Theme 4 (Cybersecurity) - TrustRoute

Ans1) TrustRoute: A blockchain-powered platform that simulates IoT-based tamper detection and verifies product authenticity to build trust in Walmart's retail supply chain.

Ans2) Customers often lack visibility into the authenticity and handling of the products they purchase, particularly in categories such as food, electronics, and pharmaceuticals. Counterfeit goods and improper transit conditions (e.g., temperature-sensitive items) reduce consumer trust in retail. These issues occur throughout the **supply chain** — from manufacturing to delivery — and affect both **customers** and **Walmart's brand integrity**. Without a transparent, tamper-proof system, customers cannot verify whether products are **authentic or have been handled safely**.

Ans3) We are building **TrustRoute**, a secure traceability system that leverages:

- **Blockchain** (Ethereum smart contracts) to immutably record the product journey
- **Simulated IoT data** (e.g., temperature, seal status) to detect tampering events during transit
- **Decentralised Identity (DID)** using wallet-based access control, to ensure only verified roles (manufacturer, transporter, retailer) can update product logs
- **QR codes** that customers scan to view the full product history and verify authenticity
- Tech stack:
- **Solidity + Hardhat/Remix**: Smart contracts on Ethereum testnet
- **React + ethers.js**: Frontend UI for scanning and viewing product journey
- **MetaMask**: Wallet-based identity for role verification (DID)
- **Python**: Simulation of IoT sensor data during transit
- **Optional**: IPFS to store certificates or product metadata

By simulating IoT conditions and storing verified, role-based updates immutably on-chain, we offer a **transparent, tamper-resistant solution** to protect both **customer trust** and **retail integrity**.

Ans4) Link to demo: