TSEC
THADOMAL SHAHANI
ENGINEERING COLLEGE

{ } CodeTantra

PRESENTS

NEED FOR CODE 4.0

Dominate the race track of innovation

PROBLEM STATEMENTS

GENERAL INSTRUCTIONS

➤ Read the problem statements carefully

➤ All the teams should make a Github repository and name it as follows : NFC4_<TEAMNAME>

➤ We Recommend you to update Repositories every 2 hours

➤ It is Forbidden to plagiarize or reuse previously published content. If found upon inspection that the project has reused code that was not revealed with the submission, the project will be disqualified

➤ You are free to use any data sets you find appropriate for the respective Problem statements

BLOCKCHAIN

1. Blockchain for a Better Academic Credential Ecosystem

Problem Statement:
Academic credentialing today is plagued by inefficiencies, lack of transparency, and risks of fraud. Verifying transcripts and degrees is often manual, slow, and reliant on intermediaries, reducing trust. Students rarely have full control over their records, while institutions and employers struggle to confirm authenticity.
Blockchain offers a chance to transform how academic records are issued, stored, and verified. Yet, a secure, scalable system designed for academics is still missing.
This project proposes a blockchain-based solution for secure, verifiable, and student-owned credentials. It will digitize records and build a decentralized system for seamless verification among students, institutions, and employers.

Key Functionalities:
- Digitize academic certificates, transcripts, and achievements by authorized stakeholders and store them securely on the blockchain.
- Use cryptographic hashing and time-stamping to ensure all credentials are authentic, immutable, and tamper-proof.
- Grant students full ownership and control over their records, allowing them to manage access permissions.
- Enable secure, selective credential sharing through cryptographically signed links or smart contract-based access.
- Maintain end-to-end transparency by recording issuance, verification, and updates on-chain for full auditability.
- Utilize decentralized ledger infrastructure to eliminate single points of failure and enhance data resilience.
- Ensure interoperability among students, institutions, and employers for smooth, standardized credential exchange.
- Prevent fraud and reduce verification time by allowing instant on-chain validation of academic records.
- Automate issuance, expiration, and revocation of credentials using smart contracts to reduce manual tasks.
- **Compulsory Functionality: Integrate agentic AI to autonomously verify, manage access to, and revoke academic records via smart contracts.**

BLOCKCHAIN

2. Blockchain in transforming the FinTech Sector.

Problem Statement:
The rapid advancement of technologies such as Artificial Intelligence (AI) and Blockchain is reshaping the financial services sector. Traditional systems often struggle with manual processes, limited personalization, and security concerns. There is a growing need for intelligent, secure, and automated solutions that can enhance customer engagement and streamline financial decision-making.
This project aims to design and implement a web/mobile-driven intelligent backend system that leverages AI for smart automation and Blockchain for secure, transparent operations within the fintech ecosystem. The focus is on developing the core functional logic rather than user interface elements, ensuring scalability, auditability, and real-time responsiveness.

Key Functionalities:
- Automate credit scoring, loan approvals, fraud detection, and investment advice using AI, machine learning, and predictive analytics.
- Use blockchain for immutable transaction records, smart contracts for automation, and tamper-proof audit trails.
- Enable AI-powered chatbots, personalized product suggestions, and NLP-based customer query handling.
- Integrate backend APIs with web/mobile apps, support real-time performance, and use blockchain for secure digital identity.
- Process live financial data streams with event-driven logic and real-time fraud and risk analytics.
- Monitor regulatory compliance via AI, maintain blockchain-based audit trails, and support global financial standards.
- Design with modular microservices, plug-and-play AI tools, and scalability for future fintech expansions.
- Ensure privacy and security using permissioned blockchain, federated learning, and end-to-end encryption.
- **Compulsory Functionality: Integrate multi-agent AI systems for fraud detection, credit scoring, customer support, and compliance automation.**

BLOCKCHAIN

3. Real Estate Chain

Problem Statement:
The real estate industry, a fundamental pillar of the global economy, continues to rely heavily on outdated, paper-based processes for property transactions and ownership transfers. These traditional methods are often inefficient, lack transparency, and contribute to significant delays, high transaction costs, and accessibility issues for all stakeholders involved. The absence of a unified, secure, and verifiable system has further exacerbated risks associated with fraud, data manipulation, and regulatory non-compliance.

To address these challenges, there is a pressing need to adopt blockchain technology to revolutionize the way real estate transactions are conducted. By leveraging the capabilities of decentralized systems, smart contracts, and immutable ledgers, the aim is to create a more secure, efficient, and transparent framework for managing property transactions and records

Key Functionalities:
- Enable seamless, privacy-preserving digital representation of property ownership for secure access and control.
- Use smart contracts to automate property transactions, reduce intermediaries, and minimize fraud risk.
- Build a tamper-proof, decentralized property ledger accessible to authorized parties like buyers, sellers, and regulators.
- Maintain an immutable, transparent history of property transactions to ensure accountability and trust.
- Enforce compliance with real estate laws through automated regulatory checks embedded in transactions.
- Improve stakeholder access to verified property data for better decision-making and a more efficient market.
- **Compulsory Functionality: Integrate agentic AI to automate and validate transactions, ownership transfers, and fraud detection.**

BLOCKCHAIN

4. Transforming Cross Border Commerce

Problem Statement:
Indian businesses engaged in import-export activities face significant challenges in achieving fast, cost-effective, and compliant cross-border transactions that align with WTO regulations and Environmental, Social, and Governance (ESG) standards. Existing trade systems often lack the necessary transparency, traceability, and automation, leading to delays, increased operational costs, and compliance issues with international trade laws and sustainability requirements.
To overcome these inefficiencies, there is an urgent need for a Consortium Blockchain-based solution that can streamline global trade processes by enabling secure, transparent, and efficient cross-border transactions while ensuring compliance with global trade and ESG norms.

Key Functionalities:
- Automate and enforce trade agreements via smart contracts aligned with WTO rules to reduce disputes and ensure compliance.
- Secure transactions using a consortium blockchain escrow system with multi-signature approval for enhanced trust.
- Implement decentralized identity management to verify participants, prevent fraud, and meet global standards.
- Integrate ESG metric tracking to monitor and improve the sustainability of import-export operations.
- Enable transparent cross-border trade through real-time tracking, auditability, and blockchain consensus.
- **Compulsory Functionality: Deploy an AI agent to manage trade flows, enforce compliance, and monitor ESG metrics securely and transparently.**