Code-O-Clock
CIT Hackathon - Problem Statements

Rubric Criteria

Criteria Rubric	Description	Weightage
Innovation & Creativity (30%)	Evaluates the originality and uniqueness of the solution. Does it offer fresh ideas or approaches that set it apart?	30%
Scope & Feasibility (30%)	Assesses the clarity and practicality of the project's goals. Can the solution be realistically implemented with available resources?	30%
Technical Proficiency (25%)	Measures the technical skill and execution. Is the solution built with sound technical knowledge and expertise?	25%
Presentation (15%)	Rates the clarity and effectiveness of communication. Is the project well-presented and easy to understand?	15%

Themes
1. Block Chain & Cyber Security
2. Gamification of Education
3. Agriculture & Rural Development
4. Healthcare
5. Travel and Tourism
6. Social Good / Sustainability

Problem Statements

1. Block Chain & Cyber Security

Problem Statement 1: MITRE ATT&CK Insights Extractor
Many threat intelligence teams publish insights on cyber threat actors and their latest attack campaigns. Some align their reports with the MITRE ATT&CK framework by tagging TTPs (Tactics, Techniques & Procedures) and offering security control recommendations. However, others produce reports without clear connections to ATT&CK, requiring readers to sift through content to identify tactics and defences.

Create a tool to extract TTPs from various public threat intelligence reports (e.g., webpages, PDFs), whether clearly tagged or embedded in text. The tool should utilise the MITRE ATT&CK framework to provide a clear summary of recommended security controls for detection and mitigation. This tool should be usable by senior analysts or cybersecurity managers on a monthly basis to prioritise defences against current threats, potentially leveraging AI methods like Large Language Models.

References: https://attack.mitre.org/

Report example where TTPs are tagged well:
https://thedfirreport.com/2024/04/29/from-icedid-to-dagon-locker-ransomware-in-29-days/

Report example with less obvious TTPs:
https://unit42.paloaltonetworks.com/alloy-taurus/

Problem Statement 2: Blockchain for Secure Supply Chain Transparency

Create a blockchain-based solution that enhances supply chain transparency and security by providing real-time tracking of goods from origin to consumer. This platform should address issues such as fraud, counterfeiting, and lack of accountability in supply chains.

Potential Solutions:

- **Immutable Tracking Ledger:** Develop a system where all transactions and movements of goods are recorded on a tamper-proof blockchain, enabling traceability and accountability.
- **Consumer Verification App:** Create a mobile application that allows consumers to scan products and verify their authenticity and origin through blockchain records, promoting trust and informed purchasing.
- **Automated Compliance Checks:** Implement smart contracts that automatically verify compliance with safety and ethical standards throughout the supply chain, ensuring adherence to regulations.

2. Gamification of Education

Problem Statement 1: Adaptive E-Learning Platform

Develop an innovative solution that creates immersive and interactive learning experiences for students and adapts to individual learning styles and paces. Traditional online courses often fall short in engagement and struggle to meet diverse learning styles. Asynchronous learning, which allows students to learn independently, offers a unique chance for personalization and flexibility.

Potential Solutions:

- **Personalized Learning Paths:** AI can analyse student data to suggest customised learning materials and activities that align with individual strengths and weaknesses.
- **Interactive Content Creation:** AI can produce tailored quizzes, provide live translations, and establish feedback loops, ensuring that students remain actively engaged with the course content.
- **Immersive Learning Environments:** AI could be utilised to create chatbots that function as virtual mentors, foster peer-to-peer interactions in online forums, or even develop interactive simulations for a more profound learning experience.

3. Agriculture & Rural Development

Problem Statement 1:

Develop an innovative solution that provides real-time, data-driven advisory services to farmers, enabling them to optimise crop yields and manage resources efficiently. The platform should incorporate weather forecasts, soil health data, pest and disease alerts, and market prices to help farmers make informed decisions.

- Predict crop performance under various conditions, providing tailored recommendations for planting, fertilisation, and irrigation.
- It could deliver actionable insights directly to farmers in remote areas, ensuring they have access to vital information regardless of connectivity challenges.
- Integrate a community forum where farmers can share experiences and strategies, fostering a collaborative environment for knowledge exchange and support.

Problem Statement 2:

Design a blockchain solution that enhances transparency and trust in the agricultural supply chain, from producers to consumers. This tool should track the journey of agricultural products, ensuring quality control, fair trade practices, and sustainability.

- Develop an immutable ledger that records every transaction in the supply chain, allowing consumers to verify the origin and handling of products, promoting informed purchasing decisions.
- Implement smart contracts that automatically enforce fair trade agreements between farmers and buyers, ensuring timely payments and fair pricing based on market conditions.
- Create dashboards for farmers to report sustainable practices, enabling consumers to support environmentally responsible agriculture through informed choices.

4. Healthcare

Problem Statement 1:

The global health crisis is dominated by noncommunicable diseases (NCDs) like heart disease, cancer, and diabetes, which account for 74% of worldwide deaths (WHO). These diseases stem from unhealthy lifestyles, including poor diet and inactivity, leading to serious health issues if not managed effectively.

Healthcare providers are essential in promoting healthier lifestyles, but effective coaching techniques are often lacking among professionals, complicating the fight against NCDs.

Challenge:
Develop an AI health coach that offers personalised coaching based on individual health risks (e.g., hypertension, high cholesterol). This AI should provide customised advice, draw from an evidence-based health knowledge base, and use motivational behavioural science strategies to foster habit change.

Objectives:

- **Personalization:** Assess individual health risks and preferences to offer tailored advice.
- **Knowledge Integration:** Include a repository of evidence-based health information.
- **Behavioural Change:** Employ techniques like the Stages of Change model to encourage healthy choices.
- **Engagement:** Create interactive elements to keep users motivated.

Additional Mini Challenge:
How can the AI health coach incorporate cultural sensitivity to adapt to users' diverse dietary, exercise, and health beliefs?

Problem Statement 2:

Create a solution that identifies and addresses healthcare disparities in underserved communities by connecting individuals with tailored health resources, education, and support services. The platform should enhance access to care and promote health equity through localised solutions.

- **Community Resource Mapping:** Develop a database that maps local healthcare services, including clinics, pharmacies, and support groups, along with their accessibility and cultural competencies.
- **Culturally Relevant Educational Materials:** Provide personalised health education resources in multiple languages and culturally appropriate formats to improve health literacy in diverse populations.
- **Referral and Advocacy Network:** Establish a network for community health workers and advocates to assist individuals in navigating healthcare systems, securing appointments, and accessing necessary resources.

5. Travel and Tourism

Problem Statement 1:
Create a solution that helps travellers plan eco-friendly trips. The platform should provide options for sustainable accommodation, transportation, and activities while calculating the carbon footprint of the trip. It should also suggest ways to offset the environmental impact of their journey. Integrate real-time data on green energy sources or local environmental projects that users can contribute to.

Problem Statement 2:
Build an innovative solution that predicts future travel prices (flight tickets, hotels, or car rentals) based on historical data and external factors like holidays, events, and geopolitical situations. The app should advise users on the best time to book. It could provide travellers with real-time information during their trip. This could involve weather updates, transportation schedules, travel restrictions, or localised safety information.

Problem Statement 3:
Build a solution that predicts crowd levels at popular tourist destinations and suggests optimal visiting times to avoid long waits or overcrowding. It should factor in data such as ticket sales, social media check-ins, or foot traffic from mobile devices.Integrate with public transport systems to suggest the best ways to travel during off-peak hours.

6. Social Good / Sustainability

Problem Statement 1: Use Generative AI to revolutionise the analysis of sustainability reporting for companies.

Develop a solution using Generative AI to extract and analyse sustainability commitments from public corporate reports. The system should compare these objectives with actual progress data to assess companies' alignment with sustainability goals and regional emissions standards. Public data will be used to create a framework for evaluating performance and potentially predicting future compliance with environmental targets.

Data Sources:

- **Annual and Sustainability Reports**
- **Public News Articles**
- **Company Announcements**

Problem Statement 2: Digital Waste Reduction Network

Create a digital platform that connects individuals and businesses to facilitate the redistribution of surplus resources and reduce waste in local communities. This platform should empower users to donate, swap, or sell surplus items—ranging from food to clothing—while fostering a culture of reuse and community resilience.

- Resource Matching Algorithm: Utilise AI to match users with surplus resources to those in need, ensuring efficient distribution based on location and availability.
- Gamification of Participation: Implement a rewards system that encourages community members to engage in waste reduction activities, such as donating items or volunteering.

- Impact Analytics Dashboard: Provide users with insights into the environmental impact of their contributions, such as carbon footprint reduction and community engagement metrics.