

ASSIGNMENT 2

Unit - 2

Business use cases.

Q.1

Explain one of the business use case of Blockchain.

→ 4

Blockchain technology can be applied in Supply chain Management to improve transparency, traceability and efficiency. In a typical supply chain, goods pass through multiple stages - manufacturers, distributors, retailers - before reaching the consumer. Blockchain offers a decentralized, immutable ledger that can track every step of the product journey, from production to delivery.

• working of Blockchain in Supply chain :-

- (i) Provenance Tracking : Each step in the supply chain (raw materials, manufacturing, shipping) is recorded on the blockchain.
- (ii) Transparency : All stakeholders can access the same data, ensuring transparency.
- (iii) Smart Contracts : Automated agreements can be set up to trigger payments or actions once conditions are met.
- (iv) Security : Blockchain's cryptographic features secure sensitive data, preventing fraud or unauthorized changes.

eg:

Walmart uses blockchain to trace food products, allowing them to track the origin of products.

like meat and produce in seconds, ensuring food safety and reducing the time to recall contaminated products.

Q.2 Explain how Blockchain technology enhances business.

→ Blockchain Technology provides business with a secure, transparent and efficient way to handle transactions, data management and operations. It eliminates intermediaries, reduces frauds and enhances trust. Stakeholders

i) Improved security and privacy.

Blockchain enhances security using cryptographic techniques like hashing and public-private key encryption. Once information is recorded and stored, it is nearly impossible to alter without detection. Permissioned blockchains allow businesses to restrict data access to authorized participants, while ensuring transparency.

ii) Reduced costs.

Blockchain removes intermediaries like banks, lowering transaction cost. Smart contracts automate processes, reducing manual work and errors. (reducing operational cost).

iii) Improved speed and efficiency.

Blockchain enables real-time transaction without intermediaries, making processes faster and more direct.

iv) Streamlined Supply Chain Management.

Blockchain offers real-time tracking and visibility in supply chains, preventing fraud and errors with its immutable ledger.

v) Smart Contracts.

Smart contracts are self-executing agreements that automate contract fulfillment, reducing legal costs and ensuring compliance.

vi) Transparent Payment Processes.

Blockchain promotes transparency by allowing all participants to view transactions in real-time, improving audit and reconciliation processes.

vii) Enhanced Customer Engagement.

Blockchain supports secure, transparent loyalty programs and personalized services, giving customers control over the data.

- eg:
- Finance : Faster cross-Border Payments (Ripple, ^{BitCoin})
 - Health care : Secure and tamper-proof patient records
 - Supply chain : Walmart and IBM's blockchain solution for tracking food safety

Q.3

-4

Explain Cryptocurrency and tokens.

Cryptocurrency is a digital currency that operates on a blockchain and is designed to

work as a medium of exchange. It uses cryptography for security and it operates on decentralized networks based on blockchain technology, meaning no central authority controls it. They enable peer-to-peer transactions directly between users, with transaction records stored in the blockchain.

Examples are Bitcoin (BTC), the first and most popular cryptocurrency, used for peer-to-peer transactions; Ethereum (ETH), it supports smart contracts and decentralized applications (DApps); Litecoin (LTC), a faster and lighter version of Bitcoin.

- Use cases:
 - Payments - used for buying goods/services.
 - Investment - People invest in cryptocurrencies for potential profit.
 - Remittances - Fast & cheap cross-border transactions.

-4 Tokens are a digital asset built on an existing blockchain (like Ethereum) and serves specific purposes beyond just currency, such as access to specific platform, voting rights, or even ownership of an underlying asset.

* Types of Tokens :-

- (i) Utility Tokens : Provide access to a product/service (BNB on Binance, BAT for Brave Browser rewards).
- (ii) Security Tokens : Represent real-world assets like

stocks or real estate on blockchain.

- (iii) Stablecoins : Pegged to a stable asset like USD.
- (iv) NFTs (Non-Fungible Tokens) : Unique digital collectibles or assets (digital art, gaming items).

- eg:
- USDT (Tether) : A stablecoin pegged to the US dollar for stability.
 - UNI (Uniswap) : A governance token for the Uniswap exchange.
 - BAYC NFT : A unique digital collectible in the Bored Ape Yacht Club Collection.

Q.4 with digra diagram explain Know Your Customer (KYC).

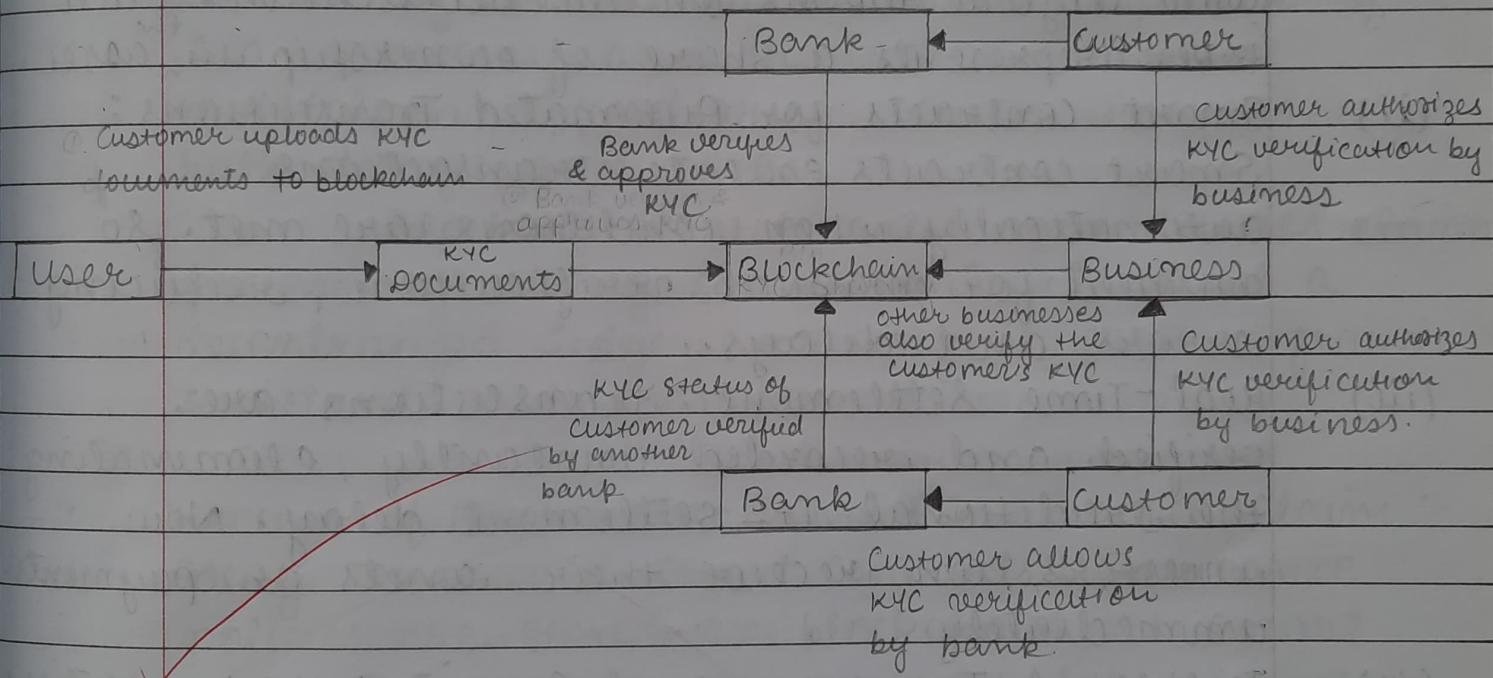
→ KYC (Know Your Customer) is a process where businesses verify the identity of their customers before allowing them to use financial services. It is mainly used by banks, crypto exchanges and financial institutions to prevent fraud, money laundering and terrorist financing.

Process of KYC :-

- (i) Customer Registration : The user submits personal information and documents like passport, Aadhar card or driver's license are uploaded.
- (ii) Identity Verification : Businesses use AI and manual checks to verify the authenticity of the documents. Biometric verification (face scan, fingerprint) may be done.

- (iii) Background Checks : Cross - checking customer details with databases to detect fraud , criminal records or financial risks.
- (iv) Approval or Rejection : If the customer passes the verification , they are approved for financial transactions and if suspicious activity is detected, additional verification or rejection occurs.

*customer allows
KYC verification by bank*



Q.5 Explain asset management settlement use case in blockchain.

→ Asset Management settlement involves buying, selling and managing financial assets like stocks, bonds, real estate and commodities. Traditional asset management is complex, involving multiple intermediaries like broker, bank and clearinghouse, which causes delays,

high costs and risks of fraud.

Blockchain revolutionizes it by providing instant, transparent and secure settlements without intermediaries.

Working of Blockchain-based Asset Management:-

(i) Tokenization of Assets: physical or financial assets (real estate, stocks, bonds) are converted into digital tokens on the blockchain. Each token represents a share of ownership in the asset.

(ii) Smart contracts for Automated Transactions: Smart contracts execute transactions automatically when conditions are met. so no need for manual verification, reducing errors and delays.

(iii) Real-Time Settlement: Transactions are verified and recorded instantly, eliminating the traditional T+2 settlement delay. Now investors can receive their assets or payments immediately.

(iv) Increased Transparency & Security: All transactions are stored on an immutable ledger, preventing fraud. Also investors and regulators can track assets in real time.

eg: JPMorgan's Blockchain-Based Settlement System.

JPMorgan launched the "Onyx Blockchain" for asset settlement, allowing instant transactions of tokenized assets. This reduced settlement times from days to seconds, saving costs and improving efficiency.



Q.6 Explain insurance claim processing use case in blockchain.

→ Insurance Claim Processing refers to the steps involved in managing and evaluating a claim made by a policy-holder to an insurance company. Traditionally, it is often slow, inefficient and vulnerable to fraud due to lengthy paperwork, fraudulent claims that cost insurers billions, lack of transparency and the involvement of multiple intermediaries, which increases both delays and costs.

Blockchain automates and secures claim processing using smart contracts and a decentralized ledger, making it faster, fraud-resistant and transparent.

• Process of Blockchain-Based Insurance Claim :-

- (i) Policy Issuance & Smart Contracts : Insurance policies are stored on blockchain as smart contracts, which contains rules for claims (eg: accident coverage, payout amount).
- (ii) Claim Filing & Verification : Policyholders submits claims digitally and blockchain automatically verifies claim data (eg: accident reports, medical records).
- (iii) Automated Claim Assessment : Smart contracts check eligibility based on policy terms. If it is valid, payment is automatically triggered, eliminating delays.

(iv) Fraud Prevention & Transparency : Immutable records prevent duplicate or fake claims and customers can track claims in real time.

eg: AXA's Blockchain Insurance

- AXA launched "Fizzy", a blockchain-based flight delay insurance. If a flight is delayed, smart contracts automatically trigger compensation, removing the need for manual claims.

Q.7 Explain trade finance (supply chain) use case in blockchain.

Trade Finance refers to the financing and processes involved in the buying and selling of goods, particularly in international trade. It encompasses various activities, such as securing payments, ensuring the legitimacy of goods, handling documentation and mitigating risks for both buyers and sellers. Traditionally, trade finance relies on multiple intermediaries and is often plagued with inefficiencies, paperwork, fraud and delays.

Blockchain technology can revolutionize trade by providing a secure, transparent and efficient digital framework to manage the supply chain and trade processes, reducing the need for multiple intermediaries, improves transparency and speeding up transactions.

Process of Blockchain-Based Trade Finance & Supply Chains :



- (i) Digital Trade Agreements & Smart Contracts: Trade agreements are stored as smart contracts on a blockchain. These contracts automatically execute payments when terms are met.
- (ii) Real-Time Tracking of Goods: Products are tagged with blockchain-based IoT sensors (RFID, GPS). Buyers, suppliers and banks can track shipments in real time.
- (iii) Instant & Secure Payments: Blockchain eliminates intermediaries and payments are settled instantly using cryptocurrencies or stablecoins.
- (iv) Fraud Prevention & Transparency: All transactions are recorded on an immutable ledger. Buyers and sellers can verify authenticity, preventing fake invoices and double financing.

eg: HSBC & we.trade Blockchain Trade Finance.

HSBC uses we.trade, a blockchain-based trade finance platform, enabling real-time verification and automated payments, reducing trade transaction time by 40%.

Q.8 Explain global payments use case in blockchain.
-4 Global Payments refer to the transfer of funds across borders, typically involving multiple financial institutions, currency exchanges and sometimes, intermediary banks. Traditional methods of global payments (eg: SWIFT, wire transfers) often involve high fees, delays, multiple intermediaries and lack transparency.

Blockchain technology offers a transformative solution by providing a decentralized, secure and efficient method for transferring funds globally, reducing costs, speeding up transactions and improving transparency.

Process of Blockchain-Based Global Payment :-

- (i) Sender Initiates Payments : User sends money using blockchain-based payment platforms like Ripple (XRP) or Stellar (XLM). The payment is recorded on a transparent ledger.
- (ii) Transaction Validation & Smart Contracts : Blockchain nodes validate the transaction using consensus mechanisms. Smart contracts ensure automatic execution of payments without intermediaries.
- (iii) Instant Settlement & Low Fees : Funds are transferred within seconds without third-party delays. Transaction fees are significantly lower than bank wire transfers.
- (iv) Receiver Gets Payment Securely : The recipient gets fund in their digital wallet or converted into local currency. Transactions are immutable and transparent, reducing fraud risk.

eg: Ripple (XRP) & Stellar (XLM).

- Ripple (XRP), used by banks like Santander & SBI for real-time global statements.
- Stellar (XLM), helps individuals and businesses send low-cost cross-border payments.



Q.9

Explain smart property use case ⁱⁿ blockchain.

→

Smart Property refers to physical assets (like real estate, vehicles or electronics) that are digitally tokenized and managed using blockchain technology. These assets can be transferred, sold or leased via smart contracts, enabling secure, transparent and automated transactions without intermediaries.

• Working of Smart property on blockchain :-

- (i) Tokenization of Property : Real-world assets (cars, real-estate) are digitized into tokens on a blockchain. Each token represents a share of ownership of the entire property.
- (ii) Smart contracts for Property Transfer : Ownership of the property is transferred using smart contracts, which automatically execute transactions when both parties fulfill the conditions.
- (iii) Decentralized Verification & Transfer : Blockchain ensures that ownership and transaction records are immutable and visible to all parties. The property's history is transparent and tamper-proof.
- (iv) Leasing & Rental Agreements : They can be managed via smart contracts. Rent payments and property use rights are automatically handled through blockchain, reducing disputes and delays.

eg:

Propy

Propy is a real-estate platform that uses

blockchain for cross-border property transactions.

- Buyers and sellers can automatically execute transactions using smart contracts.
- Property ownership is digitally recorded on the blockchain, enabling transparent and secure deals across the globe.

Q.10

Explain transferring of ownership of smart property in blockchain with proper diagram.

-4

The transfer of ownership of smart property refers to the process where ownership rights of a digitally tokenized asset are moved from one party to another using blockchain-based tools such as smart contracts. This process eliminates intermediaries and ensure a secure, transparent and fast transfer.

Steps for transferring ownership of smart property using blockchain :-

i)

Tokenization of the Property.

The physical property is digitized into a token on the blockchain, which represents ownership of the asset.

ii)

Agreement between Buyer & Seller.

The buyer and seller agree to transfer ownership and set conditions (price, payment methods, deadlines).

iii)

Smart Contract Creation.

A Smart contract is created that includes the terms of the transfer and the contract is deployed on the blockchain, ensuring it is immutable & transparent.

(iv) Conditions Met (Payment & verification)

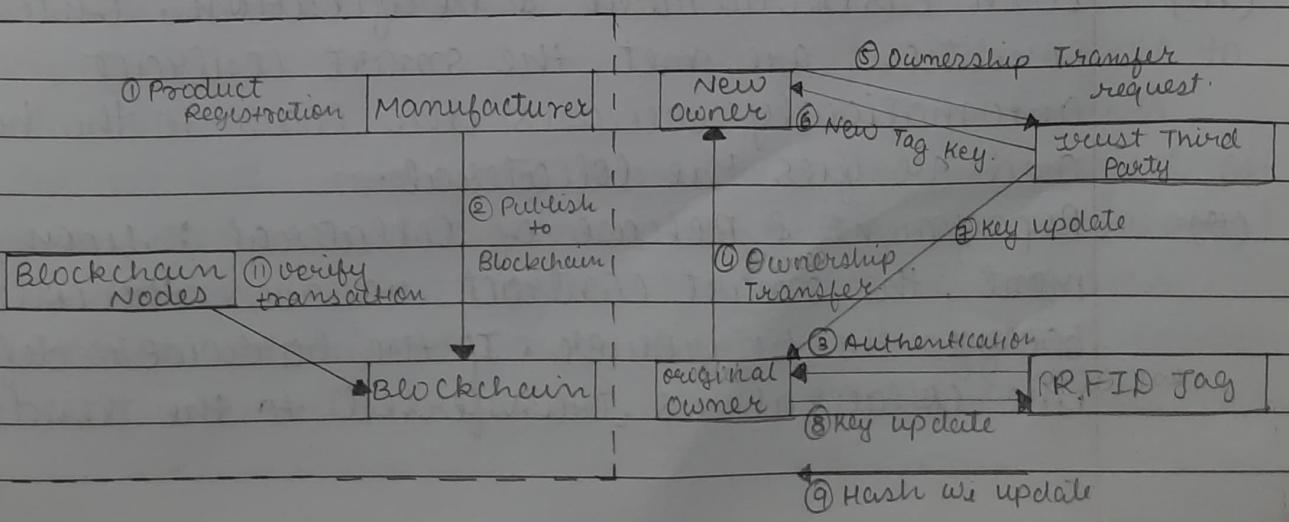
The buyer pays the agreed price. Then the smart contract verifies that ^{the} payment is made and all conditions are met.

(v) Ownership Transfer

Upon meeting the contract conditions, the smart contract automatically transfers the token representing ownership to the buyer and the transaction is recorded as immutable proof of ownership.

(vi) Finalization

The buyer now owns the asset and the transfer is complete. The buyer can resell or lease the asset in the future, with the blockchain continuing to track ownership.



Q.11 Explain smart property collateral use case in blockchain.

→ Smart property collateral refers to tokenized assets used as collateral in blockchain-based loans, leasing or agreements. By using smart contracts and blockchain technologies, this collateral can be easily transferred, verified and executed in an automated and secure manner.

• Working of smart Property Collateral :-

- (i) Tokenization of Collateral : Physical assets are tokenized into digital tokens on the blockchain and they can be used as collateral.
- (ii) Loan Agreement & Smart contract creation : A smart contract is created between the borrower and the lender, which includes loan amount, collateral, interest rate & repayment conditions.
- (iii) Collateral Secured on Blockchain : The borrower provides tokenized assets as collateral, which are securely recorded and immutably stored on the blockchain, ensuring transparency.
- (iv) Loan Disbursement & Verification : Once conditions are met, the smart contract automatically releases the loan to the borrower and verifies the collateral.
- (v) Repayment & Release of Collateral : Upon repayment, the smart contract releases the collateral back to the borrower. If the borrower defaults, the collateral is transferred to the lender.



e.g: BlockFi & Ethereum as collateral.

- BlockFi is a crypto lending platform where users can take loans by using their crypto-currency holdings as collateral.
- The crypto assets are tokenized and stored in a smart contract.
- The contract ensures the loan amount is released and in case of default, the collateral is liquidated to cover the loan.

Q.12 Explain Smart Contract.

- A smart contract is a self-executing contract with the terms of the agreement directly written into lines of computer code. These contracts are stored and executed on a blockchain, enabling the automation of contract execution without the need for intermediaries. When pre-defined conditions are met, the smart contract automatically executes the terms of the agreement, ensuring transparency, security and efficiency.

• Working of Smart Contracts :-

- (i) Agreement setup : Two or more parties agree to the terms of the contract, which are translated into code. The contract is deployed on a blockchain platform (like Ethereum or Solana).
- (ii) Conditions and Triggers : The contract defines certain conditions and they are triggered when specific event or inputs are detected on the blockchain.

(iii) Execution & Automation : Once the conditions are met, the smart contract automatically executes the agreed-upon actions, such as transferring assets, making payments or updating data.

(iv) Finalization : The contract is immutable once executed and all transaction details are recorded on the blockchain. It can be verified by all involved parties, ensuring trust and transparency.

e.g.: Buying a house using a smart contract.

- Parties : Buyer and Seller.
- Smart Contract : The smart contract includes conditions like :-
- The buyer will transfer \$500,000 to the smart contract if the property documents are verified.
- The seller will transfer the property ownership once the payment is confirmed.
- Once both conditions are met (payment and document verification), the smart contract automatically transfers the property ownership to the buyer and releases the payment to the seller.

Q.13

Explain the trust problem.

The trust problem refers to the challenge of relying on third-party intermediaries to verify, enforce and validate transactions or agreements between two or more parties. In

traditional systems, parties often need to trust each other or trust institutions to handle agreements fairly and securely.

The issue with this system is that these intermediaries can fail, misbehave or be subject to manipulation, leading to risks, inefficiencies and even fraud.

- Solving the Trust Problem with Blockchain :-
- (i) Decentralization : Blockchain operates on a peer-to-peer network with no central authority, ensuring each participant has an identical copy of the ledger, reducing fraud and corruption risks.
- (ii) Transparency : Transactions are publicly recorded in an immutable ledger, ensuring data cannot be tampered with and building trust among participants.
- (iii) Immutability : Once data is added to the blockchain, it cannot be changed, ensuring transactions are final, trustworthy and resistant to fraud.
- (iv) Smart contracts : Smart contracts automatically enforce agreement terms without third-party intervention, executing securely and efficiently when conditions are met.

- e.g. :
- * Voting Systems : Elections rely on trusted systems to ensure votes are counted fairly, but they can be vulnerable to errors or tampering.
 - * also supply chain, financial transactions and legal contracts

Q.14

-4

Explain Trusted third party ⁱⁿ blockchain.

In the traditional financial or legal systems, a trusted third party (TPP) is an intermediary that is relied upon to facilitate, validate or enforce a transaction or contract between two or more parties. The TPP acts as neutral authority that ensures the transaction is secure, valid and legally binding.

In blockchain technology, the concept of a TPP is eliminated or at least significantly minimized due to blockchain's inherent features of decentralization, security & transparency.

~~Process of eliminating the need of TPP :-~~

- (i) ~~Decentralization : Blockchain operates on a peer-to-peer network where no single entity controls the systems, allowing participants to verify transactions without relying on intermediaries.~~
- (ii) ~~Consensus Mechanism : Consensus algorithm like PoW and PoS allow participants to agree on transaction validity, removing the need for a single trusted party.~~
- (iii) ~~Immutability : Once recorded, transactions cannot be altered, ensuring data integrity and reducing fraud without needing a trusted intermediary.~~
- (iv) ~~Smart contracts : Self-executing contracts automate enforcement, eliminating the need for third parties to manage agreements.~~

(v) Transparency: Transactions are publicly recorded on an immutable ledger, allowing all parties to independently verify them, removing the need for a central authority.

eg: Blockchain vs. Traditional TTP.

- Traditional System: In a bank transfer, the bank acts as trusted third party to verify and settle the transaction.
- Blockchain System: Here, a decentralized network of nodes verifies the transaction through consensus, eliminating the need for a central authority like a bank.

Q.18 How does a smart contract work?

-4 Same answer given in Question -12.


Q.18 Same answer given in Question -12.