GANACHE TRANSACTIONS

Blockchain Technology

Time: 60 mins

Introduction

In this class, the student/s will learn to send and receive amounts via digital wallet and display the transaction history in the wallet.

New Commands Introduced

● sign_transaction(transaction, privateKey)	Creates a signed transaction using the private key
● send_raw_transaction(signedTransaction)	Sends the raw transaction and returns the transaction has.
● get_balance(address)	Fetches the balance of the address specified from the network
● from_wei(balance, 'ether')	Converts the balance into Ether

Vocabulary

- **Signed Transaction** uses the private key to sign the digital transaction and verify the user's impressions of the transaction.
- **Wallet Balance** represents the total value of the cryptocurrency held in a user's futures wallet.
- **Transaction History** is the list of all the prior transactions that happened through the account.
- **Wei** is the smallest denomination of ether—the cryptocurrency coin used on the Ethereum network.

Learning Objectives

Student/s should be able to:

- ***Explore*** the different transactions between the ganache accounts on the ganache server.
- ***Create*** a transaction using the ganache server and update the balance on the wallet.
- ***Implement*** *a new feature to display the transaction history sorted by time in the wallet.*

Activities

1. **Class Narrative:** *(2 mins)*

- Brief the student/s that Jack wants to add the functionality to send or receive money from the wallet and display the updated balance and transaction history.
- Explain that Jack must implement and test the functionality on the local Ganache server before putting it on the main wallet.

2. **Concept Introduction Activity:** *(5 mins)*
    - Let the student/s undertake the explore-activity to observe that the transaction requires a sender address, a receiver address and the amount of the transaction.
    - The updated balance should be displayed on the wallet after each transaction.
    - All the transactions executed for the account should display under the transaction history.

3. **Activity 1: Make a Transaction***(20 min)*

    Teacher Activity: *(10 mins)*

- Let students observe that there are two types of transactions, one in which sender is a Ganache test account and other in which sender is the newly created account through the wallet.
- Demonstrate how to create a transaction when the sender logins through the Ganache test account.

Student Activity: *(10 mins)*

- Guide the student/s to complete the methods to create the transaction when the sender logins through the wallet account.
- Execute a few transactions to receive money from Ganache test accounts and send to other Ganache test accounts.

4. **Activity 2: Update the Balance** *(10 min)*

    Student Activity: *(10 mins)*

- Make student(s) observe that the wallet balance is not getting updated.
- Explain how to fetch the account balance from the server to keep it updated..
- Guide the student/s to fetch the balance from the server for the account linked with the wallet.

5. **Activity 3: Display the Transactions***(15 mins)*

    Teacher Activity: *(8 mins)*

- Explain that the transaction hash of every new transaction must be saved on the server.

- All the transactions must be fetched from the server and displayed in the decreasing order of time.
- Demonstrate how to add the transaction hash to the server for every new transaction.

  Student Activity: *(7 mins)*

- Guide the students to fetch all the transactions for the specified account, sort it and display it in the wallet.

6. **Introduce the Post class project:** *(2 min)*
   - Encourage students to build the functionality in the wallet to refund a payment.

7. **Test and Summarize the class learnings:** *(5 mins)*
   - Check for understanding through quizzes and summarize learning after respective activities.
   - Summarize the overall class learning towards the end of the class.
8. **Additional activities:**
   - Encourage the student/s to display all the ganache accounts and their balance in the wallet.
   - Encourage the student/s to display transactions of all the ganache accounts in the transaction history.

9. **State the Next Class Objective:** *(1 min)*
   - In the next classes, you will learn to store the account addresses securely on the firebase.

U.S. Standards:

CSTA: 2-AP-11, 2-AP-12, 2-AP-13, 2-AP-14, 2-AP-19

Links Table		
Activity	**Activity Name**	**Link**
Class Presentation	Ganache Transactions	https://s3-whjr-curriculum-uploads.whjr.online/584c24d5-cd00-4a88-a481-fe91dbbe1a48.html
Explore Activity	Ganache Transactions	https://github.com/Tynker-Blockchain/TNK-M13-C98-SAS-BP

Teacher Activity 1	Make a Transaction	https://github.com/Tynker-Blockchain/TNK-M13-C98-TAS-BP
Teacher Reference: Teacher Activity 1 Solution	Make a Transaction	https://github.com/Tynker-Blockchain/TNK-M13-C98-TAS
Student Activity 1	Make a Transaction	https://github.com/Tynker-Blockchain/TNK-M13-C98-SAS-BP
Teacher Reference: Student Activity 1 Solution	Make a Transaction	https://github.com/Tynker-Blockchain/TNK-M13-C98-SAS
Student Activity 2	Update the Balance	https://github.com/Tynker-Blockchain/TNK-M13-C98-SAS-BP
Teacher Reference: Student Activity 2 Solution	Update the Balance	https://github.com/Tynker-Blockchain/TNK-M13-C98-SAS
Teacher Activity 3	Display the Transactions	https://github.com/Tynker-Blockchain/TNK-M13-C98-TAS-BP
Teacher Reference: Teacher Activity 3 Solution	Display the Transactions	https://github.com/Tynker-Blockchain/TNK-M13-C98-TAS
Student Activity 3	Display the Transactions	https://github.com/Tynker-Blockchain/TNK-M13-C98-SAS-BP
Teacher Reference: Student Activity 3 Solution	Display the Transactions	https://github.com/Tynker-Blockchain/TNK-M13-C98-SAS
Student's Additional Activity 1	Display all the Accounts	https://github.com/Tynker-Blockchain/TNK-M13-C98-SAS-BP
Teacher Reference: Student's Additional Activity 1 Solution	Display all the Accounts	https://github.com/Tynker-Blockchain/TNK-M13-C98-SAS
Student's Additional Activity 2	Display all the Transactions	https://github.com/Tynker-Blockchain/TNK-M13-C98-SAS-BP
Teacher Reference: Student's Additional Activity 2 Solution	Display all the Transactions	https://github.com/Tynker-Blockchain/TNK-M13-C98-SAS
Post Class Project	Refund Payment	https://github.com/Tynker-Blockchain/TNK-M13-C98-PCP-BP
Teacher Reference: Post Class Project Solution	Refund Payment	https://github.com/Tynker-Blockchain/TNK-M13-C98-PCP