



GLOBAL
ROBOTICS
CHALLENGE

 RULE BOOK 2026

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BILLIARDS GAME



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1. Technical Introduction :

Billiards Game is a competition inspired by billiards, where two teams compete using remote-controlled robots to pocket their assigned balls into the table's pockets.

Each team must pocket seven balls assigned to them before attempting to pocket the black ball (Ball No. 8). The team that successfully pockets all its balls plus the 8-ball first wins the match.

2. Team Composition :

- **Team members:** 2 to 4 Students, guided by a Coach.
- **Age category:** 6 to 10 years.
- **Allowed tools:** WeDo Kits, Spike Essential, LEGO EV3, or Spike Prime.

3. Playground:

- **Dimensions:** Rectangular table, **120 cm × 160 cm**.
- **Pockets:** **Six pockets** distributed around the table like a real billiard table (four in the corners and two in the middle of the long sides). Each pocket has a diameter of **10 cm**.
- **Ball Setup:**
 - ❖ At the beginning, **15 balls** are arranged in a triangle formation in the middle of the table.
 - ❖ **Ball diameter:** **5 cm** (similar to Duplo balls).
 - ❖ **Number of balls:** **14 balls** equally divided and colored for each team (**7 balls per team**).
 - ❖ **8-ball:** A **black** common ball placed in the center of the formation, which must be pocketed last.



4. Robot Specifications:

- **Type:** WeDo, Spike Essential, LEGO EV3, or Spike Prime.
- **Size:** Must not exceed **20 cm × 20 cm**.
- **Weight:** Maximum weight **1 kg**.
- **Control:** Robots are controlled manually using a **remote controller**. Autonomous programming is not allowed during the game.

5. Game Setup and Start:

- **Starting positions:** Each robot starts from its side of the table, opposite to the other
- **Start of play:** At the referee's signal, both robots move simultaneously to strike the group of balls in the center.
- **Objective:** Each team must pocket its **assigned 7 balls first**, then attempt to pocket the **8-ball**.
- The team that achieves this first **wins** the match.

6. Game Rules:

- **Control:** Players may move their robots after the referee's whistle and strike balls until time ends or until the opposing team pockets the 8-ball.
- **Pocketing balls:**
 - ❖ Teams are only allowed to pocket their 7 balls before going for the 8-ball.
 - ❖ The 8-ball becomes active only after all team balls are pocketed.
- **Gameplay:** Both teams play simultaneously. Defensive positioning to block the opponent from the 8-ball is allowed, but violent collisions are prohibited.
- **Pocketing the 8-ball too early:**
 - ❖ **First violation:** Stop play for **5 seconds**.
 - ❖ **Second violation:** Same penalty (**5 seconds**).
 - ❖ **Third violation:** Immediate **loss** of the match.

7. Scoring System:

- **Scoring Mechanism:**

- ❖ Pocketing some team balls does not count as points; the robot must pocket all 7 assigned balls to be considered a winner and score points.
- ❖ Pocketing the 8-ball after finishing all team balls = **Win**.
- ❖ Pocketing the 8-ball prematurely = **violation**.

- **Time Bonus Calculation:**

Points will be awarded based on the total number of correctly pocketed balls, the control mode used, and the completion time.

- ❖ Points awarded based on completion time are calculated using the formula :

$$\text{Time Bonus} = (T/300) * \text{Total Points.}$$

- ❖ Where T is the remaining time in seconds (Maximum time is 300 seconds).
- ❖ No time bonus will be awarded if the robot does not complete all required ball placements in their designated pockets.

- **Example Calculation:**

Suppose a team successfully pockets **7 balls** in their correct pockets and the **8 ball**, completing the task with **120 seconds** remaining.

(**Note the total balls in this example is 7, plus the 8 ball**).

- ❖ **Points for Ball Placement:** 7 balls x 5 points = 35 points
- ❖ **Points for 8 Ball:** 1 ball x 10 points = 10 points
- ❖ **Time Bonus:** Calculated based on the remaining time, with 120 seconds factored in according to the scoring formula:
Time Bonus = $(120/300) * 45 = 18$ points
- ❖ **Total Score: Ball Placement + 8 Ball + Time Bonus**
= 35 + 10 + 18 = 63 points.

8. Match Duration:

- **Match duration:** Maximum **5 minutes**.
- **If no team completes all balls:** the team with more pocketed balls wins.
- **If the match ends in a tie:** an extra round of **2 minutes** is played. If **still tied**, the result is declared a **draw**.

9. Errors and Penalties:

- **Errors:**
 - ❖ Excessive or destructive collision with the opponent's robot.
 - ❖ Pocketing the 8-ball before finishing the team's balls.
 - ❖ Manual interference with the robot or balls.
 - ❖ Blocking the opponent's ball for more than 5 seconds is not allowed (only blocking your own team's ball is allowed).
- **Penalties:**
 - ❖ For each violation: The referee returns one previously pocketed ball of the violating team to the table + the team's robot is stopped for 5 seconds before resuming play upon referee's signal.
 - ❖ If a team commits three violations, it will be disqualified.

10. Safety and Sportsmanship:

- All robots must be safe and free from sharp edges.
- All teams must demonstrate respect and sportsmanship.
- Any aggressive or unfair behavior may result in penalties or disqualification from the competition.

11. Notes:

To download the official game field (ready to print):

https://drive.google.com/drive/folders/1ci_0ra0Ebq8TgfJn4ST2Mha56yMsFXe_?usp=sharing

To download the STL file of the balls for 3D printing:

<https://drive.google.com/file/d/1locvxdPzZmibuwbGuNF0as3NHtJeBaUP/view?usp=sharing>



Good Luck.