SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE NAME: 19CS622-Blockchain Technology

III YEAR /VI SEMESTER

Unit 1- INTRODUCTION TO BLOCKCHAIN

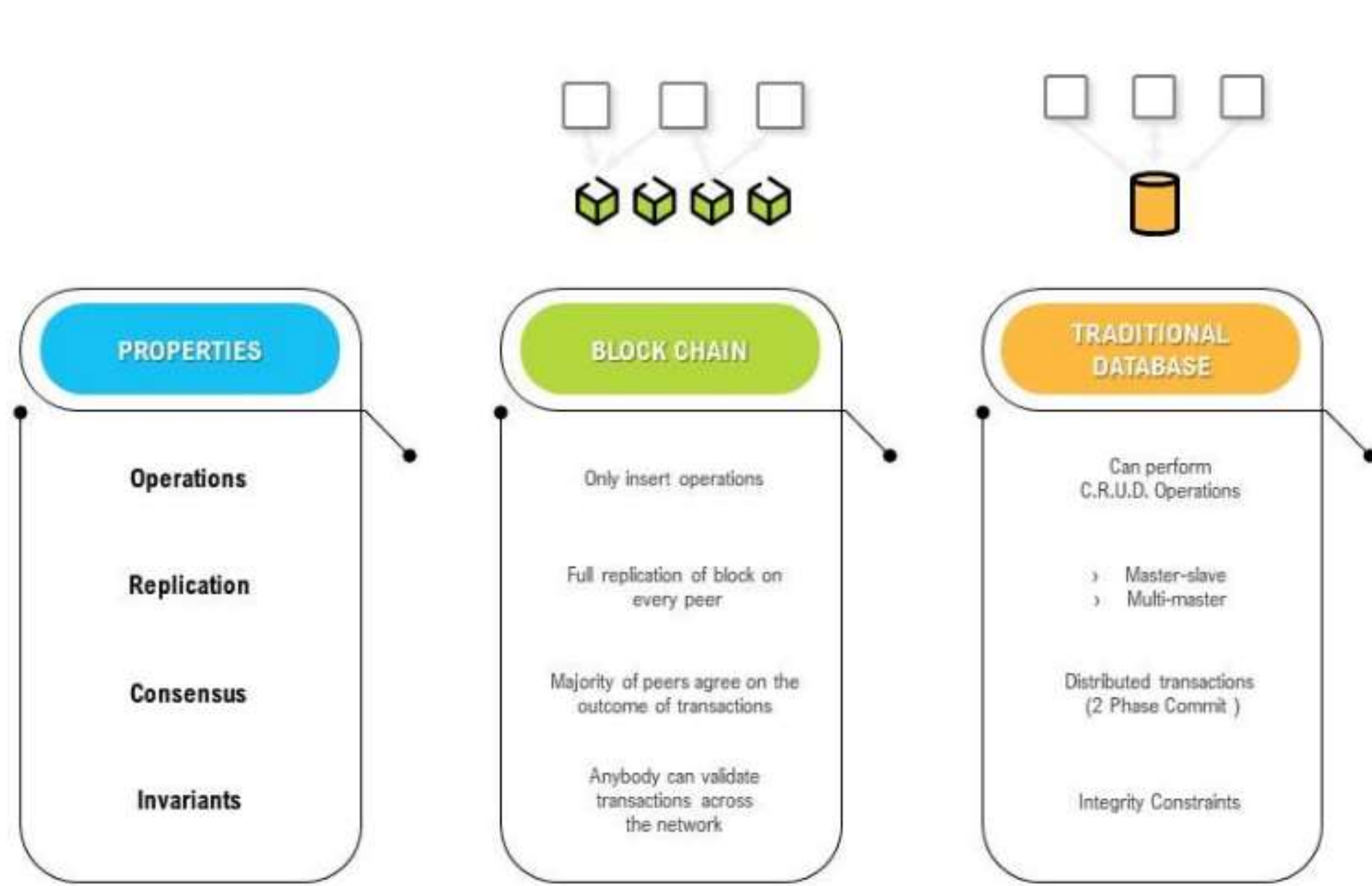Topic 2: Distinction between databases and blockchain

Brain Storming

1. What Is a Database?

2. Define Traditional Database.

Blockchain Vs Traditional Database

PROPERTIES	BLOCK CHAIN	TRADITIONAL DATABASE
Operations	Only insert operations	Can perform C.R.U.D. Operations
Replication	Full replication of block on every peer	› Master-slave › Multi-master
Consensus	Majority of peers agree on the outcome of transactions	Distributed transactions (2 Phase Commit)
Invariants	Anybody can validate transactions across the network	Integrity Constraints

Blockchain Vs Traditional Database

Blockchain Vs Traditional Database

WHAT IS BLOCKCHAIN?
Blockchain is a peer-to-peer decentralized distributed ledger technology. It was first introduced in 2009.

WHAT IS A DATABASE?
Databases are centralized ledger which stores data in a structured way and is managed by an administrator.

BLOCKCHAIN V/S DATABASE

BLOCKCHAIN		DATABASE
Blockchain is decentralized and has no centralized approach. However, there are private blockchains that may utilize some form of centralization.	AUTHORITY	Databases are controlled by the administrator and are centralized in nature.
Blockchain uses a distributed ledger network architecture.	ARCHITECTURE	Database utilizes a client-server architecture.
Blockchain utilizes Read and Write operations.	DATA HANDLING	The database supports CRUD (Create, Read, Update and Delete).
Blockchain data supports integrity.	INTEGRITY	Malicious actors can alter database data.
Public blockchain offers transparency.	TRANSPARENCY	Databases are not transparent. Only the administrator decides which the public can access data.
Blockchains are comparatively harder to implement and maintain.	COST	The database being an old technology is easy to implement and maintain.
Blockchain is bobbed down by the verification and consensus methods.	PERFORMANCE	Databases are extremely fast and offer great scalability.

Blockchain Vs Traditional Database

BEST USE CASES FOR DATABASE
- Apps or systems that utilize the continuous flow of data
- Storing confidential information
- Online transaction processing that needs to be fast
- Apps or systems where data verification is not needed
- Relational data

BEST USE CASES FOR BLOCKCHAIN
- Transfer value
- Storage value
- Monetary transactions
- Trusted data verification
- Voting systems
- Decentralized apps (dApps)

	Database	Hybrid/Federated Blockchain	Public Blockchain
Type	Permissioned	Permissioned	Public
Control	Centralized	Hybrid with few features centralized	Decentralized
Architecture	Client-Server architecture	Closed Peer-to-Peer architecture	Public peer-to-peer architecture
Data Persistence	non-persistence	Immutable	Immutable
Chance Of Failure	Yes	No	No
Performance	Extremely fast	Slow to medium	Slow

Blockchain Vs Traditional Database

	Database	Hybrid/Federated Blockchain	Public Blockchain	
Type	Permissioned	Permissioned	Public	
Control	Centralized	Hybrid with few features centralized	Decentralized	
Architecture	Client-Server architecture	Closed Peer-to-Peer architectur	Public peer-to-peer architecture	
Data persistence	non-persistence	Immutable	Immutable	
Chance of failure	Yes	No	No	
Performance	Extremely fast	Slow to medium	Slow	

Key Features & challenges

Blockchain Vs Database: Immutability and Data Handling

- When it comes to data storage and handling, both blockchain and database work differently. In a traditional database, data can be stored and retrieved with ease.
- To ensure proper operation of the application, CRUD is utilized at the primary level.
- CRUD stands for Create, Read, Update, and Delete.
- This also means that data can be erased and replaced with new values if needed.

Blockchain, on the other hand, works differently when it comes to data storage. Blockchain supports immutability, which means that data once is written cannot be erased or replaced. Immutability means that no data tampering is possible within the network.

Traditional databases don't exhibit immutability and hence are more prone to being manipulated by a rogue administrator or third-party hacks.

In short, blockchain only supports two operations, Read and Write.

- **Read Operations:** Used to read or retrieve data from the blockchain network
- **Write Operations:** Used to add information and data to the blockchain network

Assessment 1

1. A blockchain provides

Ans : _____

2. Basic application:

Current largest:

Ans : _____

References

TEXT BOOKS

1. Mastering Bitcoin: Unlocking Digital Cryptocurrencies, by Andreas M Antonopoulos 2018

2. Imran Bashir, "Mastering Blockchain: Distributed Ledger Technology, Decentralization and Smart Contracts Explained", Second Edition, Packt Publishing, 2018.

3. https://101blockchains.com/blockchain-vs-database-the-difference/

REFERENCES

1. William Mougayar, "Business Blockchain Promise, Practice and Application of the Next Internet Technology, John Wiley & Sons 2016.

2. Josh Thompson, 'Blockchain: The Blockchain for Beginnings, Guild to Blockchain Technology and Blockchain Programming', Create Space Independent Publishing Platform, 2017.

3. Arvind Narayanan, "Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction", Princeton University Press, July 19, 2016.

4. Henning Diedrich, Ethereum: Block chains, Digital Assets, Smart Contracts, Decentralized Autonomous Organizations-2016

Thank You