Questions Based on Assignments :

Assignment C-1 : Installation of MetaMask and study spending Ether per transaction

1. **What is Blockchain**
   Blockchain is a decentralized, digital ledger technology that records transactions across multiple computers, ensuring transparency and security without a central authority.

2. **What is Cryptocurrency?**
   Cryptocurrency is a digital or virtual currency that uses cryptography for security, operates on blockchain technology, and enables peer-to-peer transactions without intermediaries, such as Bitcoin or Ethereum.

3. **What are Transaction Wallets?**
   Transaction wallets are digital wallets that store cryptocurrencies and allow users to send, receive, and manage their digital assets securely. Examples include MetaMask and Trust Wallet.

4. **What is an Ether Transaction?**
   An Ether transaction involves transferring Ether (ETH), the native currency of the Ethereum blockchain, between wallets. Transactions are recorded on the blockchain and require a small transaction fee.

5. **Installation Process of MetaMask**

- Step 1: Go to the MetaMask website or browser extension store.

- Step 2: Download and install MetaMask for your browser or mobile device.

- Step 3: Create a new wallet, set up a strong password, and securely store your backup phrase.

- Step 4: Once set up, MetaMask is ready to manage Ether and other Ethereum-based assets.

6. **What Are the Different Types of Blockchain Technology?**
   - **Public Blockchain:** Open to everyone (e.g., Bitcoin, Ethereum).
   - **Private Blockchain:** Restricted access for specific users.
   - **Consortium Blockchain:** Controlled by a group of organizations.

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- **Hybrid Blockchain:** Combines public and private features for flexibility.

7. **What Are the Key Features/Properties of Blockchain?**
   - **Decentralization:** No central authority; data is spread across nodes.
   - **Transparency:** Transactions are visible to all participants.
   - **Immutability:** Data cannot be altered once added to the blockchain.
   - **Security:** Cryptographic techniques secure data and transactions.

8. **What is the Difference Between Ethereum and Bitcoin?**
   - **Bitcoin:** Primarily a digital currency for secure payments.
   - **Ethereum:** A platform for creating decentralized applications (dApps) with smart contract functionality, in addition to its currency, Ether.

9. **What are Merkle Trees? Explain Their Concept.**
   Merkle Trees are a data structure used in blockchain to efficiently and securely verify transactions. They organize transaction data into a tree structure, where each leaf node is hashed, and hashes are combined up to form a single root hash, providing an easy way to verify data integrity.

10. **Give Real-Life Use Cases of Blockchain.**
    - **Finance:** Cross-border payments and decentralized finance (DeFi).
    - **Supply Chain:** Tracking goods from production to delivery.
    - **Healthcare:** Secure storage and sharing of patient records.
    - **Voting Systems:** Transparent and tamper-proof voting records.
    - **Digital Identity:** Managing digital identities and preventing fraud.

Assignment C-2 : Create your own wallet using Metamask.

1. **What is Bitcoin?**
   Bitcoin is a decentralized digital currency created in 2009 by an anonymous person or group known as Satoshi Nakamoto. It operates on blockchain technology, allowing peer-to-peer transactions without the need for intermediaries like banks.

2. **What Are the Biggest Four Common Cryptocurrency Scams?**

Phishing Scams: Fake websites or emails trick users into revealing private keys.
Ponzi Schemes: Fraudulent investment schemes promising high returns.
Fake ICOs (Initial Coin Offerings): Scammers create fake tokens or projects to get investors' funds.
Rug Pulls: Developers abandon a project suddenly, taking investors' money.

3. **Explain How Safe Are Money E-Transfers?**
Money e-transfers can be safe when using secure networks and reputable services. Encryption and authentication protocols make them secure, but users should be cautious of phishing, hacking, or unauthorized access.

4. **What is Cryptojacking and How Does It Work?**
Cryptojacking is unauthorized use of someone's computer or device to mine cryptocurrency. Attackers install malware or use malicious scripts on websites to hijack device resources, slowing down systems and potentially causing damage.

Assignment C-3 : : Write a smart contract on a test network, for Bank account

1. **What is a Smart Contract?**
A smart contract is a self-executing contract with code that runs on a blockchain. It automatically enforces terms and conditions agreed upon by all parties**.**

2. **What is a Test Network?**
A test network (testnet) is a blockchain network used for testing smart contracts and applications without real currency. Examples include Ropsten and Goerli for Ethereum.

3. **What is MetaMask, and why is it used?**
MetaMask is a browser extension and wallet that allows users to manage and interact with Ethereum-based assets and decentralized applications (dApps). It's used to deploy and test smart contracts on test networks.

4. **Explain the Role of MetaMask in Smart Contract Deployment.**
MetaMask connects to Ethereum networks and provides an account to sign and send transactions, allowing users to deploy and test smart contracts.

5. **How Do You Deploy a Smart Contract on a Test Network?**
   - Write the smart contract code.
   - Use Remix (online IDE) to compile the code.
   - Connect MetaMask to Remix and choose a test network.
   - Deploy the contract using MetaMask to sign and send the transaction.

6. **Explain the Deposit Operation in the Bank Account Smart Contract.**
   The deposit function allows a user to send a specific amount of cryptocurrency to their account balance within the smart contract.

7. **Explain the Withdraw Operation in the Bank Account Smart Contract.**
   The withdraw function enables a user to take money out of their account balance, provided they have sufficient funds available.

8. **How Does the Show Balance Operation Work in the Smart Contract?**
   The show balance function returns the current balance of a user's account, showing how much cryptocurrency they have deposited in the contract.

9. **What Is the Objective of Using MetaMask and Test Network in This Assignment?**
   The objective is to teach students how to interact with Ethereum networks and deploy smart contracts, gaining practical experience in blockchain technology and its applications.

10. **What Are the Key Advantages of Using Smart Contracts for Banking Operations?**
    - Transparency: All operations are recorded on the blockchain.
    - Security: Transactions are encrypted and tamper-proof
    - Automation: Smart contracts self-execute based on coded conditions.

11. **How Do You Test and Verify the Smart Contract?**
    Use a test network to run transactions (deposit, withdraw, balance check) and confirm they work as expected. Errors or bugs can be fixed and retested

12. **What Are Gas Fees, and Why Are They Relevant in Smart Contracts?**
Gas fees are the transaction costs required to run a smart contract on the blockchain. They're necessary for processing and securing transactions but are lower on test networks.

Assignment C-4 : Solidity

1. **What is Solidity?**
Solidity is a high-level programming language designed for writing smart contracts on the Ethereum blockchain, enabling developers to create decentralized applications.

2. **What is a Smart Contract?**
A smart contract is a self-executing contract with terms directly written into code, running on a blockchain, which automatically enforces the agreed-upon conditions

3. **What is the Purpose of Creating Student Data in a Smart Contract?**
The purpose is to store and manage student information securely on the blockchain, allowing for transparent and tamper-proof records.

4. **What are Structures in Solidity?**
Structures (structs) are user-defined data types that allow developers to group related variables together, such as a student's name, age, and grade.

5. **What are Arrays in Solidity?**
Arrays are data structures that can store multiple values of the same type, allowing for easy access and manipulation of collections of data, like a list of students.

6. **What is the Fallback Function in Solidity?**
The fallback function is a default function that is called when a smart contract is sent Ether without data or when no other function matches the call, allowing the contract to handle unexpected transactions