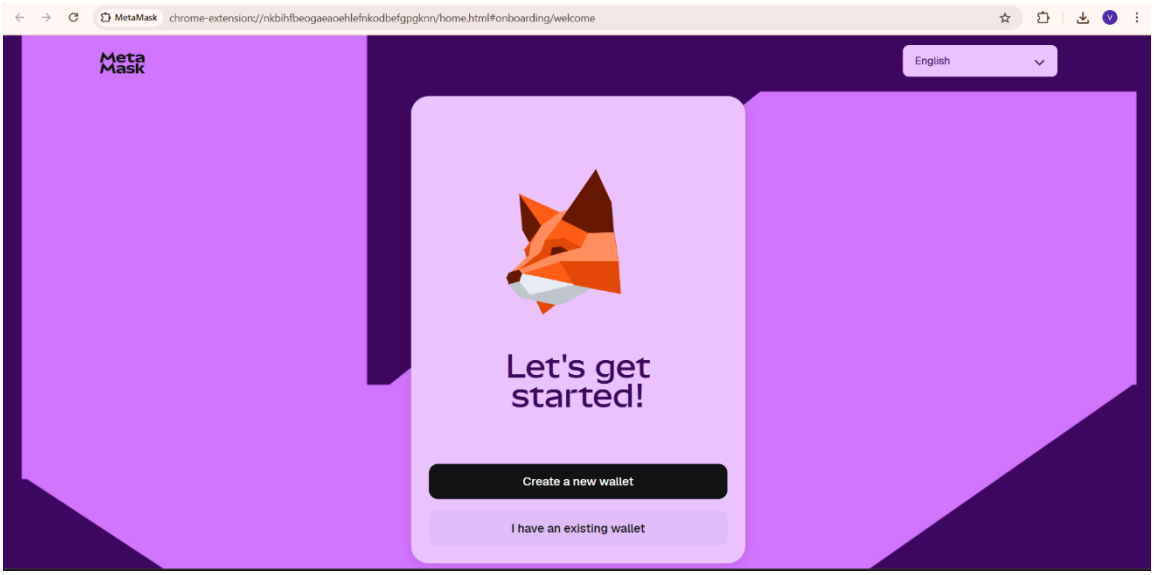
🌐 Web3 Basics Documentation

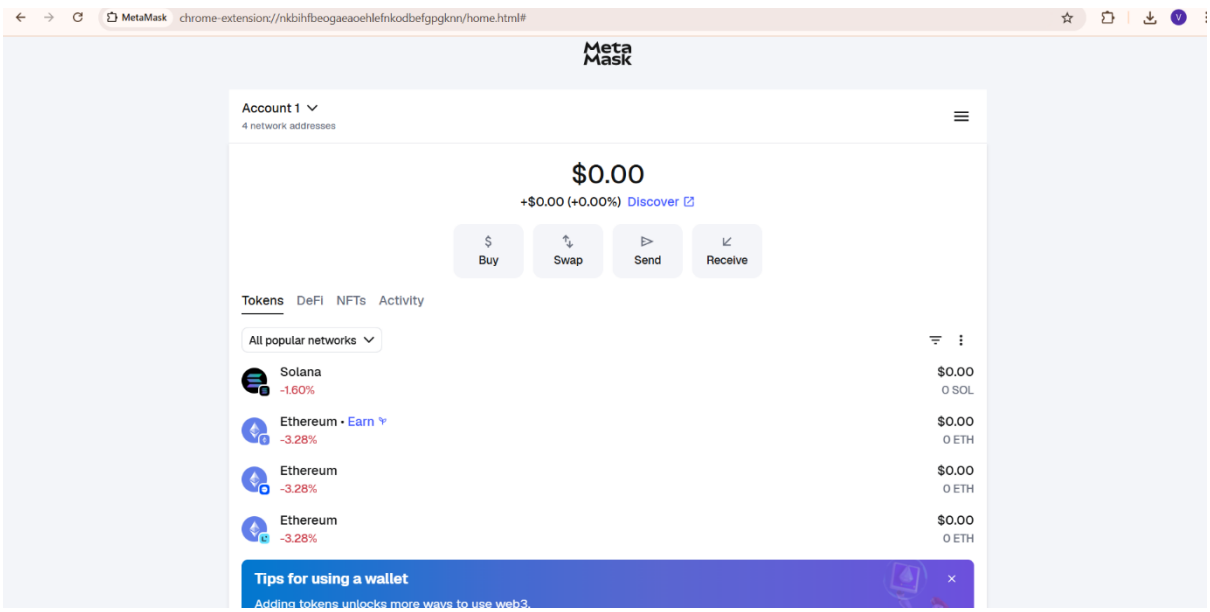
Name: Anusha Pavani Venneti
Roll Number: 23A91A05K3

🧩 1. Documentation

🔹 a. MetaMask Installation

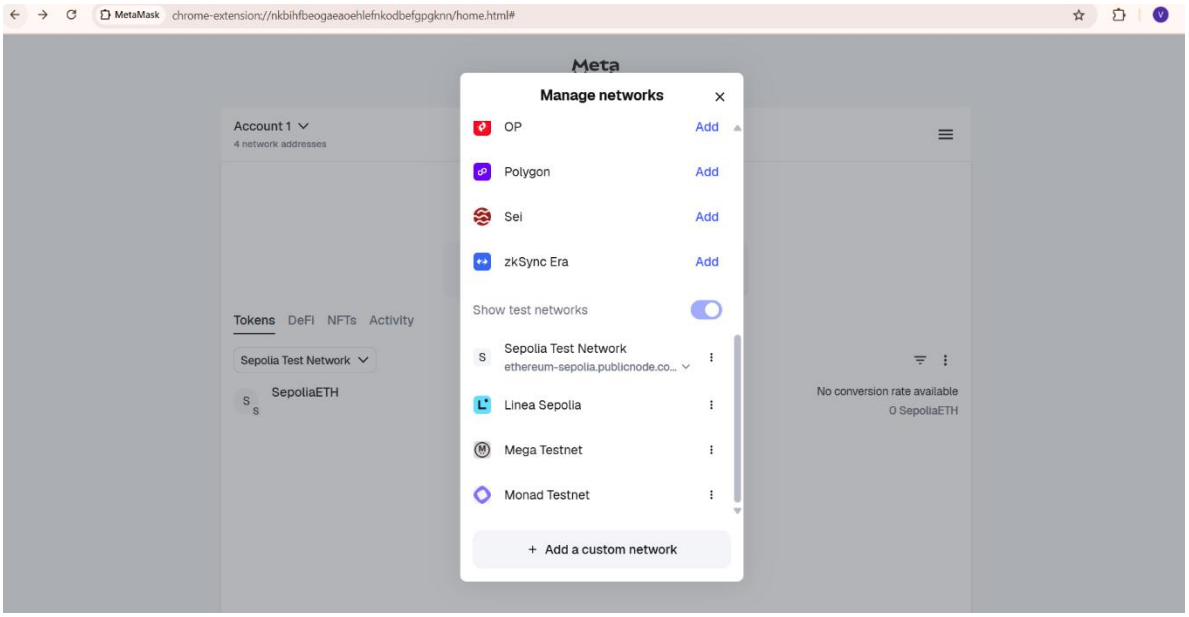
- Installed **MetaMask** browser extension.
- Created a new Ethereum wallet with a **secure seed phrase** (stored safely offline).
- Understood how MetaMask manages **public and private keys** to ensure asset security.

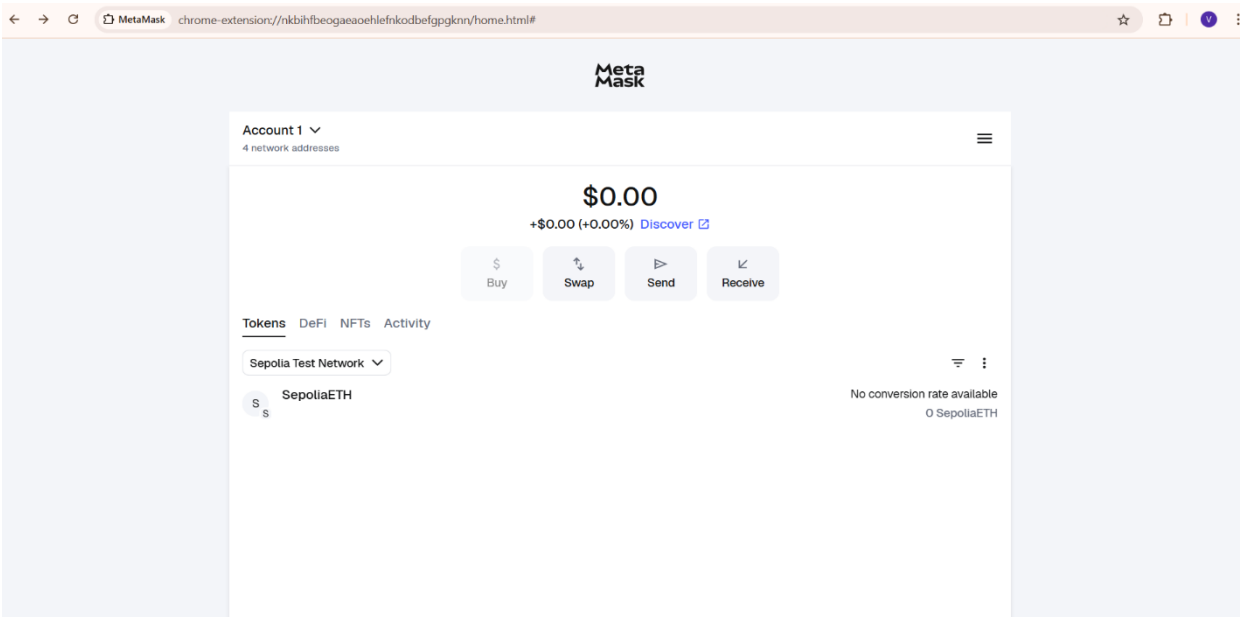




🔹 b. Network Configuration

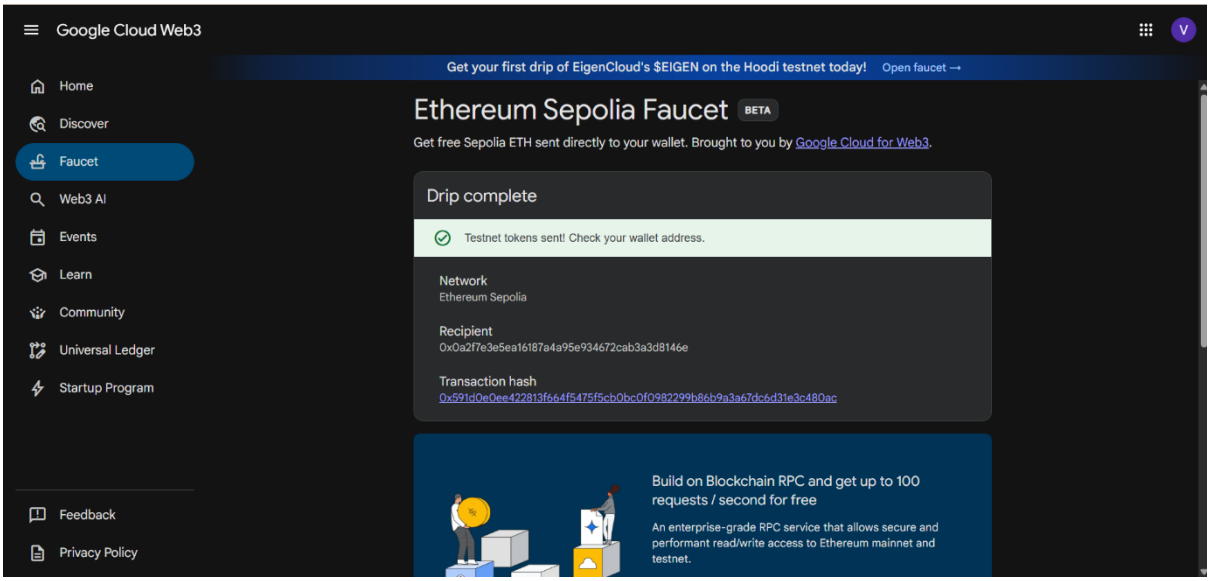
- Added **Sepolia Test Network** manually in MetaMask.
- Used the following network details:
    - **Network Name:** Sepolia Test Network
    - **RPC URL:** https://rpc.sepolia.org
    - **Chain ID:** 11155111
    - **Currency Symbol:** ETH
- Confirmed that Sepolia was added successfully to the network list.

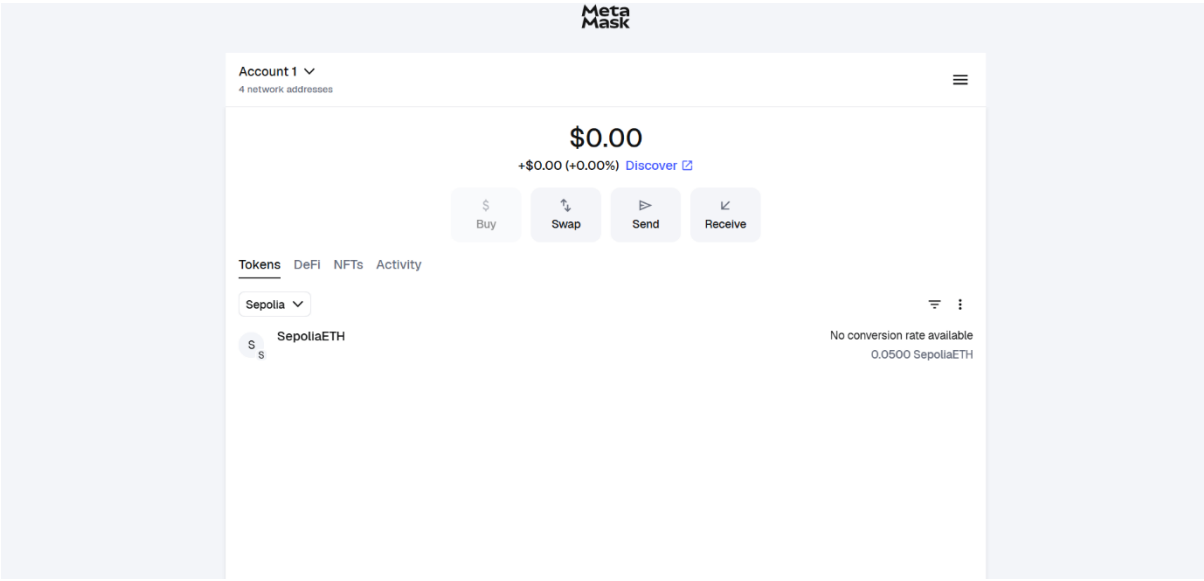




c. Testnet ETH Faucet

- Requested **test ETH** using a faucet site.
- Faced a few issues (some faucets required balance or verification).
- Finally received **Sepolia test ETH** in the wallet.





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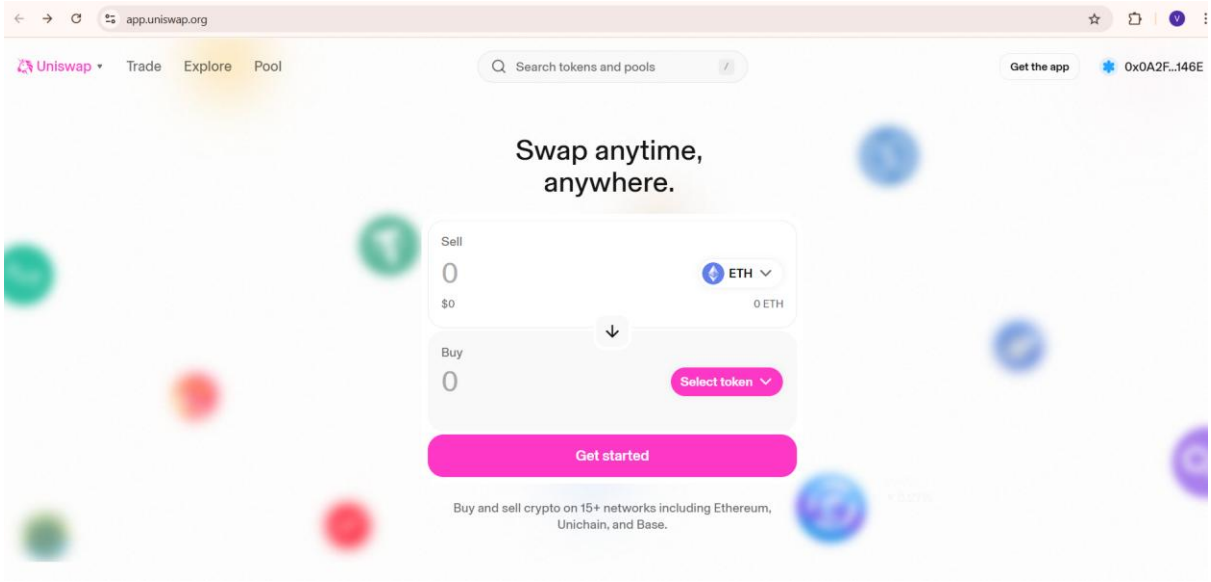
d. DApp Connection

- Connected MetaMask wallet to a sample **DApp (Decentralized Application)**.
- MetaMask prompted to approve the wallet connection.
- Successfully connected and interacted with the Dapp.



🔹 **e. Transaction Verification**

- Performed a **test transaction** using Sepolia ETH.
- Verified it on **Etherscan** using the transaction hash.
- Confirmed successful completion of the transaction.

Wallet Public Address:

0x0a2f7e3e5ea16187a4a95e934672cab3a3d8146e

🪄 **2. Written Reflection (≈450 Words)**

💡 **Understanding Blockchain vs Traditional Databases**

- Traditional databases are **centralized**, managed by a single authority.
- Blockchain is **decentralized**, where every node holds a copy of the ledger.
- Data once added cannot be changed — ensuring **transparency and immutability**.
- Transactions are validated using **cryptography and consensus mechanisms**.

⚙️ **Role of Smart Contracts in DApps**

- Smart contracts are **self-executing digital agreements** stored on the blockchain.
- They trigger automatically when predefined conditions are met.
- Eliminates the need for intermediaries, making processes **faster and cost-effective**.
- Used in DApps for payments, verifications, and other automated operations.

🛡️ Experience with Wallet Security

- Learned about **private keys**, **seed phrases**, and **wallet authentication**.
- MetaMask signing feature ensures only the wallet owner can approve transactions.
- Realized the importance of **keeping seed phrases offline** for safety.
- Wallet connection to DApps always requires **user permission** — adds an extra layer of security.

⛽ Observations on Gas Fees & Transaction Times

- Gas fees vary based on **network congestion** and **validator activity**.
- Sometimes transactions took longer to confirm due to **high network load**.
- Gas fees act as **rewards for miners/validators**, ensuring fair processing.
- Learned to adjust gas limits for faster confirmations on test networks.

⚠️ Challenges Faced & How I Overcame Them

- Many faucet sites were empty or required small balances to proceed.
- Tried multiple options like **QuickNode** and **Alchemy Sepolia Faucet** until success.
- Faced minor delays while verifying on Etherscan but learned how to trace transactions.
- Developed **patience and troubleshooting skills** while exploring Web3 tools.

🌟 Learning Outcome

- Gained a solid understanding of **how decentralized systems operate**.
- Experienced **real-time wallet operations**, DApp interaction, and transaction signing.
- Understood the **power of blockchain transparency** and **security principles**.
- This project helped build confidence to explore **advanced Web3 and smart contract projects**.