

Contest Rule Book

International Design Contest 2026

AI TO SCIENCE

(サイエンスに愛 (AI) を)

Institute of Science Tokyo
Japan

IDC Robot Contest Organizing Committee

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Game rule

Theme of Robocon International Design Contest 2026

AI to Science (サイエンスに愛 (AI) を)

[Game Concept]

Science does not advance through logic and experimentation alone. Especially in fields like robotics—where both humans and artificial artifacts (robots) are the subject—research outcomes depend greatly on how deeply researchers understand their subjects and how much passion they devote to them.

This robot contest places that *passion as love* at the center of the game.

1. The “Orange Ball” Symbolizing Love for Humans

The orange ball handled by robots in the competition represents understanding, empathy, and support for humans.

- Accepting human motion and uncertainty
- Designing robots that work for people
- Considering human happiness and safety

These attitudes are expressed as “love for humans.” Each time a robot acquires an orange ball, it earns points symbolizing *the scientific stance of trying to understand humans*.

2. The “Silver Ball” Symbolizing Love for Robots

The silver ball represents affection, creativity, and curiosity toward robots themselves.

- Understanding a robot’s quirks
- Continuing to improve even after failures
- Pursuing beautiful mechanisms and control

A researcher’s passion for their robot is like “raising” it with love. Each silver ball acquired symbolizes *creative love toward artificial artifacts*.

3. Victory Comes from Collecting Love and Using AI Properly

The goal of this competition is not simply to compete in speed or strength.

Victory is determined by:

- How many love balls for humans (orange balls) are collected
- How many love balls for robots (silver balls) are collected
- Whether balls are placed into the correct goals
- How properly AI and human knowledge are used in the process

This game symbolizes the development of science through deep understanding and passion for both humans and artificial artifacts, as well as the correct use of AI in scientific practice.

[Game Field]

The game field is symmetrical, consisting of the left red team's field and the right blue team's field. Each field contains a platform stacked with a total of 55 orange and silver balls.

Each field also has elevated areas called Zone W and Zone P, raised by 20 cm. Zone P contains blocks arranged as shown in Fig. 1 (some stacked in two layers). In front of Zone S are each team's Goal A and Goal B.

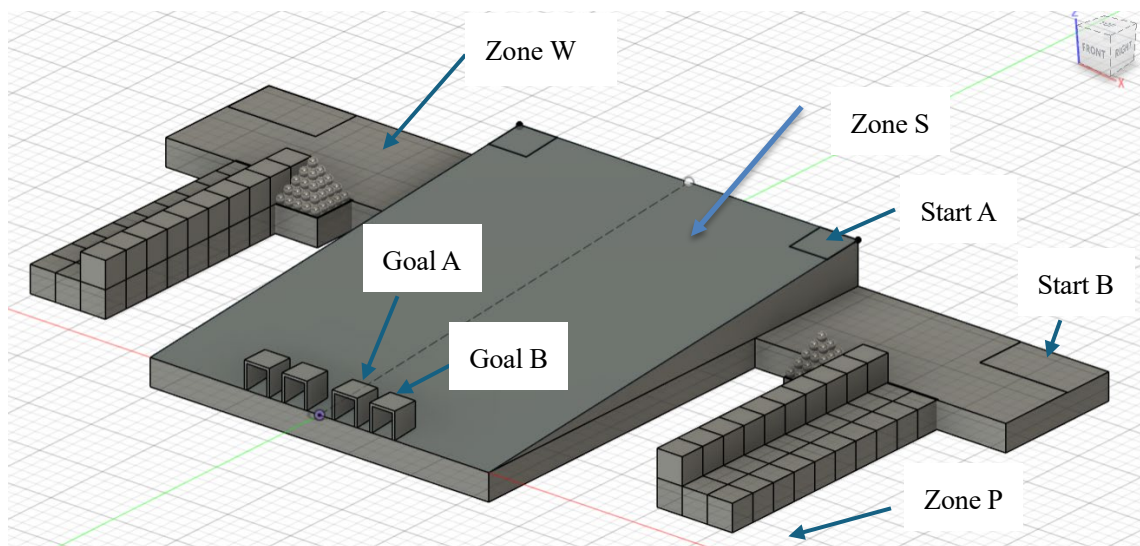


Fig. 1 Game Field

[Cyber World Game Rule]

Go 2 model which is a 4-leg walking robot, and which can be used in the cyber world game field is provided. You can add any mechanism to the original model if the whole

system is fitted to the starting area B at first. The robot can start from Red start B or from Blue start B, one orange and one silver balls can be installed in the robot. At start, the model must fit within 50 cm × 80 cm × 80 cm.

The robot should be controlled so that the installed balls pass through the corresponding color goals on the own color field.

Game Duration

3 minutes

Scoring (Advantage)

According to the goaled balls, the same goaled balls can be installed in the automatic controlled robot in the physical world game in addition to the allowed installed balls.

[Physical World Game Rule]

Human-shaped and robot-shaped figures can be placed on Goal A and Goal B. Which figure is placed on which goal is determined randomly for each match. (For the opposing team, the placement is mirrored across the center.)

When placing figures:

- The opposing team's robot figure
- The team's own human figure

may have their poses freely chosen by each team. However:

- The figure's pelvis must be in contact with the top surface of the goal
- Poses that obstruct ball passage are not allowed

Restrictions

- Each team may build one teleoperated robot and one autonomous robot.
- Teleoperated robots may not touch Zone S or Zone P directly. (Indirect contact via blocks or balls is allowed.) Teleoperated robots can not touch the surface of the slope.
- Autonomous robots must start from Start A, teleoperated robots from Start B.
- A quadruped robot may be placed at Start B, and the teleoperated robot can start from on top of it.

- Initially, an autonomous robot may install up to 1 orange ball and 1 silver ball in addition to the number of advantage balls obtained in the Cyber world game.
- Autonomous robots must fit within a 50 cm cube at the start.
- Teleoperated robots must fit within 50 cm × 80 cm × 80 cm at the start.
- Robots must not touch figures.
- Autonomous robots can not cross the center line.

Scoring

- Placing orange balls into the human figure's goal earns 1 point each.
- Placing silver balls into the robot figure's goal earns 1 point each.

If balls are outside of goals at the end of the match, they are not counted.

If, at the end of the match:

- At least, one orange ball and one silver ball are in the correct goals respectively.
- All balls in the goals are of the correct colors.

→ The total match score is **doubled**.

Game Duration

3 minutes

[Victory Condition]

The team with the higher score at the end of the match wins. When the point is the same, a team whose point in the cyber game point is higher wins. If the point is also the same, a team whose automatic robot stays nearer at the center of own Start A.

4. Control

- Team members must control their own machines. Two team members at a maximum can be actively involved in manipulating the controls.
- All control must be accomplished without contacting the robot.
- Control may be achieved via wireless device supplied by the referees and IDC staff.
- A contestant may not deliberately interfere with the remote control of the opposing player.

5. Robot Configuration

- a. **Materials:** Your entire robot must be made from the kit materials and components in a specified list. Your team also can purchase passive elements and materials for robots under the expense of 2000 yen (almost \$15). Electric components must be authorized by the referees. Screws, Bolts, Nuts, Washers, Stick Glue, Vinyl tape for electric insulators are prepared in the machine shop. They can be used adequately when needed but are not allowed to be used as structural materials. Grease is also prepared in the machine shop. Irreversible working such as cutting, bending and deforming for items with recycled mark in the list is strictly forbidden. Un-functional ornaments can be attached.
- b. **Control Unit:** One control unit and a transmitter with a receiver are distributed for each team. A control unit provides electrical energy supply, PWM control for DC motors, small electric current less than 1A, electromagnet control and air actuator control. The control unit can be connected to a control pad via a wireless technology. Those functions of the control unit can be controlled manually by the control pad. You MUST consult IDC staffs with respect to electric rating if you introduce and connect additional electrical parts you buy to the control unit. You may need a protection circuit. The control unit is NOT allowed to be used as structural material for each robot, i.e. a robot must be designed so that the control unit can be quickly-release. Battery charging in the control unit MUST be operated by only IDC staff to avoid accidents and damaging batteries.
- c. **Fabrication:** You can use machines in the machine shop, for example, bench drilling machines, band saws, lathes, benders, shearing machines. Tools for hand working are also available, e.g., saws, hand drills, taps, dies, soldering irons etc. You may ask technical advisers in the machine shop and IDC staff how to use them.
- d. **Energy:** Energy may be stored in batteries, compressed air, elastic strain, and gravitational potential energy. In terms of electrical energy, only the energy supplied from the control unit and distributed batteries is available. Total stored energy may not exceed 30kJ. This limit will be enforced by the referees based on calculations the team must provide. Compressed air may not exceed 0.5MPa pressure. Mechanisms using large amounts of rubber or springs must have adequate safety locks to reduce the chance of accidents. These locks may be removed once all contestants and onlookers are safely away from the device. Safety of all forms of energy storage will be at the discretion of the faculty and judges.

- e. **Energy charging:** Contestants will be responsible for charging their compressed air containers, springs, rubber bands, etc. Charging batteries in the control unit is operated by only IDC staff during production period and contest day because some technical operation and experienced observation are required for charging batteries avoiding accidents and damaging batteries.
- f. **Set-up for match:** Your machine may be reconfigured between rounds. One reason to reconfigure is to accommodate the differences between the right and left sides of the field. You will know at least 5 minutes before you compete which side your machine will be assigned. You will have access to set up your machine within the starting box prior to each round. You should be able to complete your set set-up fully in less than three minutes.

6. Sporting Conduct & Safety

- a. Damaging, overturning, pushing and lifting an opponent's robot is not allowed
- b. Once scoring is accomplished, it cannot be reversed by defensive actions, but additional scoring can be prevented.
- c. Damaging the contest table and or control equipment is strictly forbidden.
- d. In the case of destruction deemed by the judges to be accidental, the judges may permit repairs and a rematch.
- e. Contestants and spectators (i.e. any human beings) may not directly affect the motion of the machines or anything else on the table.
- f. Any robot components or table items that depart the table cannot be manually re-introduced to the table during a round.
- g. It is **not** permissible to drive a robot off the contest field during a round.
- h. Nets or entanglement devices are not permitted, but other defensive devices generally are permitted.
- i. After the time limit, the referee judges the winner of the match according the points as mentioned.
- j. **NO DANGEROUS MACHINES. THE JUDGES' DECISIONS ON SAFETY MUST BE RESPECTED AND OBEYED PROMPTLY.**

General questions may be asked of all participating faculties, graduate students, undergrad assistants, and staff of IDC2026. However, all officially sanctioned rule interpretations will be made by the referees. The key rulings will be discussed at a daily meeting.

IDC2026 List of materials in a kit (for two machines)

Robocon Distribution List				
Item Name	Per Team	Notes	Status	Recycling
Control Box	1	[User Manual (English ver)] [User Manual (Japanese ver.)]	☐	○
Raspberry Pi 5	1	Main CPU board [Datasheet]	☐	○
Raspberry Pi Pico	3	Sub CPU board [Datasheet]	☐	○
Raspberry Pi Camera Module 3	1	[Datasheet]	☐	○
AI camera (RPI-SC1174)	1	[Datasheet]	☐	○
Photo reflector (RPR-220)	6	6 per team [Datasheet]	☐	
Limit Switch	3		☐	
Motor Driver (MDD3A)	2	[Datasheet]	☐	○
Servo motor (MG996R)	3		☐	○
Bosh Motor	3		☐	○
Servo Motor Driver	2	2 per team	☐	○
IO board / PWM board (ADA-815)	1	[Datasheet]	☐	○
Universal Board	1		☐	
MDF Board	4	Planned to distribute 4 per team (tentative)	☐	
Anker Power Bank	1	Used to drive Raspberry Pi 10000mAh, 22.5W	☐	○
Zee LiPo Battery	1	Used to drive motor 11.1V 80C 5200mAh	☐	○
B6 Balance Charger	1	[Database]	☐	○
AC Adapter	1	For LiPo charger	☐	○

LiPo Battery Charging Cable	1	Homemade	☐	
Keyboard	1		☐	○
Mouse	1		☐	○
Encoder (LPD3806)	1	600 Plus/Round (5V)	☐	○

Robocon Distribution List

Item Name	Per Team	Notes	Status	Recycling
Wheel Shaft Stopper	2		☐	○
Wooden Board	1		☐	
Wheel	2		☐	○
Spray	1		☐	
Caster	2		☐	
Paper Tube	1		☐	
Perforated Aluminum Plate	1		☐	
Aluminum Pipe	1		☐	
Rubber Band	2		☐	
Plastic Board	1		☐	
Constant Force Spring	2		☐	
Timing Belt	1		☐	
Gearbox	1		☐	
Mabuchi Motor	1		☐	○
Gearbox with Motor	1		☐	

Bosch Motor Connector	6	Model: TMDN630809-FA Red	☐	
Acrylic Board	1		☐	
AC Adapter	1	For charger	☐	○
USB cable	2	Raspberry Pi5 ⇔Pico	☐	○
Potentiometer(volume)	3		☐	
Jumper wire set	1		☐	