Ref: RF26.CMP.04 **Date:** 10.08.2026

Line-Following Bot Competition

Rules & Guidelines Framework

Section 01: Competition Overview

Section 1.1: Competition Rounds

Round	Purpose
Qualification Time Trial	Each team completes One Individual Runs.
Single Elimination Showdown (Tournament)	Head-To-Head Race on identical mirrored Tracks.

Section 1.2: Definitions

- **Run:** A single attempt to complete the Course.
- **Race:** A single Head-To-Head showdown.
- **Showdown:** A Knockout Race where the Winner advances.
- **Qualification Ranking:** The Final Seeding after the Time Trial.

Section 02: Robot Requirements

Section 2.1: General Rules

- Robots must be Designed, Built and Programmed by Student Team Members.
- Robots must be Fully Autonomous after the Start Signal.
- One Robot Per Team throughout the Competition.

- Team ID must be visible on the Robot.
- Teams must bring their own Laptop and Charger for Programming.
- Mentors may Teach but may Not Build or Program the Robot.

Section 2.2: Robot Specifications

Maximum Dimension of the Robot for Both Categories:

- **Length:** 24cm
- **Width:** 24cm
- **Height:** 24cm

Section 2.3: Sensors, Motors and Materials

Robots shall use Components commonly available in Bangladesh. Examples include Arduino Uno/Nano, ESP32, TCRT5000 or QTR Line Sensors, BO/N20/TT/DC Gear Motors, L298N or TB6612 Motor Drivers, 18650 Batteries and Similar Hardware. **Cameras & Vision-Based Navigation** are **NOT Permitted**.

Any safe construction material such as Acrylic, Plywood, PVC, Aluminium, 3D-Printed parts or Recycled Materials may be used.

Section 03: Playing Field Specifications

Section 3.1: Competition Track

- The Competition uses Two Identical Mirrored Line-Following Tracks placed side by side for the Showdown Round. During the Qualification Time Trial, only one of the Tracks will be used and there may be duplicates of such Tracks to finish the Preliminary Round Quicker.
- Both Tracks are Identical in Dimensions, Layout, Line Markings, and Difficulty to ensure Fairness during Head-To-Head Races.
- The Competition Track is designed to evaluate a Robot's Speed, Stability, and Programming Accuracy rather than its ability to Memorize a specific Course.
- The exact Course Layout will not be published before the Competition. However, the general Specifications, Dimensions, and Course Guidelines described in this Rulebook will remain consistent.

Section 3.2: Surface & Line Specifications

The Course will be Constructed on a Flat, Rigid Surface such as Plywood, MDF Board, Laminated Board, or similar Material. The Course will use a continuous **Black Line** placed on a **White Surface**. Small Variations in Colour or Brightness due to Lighting Conditions are considered normal. Teams are encouraged to design Robots capable of Reliable Line Detection under varying Lighting Conditions.

Section 3.3: Course Elements

A Competition Course may include any combination of the following Features:

- Straight Sections
- Gentle Curves
- 45° Turns
- 90° Turns
- S-Curves
- Hairpin Turns
- Long Straight Acceleration Zones
- Finish Zone

Section 3.4: Checkpoints

- The Competition Course will contain multiple Checkpoints placed throughout the Track.
- Checkpoints are used by Judges to determine Robot progress whenever a Robot does not successfully Complete the Course.
- In any Run, a Robot may start back from its previous Checkpoint if it gets off the Track or Skip a Checkpoint entirely, however there will be a **Time Penalty**.

Section 3.5: Start Area

Each Course contains a designated Start Box.

Before each run:

- The Robot must be placed completely inside the Start Box.
- The Robot must face the direction specified by the Judge.
- No part of the Robot may extend outside the Start Box before the run Begins.

Section 3.6: Finish Zone

✓ The Finish Area consists of a Solid, Matte Black rectangular zone placed symmetrically over the main guideline.

✓ The shape has a dimension of 30 x 30 cm

Section 04: Robot Start Task

Every Robot must remain Stationary for **Three (3) Seconds** after being started before any movement Begins.

This Start Task applies to both:

- Qualification Time Trial
- Showdown Round

All Robots must be started using the same Button, Switch, or Programmed Procedure throughout the Competition. Failure to satisfy the Start Task will be handled as follows:

- **Qualification Time Trial:** Results in lower placement in the seeding order (See Section 6.5).
- **Showdown Round:** Results in loss of that Race (See Section 8) or a Tie if both Robots fail (See Section 9).

The Robot's Program may not be changed during an Individual Run.

Any Calibration Values, Motor Parameters, or Sensor thresholds must be finalized During the Work Period (See Section 5.2).

Section 4.2 Maximum Time

Both the Qualification Time Trial Round and Single Elimination Showdown Round will have a **Maximum Allowed Time** to complete its course.

- Qualification Time Trial: **2 Minutes**
- Single Elimination Showdown: **3 Minutes**

Section 4.3: Human Assistance

Once any Course Begins:

- Only **One (1)** participant from the team may remain on the course.
- Only if the Robot leaves the course or the Participating team wants to **Skip** a checkpoint, **One (1)** participant from the team may reposition the Robot.

While repositioning the Robot, it shall not be **Pushed**. No form of Human Assistance is allowed outside this rulebook.

Section 05: Competition Day Procedures

Section 5.1 Participant Access

- Only Registered Participants, Judges, Volunteers, and Authorized Organizers may enter the Competition Area.
- Spectators must remain outside the designated Competition Boundary.

Section 5.2: Work Period

Immediately following the Opening Ceremony, Teams will receive a **15-Minute Work Period**.

During this time, teams may:

- Modify Hardware
- Upload Programs
- Charge or Replace Batteries
- Perform Final Inspections

Robots must remain Compliant with all Competition Specifications after any Modifications.

Section 5.3: Robot Inspection

After the Work Period, all Robots must report for Inspection.

Judges will verify:

- Robot Dimensions
- Team Identification
- General Safety

The robot must be **Fully Autonomous** — no remote control, Bluetooth/Wi-Fi tele-operation, or human signalling of any kind is permitted. Robots failing inspection must correct the issue before Competing.

Section 5.4: Qualification Runs

- Each Team will be called individually for its Qualification Time Trial.
- Teams must report promptly when called.
- Failure to report within the Designated Time may result in **Forfeiture** of that **Qualification Attempt**.

Section 5.5: Showdown Preparation

- Following completion of all Qualification Runs, Organizers will publish the Official Qualification Rankings and Single-Elimination Bracket.
- Only the Top 10 (or adjusted number per Section 6.5) ranked Teams will be included in the published Single-Elimination Bracket.

Section 06: Qualification Time Trial Rules

The Qualification Time Trial determines the seeding order for the Single Elimination Showdown Tournament. Each team shall complete **One (1) Qualification Run**, and it will be used for Ranking with **Time Penalty** every time the bot gets off the track.

Section 6.1: Starting the Run

- In the Beginning of each Qualification Run, the Judge announces the Robot's Starting Position And Orientation.
- The Starting Position shall remain identical for every Participating Team.
- Teams must place their Robot exactly as instructed by the Judge.

Section 6.2: Timing

Timing begins immediately when the Robot starts moving after the successful Completion of the Start Task.

Timing stops when:

- The Robot completely crosses the Finish Line.
- The Robot has received **Three (3)** Time Penalties.
- The Maximum Allowed Time is reached (See Section 4.2).

Timing shall be recorded to the nearest **1/100th** of a **Second** whenever possible.

Section 6.3: Leaving The Course

A Robot is considered to have left the Course if:

- It completely loses the Black Line and continues moving away from the Intended Path.
- The entire Robot moves outside the Course Boundary.
- The Robot becomes Immobilized or Stops without following the line.

Once a Robot has left the Course, the run can be Restarted from the nearest checkpoint (if any) up to **Three (3)** times each time receiving a **Time Penalty**. See Section 4.3 for more details.

Section 6.4: Pre-Showdown Work Period

After every Team has completed its Qualification Run, all Teams will receive a **15-Minute Work Period**. This period follows the same permissions and restrictions described in Section 5.2 (modify hardware, upload programs, charge/replace batteries, final inspections), but is a separate window held after Qualification.

Section 6.5: Qualification Ranking

After every Team completes Qualification Runs, Teams will be ranked according to the following order:

1. Successful completion of the Start Task.
2. Course Completion.

3. Fastest valid Completion Time.
4. Greatest number of Checkpoints Completed (If Applicable).

Only the Top 10 Teams by Qualification Ranking will advance to the Single Elimination Showdown Tournament. All remaining Teams are **eliminated** following completion of the Qualification Time Trial.

This number may be adjusted depending on the total number of Participating Teams. The Qualification Ranking determines the seeding for the Showdown Tournament.

Section 07: Showdown Rules (Head-to-Head Race/Knockouts)

- The Showdown Tournament is conducted using a **Single-Elimination Knockout Format**.
- Each Knockout Round consists of **One (1) Race Only**.
- The Winner advances to the next Round.
- The losing Team is **Eliminated**.

Section 7.1: Race Setup

Before each Showdown Race, the Judge announces:

- Starting Lane
- Robot Orientation
- Start Confirmation

Both Robots shall be positioned simultaneously. Each Robot Races on its own identical mirrored Course.

Section 7.2: Detached Parts

- If any Component of a Robot becomes detached during the Race due to Poor Construction, the Detached Component shall not be replaced during that Race.
- The Judge may continue the Race if it is safe to do so.
- Regardless if the Detached Component creates a Safety Hazard or interferes with the competition, the Judge may stop the Race and declare the **Opposing Robot** the **Winner**.

Section 7.3: Between Rounds

Between Knockout Rounds, teams may:

- Recharge Batteries
- Replace Batteries
- Upload Updated Programs
- Repair Damaged Components

All Repairs and Modifications must remain within the Specifications described in Section 5.2.

The Judge may Re-Inspect any Robot before allowing it to compete in the next Round.

Section 08: Determining The Winner

A Robot wins a Showdown Race if any of the following occurs:

- It completes the Course before its Opponent.
- It successfully Completes the Start Task while its Opponent Fails.
- The Opposing Robot becomes Immobilized completely before completing the Course.
- The Opposing Robot receives **Three (3) Time Penalty**.

Section 09: Tiebreaker rules

A showdown race shall be declared a Tie if any of the following occurs:

- Both Robots successfully complete the Course at the same time and the Judges are unable to determine a Clear Winner.
- Both Robots Fail the Start Task.
- Both Robots stop before completing the Course and are Judged to have reached the same Checkpoint and travelled an equal distance beyond it.
- The result is genuinely too close to Determine.

The Judge's decision shall be based on the best available Evidence, including Visual Observation and Official Timing Records.

Section 9.1: Tie Resolution

If a Showdown Race is declared a Tie, the following procedure shall be used:

1. The Race shall be rerun once under Identical Conditions.
2. If the Rerun also results in a Tie, the team with the Higher Qualification Time Trial Ranking shall advance.

Section 9.2: Judge's Decision

The Judge reserves the right to modify these Rules where situations arise that are not specifically covered by this Rulebook. The Judge's decision is Final. In case of change of Rules, prior announcement will be made.

Section 10. Frequently Asked Questions (FAQ)

Q: Can we use Arduino, ESP32, or other Generic Microcontrollers?
A: Yes. Any commercially available Microcontroller may be used provided the Robot complies with the specifications in Section 02.

Q: Can we use Components purchased from Bangladeshi Robotics Stores?
A: Yes. The Competition has been designed around affordable Components commonly available in Bangladesh through Robotics & Electronics Suppliers.

Q: Are Cameras or Vision-Based Systems allowed?
A: No. Cameras and Vision-Based Navigation Systems are not permitted in any Competition Category.

Q: Can we use Block-Based Programming instead of C or C++?
A: Yes. Any Programming Language or Development Environment may be used, provided the Robot operates fully autonomously.

Q: Can we Change our program after Qualification?
A: Yes. Teams may update their Program during designated Work Periods between Competition Stages.

Q: Can we replace Batteries between Races?
A: Yes. Teams may Recharge or Replace Batteries between Knockout Rounds. Battery Replacement is not permitted during an Active Run.

Q: What is the exact amount of time we will receive for Time Penalty?

A: The exact timing will be disclosed during the competition day.

Q: What happens if our Robot leaves the Line?

A: One of the team members may provide assistance see section 4.3 and the robot will get time penalty accordingly see section 6.3

Q: Can I use a remote Controlled Robot?

A: The robot must be **Fully Autonomous** — no remote control, Bluetooth/Wi-Fi tele-operation, or human signalling of any kind is permitted. Upon discovery of such, will result in immediate Disqualification.

Q: What happens if our Robot stops moving during a Race?

A: If the Robot becomes Immobilized and cannot continue following the Course, its race ends immediately.

Q: Can our Robot expand after the Race starts?

A: No. The Robot must remain within its Maximum Permitted Dimensions throughout the entire Competition.

Q: Will the exact Competition course be published before the Event?

A: No. The general course specifications will be published in advance, but the exact layout will only be revealed on competition day to encourage robust robot design rather than memorization.

Q: What Components do you recommend for Beginners?

A: While Teams may use any Compliant Components, many successful beginner Robots can be built using affordable parts commonly available in Bangladesh, such as Arduino-Compatible Boards, IR Line Sensors, DC Gear Motors, Motor Drivers, and Rechargeable Li-Ion Batteries.

Section 11: Contact Us

For any Queries Regarding the Competition, Please Contact:

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