Centurion University
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School: ..... Campus: .....

Academic Year: ..... Subject Name: ..... Subject Code: .....

Semester: ..... Program: ..... Branch: ..... Specialization: .....

Date: .....

Applied and Action Learning

(Learning by Doing and Discovery)

Name of the Experiement : Mine It – Basic Proof-of-Work Simulation

* Coding Phase: Pseudo Code / Flow Chart / Algorithm

ALGORITHM:

Proof of Work Simulator – Mining Algorithm Steps

1. **Initialize Block #1**
   - Ensure Block #1 starts with a previous hash value of all zeroes.
2. **Mine Block #1**
   - Click the **Mine** button on Block #1.
   - The simulator searches for a valid **nonce** that produces a hash meeting the difficulty requirement.
   - Once a valid nonce is found, the block turns **green** to indicate it is valid.
3. **Proceed to Block #2**
   - The previous hash field in Block #2 is auto-filled with the hash of Block #1.
   - Click **Mine** under Block #2 to discover a valid nonce.
   - Upon success, Block #2 turns **green**.
4. **Repeat for Blocks #3 and #4**
   - For each block:
     - Confirm it takes the **previous block's hash** as input.
     - Click **Mine** to find a valid nonce.
     - Block turns **green** on success.
5. **Tampering Check**
   - Manually modify the **data** or **nonce** in any block.
   - That block and **all blocks after it** will turn **red**, indicating invalidity and a broken chain.
6. **Clear the Blockchain**
   - Click the **Clear** button to reset all blocks.
   - This re-mines Block #1 automatically with a new valid nonce.
7. **Experiment with Tampering**
   - Modify earlier blocks' data or nonce.
   - Observe how the changes invalidate all subsequent blocks.
   - Document the:
     - New nonces found
     - Hash outputs
     - Color transitions (green ↔ red)
     - Chain validity status

Software used

1. Blockchain-academy (https://blockchain-academy.hs-mittweida.de/2021/05/proof-of-work-simulator/)

*As applicable according to the experiment.
Two sheets per experiment (10-20) to be used.

* Implementation Phase: Final Output (no error)

1. First block mine.

2. Mine the second block with previous hash - 00874663f642b77efa3708ef99b7 abd Hash- 003034e84b7cceca22663b3f6134

3. Accordingly mine the 4th block

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Two sheets per experiment (10-20) to be used.

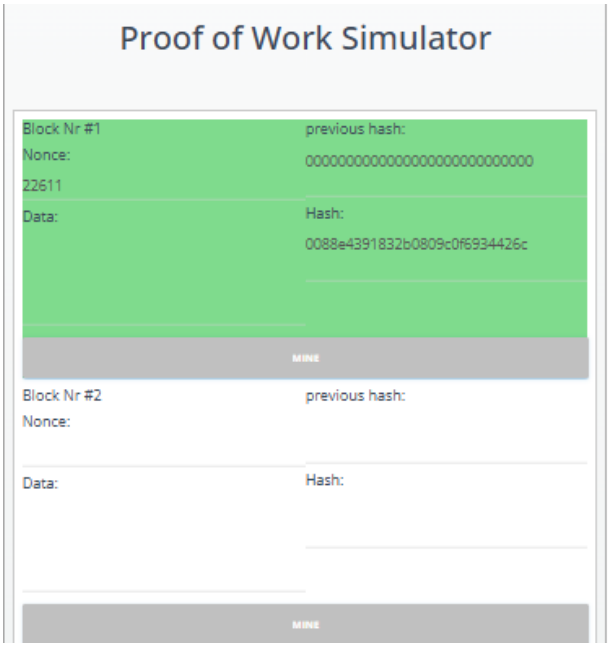
* Implementation Phase: Final Output (no error)

4. If I do some changes in any block or tamper any data in any block then this shows the chain is **no longer valid** due to tampering.

5. **Reset All Blocks**

   Click the **Clear** button.

   Block #1 auto-mines again and turns green.



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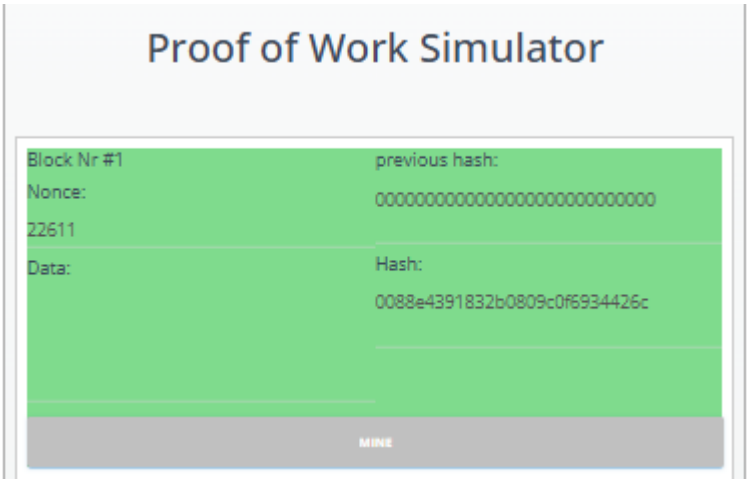
Two sheets per experiment (10-20) to be used.

* Implementation Phase: Final Output (no error)

- We can re-mine by giving different data or value from starting.



***Observations:**

1. Each block's validity depends on the exact hash of the previous block.
2. Mining adjusts the nonce until the hash meets the required difficulty.
3. Altering any block breaks the chain by invalidating all following blocks.

ASSESSMENT

Rubrics	Full Mark	Marks Obtained	Remarks
Concept	10		
Planning and Execution/ Practical Simulation/ Programming	10		
Result and Interpretation	10		
Record of Applied and Action Learning	10		
Viva	10		
Total	**50**		

Signature of the Student:

Name :

Regn. No. :

Signature of the Faculty:

**As applicable according to the experiment.*
Two sheets per experiment (10-20) to be used.