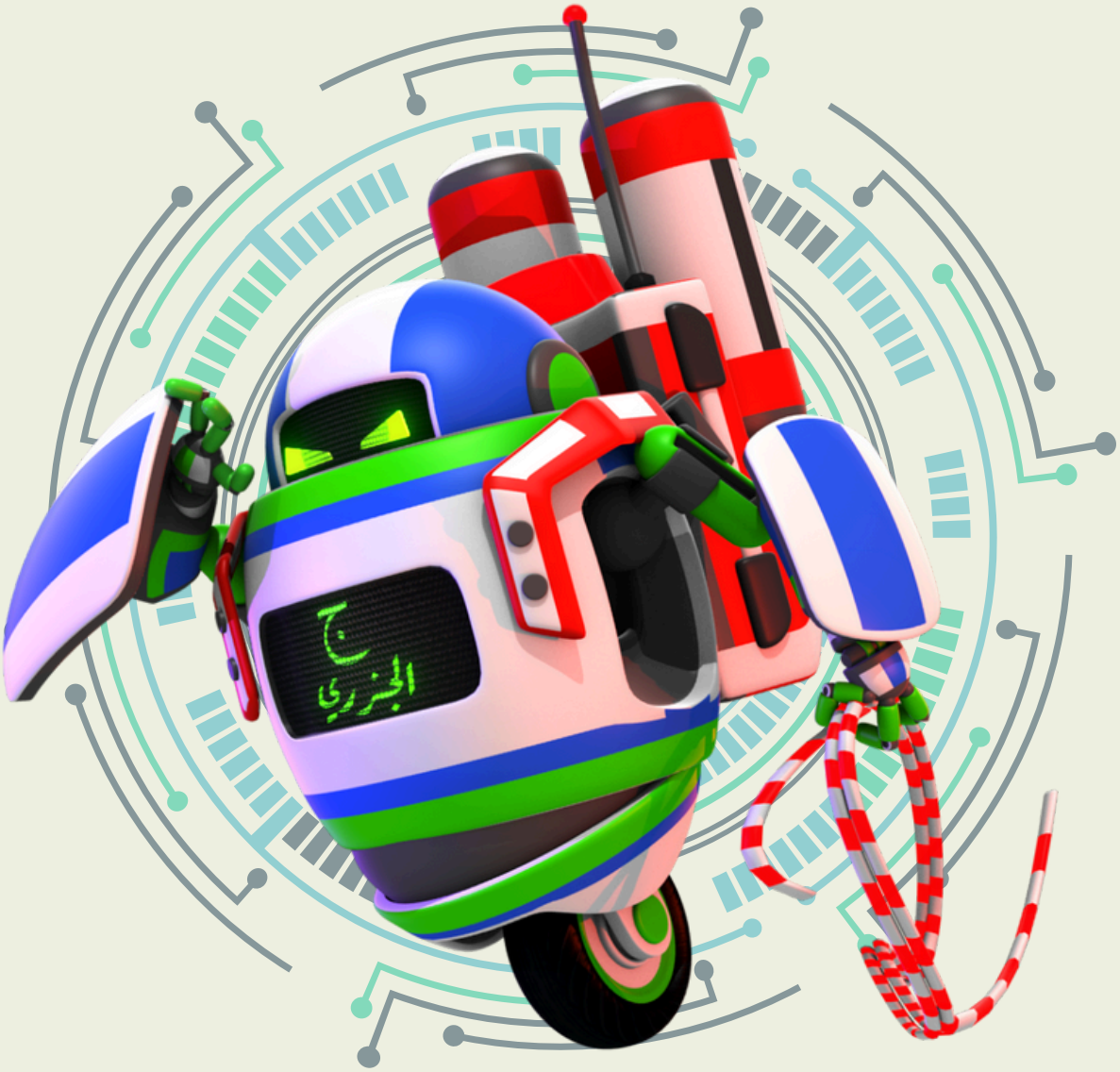
GUIDE BOOK

International Islamic School Robot Olympiad

أولمبياد الروبوتات العالمي لمدرسة إسلامية

ROBOT CAN COLLECTOR



1. OBJECTIVE

To design and build a robot that is able to start from a “Start-Box” to collect a “can” weighing 200g one at a time and then return to the starting point. During the collection trip, the robot will navigate a black path automonously and at the end of the path of Module 1, it is to be navigated manually via remote-control mode to collect a piece of can placed on a rocker. During the return trip, the robot is to be navigated wirelessly and manually until the end of the path of Module 2 and then it will subsequently return to the starting box for unloading through path-tracing means automonously.

2. JUDGING CRITERIA

The robot which has the **highest points (**collected “cans” – total penalty points) within the stipulated time of **FOUR minutes** is the winner.

3. ENTRY REQUIREMENTS

- The **Robo Can–Collector** is opened for all full-time students from formal MOE primary or secondary schools.
- Each school could submit up to **three entries**. Each entry shall not be more than four students and must have its own can-collection robot. No robot shall be shared by any entries and no cloning (identical design) is allowed.
- Entry closes two weeks before the competition. The robot must pass inspection at the beginning of the competition. Further details are available from the official web site.
- All robots and the transmitting controller shall be caged at the beginning of the competition and will be returned only at end of the entire competition.

4. RULES AND REQUIREMENTS

- The robot is to be controlled by an on-board programmable microcontroller and powered by 12volt (LiPo 3s or 6-8x AA batteries). The robot should not exceed 20 cm in length and width.
- Playing field design:
    - The total field size is 240 cm x 160 cm (the standard size of a single sheet of plywood).
    - The field is divided into two zones: the Automatic Zone (Left) and the Manual Zone (Right).
    - Autonomous Zone: Has a lined path on a white background. The path design is secret (the path is unknown) and has intersections. There is a 25 cm x 25 cm Start Box.

- Manual Zone: This is the remote control area. It consists of a physical obstacle area and a target capture area.
  - Obstacles: There will be several obstacles that participants must overcome and will be identified during the race.
  - Can Towers: There are five wooden towers as tall as the side barriers at the end of the manual zone. The tower mechanism can be pushed or can be used to retrieve cans

5. Controller & Communication:

• Each team provides one robot and one wireless controller (transmitting controller).
• Wireless connections are permitted using Bluetooth, WiFi, or 2.4GHz Radio Frequency (e.g., PS2 Wireless Stick, RC Remote, or Android App).
• The robot and controller must be caged before the start of the competition.

6. Starting Procedure:

• The robot is manually placed in the Start Box in the Autonomous Zone.
• A can weighing approximately 300g will be placed by the judge in the Wooden Tower.
• Competitors are prohibited from touching the remote control button before the robot completes the line and touches the Manual Zone boundary line.
• Penalty: 10 points deducted if a participant touches the remote control too early.

7. Can Collection:

• Upon entering the Manual Zone, participants control the robot over obstacles to the tower.
• The robot must collect the can from the top of the tower. The can must be lifted off the surface (not pushed or dragged along the floor).
• The can is considered successfully retrieved if the robot successfully brings it down the tower without falling.

8. Return Trip:

• The robot carries the can back over obstacles to the Start/Finish Square.
• The can is considered "Successfully Delivered" if the robot and the can touch the Start/Finish Square line.
• After finishing, the handler (participant on the field) retrieves the can, and the robot can be repositioned for the next run.

9. Failure (Aborted Run):

- If the can falls from the robot mid-run, it is considered an Aborted Run.
- The robot must be retrieved and returned to the Start Square to start over (the score for the can is forfeited).
- Repairs are not permitted on the field. Repairs may only be made in the pit stop area with the judge's permission (the race time continues).

10. Time & Winners:

- The competition time is 4 minutes.
- The robot must collect as many cans as possible.
- In the event of a tie, the winner is determined by:
  - Fastest time for the first successful can.
  - Fewest number of Aborted Runs (failures).