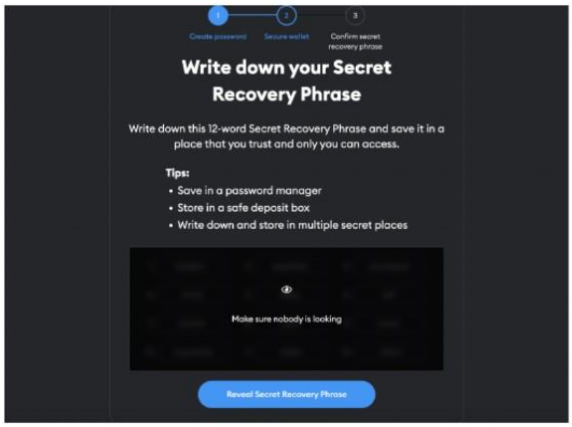


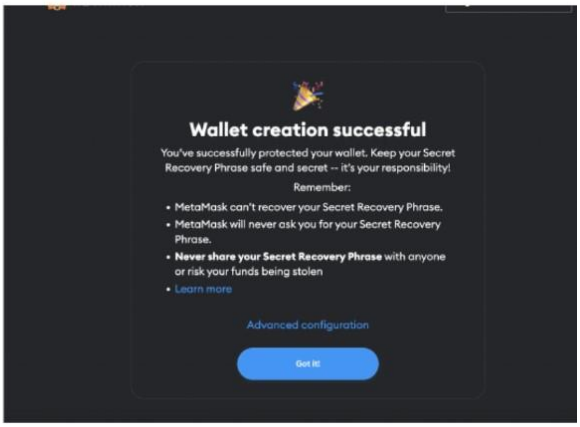
Step 5:

Backup Your Seed Phrase: After setting up your wallet, you'll receive a seed phrase. This is crucial for wallet recovery and should be stored securely offline. Do not share it with anyone





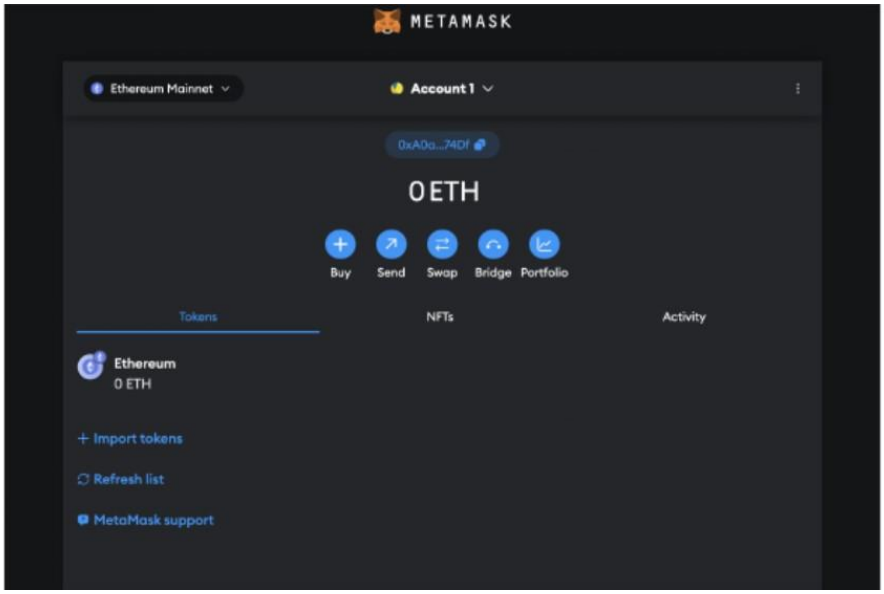




Step 6:

Once you've completed the setup and backed up your seed phrase, your MetaMask wallet is ready to use. You can now manage your cryptocurrencies and access decentralized applications (DApps) directly from your browser.

Remember to follow security best practices and keep your seed phrase safe. If you're new to cryptocurrency wallets, take your time to familiarize yourself with MetaMask's features and functions before making transactions.



Conclusion :

In conclusion, this practical introduced students to MetaMask and Ethereum transactions. They learned wallet setup, secure key management, and how gas fees affect transaction speed and cost. The assignment provided real-world insight into blockchain transaction expenses and their importance. Students gained awareness of secure crypto handling and practical blockchain participation. Overall, it built a strong foundation in cryptocurrency wallet management and Ether expenditure**.**