



**Centurion**  
UNIVERSITY  
*Shaping Lives... Empowering Communities...*

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 Experiment :

### \* **Coding Phase: Pseudo Code / Flow Chart / Algorithm**

#### ALGORITHM:

1. Open this link: [Proof of Work Simulator](#).
2. You will see multiple blocks (Block #1, Block #2, etc.).
3. Click "Mine" on Block #1.
4. Wait for the block to turn green (valid hash with leading zeros).
5. Now click "Mine" on Block #2.
6. Repeat mining for other blocks one by one.
7. Try changing the Data in any block.
8. Observe that all next blocks turn red (chain broken).
9. Click "Clear" to reset and try again.
10. Understand how mining keeps the chain valid.

### \* **Softwares used**

1. Brave Web Browser
2. Proof of Work Simulator – Online tool from Blockchain Academy (Mittweida).

Page No.....

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

## \* Testing Phase: Compilation of Code (error detection)

Open the Proof of Work Simulator On your brave browserThe page will load a visual simulator with multiple blocks.



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### Proof of Work Simulator

Published by [Mario Oettler](#) on 28. May 2021

Last Updated on 12. August 2024 by [Martin Schuster](#)

#### Proof of Work Simulator

Block Nr #1	previous hash:
Nonce:	00000000000000000000000000000000
77318	
Data:	Hash:
	00460059210f0f0654fc6fe685e



Understand the Layout You'll see blocks labeled Block #1, Block #2, etc.

Each block has:Data (text field),Nonce (number),Previous Hash (link to previous block),Hash (current block hash),Mine button.

Mine the First Block Click the “Mine” button on Block #1.The simulator will start calculating a valid nonce.Once the hash of the block starts with required zeroes (like 00...), the block turns green (valid).Now Block #1 is mined successfully.

### Proof of Work Simulator

Block Nr #1	previous hash:
Nonce:	00000000000000000000000000000000
89161	
Data:	Hash:
amit kumar	002017b26f43fe8d9d8aad2002c1

**MINE**

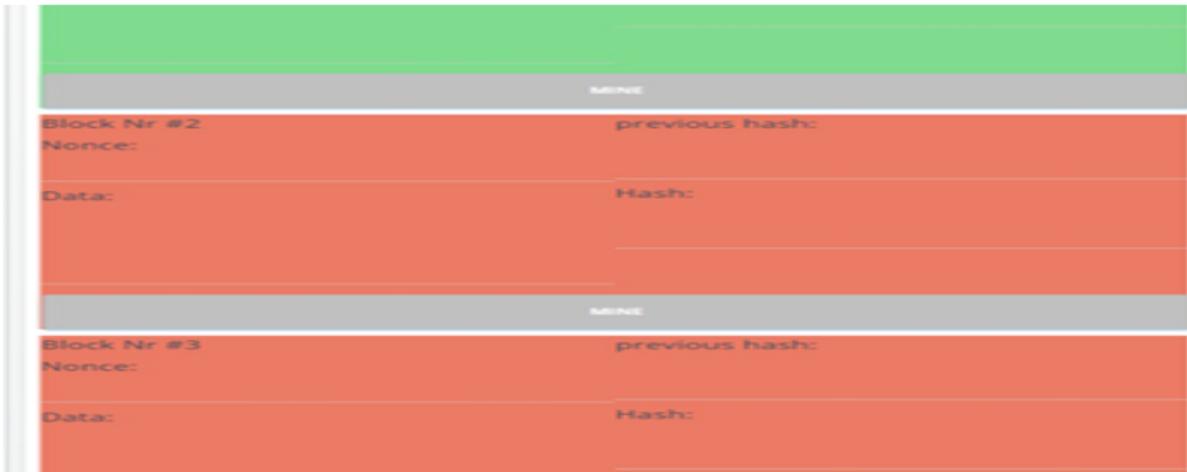
Mine the Next Block (Block #2),Block #2 takes the hash of Block #1 as its “Previous Hash”.

Click the “Mine” button on Block #2.Again, the simulator finds a valid nonce and turns the block green once it's valid.

Page No.....

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## \* Testing Phase: Compilation of Code (error detection)



Continue Mining All Blocks Repeat the process for Block #3 and Block #4. Each block is dependent on the hash of the previous block.

Modify the Block Data Now try changing the Data field in Block #1. You'll see that the hash changes, and Block #1 and all blocks after it turn red. This shows the chain is broken due to tampering—this is how blockchain ensures immutability.



## \* Implementation Phase: Final Output (no error)

Applied and Action Learning

Now you see i successfully completed the mining of all the blocks

The screenshot shows a web-based Proof of Work Simulator interface. At the top left, it says "Proof of Work Simulator" published by Mario Oettler on 28. May 2021, last updated on 12. August 2024 by Martin Schuster.

The interface displays four blocks:

- Block Nr #1:** previous hash: 002017b26f43fe8d9d8aad2002c1  
Nonce: 89161  
Data: amit kumar  
Hash: 002017b26f43fe8d9d8aad2002c1
- Block Nr #2:** previous hash: 002017b26f43fe8d9d8aad2002c1  
Nonce: 34660  
Data: quick mine  
Hash: 004e50f496349614c28cba8fa992
- Block Nr #3:** previous hash: 004e50f496349614c28cba8fa992  
Nonce: 88449  
Data: not available  
Hash: 00f919fbde3e47689f6e9a2a50b
- Block Nr #4:** previous hash: 00f919fbde3e47689f6e9a2a50b  
Nonce: 29338  
Data: mining  
Hash: 0078ccfac17ed22d37c408352cd7

Below the blocks are buttons: "MINE" (disabled for Block 1), "CLEAR" (disabled for Block 4), and "CLEAR" (disabled for Block 4).

## \* Observations

- In this Proof of Work (PoW) mining simulator, you can test the mining of blocks. Click on “mine” to create your first block. Once the hash puzzle is solved, the block turns green.
- Now, you can mine the next block. It takes the hash from the previous block as input and tries to find a nonce that solves the hash puzzle. Again, as soon as the solution is found, the block turns green. You can continue with the other blocks.
- If you make any changes to one the blocks, it is mined again. The result is that the hash changes and the link to all following blocks breaks. You can see this because all following blocks turn red.

## 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		
<b>Total</b>	<b>50</b>		

**Signature of the Student:**

Name :

Regn. No. :

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

***Signature of the Faculty:***

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