CENTURION UNIVERSITY
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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 Experiment: Build the Network – Peer-to-Peer Simulation

*Coding Phase: Pseudo Code / Flow Chart / Algorithm

1. Initialize Network

- Define the number of nodes (peers) participating in the network.
- Assign each node a unique ID and an empty ledger/memory.

2. Create Connections

- Each node connects to a few other nodes randomly to simulate a mesh network.
- Maintain a list of peers each node can send/receive messages from.

3. Message Broadcast

- One node (the initiator) sends a transaction or message to its peers.
- Each peer forwards the message to its connected nodes (except the sender).

4. Verification Process

- Each node validates the message (e.g., checks if it's new and not already received).
- Invalid or duplicate messages are ignored.

5. Ledger Update

- If the message (transaction/block) is valid, it is added to the node's ledger.

6. Consensus (Optional)

- If simulating consensus, use a simple rule such as: the first valid message received by a majority is accepted; nodes reject conflicting data.

7. End Simulation

- Display how many nodes successfully received and accepted the message and show that the network synchronized without a central server.

* Software used:

- Metamask Wallet
- Vs code
- Word editor
- Microsoft edge for research

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

* Implementation Phase: Final Output (no error)

Input:

- Number of peers (e.g., 6).
- Establish peer connections.
- Node 1 broadcasts a message.
- Nodes 2–6 receive and validate the message.
- Ledger updated in each node.

Output:

- Message broadcast from Node 1.
- Node 2 received message from Node 1.
- Node 3 received message from Node 2.
- Node 4 received message from Node 3.
- All nodes synchronized successfully.

* Observation:

- The message reaches all nodes without any central server.
- Duplicate messages are automatically avoided using validation.
- The network demonstrates **decentralization**, **fault tolerance**, and **equal node importance**.
- Communication delay or missing peers can affect synchronization — similar to real blockchain
- networks.
- When consensus rules are added, the simulation behaves like a mini blockchain environment.

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 :

Signature of the Faculty : ***Regn. No. :***

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