



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

IV YEAR / VII SEMESTER

Unit 1- INTRODUCTION TO BLOCKCHAIN

Topic 1 : History of Bitcoin and Blockchain



Problem



- Bitcoin became cumbersome, slow, and expensive to use. It takes [about 10 minutes](#) to validate most transactions using the cryptocurrency and the [transaction fee](#) has been at a median of about \$20 this year.
- Bitcoin's unstable value has also made it an unviable medium of exchange





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Syllabus

UNIT -1 INTRODUCTION TO BLOCKCHAIN

9

History of Bitcoin and Blockchain, Types of Blockchain, Distinction between databases and blockchain, Distributed ledger. Blockchain ecosystem - Consensus Algorithms & Types, Blockchain structure, Decentralization using Blockchain – Blockchain and Full Ecosystem, Decentralization – Platforms for Decentralization.

UNIT II CRYPTOCURRENCY

9

Bitcoin – Digital Keys and Addresses – Transactions – Mining – Bitcoin Networks and Payments – Wallets – Alternative Coins – Theoretical Limitations – Bitcoin limitations – Name coin – Prime coin – Zcash – Smart Contracts – Ricardian Contracts



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UNIT III ETHEREUM

9

The Ethereum ecosystem, DApps and DAOs - Ethereum working- Solidity- Contract classes, functions, and conditionals- Inheritance & abstract contracts- Libraries- Types & optimization of Ether- Global variables- Debugging- Future of Ethereum- Smart Contracts on Ethereum

UNIT IV HYPERLEDGER

9

Hyperledger Architecture- Consensus- Consensus & its interaction with architectural layers- Application programming interface- Application model -Hyperledger frameworks- Hyperledger Fabric -Various ways to create Hyperledger Fabric Blockchain network



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UNIT V BLOCKCHAIN APPLICATIONS

9

Case studies –blockchain in healthcare, blockchain based voting system, Walmart blockchain, blockchain in banking.



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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.

REFERENCES:

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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.



Bitcoin



- **Bitcoin (₿)** is a decentralized [digital currency](#) that can be transferred on the peer-to-peer [bitcoin network](#).
- Bitcoin transactions are verified by network [nodes](#) through [cryptography](#) and recorded in a public [distributed ledger](#) called a [blockchain](#).
- The [cryptocurrency](#) was invented in 2008 by an unknown person or group of people using the name [Satoshi Nakamoto](#).
- The currency began use in 2009, when its implementation was released as [open-source software](#).
- Bitcoin has been described as an [economic bubble](#) by at least eight [Nobel Memorial Prize in Economic Sciences](#) recipients.



[BLOCKCHAIN](#) TECHNOLOGY



- The bitcoin (or) [blockchain](#) is a public [ledger](#) that records bitcoin transactions.
- It is implemented as a chain of *blocks*, each block containing a [cryptographic hash](#) of the previous block up to the genesis block in the chain.
- A [network](#) of communicating nodes running bitcoin software maintains the blockchain.
- Transactions of the form *payer X sends Y bitcoins to payee Z* are [broadcast](#) to this network using readily available software applications.
- Network nodes can validate transactions, add them to their copy of the ledger, and then broadcast these ledger additions to other nodes.
- To achieve independent verification of the chain of ownership each network node stores its own copy of the blockchain.



Block Chain Technology

- Cont..



- Blockchains are typically managed by a [peer-to-peer](#) network for use as a public [distributed ledger](#), where nodes collectively adhere to a [protocol](#) to add and validate new transaction blocks.
- Although blockchain records are not unalterable, since [blockchain forks](#) are possible, blockchains may be considered [secure by design](#) and exemplify a distributed computing system with high [Byzantine fault tolerance](#)



Block Chain Technology

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- The blockchain was created by a person (or group of people) using the name (or [pseudonym](#)) [Satoshi Nakamoto](#) in 2008 to serve as the public [distributed ledger](#) for [bitcoin cryptocurrency](#) transactions, based on previous work by [Stuart Haber](#), [W. Scott Stornetta](#), and [Dave Bayer](#).
- The identity of Satoshi Nakamoto remains unknown to date. The implementation of the blockchain within bitcoin made it the first digital currency to solve the [double-spending](#) problem without the need of a trusted authority or central [server](#).
- The bitcoin design has inspired other applications and blockchains that are readable by the public and are widely used by [cryptocurrencies](#).
- The blockchain may be considered a type of [payment rail](#).



Block Chain Technology

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➤ CENTRALIZATION VERSUS DECENTRALIZATION

- Decentralization is an important concept that is not unique to Bitcoin. The notion of competing paradigms of centralization versus decentralization arises in a variety of different digital technologies.
- To best understand how it plays out in Bitcoin, it is useful to understand the central conflict—the tension between these two paradigms—in a variety of other contexts.

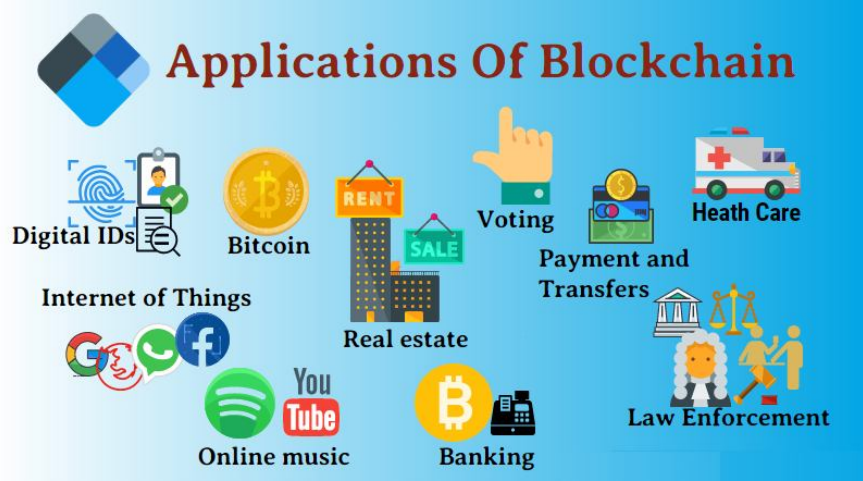


Block Chain Technology

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- How the Bitcoin protocol achieves decentralization into five more specific questions:
- 1. Who maintains the ledger of transactions?
 - 2. Who has authority over which transactions are valid?
 - 3. Who creates new bitcoins?
 - 4. Who determines how the rules of the system change?
 - 5. How do bitcoins acquire exchange value?

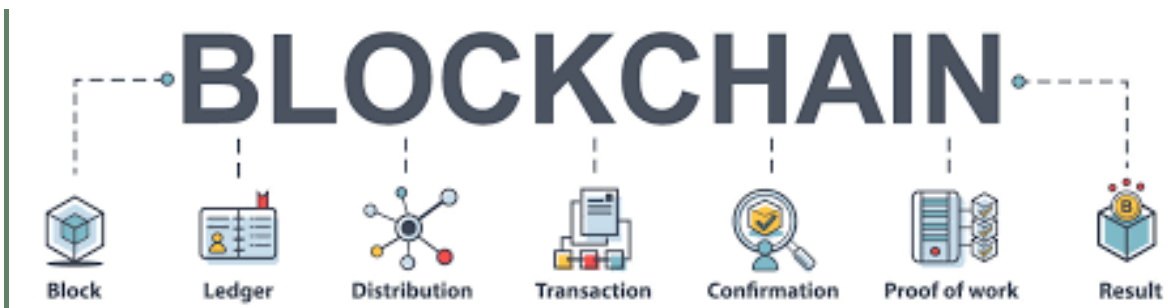


Applications Of Blockchain

The diagram illustrates various applications of blockchain technology, including:

- Digital IDs
- Bitcoin
- Internet of Things
- Real estate (RENT, SALE)
- Voting
- Payment and Transfers
- Heath Care
- Online music (YouTube, Spotify)
- Banking
- Law Enforcement

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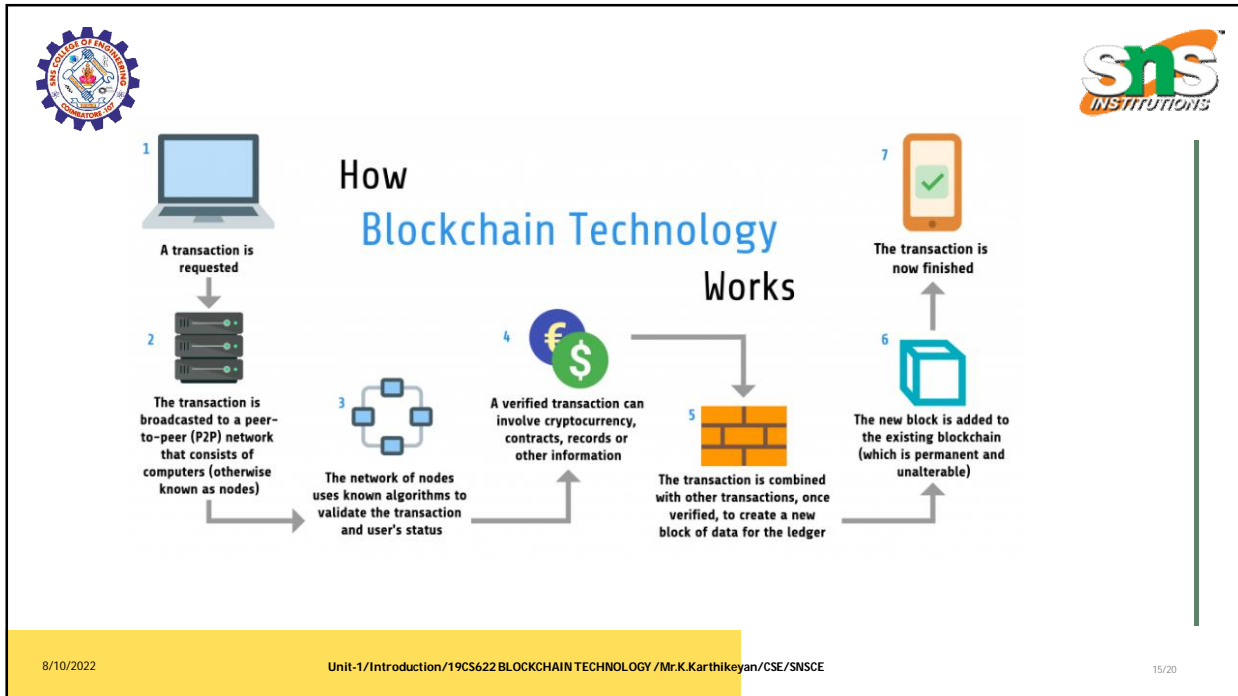


BLOCKCHAIN

The process flow diagram shows the following steps:

- Block
- Ledger
- Distribution
- Transaction
- Confirmation
- Proof of work
- Result

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Activity

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Disadvantages




- ✓ Significant technology cost associated with mining bitcoin
- ✓ Low transactions per second
- ✓ History of use in illicit activities, such as on the dark web
- ✓ Regulation varies by jurisdiction and remains uncertain
- ✓ Data storage limitations




Advantages



- ✓ Improved accuracy by removing human involvement in verification
- ✓ Cost reductions by eliminating third-party verification
- ✓ Decentralization makes it harder to tamper with
- ✓ Transactions are secure, private, and efficient
- ✓ Transparent technology
- ✓ Provides a banking alternative and a way to secure personal information for citizens of countries with unstable or underdeveloped governments



Assessment 1



1. List out the Advantages of Block Chain Technology

a) _____

b) _____

c) _____

d) _____


2. Identify the Applications of Block Chain Technology

a) _____

b) _____

c) _____

d) _____



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THANK YOU

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