1. Bitcoin

Bitcoin is a decentralized digital currency introduced in 2009 by an unknown person or group using the pseudonym Satoshi Nakamoto. It operates without a central bank or single administrator. Instead, it uses a peer-to-peer network where users can send and receive payments without intermediaries.

Key Features:

- Based on blockchain technology

- Limited supply: Only 21 million bitcoins will ever exist

- Transactions are secure, transparent, and irreversible

2. Bitcoin Networks and Payments

The Bitcoin network is a global, decentralized network of computers (nodes) that use the Bitcoin protocol to send, verify, and record transactions.

How Payments Work:

- Users create a digital wallet with public and private keys

- Transactions are broadcast to the network and verified by miners

- Once verified, transactions are added to the blockchain

- Payments can be made globally with low fees and without intermediaries

Advantages:

- Fast and low-cost international payments

- No need for bank accounts

- Secure and pseudonymous

3. Bitcoin and Alternative Coins (Altcoins)

While Bitcoin is the first and most well-known cryptocurrency, many other digital currencies have been created, called Altcoins (alternative coins).

Examples of Altcoins:

- Ethereum: Supports smart contracts

- Litecoin: Faster transaction confirmation than Bitcoin

- Ripple (XRP): Focused on bank transfers

- Dogecoin: Initially created as a meme, now widely used

Comparison:

- Altcoins often aim to improve upon Bitcoins speed, scalability, or features

- Some offer privacy (like Monero), or lower fees (like Nano)

4. Theoretical Foundations of Bitcoin

Bitcoin is based on various theoretical principles:

- Cryptography: Ensures secure transactions using public and private keys

- Game Theory: Encourages honest behavior among miners through rewards

- Decentralization: No single entity controls Bitcoin; it runs on a distributed network

- Proof of Work (PoW): A consensus algorithm used to validate transactions and secure the network

These foundations make Bitcoin reliable, secure, and trustless (no need to trust a third party).

5. Bitcoin Currency Units

Bitcoin can be divided into smaller units to allow for micro-transactions.

Common Units:

- 1 Bitcoin (BTC) = 100,000,000 Satoshis

- MilliBitcoin (mBTC) = 0.001 BTC

- MicroBitcoin (BTC or bits) = 0.000001 BTC

- Satoshi = Smallest unit = 0.00000001 BTC

This divisibility makes Bitcoin usable for small purchases or fees.

6. Transactions in Bitcoin

A Bitcoin transaction involves transferring value from one wallet to another using cryptographic signatures.

Steps in a Transaction:

1. Sender signs the transaction using their private key

2. Transaction is broadcast to the network

3. Miners validate the transaction and include it in a block

4. Block is added to the blockchain

5. Receiver gets confirmation and access to funds

Important Features:

- Unspent Transaction Outputs (UTXOs): Remaining funds after a transaction, used in future transactions

- Transaction Fees: Paid to miners to prioritize transactions