



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 : Stake Your Claim – Proof of Stake Simulation**

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

#### Initialize the Network:

- Define a set of nodes (validators).
- Assign each node a certain stake value (representing their coin balance).

#### Calculate Total Stake:

- Compute the sum of all stakes across validators.

$$\text{Total Stake} = \sum_{i=1}^n \text{Stake}(\text{Node}_i) \quad \text{Total Stake} = \sum_{i=1}^n \text{Stake}(\text{Node}_i)$$

#### Determine Selection Probability:

- Calculate each node's probability of being chosen as:

$$P(\text{Node}_i) = \frac{\text{Stake}(\text{Node}_i)}{\text{Total Stake}} \quad P(\text{Node}_i) = \frac{\text{Stake}(\text{Node}_i)}{\sum_{i=1}^n \text{Stake}(\text{Node}_i)}$$

#### Random Validator Selection:

- Generate a random number and choose the validator according to assigned probabilities.

#### Block Validation:

- The selected validator adds a new block to the blockchain (simulated).
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#### Reward Distribution:

- Increase the stake of the chosen validator by a reward value.

#### Repeat the Process:

- Continue for several rounds to simulate continuous block production.

#### Display Final Results:

- Show validator selection frequency and final stakes.

### Software used

1. MetaMask Wallet
2. VS Code.
3. MS Word.
4. Brave for researching.

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

### Initial Stakes:

Node A: 50  
Node B: 30  
Node C: 20

### Simulation Result:

Round 1 → Selected Validator: Node A (Reward +10)  
Round 2 → Selected Validator: Node B (Reward +10)  
Round 3 → Selected Validator: Node A (Reward +10)  
Round 4 → Selected Validator: Node C (Reward +10)

### Final Stakes:

Node A: 70  
Node B: 40  
Node C: 30

## \* Observations:

- Validators with higher stakes were more frequently selected.
- The selection process is fair yet random, allowing smaller stakers a chance to validate occasionally.
- The reward system gradually increases the stake of active validators.
- No mining power or computational work is required, unlike PoW.
- Demonstrates energy efficiency and economic fairness in blockchain consensus.
- Over time, rich validators may gain more rewards — showing wealth concentration, a real-world concern in PoS networks.