Block Validation

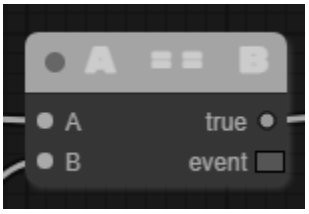
Blockchain Development

Time: 60 mins

Introduction

In this class, the student/s will validate the block and its data on terminal and sandbox and highlight the invalid blocks.

New Commands Introduced



Returns true if value of both variables is same; else returns false

Returns true or false depending on the condition

Vocabulary

- **Block Validation:** A process that helps to ensure the security and accuracy of transactions.
- **Genesis block:** The genesis block is the initial and foundational block of a blockchain network.
- **Ledger:** Virtual record-keeping system that tracks transactions and state, allowing developers to test and experiment without affecting the real production environment.
- **Transaction:** A simulated or test interaction that represents a specific action or operation within the system, helping developers to experiment and verify processes without affecting the actual production data.

Learning Objectives

Student/s should be able to:

- ***Recall*** how block data is hashed and distinguished as valid or invalid.
- ***Explain*** how to validate a block on a sandbox.
- ***Demonstrate*** how to highlight invalid blocks.

Activities

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

    - Brief the student/s that the validation of block is done to represent valid and invalid blocks in the chain.

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

    - Let the student/s play the explore-activity to observe .
    - Explain the need of validation in blockchain and introduce the process of validation.
    - Using the slides, explain that the student/s will learn:
        - to validate the block and its data.
        - Validate the new block added to genesis block
        - to highlight the invalid block.

3. **Activity 1: Validate the Block on Terminal** *(14 mins)*

    Teacher Activity: *(7 mins)*

    - Explain how we validate the block.
    - Explain how to perform validation by checking if the current hash value of the previous block matches the previous hash value of the current block.

    Student Activity: *(7 mins)*

    - Guide the student/s to perform block validation on the terminal.

4. **Activity 2: Validate the Block on Sandbox** *(12 mins)*

    Teacher Activity: *(3 mins)* .

    - Recall the block addition for a single transaction.
    - Introduce and demonstrate addition of genesis block and additional blocks on sandbox.

    Student Activity: *(9 mins)*

    - Guide the student/s to add the genesis block and proceeding block on the sandbox.

5. **Activity 3: Highlight the Invalid Block***(12 mins)*

Teacher Activity: *(6 mins)*

- Explain the concept of not adding the invalid block and highlighting it with a different color in the blockchain.
- Explain how we highlight the invalid block on the output.

Student Activity: *(6 mins)*

- Guide the students to perform validation of the block and highlight the invalid block .

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

   Load the project and demonstrate how invalid blocks are highlighted and blocks are validated.

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 remove the highlighted invalid block.
   - Encourage the student/s to improvise the form input.

9. **State the Next Class Objective:** *(1 min)*
   - In the next class, student/s will learn to build a blockchain-based art verification system to prevent sale of art imitations to unsuspecting customers.

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	Block Validation	https://s3-whjr-curriculum-uploads.whjr.online/5f6541aa-a86b-4ea6-b010-9c396b7bdf80.html
Explore Activity	Block Validation	https://github.com/Tynker-Blockchain/TNK-M11-C88-SAS-BP

Teacher Reference: Teacher Activity 1	Validate the Block on Terminal	https://github.com/Tynker-Blockchain/TNK-M11-C88-TAS-BP
Teacher Reference: Teacher Activity 1 Solution	Validate the Block on Terminal	https://github.com/Tynker-Blockchain/TNK-M11-C88-TAS
Student Activity 1	Validate the Block on Terminal	https://github.com/Tynker-Blockchain/TNK-M11-C88-SAS-BP
Teacher Reference: Student Activity 1 Solution	Validate the Block on Terminal	https://github.com/Tynker-Blockchain/TNK-M11-C88-SAS
Teacher Reference: Teacher Activity 2	Validate the Block on Sandbox	https://github.com/Tynker-Blockchain/TNK-M11-C88-TAS-BP
Teacher Reference: Teacher Activity 2 Solution	Validate the Block on Sandbox	https://github.com/Tynker-Blockchain/TNK-M11-C88-TAS
Student Activity 2	Validate the Block on Sandbox	https://github.com/Tynker-Blockchain/TNK-M11-C88-SAS-BP
Teacher Reference: Student Activity 2 Solution	Validate the Block on Sandbox	https://github.com/Tynker-Blockchain/TNK-M11-C88-SAS
Teacher Activity 3	Highlight the Invalid Block	https://github.com/Tynker-Blockchain/TNK-M11-C88-TAS-BP
Teacher Reference: Teacher Activity 3 Solution	Highlight the Invalid Block	https://github.com/Tynker-Blockchain/TNK-M11-C88-TAS
Student Activity 3	Highlight the Invalid Block	https://github.com/Tynker-Blockchain/TNK-M11-C88-SAS-BP
Teacher Reference: Student Activity 3 Solution	Highlight the Invalid Block	https://github.com/Tynker-Blockchain/TNK-M11-C88-SAS
Student's Additional Activity 1	Remove the Invalid Block	https://github.com/Tynker-Blockchain/TNK-M11-C88-SAS-BP
Teacher Reference: Student's Additional Activity 1 Solution	Remove the Invalid Block	https://github.com/Tynker-Blockchain/TNK-M11-C88-SAS
Student's Additional Activity 2	Add the Required Field	https://github.com/Tynker-Blockchain/TNK-M11-C88-SAS-BP
Teacher Reference: Student's Additional Activity 2 Solution	Add the Required Field	https://github.com/Tynker-Blockchain/TNK-M11-C88-SAS
Post Class Project	Validate and Highlight the Blocks	https://github.com/Tynker-Blockchain/TNK-M11-C88-PCP-BP
Teacher Reference: Post Class Project Solution	Validate and Highlight the Blocks	https://github.com/Tynker-Blockchain/TNK-M11-C88-PCP