

ARTGUARD- ETHEREUM TRANSACTIONS

BLOCKCHAIN DEVELOPMENT

Time: 60 mins

Introduction

In this class, the student/s will be able to add multiple transactions for a single block.

New Commands Introduced

- `time()`
Time function returns the number of seconds passed since epoch.
- `__init__()`
Python `__init__()` constructor is a constructor in object oriented approach. This function is called every time an object is created from a class.
- `self`
A default parameter, named 'self' is always passed in its argument. This self represents the object of the class itself.

Vocabulary

- **Transaction:** A transaction is a transfer or exchange of assets between two or more parties. A blockchain transaction is nothing but data transfer across the network of computers in a blockchain.
- **Art:** The activity or skill of producing things such as paintings, designs, etc.

Learning Objectives

Student/s should be able to:

- **Recall** how to fetch live block and transaction data from ethereum network using Web3 libraries.
- **Explain** how multiple transactions can be stored in a single block.
- **Demonstrate** by creating a block with multiple transactions and adding it to the blockchain.

Activities

1. Class Narrative: (2 mins)

- Brief the student/s about the issue of selling duplicate art to consumers and hence Jack thinks of building a blockchain technology to buy genuine art.

2. Concept Introduction Activity: (5 mins)

- Let the student/s play the explore-activity to observe .
- Explain the need of using blockchain for art verification systems .
- Using the slides, explain that the student/s will learn:
 - to fetch the block data
 - to fetch transaction data
 - To add multiple transactions to the block

3. Activity 1: Fetch the Block Data (14 mins)

Teacher Activity: (7 mins)

- Explain how to choose a live block number from the Etherscan portal and fetch its data using Web3 libraries and API.
- Explain Web3 and Infura platform.
- Demonstrate by fetching live data and storing it in a Dictionary object.

Student Activity: (7 mins)

- Guide the student/s to fetch data of a live block in an Ethereum network.

4. Activity 2: Fetch the Transaction Data (12 mins)

Student Activity: (12 mins)

- Guide the student/s to create an empty transactions array.
- Guide the student/s to store the data of first 10 transactions fetched using API in the transactions array and display them on the UI.

5. Activity 3: Stage 1: Add Multiple Transaction to the Block (12 mins)

Teacher Activity: (6 mins)

- Explain to the student/s the need to add multiple transactions in a block before adding to the blockchain.
- Demonstrate how to add multiple transactions to the same block until the limit is reached. and
- Demonstrate how to add the block to the blockchain once the transaction limit is reached and the block status is ready.

Student Activity: (6 mins)

- Guide the students to update the code to add multiple transactions to a block and add it to the blockchain when its status is ready.

6. Test and Summarize the class learnings: (5 mins)

- Check for understanding through quizzes and summarize learning after respective missions.
- Summarize the overall class learning towards the end of the class.

7. Additional activities:

- Encourage the student/s to fetch additional details for the block and display it on the UI.
- Encourage the student/s to increase the limit for adding the number of transactions to the block.

8. State the Next Class Objective: (1 min)

- In the next class, student/s will learn to compute the transaction fee basis the speed of the transaction.

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	Artguard- Ethereum Transactions	https://s3-whjr-curriculum-uploads.whjr.online/a370d1ab-7ea1-493d-bf9f-0974c8774709.html
Explore Activity	Artguard- Ethereum Transactions	https://github.com/Tynker-Blockchain/TNK-M12-C89-SAS-BP
Teacher Activity 1	Fetch the Block Data	https://github.com/Tynker-Blockchain/TNK-M12-C89-TAS-BP
Teacher Reference: Teacher Activity 1 Solution	Fetch the Block Data	https://github.com/Tynker-Blockchain/TNK-M12-C89-TAS
Student Activity 1	Fetch the Block Data	https://github.com/Tynker-Blockchain/TNK-M12-C89-SAS-BP
Teacher Reference: Student Activity 1 Solution	Fetch the Block Data	https://github.com/Tynker-Blockchain/TNK-M12-C89-SAS

Teacher Activity 2	Fetch Transactions Data	https://github.com/Tynker-Blockchain/TNK-M12-C89-TAS-BP
Teacher Reference: Teacher Activity 2 Solution	Fetch Transactions Data	https://github.com/Tynker-Blockchain/TNK-M12-C89-TAS
Student Activity 2	Fetch Transactions Data	https://github.com/Tynker-Blockchain/TNK-M12-C89-SAS-BP
Teacher Reference: Student Activity 2 Solution	Fetch Transactions Data	https://github.com/Tynker-Blockchain/TNK-M12-C89-SAS
Teacher Activity 3	Stage 1: Add Multiple Transactions to the Block	https://github.com/Tynker-Blockchain/TNK-M12-C89-TAS-BP
Teacher Reference: Teacher Activity 3 Solution	Stage 1: Add Multiple Transactions to the Block	https://github.com/Tynker-Blockchain/TNK-M12-C89-TAS
Student Activity 3	Stage 1: Add Multiple Transactions to the Block	https://github.com/Tynker-Blockchain/TNK-M12-C89-SAS-BP
Teacher Reference: Student Activity 3 Solution	Stage 1: Add Multiple Transactions to the Block	https://github.com/Tynker-Blockchain/TNK-M12-C89-SAS
Student's Additional Activity 1	Fetch Additional Details	https://github.com/Tynker-Blockchain/TNK-M12-C89-SAS-BP
Teacher Reference: Student's Additional Activity 1 Solution	Fetch Additional Details	https://github.com/Tynker-Blockchain/TNK-M12-C89-SAS
Student's Additional Activity 2	Change Transaction Limit	https://github.com/Tynker-Blockchain/TNK-M12-C89-SAS-BP
Teacher Reference: Student's Additional Activity 2 Solution	Change Transaction Limit	https://github.com/Tynker-Blockchain/TNK-M12-C89-SAS
Post Class Project	Real Estate Tracker System	https://github.com/Tynker-Blockchain/TNK-M11-C89-PCP-BP
Teacher Reference: Post Class Project Solution	Real Estate Tracker System	https://github.com/Tynker-Blockchain/TNK-M11-C89-PCP