# Code Festival 2025

## ROBOTICS CHALLENGE



05th July 2025

**Robotics Competition Tasks (≤5 Minutes)**

| Theme | Ages 10–14 (Beginner/Intermediate) | Ages 15–18 (Advanced) |
|---|---|---|
| **1. Smart Learning Tools for Rural Schools** | **Task:** Program a robot to deliver "books" (colored blocks) to matching "classrooms" (zones) in under 5 minutes. Sensors must detect zone colors. | **Task:** Design a robot that sorts "educational kits" (objects with QR codes/labels) into subject-specific boxes (Math, Science, etc.) using vision sensors or encoded cues. |
| **2. Waste Management & Recycling** | **Task:** Robot picks up 3–5 objects (paper, plastic, metal) and places them in corresponding colored bins. Manual pre-programming allowed. | **Task:** Autonomous robot sorts mixed waste (6+ items) into correct bins using real-time sensor feedback (e.g., color, material detection). Penalties for errors. |
| **3. Climate Change Awareness** | **Task:** Robot follows a "carbon footprint" path (black line) and stops at "action stations" (e.g., tree planting, recycling) to trigger lights/sounds. | **Task:** Robot navigates a maze to "reduce emissions" by collecting "clean energy tokens" (disks) while avoiding "pollution zones" (red areas). |
| **4. Renewable Energy Monitoring** | **Task:** Robot moves to "solar/wind" zones (lit or fan-powered) and displays energy data (e.g., LED lights for high/low output). | **Task:** Robot collects data from mock "energy sensors" (IR beacons) and transmits optimal power grid routes via Bluetooth/display. |

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**General Rubric for Both Age Groups**

| Criteria | Ages 10–14 (Max 20 Points) | Ages 15–18 (Max 25 Points)** |
|---|---|---|
| **Task Completion** | 5 pts: Partial completion.<br>10 pts: Full completion. | 5 pts: Partial.<br>15 pts: Full + efficiency. |

| Criteria | Ages 10–14 (Max 20 Points) | Ages 15–18 (Max 25 Points)** |
|---|---|---|
| **Accuracy** | 3 pts: Minor errors.<br>5 pts: Perfect execution. | 5 pts: Minor errors.<br>10 pts: Flawless + adaptive logic. |
| **Innovation/Creativity** | 2 pts: Basic design.<br>5 pts: Unique solution. | 5 pts: Standard approach.<br>10 pts: Advanced tech (AI, sensors). |
| **Time Management** | 2 pts: Exceeds 5 mins.<br>5 pts: On time. | 5 pts: On time.<br>10 pts: Bonus for speed + precision. |

**Notes:**

**Ages 10–14:** Focus on foundational skills (color sensing, simple loops).

**Ages 15–18:** Emphasize autonomy, complex sensors (vision, IR), and data handling.

**Judging:** Penalize manual intervention (e.g., touching the robot).