❄ General Guidelines for round : 1

✳ Teams need to submit a PowerPoint presentation outlining the proposed solution, implementation workflow, technology stack , expected impact, challenges, business model, etc.

✳ Judges will review the ppts and shortlist the **top 30** teams.

✳ You need to choose **one** PS to proceed through the competition.

✳ If you choose the **open track**, you need to adhere to the guidelines mentioned in the open track section below.

✳ **All the features mentioned in a particular Problem Statement (PS) are not mandatory requirements;** instead, they are intended to clarify and provide guidance. You can add or modify technical features based on your approach and needs. However, the **core functionality of your solution should align with the PS**.

✳ Solutions can encompass **hardware , software or combination of both**.

✳ Maximum Slides: **10** (Title , Team and Thank you slide not included).
Exceeding the maximum slide limit will result in point deductions.
Each ppt **must** contain a **Title and Team slide**. PPTs without them will be disqualified.

✳ **Title slide should have Theme , Problem statement ,Team Name & Team Lead name.** Teams choosing the **Open Track** need to mention the theme as 'Open' and provide a problem statement they are solving.

❄ Team names are **case-sensitive**. Please ensure you remember and use them correctly.

❄ **Team slide should have team member information in following format**

Sl. No.	Name	Contribution	Email	Contact No
1	Lead			
2	Member 1			
3	Member 2			
4	Member 3			

❄ While **optional**, it is encouraged to present a partially working prototype in the preliminary rounds focusing on showcasing the core idea, key features, and planned improvements. You may embed demo links, GitHub repositories, or other relevant resources directly within the PPT/PDF.

❄ Submissions must be original. Plagiarism or the use of copyrighted materials without permission or proper attribution will result in disqualification.

❄ The submission will be through a **Google Form** shared in the email. Please follow the link provided in the email to upload your presentation.

❋ Submissions must be in **.pptx** or **.pdf** format. Other formats will not be accepted.

❋ Name your file as: TeamName_HackathonTheme.pptx or TeamName_HackathonTheme.pdf, for example DevBusters_Education.ppt or DevBusters_Education.pdf

❋ All presentations must be submitted by **10th February,11:59 PM** IST. Late submissions will not be considered.

❋ For any problem, feel free to reach out to team leads: Sheetali Maity and Soham Saha

❋ Green Technology

❋ **Smart Waste Management System : (PS 1)**

Develop a waste management solution that optimizes waste collection routes by analyzing real-time data from IoT-enabled smart bins. These bins may be equipped with sensors to monitor fill levels, waste types, and environmental factors such as temperature and moisture, transmitting data via IoT protocols (e.g., LoRaWAN, Zigbee, or cellular networks) to a centralized system. The system may dynamically adjust collection routes using AI-powered algorithms that account for bin capacity, waste categorization (e.g., recyclables, organic waste), and real-time traffic data sourced from APIs. Additionally, image recognition and machine learning algorithms may analyze waste at the source to identify and classify recyclable materials, supporting efficient segregation at source.

❄ Healthcare

❅ **Optimizing Hospital Operations through Patient Flow and Inventory Management Solutions: (PS 2)**
A technological solution is needed to optimize hospital operations, particularly in rural hospitals, by improving the management of OPD patient flow, bed availability, and admissions using queuing models and scheduling systems. The system may include tools for tracking and managing medicines, consumables, and inventory through simple barcode scanning or basic inventory management software. An integrated hospital management system could connect with city-wide networks to enable better resource allocation and patient referrals.

❄ Inclusivity

❅ **Accessibility Assistant: (PS 3)**

Develop an application that helps individuals with disabilities navigate public spaces by utilizing real-time, crowdsourced data on accessibility features such as ramps, elevators, and accessible restrooms. The app can also provide personalized route planning, allow users to report issues or changes in accessibility features, integrate voice guidance, and offer notifications about nearby accessible locations in real-time.

❅ **Bank Notes & Coin detection system for visually impaired individuals: (PS 4)**

Design a bank note and coin detection system for blind or visually impaired individuals that utilizes computer vision and audio feedback to identify and distinguish between different coin denominations.

The system can use machine learning algorithms, including advanced models like Vision Transformers (ViTs) and object detection techniques, to accurately process bank note & coin images captured via a smartphone camera or wearable device. The solution can also integrate real-time audio feedback, providing users with accurate money identification to assist them in making independent, confident financial transactions.

❄ **Sustainability**

❄ **Energy Consumption Optimization App: (PS 5)**

Create an application that uses AI to analyze household energy consumption patterns and provide personalized recommendations for reducing energy usage. The app should integrate with smart home devices to automate energy-saving actions. Additionally you can add a solution for analyzing daily power consumption trends (e.g., load duration curves or consumption curves) to identify peak usage hours and suggest energy-saving strategies for households and industries

❄ **Smart Grid Integration for Optimized EV Charging: (PS 6)**

The rising demand on electrical grids from EV charging is causing inefficiencies and occasional blackouts. Develop a smart system to seamlessly integrate EV charging schedules into the grid's power distribution framework. This system will optimize energy allocation by balancing real-time grid capacity with charging demands, ensuring efficient energy usage, minimizing overload risks, and enhancing grid stability

❄ Education

❄ **Design an Immersive VR Classroom for Interactive Learning (PS 7)**

Create a AR/ VR classroom environment where students can interact with educational content in immersive ways to enhance their learning experience. The virtual classroom may include features such as interactive simulations, 3D visualizations, and virtual hands-on activities, enabling students to explore complex subjects like science, history, and mathematics dynamically. The system may leverage motion tracking and hand gesture recognition for realistic interactions, as well as voice recognition for verbal engagement. Real-time feedback could be provided using AI-powered analytics that monitor and respond to student actions, enabling personalized learning paths tailored to individual progress and understanding.

❄ **Inclusive Education App: (PS 8)**

This mobile/web app should provide an accessible platform for deaf and mute students in India to learn Indian Sign Language through interactive modules. It can include features for learning alphabets, numbers, basic math, and science, with support for text-to-sign and speech-to-sign conversion. The app should track user progress, offering real-time feedback and practice exercises to reinforce learning. By integrating cloud-based data storage and analytics, it can provide detailed reports for teachers and parents.

❄ **Fintech**

✸ **Affordable Microloans for Small Farmers in India: (PS 9)**
Small farmers in India face significant challenges in accessing formal credit due to the lack of traditional collateral and formal credit histories. A fintech solution may leverage alternative data sources such as satellite imagery to assess land health, weather patterns for risk evaluation & historical crop yield data for income estimations. Machine learning models could analyze these diverse datasets to dynamically calculate risk profiles and determine creditworthiness. The platform may offer microloans with repayment schedules aligned to crop cycles and prevailing market conditions, ensuring better repayment feasibility. Additionally, the solution could integrate with mobile-based platforms to enable seamless loan applications, disbursements, and repayments, offering a user-friendly interface and secure digital transactions to improve accessibility for farmers.

✸ **Subscription Management Tool: (PS 10)**

The subscription management tool helps users efficiently track, manage, and optimize their subscriptions (e.g., streaming services, software) by providing actionable insights into their subscription usage. The tool may include features like cost vs. usage analysis based on user-input data, renewal reminders triggered by calendar integrations, and payment history logs linked to bank or wallet statements. Users could categorize subscriptions, manage shared plans by assigning roles or splitting costs, and set spending budgets with visual dashboards to monitor expenses. The system may also offer alternative recommendations for underutilized services using predefined thresholds and rules.

❄ Women Safety

✳ Predictive Analytics for Crime Prevention: (PS 11)

Leverage big data and AI to predict crime hotspots. The system may analyze historical crime data, including location, time, and type of crimes, along with external factors like local events, and socio-economic conditions. AI algorithms could process this data to detect emerging patterns and predict areas with higher likelihoods of criminal activity. The tool may generate real-time crime risk maps and heatmaps, visualizing crime density in specific areas to help law enforcement focus patrols on high-risk locations.

✳ Wearable Safety Devices: (PS 12)

Develop wearable technology that continuously monitors physiological signals indicative of stress or fear, such as changes in heart rate or sudden shifts in activity levels. The device may leverage sensors, such as accelerometers and gyroscopes, to detect abnormal behavior and trigger automatic alerts to predefined emergency contacts if distress is detected. The system may incorporate GPS functionality to provide real-time location tracking, allowing emergency responders to quickly locate the wearer. Additionally, the device may include integrated audio and video recording features, activated automatically when unusual patterns are detected, to capture real-time evidence during emergencies. The system may utilize low-power wireless communication protocols (e.g., Bluetooth or cellular networks) to transmit data securely and ensure fast response times.

❄ Road Safety Tool

❋ **Enhancing Post-Accident Emergency Response in India: (PS 13)**
India's post-accident emergency response system faces challenges such as delayed ambulance response times, inefficient resource allocation, and lack of on-scene medical support. A technological solution may involve a system that connects real-time data from GPS-enabled ambulances, traffic monitoring, and emergency services. The system may use routing algorithms to help ambulances avoid traffic and reach accident sites faster. Paramedics could be equipped with mobile devices to access patient data (like injuries and vital signs) and enable remote consultations with trauma specialists for immediate medical guidance. Additionally, the system may link with hospitals to help them prepare for incoming patients, manage available beds, and assign staff effectively, improving overall coordination and reducing delays in care.

❋ **Improving Pedestrian Safety at High-Traffic Intersections in India (PS 14)**

In India's rapidly growing urban areas, high-traffic intersections pose significant risks to pedestrians due to inadequate infrastructure, poor traffic management, and driver negligence. The lack of safe crossings, clear signage, and awareness contributes to the rising number of pedestrian accidents. Addressing this issue requires innovative solutions, such as smart traffic systems powered by IoT to optimize traffic flow and improve pedestrian safety. These systems can include IoT-enabled sensors for pedestrian and vehicle detection, smart traffic lights that adapt in real time, and connected devices that provide audio-visual alerts to pedestrians and drivers. Hardware solutions like edge devices for data processing, smart cameras for traffic monitoring can further enhance safety.

❄ Old Age Services

❋ **Comprehensive Care Management Web/Mobile App: (PS 15)**

Develop a web/mobile app that can address the challenges faced by elderly individuals. For elderly care, the app may include emergency alert capabilities, medical history tracking, and quick connection to caregivers, ensuring timely assistance during emergencies. Additionally, it can feature integrated tools for managing daily needs, such as medication reminders, dietary recommendations, activity tracking, and real-time communication with caregivers, offering a seamless and accessible solution for enhanced safety and well-being.

❄ Food Technology

❋ **AI-Powered Food Quality Assessment: (PS 16)**

Develop a food quality assessment system that may utilize computer vision, IoT sensors, and machine learning to monitor and classify food quality. The system can use convolutional neural networks (CNNs) to analyze images of food for imperfections such as bruising or spoilage. Additionally, it may integrate IoT sensors to monitor environmental factors like temperature, humidity, and pH, which affect food quality. Machine learning algorithms can classify the food into categories (e.g., fresh, spoiled) based on visual and sensor data, enabling real-time assessment and helping businesses manage food quality and reduce waste effectively.

❄ Open Tracks

Participants in the Open Track are encouraged to choose and develop a solution from the following predefined domains while addressing a real-world problem.

❄ **Machine Learning Applications:** This includes Natural Language Processing (NLP), Computer Vision & Image Processing, Reinforcement Learning, Recommendation Systems, Signal Processing, Generative AI (Gen AI) & Large Language Models (LLMs)

❄ **IOT and Smart Systems:** Projects must focus on real-time monitoring, automation, or energy optimization using IoT devices.

❄ **Robotics and Automation:** Development of autonomous robotic systems that integrate IoT / AI to efficiently execute complex tasks in dynamic real-world environments.

❄ **Web/App Development**: Projects need to focus on the integration of frontend and backend systems using modern frameworks, APIs, and optimized database management. Includes server-side automation, development of browser-based tools such as Chrome extensions, and the creation of dynamic, scalable web or mobile applications .

❄ **Cloud and DevOps Solutions:** Projects may involve the integration of cloud services, containerization (e.g., Docker), or automation tools for continuous deployment and scaling

❄ **AR/VR Development:** Projects may focus on creating immersive, interactive experiences using Augmented Reality (AR) or Virtual Reality (VR) for applications in education, training, gaming, healthcare, or retail.