

Assignment - 1

1) What is the basic definition of block chain Technology, and how does it work?

→ Blockchain is a distributed digital ledger that records transactions across multiple computers in a way that ensures the data is secure, immutable, and transparent. Each transaction is grouped into a "block", and these blocks are linked chronologically to form a chain.

→ How it Works:-

(1) Structure :-

→ Think of the blockchain as a chain of blocks, where each block contains a list of transactions. Every time a new transaction occurs, it's recorded in a new block.

(2) Decentralization:-

→ This means that the records

are distributed across a Network of Computers (called nodes). Each node ~~can~~
Keeps a copy of the entire blockchain,
So there's no single point of failure.

→ Further there A Verification process,
Security and Transparency on the Network:

2) How has blockchain technology evolved
historically, and what are some key
milestones?

→ Centralized systems (e.g., Banks, cloud storage)
managed data and transactions. These systems
were efficient but vulnerable to fraud,
hacks and data tampering.

→ Key Milestones:-

(1) 1991 - The Idea of Blockchain:-

2) 2008 - Bitcoin and Blockchain:-

3) 2015 - Ethereum and Smart Contracts:-

(4) 2018-Present - Diversification:-

3) What are the main concepts of decentralization, consensus mechanisms, and immutability in the context of blockchain?

→ (1) Decentralization:-

- Data is distributed across a network of nodes, eliminating the need for a central authority.
- Every participant (node) has a copy of the ledger.
- Enhances security and reduces the risks of single points of failure.

(2) Consensus Mechanisms:-

- Consensus Mechanisms ensure all nodes agree on the state of the blockchain.
- Prevents fraud and maintains trust.

(3) Immutability:-

- Once data is recorded, it cannot be altered.
- Ensured by cryptographic hashing and the chain structure.

4) What are the differences between public, private, and consortium blockchains, and how do they each function?

(1) Public Blockchain:-

- Open to anyone; highly decentralized.
- Transparent and Secure but slower.
- Examples:- Cryptocurrencies like Bitcoin and Ethereum.

(2) Private Blockchain:-

- Restricted to a specific organization or group
- Faster and more private but lacks full decentralization.
- Example:- IBM Food Trust tracks food supply chain

(3) Consortium Blockchain:-

- Shared by multiple organizations ; semi-decentralized.
- Balances transparency and control.
- Example :- Interbank settlements.

5) What are some of the prominent use cases and applications of blockchain technology across various industries?

(E2) Cryptocurrencies:-

- Bitcoin: A decentralized currency for peer-to-peer transactions.
- Ethereum: Introduced smart contracts for decentralized applications.

(2) Finance (DeFi):-

- Decentralized Finance eliminates intermediaries like banks.
- Example:- Platforms like Uniswap allow users to trade cryptocurrencies directly.

(3) Supply chain Management:-

- Tracks products from origin to delivery.
- Example- Maersk's TradeLens blockchain monitors global shipping.

(4) Healthcare:-

- Secures and shares patient records while maintaining privacy.

→ Example:- MedLedger ensures the authenticity of pharmaceutical products.

(5) Real Estate:-

→ Simplifies property transactions and reduces fraud.

→ Example:- Propy uses blockchain to handle cross-border Real Estate deals.