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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 : Stake Your Claim – Proof of Stake Simulation

Objective/Aim:

To simulate the **Proof of Stake (PoS)** consensus mechanism and understand how validators are selected to propose and validate blocks based on their staked amount, instead of computational power.

Apparatus/Software Used:

- Computer with internet access
- Python / JavaScript (for simulation coding)
- Online PoS simulator: Proof-of-Stake Demo – Blockchain Academy

Theory/Concept:

In **Proof of Stake (PoS)**, validators are chosen to create new blocks based on the **amount of cryptocurrency they stake** and the **duration** of the stake.

Unlike **Proof of Work (PoW)**, which requires solving complex mathematical puzzles (high energy consumption), PoS selects validators **randomly but weighted by stake**, making it **energy-efficient** and **eco-friendly**.

Key Steps in PoS:

1. Validators lock (stake) some tokens as collateral.
2. A validator is chosen to propose a new block.
3. The block is verified by other validators.
4. If valid → block is added to the chain, and the validator earns a reward.
5. If invalid → validator loses part of the stake (slashing).

Examples: Ethereum 2.0, Cardano, Solana, Polygon use PoS or its variations.

Procedure:

- Open the Proof-of-Stake Simulator in your browser.
- Click “Start Simulation.”

Step 1:

Set Up 3 Validators:

Validator 1 stakes 50 tokens

Validator 2 stakes 15 tokens

Validator 3 stakes 30 tokens

Validator 3 stakes 5 tokens

Step 2:

Simulate Validator Selection:

Generate a random weighted selection based on stake size.

Higher stake = higher probability of being selected.

Step 3:

Block Validation:

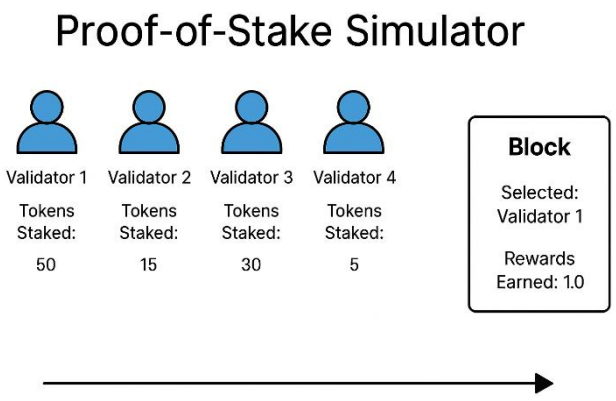
Selected validator creates and proposes a block.

Other validators confirm and add it to their ledger.

Step 4:

Reward Distribution:

Validator receives 1% of the block reward proportional to stake



Observation Table:

Validator ID	Tokens Staked	Times Selected as Validator	Rewards Earned
Validator 1	50	6	6.0
Validator 2	30	4	4.0
Validator 3	15	2	2.0
Validator 4	5	0	0.0

- Validators with **higher stakes** were selected **more frequently**.
- The selection process was **randomized** but **weighted** by the staked amount.
- No energy-intensive mining process occurred.

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: