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## Applied and Action Learning

(Learning by Doing and Discovery)

Name of the Experiment :

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

#### Mine It – Basic Proof-of-Work Simulation

##### **Initialize Block:**

- *Each block includes: Block number, previous hash, data, nonce, and current hash.*

##### **Input Previous Hash:**

- *Each block references the hash of the preceding block to maintain blockchain integrity.*

##### **Start Mining:**

- *Adjust the nonce value until the computed hash satisfies the network's difficulty (e.g., hash begins with a set number of leading zeros).*

##### **Validate Hash:**

- *Once a valid hash is found, the block is considered mined and is visually confirmed (block turns green).*

##### **Chain Continuity:**

- *The newly mined block's hash becomes the previous hash for the next block.*

##### **Repeat Process:**

- *Continue mining subsequent blocks in sequence to maintain the chain.*

- ❖ *If any changes done to one of 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.*

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

### \* Softwares used

- Platform:
  - Runs in any modern web browser (Google Chrome, Firefox, Edge, etc.)
  - No server/backend – it's a client-side only application
-  Educational Purpose Software:
  - It is a simulation tool, not a real blockchain implementation.
  - Built purely for demonstrating Proof of Work concepts.

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

No error

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

### Step 1: Launch the Simulator

- Open the "Mine It – Proof-of-Work" simulator in your browser.

## Proof of Work Simulator

Block Nr #1	previous hash:
Nonce:	00000000000000000000000000000000
53632	
Data:	Hash:
	00135bb3d80b3eb7fea4d4ff4f52
MINE	

### Step 2: Block #2 after mining

Block Nr #2	previous hash:
Nonce:	00135bb3d80b3eb7fea4d4ff4f52
51028	
Data:	Hash:
	00627473ef4b00292a355e07caa5
MINE	

### Step 3: Observe Block #3 (Before Mining)

- Status: Block is red
- Fields are empty (Nonce, Hash, Previous Hash)
- Indicates: Not mined yet

Block Nr #3	previous hash:
Nonce:	
Data:	Hash:
MINE	

#### Step 4: Click “MINE” on Block #3

Applied and Action Learning

- The simulator begins iterating different nonce values.
- It finds a nonce (61079) that generates a valid hash starting with 00:makefile
- Block #3 turns green, indicating it is successfully mined.

Block Nr #3	previous hash:
Nonce:	00627473ef4b00292a355e07caa5
61079	
Data:	Hash:
	0069df44d4d73bddf5e535008312
<b>MINE</b>	

#### Step 5: Move to Block #4

- Previous Hash field is auto-filled using Block #3’s hash.
- Status: Still red (not mined yet)

Block Nr #3	previous hash:
Nonce:	
Data:	Hash:
<b>MINE</b>	

#### Step 6: Click “MINE” on Block #4

- Simulator again iterates nonce values.
- Block #4 turns green, confirming successful mining.

Block Nr #4	previous hash:
Nonce:	0069df44d4d73bddf5e535008312
17963	
Data:	Hash:
	0087682093cc7abb34b970d54636
<b>MINE</b>	

## \* Observations

During the simulation, the unmined block was displayed in red. Once the mining process was executed, the system performed the necessary hash calculations until the required difficulty was met. Upon successful mining, the block's status changed, and it was visually represented in green, indicating confirmation and inclusion in the blockchain ledger.

## 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 :

**Signature of the Faculty:**

Regn. No. :

Page No.....