ARTGUARD: PEER-TO-PEER NETWORK

BLOCKCHAIN DEVELOPMENT

Time: 60 mins

Introduction

In this class, the student/s will be able to create a node for each user with the data from the mined node.

Introduce and Recall Commands

- render_template()

  The render_template() function renders the template passed to it as a parameter on the webpage.

- request.arg.get()

  This function gets the argument from the url.

Vocabulary

- **URL:** A Uniform Resource Locator, colloquially termed as a web address, is a reference to a web resource that specifies its location on a computer network and a mechanism for retrieving it.
- **Nodes:** A node is a computer or a device that participates in the network by maintaining a copy of the entire blockchain or a portion of it and actively contributes to the network's operation.

Learning Objectives

Student/s should be able to:
- *Recall* how a new node can be created with the copy of all the blocks in block chain using class and its instances.
- *Explain* how a new node is created and accessed by changing the url.
- *Demonstrate* how to create and access a node and its data.

Activities

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

   - Brief the student/s that they will learn to create a decentralized blockchain where every peer is a node with a copy of blockchain.

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

- Let the student/s play the explore-activity to observe that as you change the node parameter in the url a new node is created with the same data as the earlier node. The transaction at a node remains specific to that node only.

- Explain the need of creating a decentralized system of blockchain as in centralized system if a transaction history is modified then the whole blockchain will be compromised.

.

- Using the slides, explain that the student/s will learn:
    - to configure path for node
    - to create a node class
    - to create multiple nodes

3. **Activity 1: Configure Path For Node** *(14 mins)*

    Teacher Activity: *(7 mins)*

- Explain and demonstrate how to get the node Id parameter from the url and pass it to display the Artguard web page or an error notification.

- Explain that if there is node Id parameter given in the url then show the bad request notification on the screen.

- Demonstrate how to pass the node id to the web page.

    Student Activity: *(7 mins)*

- Guide the student/s to get the node id parameter from the url, display a bad request screen when the node id is not present and pass the node id to the UI.

4. **Activity 2: Create a Node Class** *(12 mins)*

    Teacher Activity: *(6 mins)* .

- Recall that a node class will be created in the same way as block class was created.

- Explain that you create a allNode dictionary to store all the created nodes.

- Recall to create a new node using the instances of the node class if it doesn't exist in the allNodes dictionary.

    Student Activity: *(6 mins)*

- Guide the student/s to create a node class, create an allNodes dictionary to store all the existing nodes and create new ones if they don't exist in the allNodes dictionary.

5. **Activity 3: Create Multiple Nodes**   *(12 mins)*

   Teacher Activity: *(6 mins)*

   ● Demonstrate to fetch and store the data for failed block, blocks and chain from the current node

   ● Explain how to pass the node id to the UI using render_template() function.

   ● Demonstrate to get the data for the requested node id form the allNodes dictionary.

   Student Activity: *(6 mins)*

   ● Guide the students to get the current blockchain data, pass the node id to the UI and display the data for the requested node id.

6. **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.

7. **Additional activities:**

   ● Encourage the student/s to access the node by entering the name of the node in the input box.

   ● Encourage the student/s to access the node by selecting the node form the list of the nodes.

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

   ● In the next class, student/s will learn to create a mining pool, reward the miners after solving the problem to validate the block.

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	NODES IN BLOCKCHAIN	
Explore Activity	NODES	

Teacher Activity 1	CONFIGURE PATH FOR NODE	https://github.com/Tynker-Blockchain/TNK-M12-C95-TAS-BP
Teacher Reference: Teacher Activity 1 Solution	CONFIGURE PATH FOR NODE	https://github.com/Tynker-Blockchain/TNK-M12-C95-TAS
Student Activity 1	CONFIGURE PATH FOR NODE	https://github.com/Tynker-Blockchain/TNK-M12-C95-SAS-BP
Teacher Reference: Student Activity 1 Solution	CONFIGURE PATH FOR NODE	https://github.com/Tynker-Blockchain/TNK-M12-C95-SAS
Teacher Activity 2	CREATE A NODE CLASS	https://github.com/Tynker-Blockchain/TNK-M12-C95-TAS-BP
Teacher Reference: Teacher Activity 2 Solution	CREATE A NODE CLASS	https://github.com/Tynker-Blockchain/TNK-M12-C95-TAS
Student Activity 2	CREATE A NODE CLASS	https://github.com/Tynker-Blockchain/TNK-M12-C95-SAS-BP
Teacher Reference: Student Activity 2 Solution	CREATE A NODE CLASS	https://github.com/Tynker-Blockchain/TNK-M12-C95-SAS
Teacher Activity 3	CREATE MULTIPLE NODES	https://github.com/Tynker-Blockchain/TNK-M12-C95-TAS-BP
Teacher Reference: Teacher Activity 3 Solution	CREATE MULTIPLE NODES	https://github.com/Tynker-Blockchain/TNK-M12-C95-TAS
Student Activity 3	CREATE MULTIPLE NODES	https://github.com/Tynker-Blockchain/TNK-M12-C95-SAS-BP
Teacher Reference: Student Activity 3 Solution	CREATE MULTIPLE NODES	https://github.com/Tynker-Blockchain/TNK-M12-C95-SAS
Student's Additional Activity 1	ACCESS THE NODES	https://github.com/Tynker-Blockchain/TNK-M12-C95-SAS-BP
Teacher Reference: Student's Additional Activity 1 Solution	ACCESS THE NODES	https://github.com/Tynker-Blockchain/TNK-M12-C95-SAS
Student's Additional Activity 2	ACCESS THE NODES FROM A LIST	https://github.com/Tynker-Blockchain/TNK-M12-C95-SAS-BP
Teacher Reference: Student's Additional Activity 2 Solution	ACCESS THE NODES FROM A LIST	https://github.com/Tynker-Blockchain/TNK-M12-C95-SAS
Post Class Project	ESTATE TRACKER: PEER-TO-PEER NETWORK	https://github.com/Tynker-Blockchain/TNK-M12-C95-PCP-BP
Teacher Reference: Post Class Project Solution	ESTATE TRACKER: PEER-TO-PEER NETWORK	https://github.com/Tynker-Blockchain/TNK-M12-C95-PCP