BLOCK VALIDATION - MINERS

BLOCKCHAIN VALIDATION

Time: 60 mins

Introduction

In this class, the student/s will learn to validate the mined block and add the blockchain copy at each peer node.

Introduce and Recall Commands

- append() — append() function adds a single element to the end of the list.
- len() — The len() function returns the number of items in an object.
- continue — The continue statement in Python returns the control to the beginning of the loop.

Vocabulary

- **Mining** is the process of adding transaction records to the blockchain.
- **Peer Nodes:** A blockchain network is composed of peer nodes, each of which can hold copies of ledgers.
- A ledger is a digital log that records transactions.

Learning Objectives

Student/s should be able to:

- ***Recall*** how to create and access a node and its data.
- ***Explain*** how a mined block is validated at the peer nodes.
- ***Demonstrate*** by validating a mined block and adding the blockchain copy at peer nodes.

Activities

1. **Class Narrative:** *(2 mins)*
    - Brief the student/s that the mined block is shared with the peer nodes for validation and an updated copy of blockchain is added on the peer node post validation.

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

- Let the student/s play the explore-activity to observe that the mined block is shared at the peer nodes for the miners to validate. Post validation, a copy of the mined block is added to the blockchains present at each peer node.
- Explain the need for a consensus mechanism to validate the transaction and mark it authentic.
- Using the slides, explain that the student/s will learn:
    - to share the block with peer nodes
    - to display mining status of the block
    - to synchronize the blockchain

3. **Activity 1: Share Block with Peer Nodes** *(12 mins)*

    Teacher Activity: *(6 mins)*

- Explain how the miner node shares the block with all the peer nodes.
- Demonstrate how to share and display the block at the peer nodes.

    Student Activity: *(6 mins)*

- Guide the student/s to share the mined block with the peer nodes and display it.

4. **Activity 2: Display Mining Status of the Block** *(12 mins)*

    Teacher Activity: *(6 mins)* .

- Explain how to validate the block as mined only when all the transactions stored within the list are verified.
- Demonstrate how to validate the block as mined and share with peer nodes only when it is mined.

    Student Activity: *(6 mins)*

- Guide the student/s to validate the block status as mined and then share with peer nodes.

5. **Activity 3: Synchronize the Blockchain** *(12 mins)*

    Teacher Activity: *(6 mins)*

- Explain the process of validating the block shared by the miner on the peer network.
- Explain how a copy of updated blockchain is created on the peer node once the block is validated.

- Demonstrate how to validate the mined block on the peer node and add to the blockchain on peer node.

  Student Activity: *(6 mins)*

- Guide the students to validate the mined block and add it to the blockchain on the peer nodes.

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 synchronize the blockchain in the newly created node.
   - Encourage the student/s to debug the code to mine the blockchain at peer nodes.

8. **State the Next Class Objective:** *(1 min)*
   - In the next class, student/s will learn to implement a wallet, store and manage currency for a blockchain 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	Block Validation - Miners	https://s3-whjr-curriculum-uploads.whjr.online/a9b46502-e218-4f7d-ad43-20332f6db733.html
Explore Activity	Block Validation - Miners	https://github.com/Tynker-Blockchain/TNK-M12-C96-SAS-BP
Teacher Activity 1	Share Blocks with Peer Node	https://github.com/Tynker-Blockchain/TNK-M12-C96-TAS-BP
Teacher Reference: Teacher Activity 1 Solution	Share Blocks with Peer Node	https://github.com/Tynker-Blockchain/TNK-M12-C96-TAS
Student Activity 1	Share Blocks with Peer Node	https://github.com/Tynker-Blockchain/TNK-M12-C96-SAS-BP

Teacher Reference: Student Activity 1 Solution	Share Blocks with Peer Node	https://github.com/Tynker-Blockchain/TNK-M12-C96-SAS
Teacher Activity 2	Display Mining Status of Block	https://github.com/Tynker-Blockchain/TNK-M12-C96-TAS-BP
Teacher Reference: Teacher Activity 2 Solution	Display Mining Status of Block	https://github.com/Tynker-Blockchain/TNK-M12-C96-TAS
Student Activity 2	Display Mining Status of Block	https://github.com/Tynker-Blockchain/TNK-M12-C96-SAS-BP
Teacher Reference: Student Activity 2 Solution	Display Mining Status of Block	https://github.com/Tynker-Blockchain/TNK-M12-C96-SAS
Teacher Activity 3	Synchronize the Blockchain	https://github.com/Tynker-Blockchain/TNK-M12-C96-TAS-BP
Teacher Reference: Teacher Activity 3 Solution	Synchronize the Blockchain	https://github.com/Tynker-Blockchain/TNK-M12-C96-TAS
Student Activity 3	Synchronize the Blockchain	https://github.com/Tynker-Blockchain/TNK-M12-C96-SAS-BP
Teacher Reference: Student Activity 3 Solution	Synchronize the Blockchain	https://github.com/Tynker-Blockchain/TNK-M12-C96-SAS
Student's Additional Activity 1	Synchronize the Blockchain on New Node	https://github.com/Tynker-Blockchain/TNK-M12-C96-SAS-BP
Teacher Reference: Student's Additional Activity 1 Solution	Synchronize the Blockchain on New Node	https://github.com/Tynker-Blockchain/TNK-M12-C96-SAS
Student's Additional Activity 2	Debug the Code	https://github.com/Tynker-Blockchain/TNK-M12-C96-SAS-BP
Teacher Reference: Student's Additional Activity 2 Solution	Debug the Code	https://github.com/Tynker-Blockchain/TNK-M12-C96-SAS
Post Class Project	Synchronize the Blockchain	https://github.com/Tynker-Blockchain/TNK-M12-C96-PCP-BP
Teacher Reference: Post Class Project Solution	Synchronize the Blockchain	https://github.com/Tynker-Blockchain/TNK-M12-C96-PCP