BLOCKCHAIN ATTRIBUTES

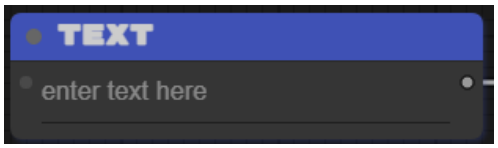
Create Secured Transaction

Time: 60 mins

Introduction

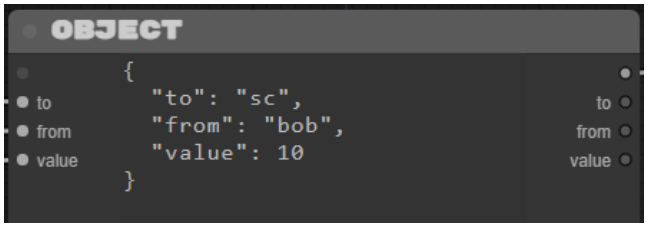
In this class, the student/s will be introduced to different attributes of Blockchain while exploring real-time blocks and transactions. Students will build and simulate their own secured transaction system on a sandbox.

New Blocks Introduced

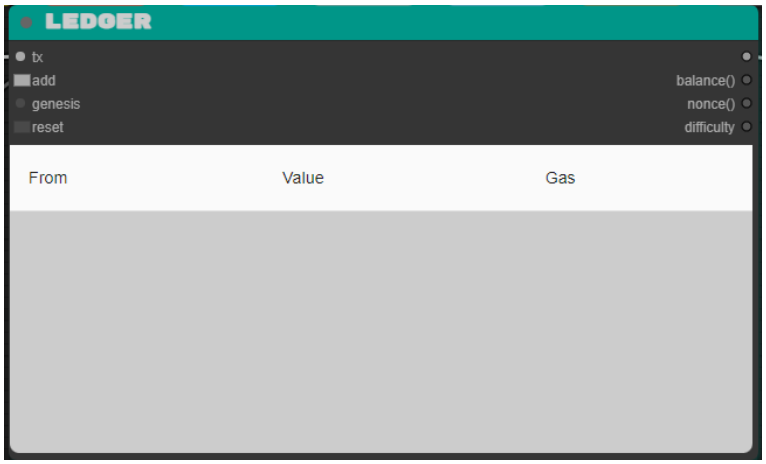


It is used to give a text value input.

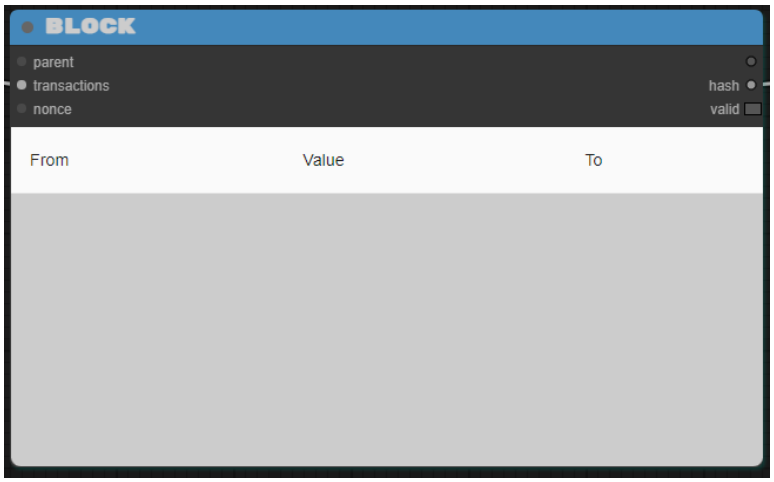
It is used to trigger an action on a mouse click.



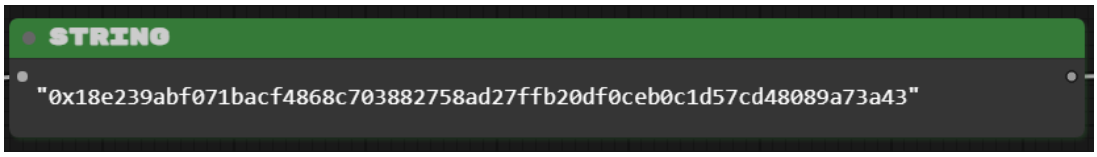
It is used to create an object to store the details of the transaction in blockchain technology.



A ledger keeps track of everyone's balance and new transactions are added to it.



It is used to create a new block in blockchain technology. It can store multiple transactions.



It is used to return a string e.g. a hash code or a password.

It is used to generate a scannable QR code from a string.

Vocabulary

- Gas is the fee required to successfully conduct a transaction or execute a contract on the Ethereum blockchain platform
- Transaction is an exchange of data/assets between two parties across the network of computers in a blockchain system.
- Ethereum network is a decentralized blockchain platform that establishes a peer-to-peer network that securely executes and verifies application code.
- Etherscan is a blockchain explorer for the Ethereum network.

- Ether is the transactional token that facilitates operations on the Ethereum network.
- Base fee is the minimum amount of gas required to include a transaction on the Ethereum blockchain.
- Nonce is a random 32-bit number that miners use as a base for their hash calculations
- Burnt Fee is a portion of the transaction amount destroyed during the transaction in the blockchain system.
- GWEI is a denomination of the cryptocurrency ether (ETH), the digital coin used on the Ethereum network.

Learning Objectives

Student/s should be able to:

- ***Explore*** how a transaction works in a blockchain.
- ***Explain*** different attributes of the transaction.
- ***Create*** your own block and add multiple transactions in a block.

Activities

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

    - Brief the student/s that the Mayor is impressed with Jack's project to share information securely and wants him to build a secure transaction system for transferring money.

2. **Concept Introduction Activity:** *(5 mins)*

    - Let the student/s play the explore-activity to observe.
    - Explain the need to create an object for each transaction and highlight the multiple transactions within the same block.
    - Introduce Ethereum which can process and store blocks of financial transactions.

3. **Activity 1: Observe the Block Attributes** *(10 min)*

    Teacher Activity: *(5 mins)*

    - Demonstrate the example of money transfer to highlight how it is not reliable, insecure and explain how blockchain technology can solve these problems using decentralized apps.
    - Introduce the Etherscan platform and explain the different attributes of the transaction by comparing it with real-life applications.

    Student Activity: *(5 mins)*

    - Guide the student/s to explore the Etherscan platform and observe the different attributes of a transaction.

4. **Activity 2: Store the Transactions** *(20 min)*

Teacher Activity: *(10 mins)*

- Recall the sandbox platform and its features.
- Demonstrate how to create a block and add multiple transactions to the block.

Student Activity: *(10 mins)*

- Guide the student/s to create their own block and add a few transactions to it.
- Ask the student/s to test the flow and verify.

5. **Activity 3: Explore Real-time Blockchain** *(10 mins)*

Teacher Activity: *(5 mins)*

- Open to the Daily blockchain website to visualize bitcoin transactions.
    - Green = input
    - Red = output
    - Yellow = input+output
    - Blue = transaction
- Open to Globe simulation to see real-time transactions happening around the globe and click on a block to see the last transaction details.

Student Activity: *(5 mins)*

- Guide the students to explore different real-time blockchain tracking and simulation of transactions happening around the globe.

6. **Introduce the Post class project:** *(2 min)*

- Load the project and demonstrate how to create multiple blocks of transactions and show their Hash QR Code.

7. **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.

8. **Additional activities:**

- Encourage the student/s to fetch live block data in the sandbox.
- Encourage the student/s to generate a hash QR code for their block.

9. **State the Next Class Objective:** *(1 min)*

    - In the next class, student/s will learn to use the blockchain technology to verify and trace the transactions.

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	Blockchain Attributes	https://s3-whjr-curriculum-uploads.whjr.online/68a46843-fd41-4662-9a6e-a157efc54d6f.html
Explore Activity	Blockchain Attributes	https://github.com/Tynker-Blockchain/TNK-M11-PRO-C85-SAS-BP
Teacher Activity 1	Observe the Block Attributes	https://github.com/Tynker-Blockchain/TNK-M11-PRO-C85-TAS-BP
Teacher Reference: Teacher Activity 1 Solution	Observe the Block Attributes	https://github.com/Tynker-Blockchain/TNK-M11-PRO-C85-TAS
Student Activity 1	Observe the Block Attributes	https://github.com/Tynker-Blockchain/TNK-M11-PRO-C85-SAS-BP
Teacher Reference: Student Activity 1 Solution	Observe the Block Attributes	https://github.com/Tynker-Blockchain/TNK-M11-PRO-C85-SAS
Teacher Activity 2	Store the Transactions (Activity On Sandbox)	https://github.com/Tynker-Blockchain/TNK-M11-PRO-C85-TAS-BP
Teacher Reference: Teacher Activity 2 Solution	Store the Transactions (Activity On Sandbox)	https://github.com/Tynker-Blockchain/TNK-M11-PRO-C85-TAS
Student Activity 2	Store the Transactions (Activity On Sandbox)	https://github.com/Tynker-Blockchain/TNK-M11-PRO-C85-SAS-BP
Teacher Reference: Student Activity 2 Solution	Store the Transactions (Activity On Sandbox)	https://github.com/Tynker-Blockchain/TNK-M11-PRO-C85-SAS
Teacher Activity 3	Explore Realtime Blockchain	https://github.com/Tynker-Blockchain/TNK-M11-PRO-C85-TAS-BP
Teacher Reference: Teacher Activity 3 Solution	Explore Realtime Blockchain	https://github.com/Tynker-Blockchain/TNK-M11-PRO-C85-TAS
Student Activity 3	Explore Realtime Blockchain	https://github.com/Tynker-Blockchain/TNK-M11-PRO-C85-SAS-BP

Teacher Reference: Student Activity 3 Solution	Explore Realtime Blockchain	https://github.com/Tynker-Blockchain/TNK-M11-PRO-C85-SAS-BP
Student's Additional Activity 1	Fetch Live Block Data	https://github.com/Tynker-Blockchain/TNK-M11-PRO-C85-SAS-BP
Teacher Reference: Student's Additional Activity 1 Solution	Fetch Live Block Data	https://github.com/Tynker-Blockchain/TNK-M11-PRO-C85-SAS
Student's Additional Activity 2	Display Hash in QR Code	https://github.com/Tynker-Blockchain/TNK-M11-PRO-C85-SAS-BP
Teacher Reference: Student's Additional Activity 2 Solution	Display Hash in QR Code	https://github.com/Tynker-Blockchain/TNK-M11-PRO-C85-SAS
Post Class Project	Create Multiple Blocks	https://github.com/Tynker-Blockchain/TNK-M11-PRO-C85-PCP-BP
Teacher Reference: Post Class Project Solution	Create Multiple Blocks	https://github.com/Tynker-Blockchain/TNK-M11-PRO-C85-PCP