**Web3 and Blockchain Basics:**

Setup Wallet and Explore DApps by

Satya Bhargavi Talatam (Roll No: 23A91A05D0)

**Partnr Network**

**Web3 and Blockchain Basics: Setup Wallet and Explore DApps**

**Submitted by :** Satya Bhargavi Talatam

**Roll No** : 23A91A05D0

**Course** : B.Tech – Computer Science and Engineering

**Domain** : Blockchain Technology

**Difficulty** : Beginner

**Network :** Sepolia

**Testnet Wallet** : MetaMask

**Dapp :** Uniswap

(**Testnet) Asset** : Test Ether (ETH)

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“Exploring the decentralized future — from wallets to Web3 DApps.”

# Objective & Learning Goals Objective

Develop foundational skills in **blockchain technology** through practical exposure to wallet creation, testnet configuration, and interaction with decentralized applications using MetaMask.

**Learning Goals**

* Understand blockchain fundamentals and decentralization.
* Learn the concept and purpose of crypto wallets.
* Explore testnets and transaction verification using block explorers.
* Gain hands-on exposure to interacting with DApps.
* Develop awareness of wallet security and gas fees.

# Overview of Blockchain

**Blockchain**

1. **Definition:**  
   A distributed digital ledger system that maintains transparent and tamper-proof records of transactions across multiple nodes in a global network.
2. **Structure:**
   * Data stored in blocks linked using cryptographic hashes.
   * Each block contains transactions, timestamp, and previous block hash.
3. **Key Features:**
   * **Decentralized:** No central authority controls it.
   * **Transparent:** All transactions are visible to everyone.
   * **Immutable:** Data once added cannot be changed.
   * **Secure:** Uses encryption and consensus mechanisms.
4. **Consensus Mechanisms:**
   * **Proof of Work (PoW):** Miners solve puzzles to validate blocks (Bitcoin).
   * **Proof of Stake (PoS):** Validators are chosen based on staked tokens (Ethereum 2.0).
5. **Smart Contracts:**
   * Self-executing programs on blockchain.
   * Automatically perform actions when preset conditions are met.
   * Used in DApps, NFTs, and DeFi platforms.

# Overview of Web3

# Definition: The next generation of the internet built on blockchain, enabling users to own data, identity, and assets.

# 1.Web Evolution:

# Web1: Read-only (static sites).

# Web2: Read and write (social media, centralized apps).

# Web3: Read, write, and own (decentralized, blockchain-powered).

# 2.Core Concepts:

# Decentralization: Data spread across multiple nodes.

# User Ownership: Users control assets via crypto wallets.

# Interoperability: DApps can communicate seamlessly.

# Trustless Systems: No need for intermediaries like banks.

# 3.Key Components:

# Crypto Wallets (MetaMask): Store tokens, connect to DApps.

# DApps: Blockchain-based decentralized applications.

# Tokens: Digital currencies (ETH, BTC) and NFTs.

# DAOs: Community-driven organizations run by smart contracts.

# 4.Applications:

# Finance (DeFi): Uniswap, Aave, Compound.

# NFTs & Art: OpenSea, Rarible.

# Gaming: Axie Infinity, Decentraland.

# Storage: IPFS, Filecoin.

# Implementation Steps

**1. Install MetaMask**

Add MetaMask browser extension or mobile app.

Create or import a wallet and securely store your seed phrase.

**2. Connect to a Test Network**

Switch network to **Sepolia** or **Goerli Testnet** in MetaMask.

Add the test network manually if not visible (via Chainlist or MetaMask settings).

**3. Get Testnet Tokens (ETH)**

Visit a **Faucet** (e.g., https://sepoliafaucet.com).

Paste your MetaMask address and claim free test ETH.

**4. Connect Wallet to a DApp**

Go to a DApp like **Uniswap Testnet** or **OpenSea Testnet**.

Click **“Connect Wallet”** and choose **MetaMask**.

Approve the connection in MetaMask popup.

**5. Interact with the DApp**

**Uniswap:** Swap test ETH for test USDC/DAI.

**OpenSea:** Browse NFT collections or try minting/listing test NFTs.

Confirm wallet prompts for approval and gas estimation.

**6. Observe the Transaction Process**

MetaMask shows **transaction fee (gas)** and total value.

Click **Confirm** to submit the transaction.

Wait for confirmation (pending → success).

**7. Verify on Etherscan**

Copy your transaction hash.

Paste it on [**https://sepolia.etherscan.io**](https://sepolia.etherscan.io).

Review on-chain details: sender, receiver, value, gas, and contract info.

**Written Reflection**

Through this project, I gained a strong foundational understanding of blockchain technology and its real-world applications. The most important concept I learned is that blockchain is a decentralized digital ledger that stores transactions securely across a global network of computers. Each block contains verified data, and once recorded, the information cannot be altered — ensuring transparency, trust, and security without needing a central authority.

I also explored the differences between centralized and decentralized applications. Centralized applications rely on a single governing entity to control user data, making them faster but more vulnerable to failures or data breaches. In contrast, decentralized applications (DApps) run on blockchain networks where control is distributed among participants. This gives users greater ownership and security over their data and assets. The DApp I used, Uniswap, demonstrated how decentralized exchanges allow peer-to-peer token swaps without intermediaries.

Another key takeaway from this experience was understanding smart contracts. Smart contracts are self-executing programs stored on the blockchain that automatically perform transactions when predefined conditions are met. They eliminate the need for third parties, reduce human error, and ensure trust between users. Interacting with a DApp helped me see how these contracts power operations like token swaps and liquidity pools.

Security was another important aspect I learned. Using crypto wallets such as MetaMask taught me the importance of protecting private keys and seed phrases. Since blockchain transactions are irreversible, any loss of keys can result in the permanent loss of funds. I also learned how gas fees are used to process transactions and how they vary based on network traffic and computational demand.

While completing the task, I faced a few challenges — particularly in connecting MetaMask to the Sepolia testnet and obtaining test Ether due to faucet delays. I resolved these issues by reloading the faucet, checking network settings, and reconnecting my wallet. Once configured, the transaction on Uniswap was completed successfully and verified on Etherscan.

Overall, this hands-on experience deepened my understanding of Web3 concepts and gave me confidence in interacting with blockchain technologies. It also helped me appreciate the shift from traditional centralized systems to decentralized ecosystems that empower users with transparency, security, and control.

# Key Links & Repository Structure

## Public Wallet Address:

0xab16108855e5698533a3d7b43cda8b98e7ddd9d6

## Transaction Hash:

## 0x519ea3c0a67779451b5edffb0041da3c3faa60b15454da2726bcd3e325b96ca9

## Etherscan Link:

<https://sepolia.etherscan.io/>

## Faucet Used:

Google Cloud Etherum sepolia faucet

## Repository Structure:

**Folder / File Description**

MetaMask, faucet, DApp,

/screenshots

And transaction screenshots

/reflection 300–500 word reflection 23A91A05D0\_Web3\_Basics.pdf Final report file

# Screenshots Section

* MetaMask installation success.
* Sepolia network configuration.
* Faucet transaction confirmation.
* Uniswap DApp connection and swap.
* Transaction verified on Etherscan.

LINK:-

[**Web3-and-Blockchain-Basics-23A91A05D0**](https://github.com/Bhargavitalatam/Web3-and-Blockchain-Basics-23A91A05D0/tree/main)/**Screenshots**/

| Aspect | Details |
| --- | --- |
| Network Used | Sepolia Testnet |
| Wallet | MetaMask |
| DApp Used | Google Cloud Ethereum Faucet |
| Type of Transaction | Testnet Token Request (Faucet → Wallet) |
| Faucet Used | Google Cloud Ethereum Sepolia Faucet |
| Transaction Hash | 0x519ea3c0a67779451b5edffb0041da3c3faa60b15454da2726bcd3e325b96ca9 |
| Block Explorer | [Sepolia Etherscan](https://sepolia.etherscan.io/) |
| Errors Encountered | “Not Enough ETH” message while trying Uniswap token swap |
| Troubleshooting Outcome | Requested test ETH again via Google Cloud Faucet, confirmed receipt on Etherscan |
| Final Status | Successful wallet setup and verified DApp interaction |

# Technical Summary

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# Conclusion & Acknowledgment

**Conclusion**

Through this activity, I gained a foundational understanding of blockchain, Web3 concepts, and decentralized applications. By setting up a MetaMask wallet, connecting to the Sepolia test network, and interacting with the Google Cloud Faucet DApp, I successfully performed a blockchain transaction and verified it using Sepolia Etherscan. This helped me understand how wallets, transactions, and block explorers work in a decentralized ecosystem.

**Acknowledgment**

I would like to express my sincere gratitude to the mentors and coordinators of this program for providing this practical learning opportunity. The blockchain hands-on task helped me explore real-world applications of Web3 technology and gain valuable technical exposure.