Centurion University

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 : 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.

Total Stake=∑i=1nStake(Nodei)\text{Total Stake} = \sum_{i=1}^{n} \text{Stake}(Node_i)Total Stake=i=1∑nStake(Nodei)

☐ **Determine Selection Probability:**
- Calculate each node's probability of being chosen as:

P(Nodei)=Stake(Nodei)Total StakeP(Node_i) = \frac{\text{Stake}(Node_i)}{\text{Total Stake}}P(Nodei)=Total StakeStake(Nodei)

☐ **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.

applicable according to sheets per experiment used.

* 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.

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:

applicable according to sheets per experiment used.