Name: Vivek Kolla

Blockchain Network: Ethereum Sepolia Testnet

Wallet Used: MetaMask

DApp Used: Uniswap (Testnet)

Block Explorer: Etherscan (Sepolia)

Objective:

The objective of this assignment is to gain a foundational, hands-on understanding of blockchain technology and Web3 concepts by directly interacting with decentralized systems. This includes setting up a crypto wallet, working with an Ethereum test network, acquiring test assets, and executing an on-chain transaction using a decentralized application (DApp).

Through these activities, the goal is to understand how users interact with the blockchain in a real-world scenario, including wallet-based authentication, transaction approval, gas fees, and transaction finality. This experience provides essential context for future work in Web3 development and decentralized application design.

Blockchain Fundamentals:

Blockchain is a distributed ledger technology where data is stored across multiple nodes rather than a central server. Each transaction is cryptographically secured and recorded in blocks, making the system transparent and tamper-resistant.

Consensus Mechanisms

- Proof of Work (PoW): Uses computational power to validate transactions.

- Proof of Stake (PoS): Validators stake tokens to secure the network (used by Ethereum).

Smart Contracts

Smart contracts are self-executing programs deployed on the blockchain. Once deployed, they are immutable and automatically execute when predefined conditions are met. Gas fees are required to pay for computation.

Web2 vs Web3

Web2	Web3
Centralized servers	Decentralized networks
Password-based login	Wallet-based authentication
Platform owns data	User owns assets and identity

Wallet Setup

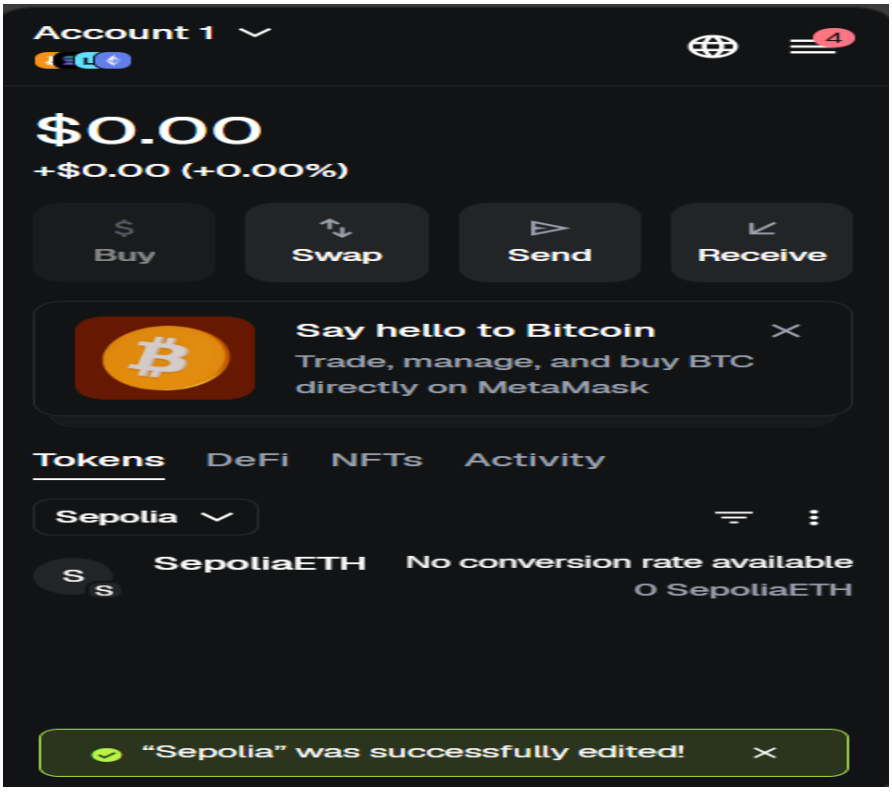
- Installed the MetaMask browser extension from the official website.
- Created a new wallet securely.
- Generated a 12-word Secret Recovery Phrase.

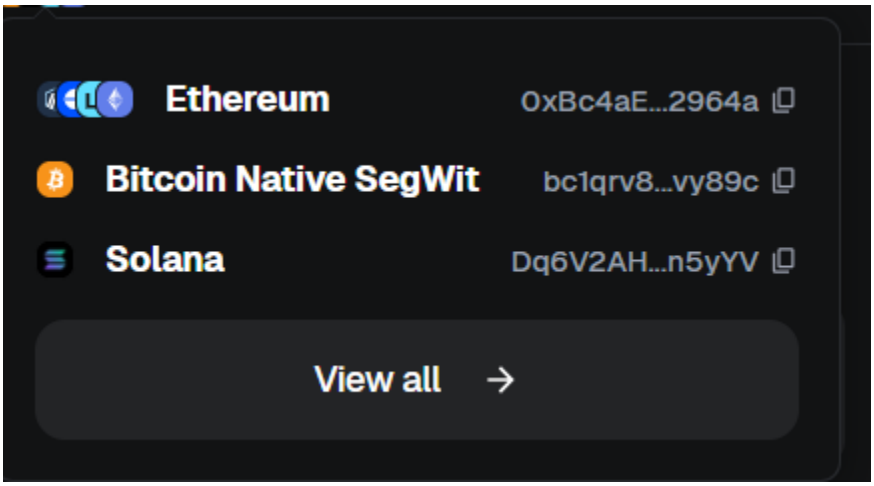
Wallet Security Practices

- The seed phrase was written down offline and stored securely.
- No screenshots or digital storage of the seed phrase.
- Private keys and passwords were never shared.
- Only trusted URLs were used to avoid phishing attacks.

Network Configuration

- Test networks were enabled in MetaMask.
- Wallet was switched to **Ethereum Sepolia Test Network**.





ACQUIRING TESTNET ETH:

Testnet ETH Acquisition

To perform on-chain transactions, testnet ETH was required.

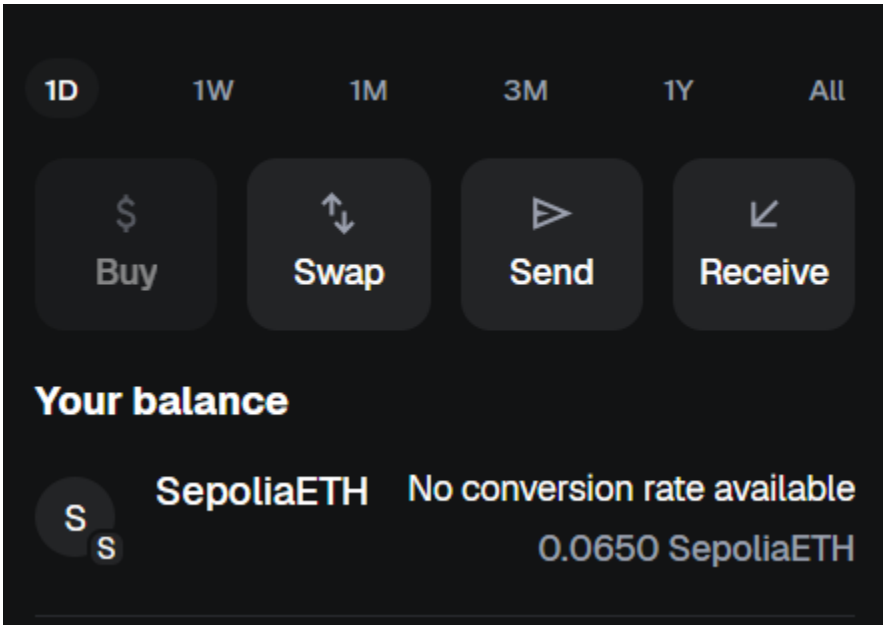
Faucet Usage

- Used a Sepolia testnet faucet.
- Public wallet address was pasted correctly.
- Test ETH was received successfully.

Verification

- Transaction was verified using Sepolia Etherscan.
- Transaction status, block number, and gas fee were reviewed.

📸 **Screenshots:**



Decentralized Application Interaction

DApp Used

- Uniswap (Ethereum Sepolia Testnet)

Steps Performed

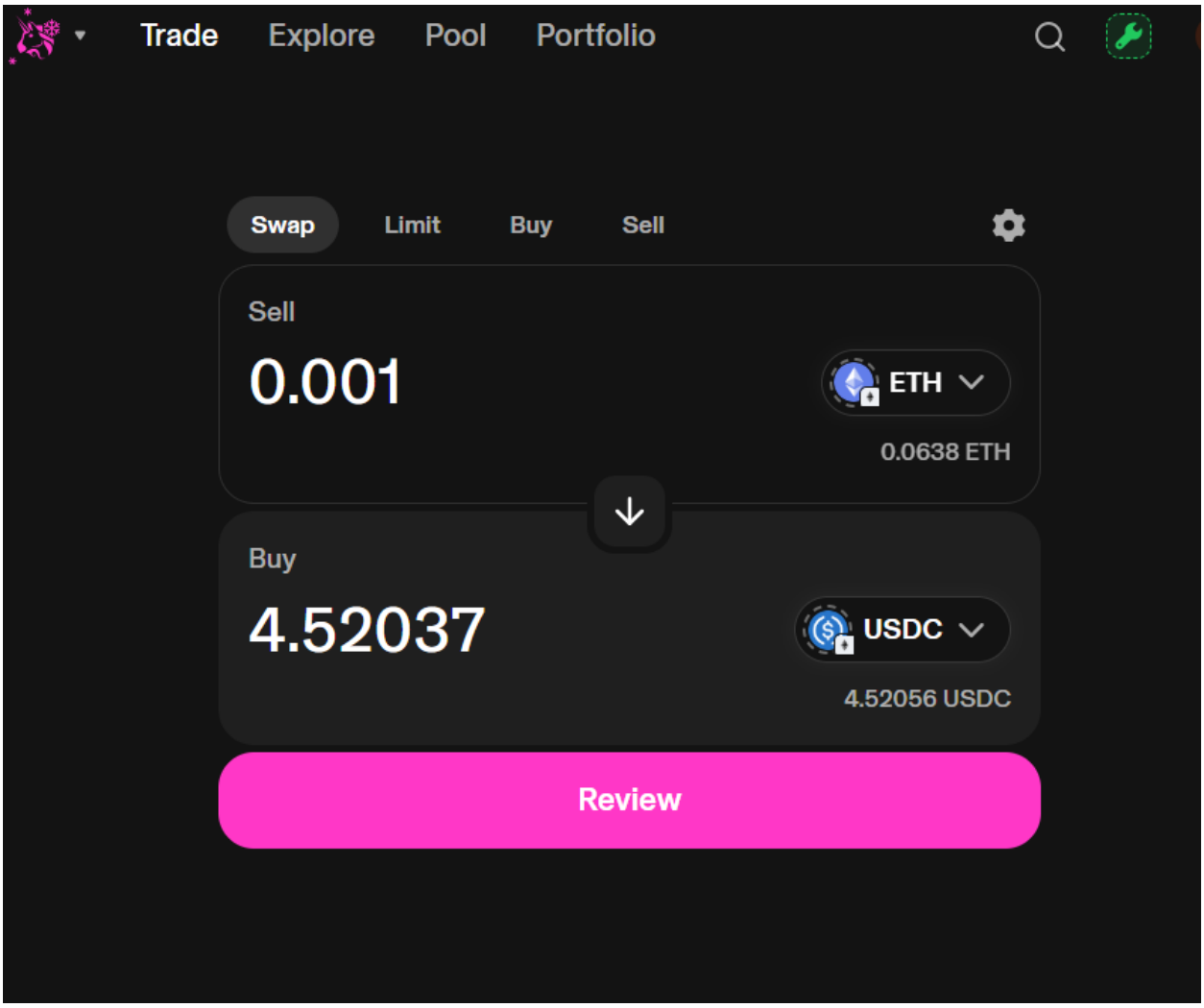
1. Connected MetaMask wallet to the DApp.
2. Approved wallet connection request.
3. Executed a token swap using Sepolia ETH.
4. Approved transaction in MetaMask after reviewing gas fees.

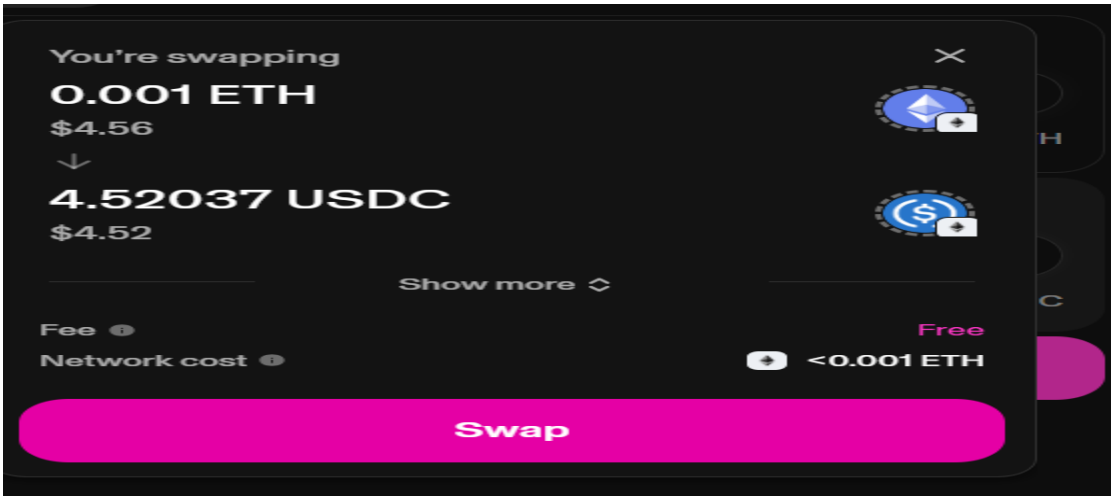
Transaction Lifecycle Observed

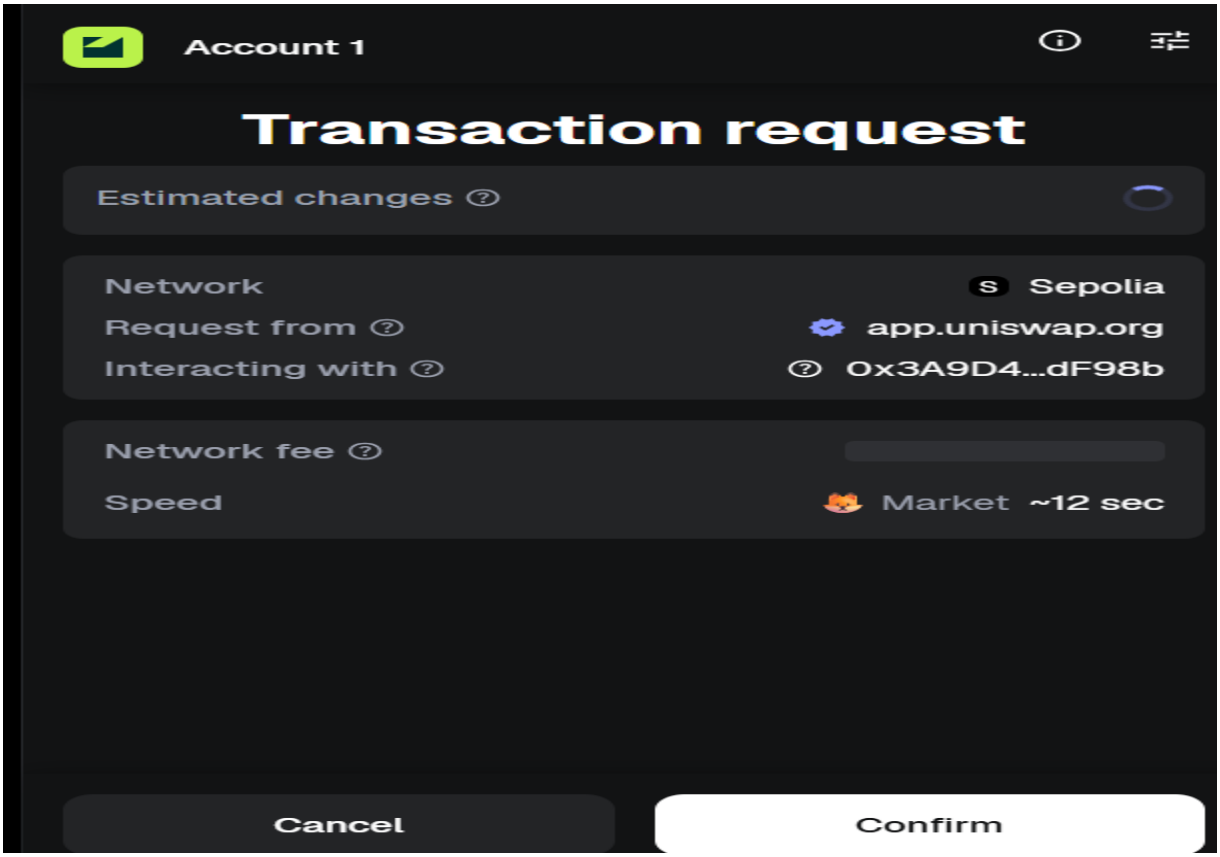
- Wallet approval
- Transaction signing
- Pending state

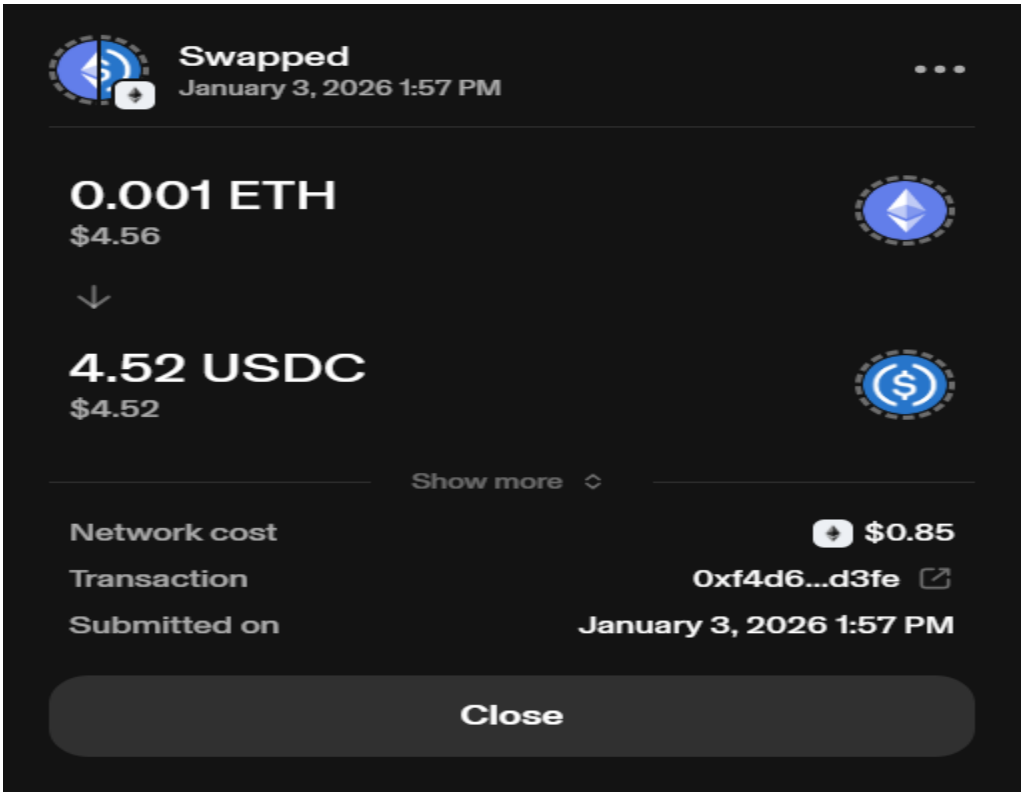
- Block confirmation
- Success status

📸 **Screenshots:**




You're swapping
0.001 ETH
$4.56
4.52037 USDC
$4.52
Show more
Fee
Free
Network cost
<0.001 ETH
Swap


Account 1
Transaction request
Estimated changes
Network
Sepolia
Request from
app.uniswap.org
Interacting with
0x3A9D4...dF98b
Network fee
Speed
Market
~12 sec
Cancel
Confirm



Reflection

This hands-on experience highlighted the fundamental differences between blockchain-based systems and traditional centralized databases. In traditional systems, data and control are managed by a central authority, requiring users to trust the organization. Blockchain replaces this trust with cryptographic verification and distributed consensus.

Smart contracts demonstrated how logic can be enforced without intermediaries. Once deployed, they execute exactly as written, which increases transparency but also requires careful development since mistakes cannot be easily corrected.

Wallet-based authentication replaced traditional usernames and passwords. Instead of logging in, users sign transactions cryptographically, giving them full ownership of assets and identity.

PAGE 8 — REFLECTION (PART 2)

Gas fees provided insight into the cost of decentralization. Every transaction consumes network resources, and users pay directly for execution. Even on testnets, observing gas estimation and transaction delays showed how network congestion affects performance.

Transaction finality was another key learning point. Unlike traditional systems where transactions can often be reversed, blockchain transactions become irreversible once confirmed. This increases trust but also requires users to be careful before approving transactions.

Overall, interacting directly with wallets, faucets, DApps, and block explorers transformed blockchain from an abstract concept into a practical system. This experience built confidence and provided a strong foundation for future Web3 development.

Conclusion

This assignment successfully provided practical exposure to Web3 by:

- Creating and securing a crypto wallet
- Using an Ethereum test network
- Acquiring testnet ETH
- Performing an on-chain transaction
- Verifying transactions via a block explorer

The hands-on approach strengthened understanding of blockchain fundamentals, wallet security, smart contracts, and the user-facing transaction lifecycle. This experience is essential for progressing into decentralized application development.

PAGE 10 — APPENDIX

Appendix

- **Wallet Address (Testnet):** 0xBc4aEa674619E5DA2bf45B32d89dAcDd4B12964a
- **Transaction Hash:** 0xf4d6476ed43d986d87075e46ada66922e899aedb39cb772dbd2322185220d3fe
- **Block Explorer:** https://sepolia.etherscan.io