INNOVERSE

INNOVERSE AI & WEB CHALLENGES GUIDE 2026

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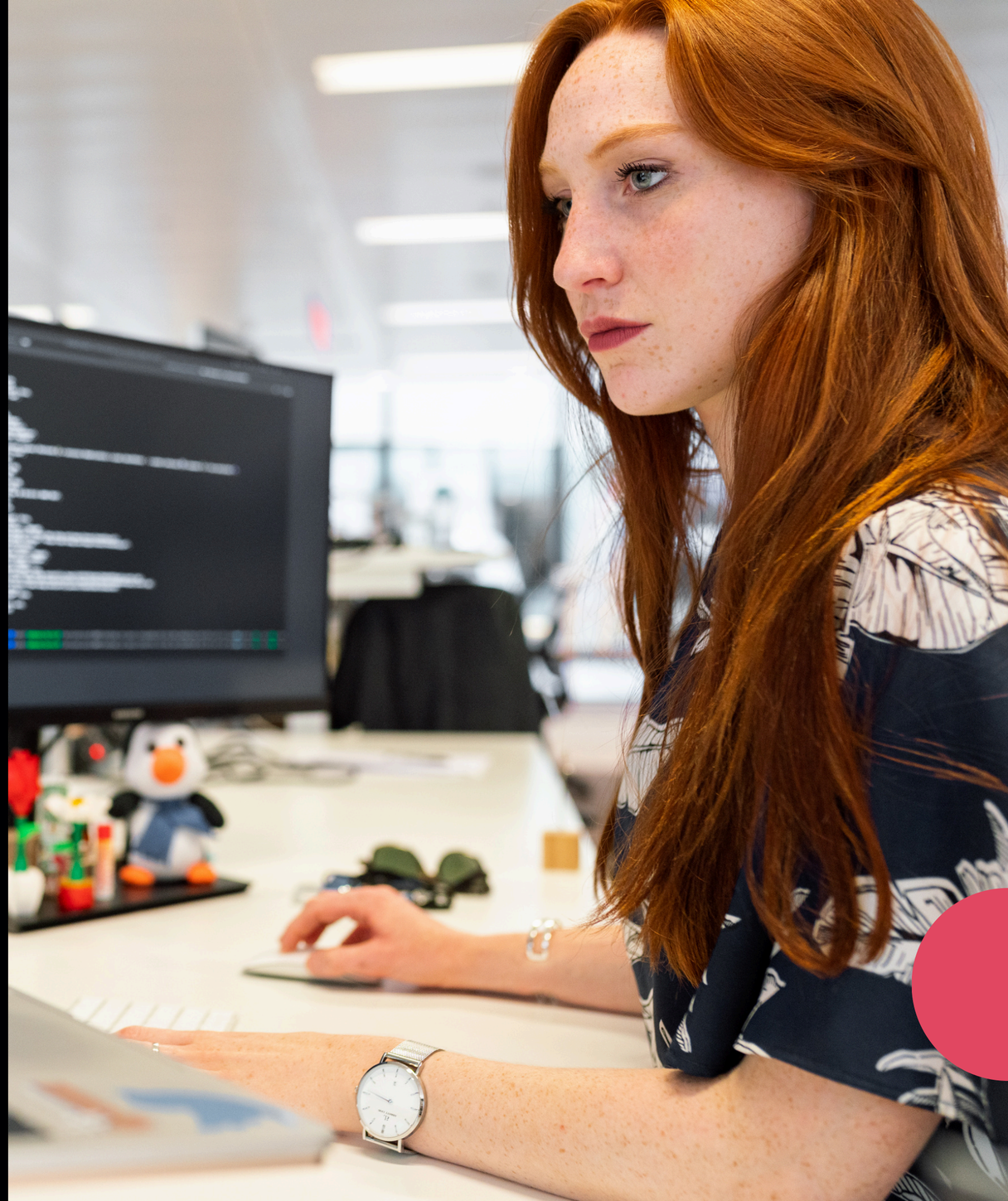
OVERVIEW

This guide provides detailed instructions for creating a programming challenge section for the Innoverse Invention & Innovation Expo. This section will include a downloadable PDF guide that outlines the challenges, instructions for participants, and guidelines for submitting their solutions via GitHub

INTRODUCTION

Welcome to the Innoverse Invention & Innovation Expo Challenges! This event aims to develop creativity, problem-solving, and technical skills among participants. In this guide, you will find everything you need to participate in our programming challenges, which are designed to be both fun and intellectually stimulating



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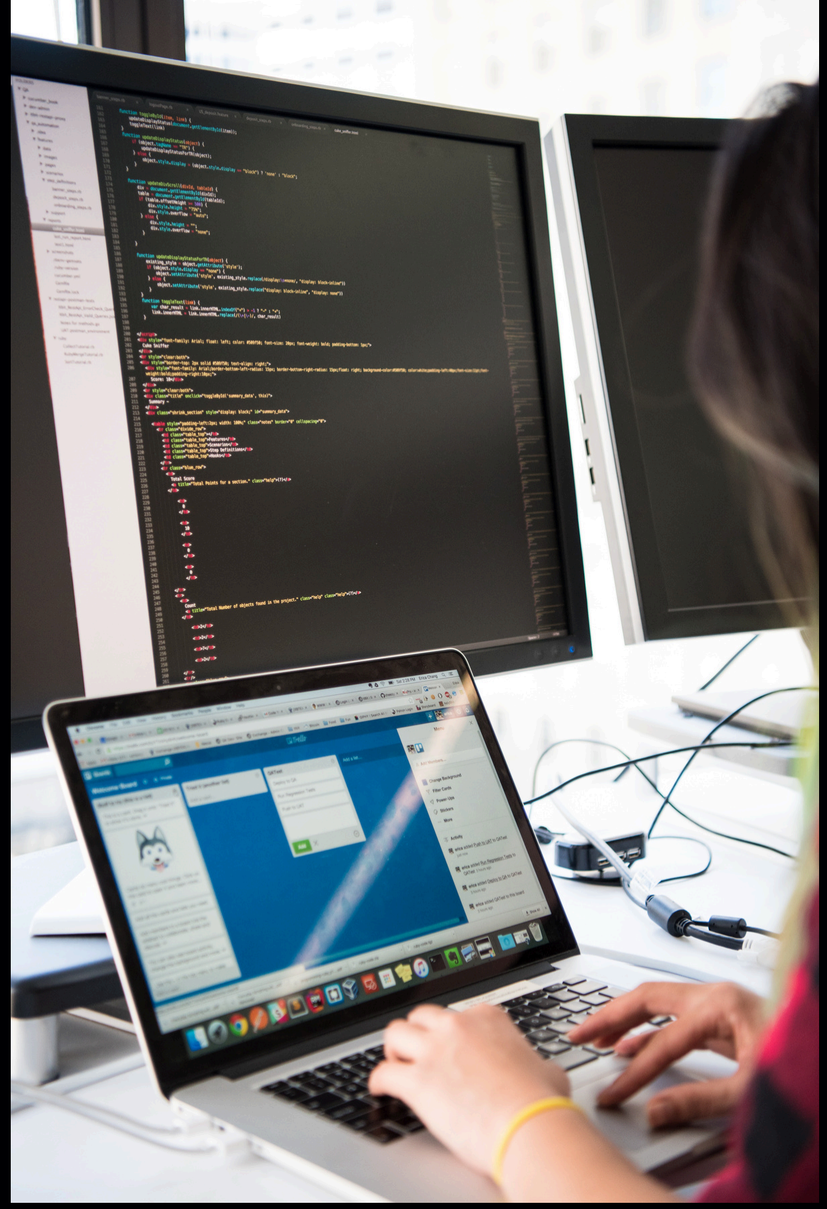
SUBMISSION GUIDELINES

1. **Create a GitHub Repository**
• Create a new GitHub repository for your solution.
• Name your repository in the format: ExpoChallenge_YourName.
2. **Upload Your Code**
• Upload your code and any related files to the repository.
• Ensure your code is well-structured and organized.
3. **Add a README File**
• Include a README.md file in your repository for documentation.
• The README should contain:
• A brief description of your solution.
• Instructions on how to run your code.
• Any dependencies or libraries required.
• Your contact information.
4. **Include a Payment Receipt**
• Attach the receipt for your payment in the email when you submit your repository link.
• Ensure the receipt is clearly legible and includes your name and the payment amount.
5. **Submit Your Solution**
• Email the link to your GitHub repository to [challenge@innoverse.world] with the subject line "Programming Challenge Submission."
• In the email body, include:
• Your full name.
• A brief summary of your approach to solving the challenge.
• Attach the payment receipt.



Judging Criteria

01 Innovation & Creativity
30%

02 Technical Execution
30%

03 Impact & Usefulness
20%

04 Presentation & Clarity
20%


AI CHALLENGES

1. Weekend Activity Planner

Project Description

The Weekend Activity Planner is an AI system designed to recommend enjoyable and realistic weekend activities based on user preferences, available budget, weather conditions, location, and group size. The system analyzes behavioral patterns and personal interests to suggest activities that maximize user satisfaction while remaining practical and accessible. This project is recommended to be developed using Machine Learning, as recommendation systems and preference prediction models are suitable for personalized suggestions.

Recommended Approach

Machine Learning

Main Tasks

- Analyze user preferences and interests
- Consider weather, budget, and time availability
- Recommend suitable weekend activities
- Personalize recommendations over time using feedback
- Optimize plans for individuals or groups

Expected Outputs

- Personalized weekend activity suggestions
- Ranked activity recommendations
- Budget and schedule-friendly plans
- Group-compatible activity options

Expected Results / Competition Expectations

The system should generate realistic and enjoyable activity recommendations with strong personalization accuracy. Better performance is expected when suggestions adapt to changing preferences and practical limitations.

2. Mood-Based Music Recommender

Project Description

This project focuses on building an AI system that recommends music according to a user's emotional state, activity, or environment. The system should recognize situations such as studying, relaxation, exercise, or stress and recommend songs that fit the mood. Feedback from users should gradually improve recommendation quality. This project is recommended to be developed using Machine Learning, since recommendation engines and preference learning are central components.

Recommended Approach

Machine Learning

Main Tasks

- Detect mood or activity patterns
- Recommend suitable music tracks or playlists
- Learn from user feedback and rejection patterns
- Improve recommendation diversity
- Personalize future suggestions

Expected Outputs

- Mood-based music playlists
- Personalized recommendations
- Adaptive preference profiles
- Activity-aware music suggestions

Expected Results / Competition Expectations

The system should provide relevant and personalized recommendations while avoiding repetitive suggestions. Accuracy, personalization quality, and adaptation to feedback are expected to influence performance.

3. Digital Wellness Analyzer

Project Description

The Digital Wellness Analyzer is designed to study user device usage habits and identify unhealthy behavioral patterns related to screen time. The system analyzes digital activity and predicts balance between productivity, entertainment, and rest. It may also provide recommendations to encourage healthier technology habits. This project is recommended to be developed using Machine Learning, because behavioral prediction and recommendation systems are the main challenge.

Recommended Approach

Machine Learning

Main Tasks

- Analyze device usage patterns
- Detect unhealthy digital behavior
- Predict screen-time balance
- Generate wellness suggestions
- Personalize recommendations over time

Expected Outputs

- Usage behavior reports
- Screen-time balance predictions
- Wellness improvement suggestions
- Personalized digital habit analysis

Expected Results / Competition Expectations

The system should accurately recognize unhealthy usage behaviors while generating useful and realistic recommendations that improve digital balance.

4. AI Personal Finance Coach

Project Description

This project involves building an AI assistant that helps users better manage personal spending and financial habits. The system categorizes expenses, predicts future spending behavior, and suggests saving strategies based on financial patterns. The project is recommended to be developed using Machine Learning, because financial forecasting and behavior analysis rely heavily on predictive models.

Recommended Approach

Machine Learning

Main Tasks

- Categorize spending patterns
- Predict future expenses
- Recommend saving strategies
- Analyze financial habits
- Personalize budget suggestions

Expected Outputs

- Expense categorization reports
- Spending forecasts
- Saving recommendations
- Personalized financial insights

Expected Results / Competition Expectations

The system should help improve spending decisions through accurate forecasting and practical financial recommendations.

5. Viral Trend Analyzer

Project Description

The Viral Trend Analyzer is an AI system that predicts which online topics, memes, or discussions are likely to become popular over time. The model analyzes anonymous digital trends, growth patterns, engagement signals, and timing information to estimate popularity changes. This project is recommended to be developed using Machine Learning, since forecasting and trend prediction are primarily data-driven tasks.

Recommended Approach

Machine Learning

Main Tasks

- Analyze trend growth signals
- Predict popularity changes
- Detect trend shifts over time
- Reduce false popularity predictions
- Evaluate engagement patterns

Expected Outputs

- Trend growth predictions
- Popularity ranking reports
- Forecast confidence scores
- Emerging topic alerts

Expected Results / Competition Expectations

The system should predict trend growth accurately while minimizing false hype predictions and adapting to sudden behavior changes.

6. Traffic Accident Risk Predictor

Project Description

This project focuses on predicting areas with a high probability of traffic accidents before incidents occur. The AI system analyzes historical accident data, weather conditions, traffic flow, road infrastructure, and visibility information to estimate risk levels. This project is recommended to be developed using Machine Learning, because structured data prediction and risk estimation are the main objectives.

Recommended Approach

Machine Learning

Main Tasks

- Analyze road and traffic data
- Predict accident risk levels
- Detect dangerous zones
- Adapt predictions to seasonal conditions
- Reduce false alarms

Expected Outputs

- Risk-level predictions
- High-risk area identification
- Safety alerts and reports
- Prevention recommendations

Expected Results / Competition Expectations

The system should accurately identify dangerous areas while balancing sensitivity and false alarms for reliable early warning performance.

7. Human-AI Collaborative Decision System

Project Description

This project involves developing an AI assistant that supports decision-making through continuous human feedback. The system provides recommendations while learning from approvals, corrections, or rejected suggestions to better align with user preferences. This project is recommended to be developed using Machine Learning, since adaptive recommendation and feedback learning are core requirements.

Recommended Approach

Machine Learning

Main Tasks

- Generate decision recommendations
- Learn from human feedback
- Adapt recommendations over time
- Balance automation and human control
- Improve cooperation quality

Expected Outputs

- Decision recommendations
- Preference-adapted suggestions
- Feedback analysis reports
- Updated recommendation strategies

Expected Results / Competition Expectations

The system should demonstrate strong adaptability and recommendation quality while maintaining user trust and improving decisions over time.

8. AI Meeting Summarizer & Action Tracker

Project Description

This project focuses on creating an AI system that summarizes meetings and extracts important action items automatically. The model should identify key discussions, decisions, deadlines, and responsible individuals while filtering unnecessary details. This project is recommended to be developed using Deep Learning, because natural language understanding and summarization tasks require advanced language models.

Recommended Approach

Deep Learning

Main Tasks

- Process meeting transcripts or audio
- Summarize important discussions
- Extract decisions and action items
- Detect deadlines and responsibilities
- Organize meeting outcomes

Expected Outputs

- Meeting summaries
- Action-item lists
- Deadline tracking information
- Structured discussion reports

Expected Results / Competition Expectations

The system should generate clear and accurate summaries that closely match human understanding while correctly identifying actionable information.

9. Classroom Focus Detector

Project Description

The Classroom Focus Detector is an AI system designed to measure classroom attention levels anonymously without identifying individual students. The system analyzes classroom behavior patterns to recognize signs of distraction, engagement, or sudden changes in focus. Teachers receive overall classroom-level insights that can improve lesson planning and learning environments. This project is recommended to be developed using Machine Learning, as behavior classification and pattern recognition are the primary objectives.

Recommended Approach

Machine Learning

Main Tasks

- Analyze classroom attention patterns
- Detect distraction and engagement signals
- Monitor sudden focus changes
- Protect anonymity and privacy
- Generate classroom-level summaries

Expected Outputs

- Attention level reports
- Classroom engagement summaries
- Focus trend analysis
- Learning environment insights

Expected Results / Competition Expectations

The system should accurately estimate classroom attention while minimizing unfair assumptions and preserving privacy.

10. Dynamic Traffic Intelligence

Project Description

This project focuses on predicting traffic congestion and improving transportation efficiency through intelligent movement recommendations. The AI system analyzes traffic conditions, congestion patterns, and city movement behavior to forecast delays and suggest better routes or traffic management strategies. This project is recommended to be developed using Machine Learning, because forecasting and optimization are based on structured prediction models.

Recommended Approach

Machine Learning

Main Tasks

- Predict traffic congestion levels
- Recommend alternative routes
- Analyze transportation patterns
- Optimize traffic movement efficiency
- Adapt predictions in real time

Expected Outputs

- Traffic forecasts
- Route recommendations
- Congestion analysis reports
- Transportation optimization suggestions

Expected Results / Competition Expectations

The system should reduce delays through accurate congestion prediction and adaptive route optimization.

11. Mental Health Conversation Safety Analyzer

Project Description

This project involves building an AI system that analyzes anonymous conversations to identify emotional distress, crisis risk, or dangerous emotional escalation while maintaining privacy. The model should recognize emotional signals, classify risk levels, and support safe decision-making without overreacting to harmless conversations. This project is recommended to be developed using Deep Learning, since natural language understanding and contextual emotional analysis require advanced language models.

Recommended Approach

Deep Learning

Main Tasks

- Analyze emotional language patterns
- Detect distress and crisis indicators
- Classify conversation risk levels
- Protect privacy and anonymity
- Improve fairness and reliability

Expected Outputs

- Risk classification results
- Emotional pattern analysis
- Safety monitoring reports
- Suggested support categories

Expected Results / Competition Expectations

The system should reliably recognize genuine emotional concern while reducing false alarms and maintaining fairness.

12. Image Caption Generator

Project Description

This project focuses on building an AI system that automatically generates meaningful captions for images. The model must understand objects, actions, scene relationships, and visual context to create natural and grammatically correct descriptions. The system should avoid generic outputs and produce detailed observations when scenes become more complex. This project is recommended to be developed using Deep Learning, because it combines computer vision with natural language generation.

Recommended Approach

Deep Learning

Main Tasks

- Analyze image content
- Detect objects and actions
- Understand scene relationships
- Generate natural captions
- Improve contextual accuracy

Expected Outputs

- Image descriptions
- Context-aware captions
- Scene understanding reports
- Human-readable explanations

Expected Results / Competition Expectations

The system should generate captions that closely resemble human descriptions while maintaining contextual accuracy and language quality.

13. Sports Strategy Coach

Project Description

The Sports Strategy Coach is an AI system that analyzes sports matches to identify movement patterns, player strengths, weaknesses, and possible strategy improvements. The model studies gameplay behavior and provides recommendations to improve team performance. This project is recommended to be developed using Deep Learning, because video analysis and movement understanding are key challenges.

Recommended Approach

Deep Learning

Main Tasks

- Analyze sports match data
- Detect player movement patterns
- Identify strengths and weaknesses
- Generate coaching recommendations
- Predict performance improvements

Expected Outputs

- Match analysis reports
- Tactical recommendations
- Performance insights
- Strategy improvement suggestions

Expected Results / Competition Expectations

The system should provide meaningful and accurate recommendations that improve team strategy and performance prediction.

14. Object Tracking System

Project Description

This project involves building an AI system that tracks moving objects across consecutive video frames while maintaining consistent object identity. The system must recognize objects despite lighting changes, temporary disappearance, overlapping movement, or viewpoint variation. Unique tracking IDs should remain stable even in crowded scenes. This project is recommended to be developed using Deep Learning, because advanced computer vision and temporal tracking models are required.

Recommended Approach

Deep Learning

Main Tasks

- Detect moving objects in video
- Track object movement over time
- Preserve object identity consistency
- Handle occlusion and reappearance
- Improve tracking accuracy in crowded scenes

Expected Outputs

- Object tracking results
- Unique object IDs
- Motion tracking reports
- Temporal movement analysis

Expected Results / Competition Expectations

The system should maintain consistent tracking accuracy while minimizing identity switching, false detections, and lost objects.

15. Smart Waste Sorting Robot

Project Description

This project focuses on developing an AI-powered robotic system that automatically recognizes and sorts waste materials into proper recycling categories. The system analyzes mixed trash using computer vision and controls a robotic mechanism to separate materials under changing conditions. It must handle damaged, dirty, or partially hidden objects efficiently. This project is recommended to be developed using Deep Learning, because visual classification and robotic automation require advanced computer vision models.

Recommended Approach

Deep Learning

Main Tasks

- Detect and classify waste materials
- Recognize recycling categories
- Control automated sorting mechanisms
- Handle difficult object conditions
- Improve sorting speed and accuracy

Expected Outputs

- Waste classification results
- Sorting automation commands
- Recycling category reports
- Performance efficiency analysis

Expected Results / Competition Expectations

The system should accurately sort waste materials while maintaining efficiency, speed, and reliable recognition under challenging conditions.

16. AI Archaeologist: Lost Language Reconstruction

Project Description

This project involves building an AI system capable of reconstructing missing words or meanings in partially destroyed ancient languages. The model receives fragmented symbols, incomplete sentences, and multilingual context while attempting to infer grammar and semantic relationships without complete dictionaries. The system must handle uncertainty and hidden linguistic structures effectively. This project is recommended to be developed using Deep Learning, because language reconstruction requires advanced sequence modeling and contextual reasoning.

Recommended Approach

Deep Learning

Main Tasks

- Analyze fragmented language patterns
- Infer missing words and grammar
- Understand semantic relationships
- Handle noisy historical data
- Estimate prediction confidence

Expected Outputs

- Reconstructed language segments
- Grammar pattern predictions
- Confidence estimates
- Semantic interpretation reports

Expected Results / Competition Expectations

The system should accurately reconstruct missing language components while demonstrating contextual understanding and explainable reasoning.

17. Autonomous City Recovery Planner

Project Description

The Autonomous City Recovery Planner is an AI system designed to rebuild and stabilize a city after a simulated disaster. The model must allocate resources across transportation, housing, food, healthcare, and public services while adapting to uncertainty and changing conditions. Every decision influences future system performance, requiring long-term planning and balanced optimization. This project is recommended to be developed using Deep Learning, because sequential decision-making and multi-objective optimization involve highly complex modeling.

Recommended Approach

Deep Learning

Main Tasks

- Allocate city recovery resources
- Predict long-term system outcomes
- Balance multiple recovery objectives
- Adapt to unexpected disruptions
- Optimize citizen wellbeing and sustainability

Expected Outputs

- Recovery planning strategies
- Resource allocation reports
- Long-term sustainability analysis
- Decision optimization recommendations

Expected Results / Competition Expectations

The system should maximize resilience, stability, and citizen wellbeing while balancing limited resources and uncertain future conditions.


WEB CHALLENGES

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#1

Middle East. All traffic lights, subways, power plants, the water system, air pollution monitors, and even security cameras are controlled by a central artificial intelligence system called NEXUS.
Three days ago, a massive cyberattack caused part of the NEXUS system to fail. Now, city traffic is gridlocked, air pollution has reached critical levels, and several districts are on the verge of blackouts.
The municipality has decided to form a Front-End development team to design a "Crisis Management Dashboard" in less than a month; a dashboard through which operators can view and control the city's status in real-time.
Data is sent in real-time from thousands of sensors. Some data is corrupted, some is delayed, and some must be analyzed graphically on a map.
Your team is responsible for building the initial version of this system.
Challenge Description:
Participants must design a fully interactive web application that displays the status of various city sectors.
All data must be managed with JavaScript, and the system must be capable of processing simulated real-time data.

Example raw sensor data:

```
const trafficMap = [
  [0,0,1,0,0],
  [0,1,1,1,0],
  [0,0,2,0,0],
  [1,1,1,0,0],
  [0,0,0,0,3]
];
```

Data meaning:
0 → Normal street
1 → Heavy traffic
2 → Accident
3 → Closed area

Example air pollution data:

```
const pollutionData = [
  { zone: "A1", aqi: 120 },
  { zone: "B4", aqi: 250 },
  { zone: "C2", aqi: 90 }
];
```

Example power plant data:

```
const powerGrid = [
  {
    station: "North Plant",
    status: "active",
    power: 82
  },
  {
    station: "South Plant",
    status: "critical",
    power: 21
  }
];
```

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#2

In the year 2050, the first permanent human base on Mars has been constructed.
The base "ARES-7" relies on hundreds of autonomous robots to conduct scientific research. These robots perform tasks such as mining, equipment repair, cargo transport, and collecting scientific samples.
After a severe solar storm, the central robot control system was damaged, and many robots are receiving incorrect commands.
The astronauts need a new tool that allows them to plan and manage robot behavior. Your team is responsible for building the initial version of this system.

Challenge Description:
Participants must design an interactive Web Application that allows users to define various tasks for robots without needing to code.
Users should be able to design different mission stages using a visual interface and observe their execution.

Example robot data:

```
const robots = [
{
id: "R-01",
type: "miner",
battery: 82
},
{
id: "R-02",
type: "repair",
battery: 65
}
];
```

Expected features:
- Build missions with Drag & Drop
- Command queue management
- Mission execution display
- Command validation

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#3

SkyGate" International Airport is about to host one of its busiest weeks of the year.
Simultaneously, several global events, increased business travel, and changing weather conditions have caused flight volumes to increase unprecedentedly.
Airport management has decided to abandon the old monitoring and control system and design a modern web-based platform to manage all airport sections in an integrated manner.
This system is intended to:
* Display live flight status
* Manage gate traffic
* Control staff schedules
* Check baggage and cargo status
* Generate real-time reports for managers

But the main challenge is not just displaying information.
Data is constantly changing:
* Some flights get delayed
* Some gates change suddenly
* Some baggage is sent to the wrong location
* And weather conditions can alter the entire schedule
Your team is responsible for designing the initial version of this operations center.

Challenge Description:
Participants must design a professional management Dashboard that controls and displays several different airport sections.
Project focus on:
* Dynamic data management
* Professional interface design
* Advanced interactions.

Example flight data:

```
const flights = [
  {
    flight: "AZ204",
    destination: "London",
    gate: "B12",
    status: "Boarding",
    passengers: 182
  },
  {
    flight: "TK118",
    destination: "Istanbul",
    gate: "A03",
    status: "Delayed",
    passengers: 146
  }
];
```

Example staff data:

```
const staff = [
  {
    name: "Emma Lewis",
    role: "Security",
    shift: "Night"
  },
  {
    name: "Daniel Ross",
    role: "Ground Crew",
    shift: "Morning"
  }
];
```

Example baggage data:

```
const baggage = [
  {
    code: "BG-2041",
    status: "Loading"
  },
  {
    code: "BG-7782",
    status: "Missing"
  }
];
```

#4

Nova Express" company has launched one of the largest online delivery services in the region.
Tens of thousands of orders are registered daily from across the city, and hundreds of couriers are moving simultaneously.
But the city faces many problems:
Traffic is constantly changing
Some streets are temporarily closed
Weather conditions affect delivery time
Some orders, like food, must be delivered within a limited time
Some couriers have more carrying capacity
Some orders have higher priority
Company management has decided to design a new intelligent system to select the best courier for each order, calculate the fastest route, and display the estimated delivery time in real-time.
Your team is responsible for developing the initial version of this system.

Challenge Description:
Participants must design an interactive Web Application that can manage orders, couriers, and city status.
The main focus of the project is on dynamic data analysis, real-time decision making, and route management.
All data must be processed with JavaScript

Example order data:

```
const orders = [
{ id: 101, type: "food", priority: "high",
destination: "Zone-D" },
{ id: 102, type: "package", priority:
"normal", destination: "Zone-B" }
];
```

#5

An international technology organization intends to hold the largest online programming competition in the region.
Thousands of teams from different countries will register, and the competitions will be held online.
But the current system has many problems:
Users can cheat
Rankings update slowly
Judges lack proper management
The server crashes under pressure
Now your team has been tasked with building a new version of this platform.

Challenge Description:
Participants must design a Full Stack system that can manage team registrations, display competition questions, store answers, generate live rankings, provide a judging panel, and manage information in a database.

Example team data:

```
const teams = [
{ id: 1, name: "Code Hunters", score:
320 },
{ id: 2, name: "Bug Slayers", score:
280 }
];
```

Example problem data:

```
const problems = [
{ id: 101, title: "Maze Escape",
difficulty: "hard" },
{ id: 102, title: "Binary River",
difficulty: "medium" }
];
```

Example database table:

```
CREATE TABLE submissions (
id INT PRIMARY KEY
AUTO_INCREMENT,
team_id INT,
problem_id INT,
status VARCHAR(20),
submitted_at DATETIME
);
```

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