School: ..... Campus: .....

Academic Year: ..... Subject Name: ..... Subject Code: .....

Semester: ..... Program: ..... Branch: ..... Specialization: .....

Date: .....

Applied and Action Learning

(Learning by Doing and Discovery)

Name of the Experiement : Blockchain in Supply Chains – Use Case Analysis

* Coding Phase: Pseudo Code / Flow Chart / Algorithm

Introduction:

- **Participant Initialization:**
  Identify all key stakeholders in the supply chain — **Manufacturer, Supplier, Transporter, Distributor, Retailer,** and **Customer**.
- **Product Registration:**
  Each product is assigned a **unique digital token or ID** on the blockchain (e.g., *Product ID #A123* created by the manufacturer).
- **Transaction Recording:**
  Every stage of the product's journey — from **manufacturing and packaging to shipping, delivery, and sale** — is recorded as a **new block** on the blockchain.
  Each block includes:
  - Product ID
  - Sender and Receiver details
  - Timestamp
  - Transaction information
  - Digital signature for authenticity
- **Verification and Validation:**
  All transactions are **verified by network nodes** before being added to the blockchain, ensuring **data accuracy and authenticity**.
- **Linking and Hashing:**
  Each block is **cryptographically linked** to the previous one using a **secure hash**, creating a **tamper-proof and immutable record**.
- **Consensus Mechanism:**
  The network employs a **consensus protocol** (e.g., Proof of Stake or Proof of Authority) to validate data, ensuring **consistency and trust** across all nodes.
- **Traceability and Tracking:**
  Stakeholders can **trace the entire product lifecycle**, from raw material sourcing to final customer delivery.
- **Audit and Transparency:**
  The **immutable ledger** provides complete **auditability and transparency**, serving as reliable proof for **regulators, businesses, and consumers**.

* Softwares used

1. Chrome Web Browser
2. Blockchain Supply-chain

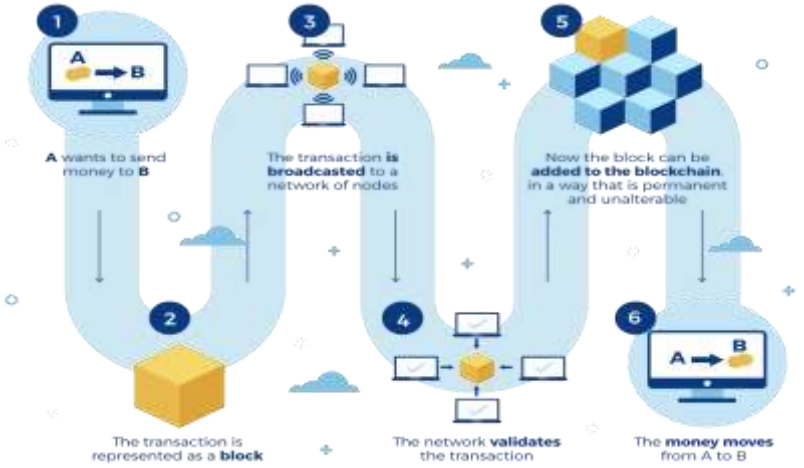
https://www.antiersolutions.com/blogs/top-5-real-life-blockchain-use-cases-in-supply-chain-in-2023/

*As applicable according to the experiment.
Two sheets per experiment (10-20) to be used.

* Implementation Phase: Final Output (no error)

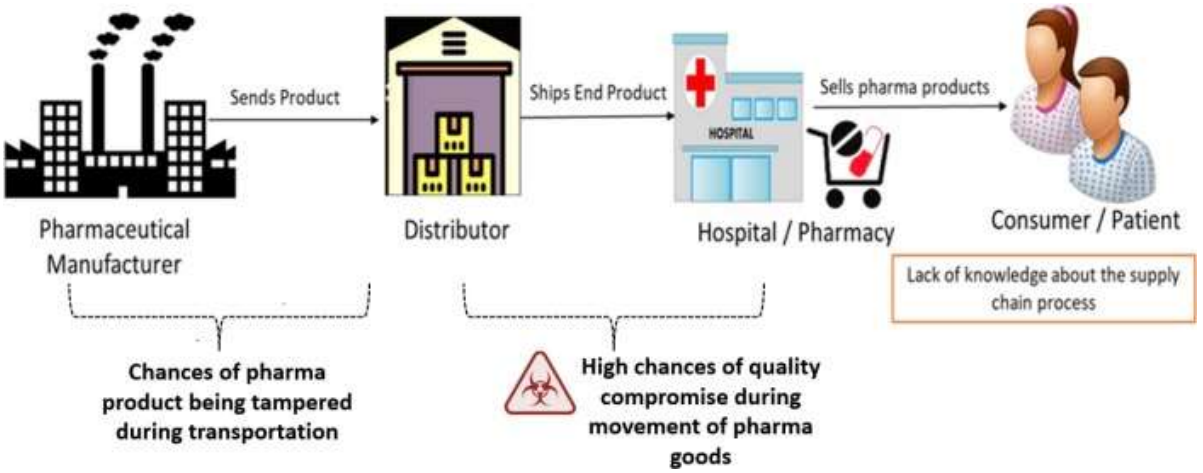
Over a century ago, supply chains were simple and local, but globalization has made them complex. Today, businesses are embracing **Blockchain technology** to **digitize, secure, and streamline** their supply chains against modern disruptions.

Transportation and Logistics Supply Chain



Food Supply Chain

Pharmaceutical Supply chain



*As applicable according to the experiment.
Two sheets per experiment (10-20) to be used.

* Implementation Phase: Final Output (no error)

- **Adoption Strategies:**
  Promote blockchain integration through **pilot projects**, **phased rollouts**, and focus on **high-value, high-risk industries** to achieve faster ROI and stakeholder confidence.
- **Technical Scalability Solutions:**
  Enhance performance and efficiency by implementing **Layer 2 blockchain protocols**, **sharding techniques**, and **hybrid architectures** that balance scalability with security.
- **Regulatory Compliance and Governance:**
  Reduce regulatory risks by **partnering with compliance specialists**, **proactively engaging with regulators**, and staying aligned with evolving legal frameworks.
- **System Flexibility and Adaptability:**
  Develop **future-ready, modular systems** capable of adapting to **changing operational, legal, and technological environments** in the global supply chain landscape.

* Observations

1. Successful blockchain implementation requires **strategic adoption and stakeholder readiness**.
2. **Scalability and regulatory clarity** remain key hurdles for large-scale deployment.
3. Building **flexible and adaptive systems** ensures long-term sustainability and compliance.

ASSESSMENT

Rubrics	Full Mark	Marks Obtained	Remarks
Concept	10		
Planning and Execution/ Practical Simulation/ Programming	10		
Result and Interpretation	10		
Record of Applied and Action Learning	10		
Viva	10		
Total	**50**		

Signature of the Student:

Name :

Regn. No. :

Signature of the Faculty:

**As applicable according to the experiment.*
Two sheets per experiment (10-20) to be used.