Centurion University
Shaping Lives... Empowering Communities...

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 : PoW vs PoS – Consensus Mechanism Comparison

* Coding Phase: Pseudo Code / Flow Chart / Algorithm

Introduction

The purpose of this lab is to create a timeline that highlights key events in the history of digital currencies. It will cover the journey from the first concepts of electronic money to modern cryptocurrencies. The timeline will include major milestones, technological innovations, and significant developments that shaped the growth of digital currencies. This will help us understand their origin, evolution, and current role in today's world.

* Softwares used

1. Chrome web browser
2. Blockchain Explorer
3. Text Editor

**As applicable according to the experiment.*
Two sheets per experiment (10-20) to be used.

* Implementation Phase: Final Output (no error

1. Definition of Proof of Work (PoW)
Proof of Work is a consensus mechanism where miners solve complex mathematical puzzles (hashing) to validate transactions and create new blocks.

2. Definition of Proof of Stake (PoS)
Proof of Stake is a consensus mechanism where validators are chosen to create and validate blocks based on the number of coins they stake (lock) in the network.

3. Working Steps of PoW
1. Mining – Miners compete to solve a cryptographic puzzle.
2. Nonce Finding – Miners repeatedly change a random value (nonce) until the block hash meets the difficulty target.
3. Block Validation – The first miner to find the solution broadcasts the block, and other nodes verify it.

4. Working Steps of PoS
1. Validator Selection – Validators are chosen based on stake and randomization.
2. Block Proposal – The selected validator proposes a new block.
3. Finalization – Other validators check and confirm the block; once approved, it's added to the blockchain.

Point	Proof of Work (PoW)	Proof of Stake (PoS)
Resource Used	Computational power	Staked coins
Energy Usage	Very high	Very low
Security	High (attack costly)	High (depends on stake)
Speed	Slower (due to mining)	Faster (less computation)
Rewards	Mining rewards	Staking rewards

(Comparison on Basic Points)

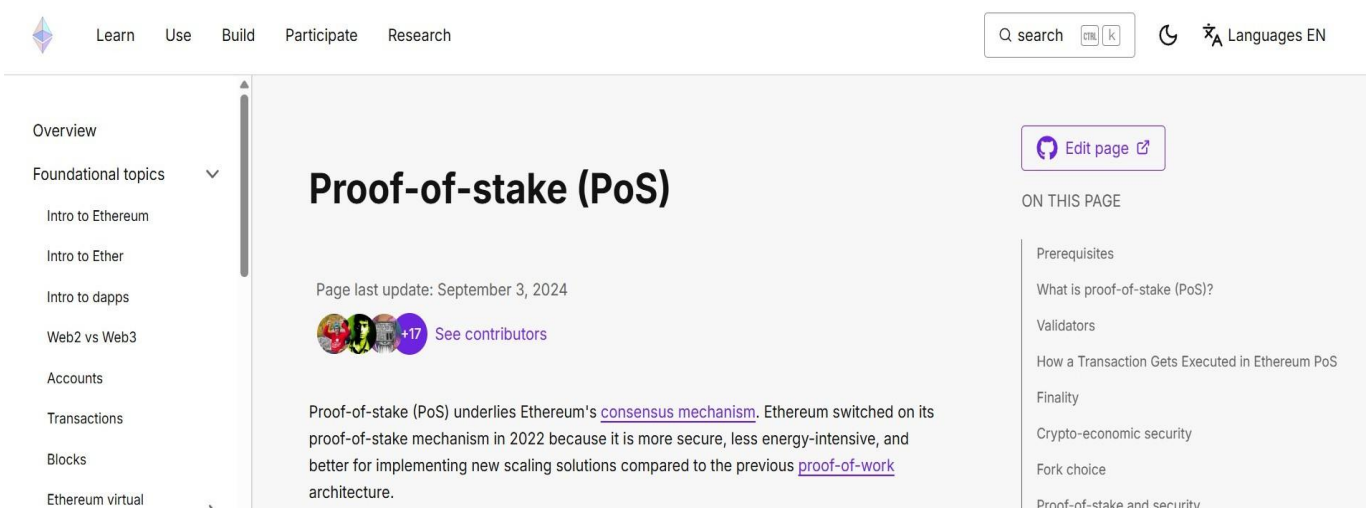
Aspect	PoW	PoS
Energy Efficiency	❌ Low	✅ High
Transaction Speed	❌ Slow	✅ Fast
Hardware Requirement	✅ High	❌ Low
Security	✅ Strong	✅ Strong but depends on stake

(Simple Comparison Table)

Here are some reliable sources you can open and research about pow and pos.
Ethereum.org – Proof-of-stake (PoS)
🔗 https://ethereum.org/en/developers/docs/consensus-mechanisms/pos/
Ethereum.org – Proof-of-work (PoW)
🔗 https://ethereum.org/en/developers/docs/consensus-mechanisms/pow/
Investopedia – Proof of Work vs Proof of Stake
🔗 https://www.investopedia.com/terms/p/proof-work.asp
🔗 https://www.investopedia.com/terms/p/proof-stake-pos.asp

*As applicable according to the experiment.
Two sheets per experiment (10-20) to be used.

* Implementation Phase: Final Output (no error)



Conclusion

Summarize the main differences.
State that PoW offers strong security through computational cost, while PoS offers efficiency and lower environmental impact.

* Observations

It was observed that **Proof of Work (PoW)** depends on computational power and consumes high energy for block creation, making it highly secure but less energy-efficient. In contrast, **Proof of Stake (PoS)** chooses validators based on the amount of cryptocurrency staked, resulting in lower energy use and faster transactions. While PoW ensures strong security through mining difficulty, PoS offers quicker finality and a more eco-friendly approach.

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:

**As applicable according to the experiment. Two sheets per experiment (10-20) to be used.*