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 : Hash Your First Block – Blockchain Basics and Setup

Objective/Aim:

- To understand the core structure of a blockchain and how blocks link through cryptographic hashes.
- To simulate block creation and hash generation using an online blockchain demonstration tool.
- To explore how even small changes in data impact the hash, ensuring data immutability.
- To gain a basic hands-on experience with blockchain's Proof of Work (PoW) mechanism.

Apparatus/Software Used:

- Laptop/PC
- PowerPoint/Word for documentation
- Internet for research

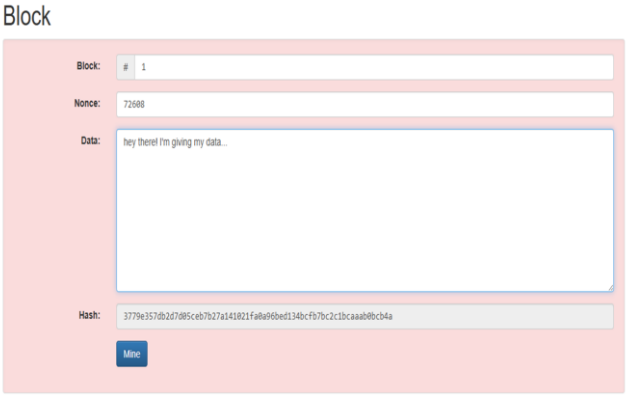
Theory/Concept:

A **blockchain** is a decentralized, tamper-resistant digital ledger that stores data in the form of linked blocks. Each block consists of:

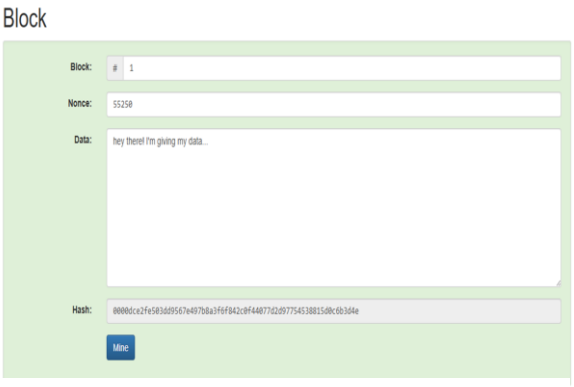
- **Data** – The core content, such as transaction records
- **Timestamp** – The exact time when the block was created
- **Hash** – A unique cryptographic signature of the block's content
- **Previous Hash** – The hash from the preceding block, which links blocks together

Procedure:

- **Access the Blockchain Simulator**
  - Open your browser and go to https://andersbrownworth.com/blockchain/block
- **Explore the Interface**
  - Familiarize yourself with fields like:
    - Block number
    - Nonce
    - Data
    - Previous hash
    - Current hash
- **Input Data into the Block**
  - In the "Data" field, enter any message. Example: “Hey there! I’m giving my data.”
- **Start Mining the Block**
  - Click the **“Mine”** button.
  - The system will auto-adjust the Nonce value until the hash begins with four zeros (e.g., `0000...`).
  - This process represents the Proof of Work.
- **Analyze the Output**
  - Watch the hash change live as the nonce is adjusted.
  - When mining is successful, the hash will appear in **green**, indicating validity.
- **Modify and Observe**
  - Slightly change the data and see the hash turn **red** (invalid).
  - Re-mine the block to generate a new valid hash.



***Before mining**



***After mining**

Observation Table

Block No.	Data	Nonce	Hash Output (SHA-256)	Hash Valid (Starts with 0000)
1	" Hey there!"	10630	0000976dc363f1459a737a2831f9b3318601…	□ Yes
2	"Testing Blockchain"	8362	00009f45a3bc3d6fa2d4b27a4431a3e8a0b9...	□ Yes
3	"First Block"	298	9fc5be5c3a452b5f21d94db179e54ab08e6e...	□ No

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:

Signature of the Faculty:

Name :

Regn.No.