AI for Good

RULEBOOK 2025-2026

make +learn

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a. Theme of the Challenge

As agriculture faces increasing pressure from resource constraints and a growing global population, food systems must adapt to meet ever-higher demand while maintaining productivity and economic viability. It is essential to optimize the use of available land and water, improve efficiency, and ensure equitable access to agricultural products. According to the Food and Agriculture Organization of the United Nations (FAO), "agriculture must meet the needs of present and future generations for its products and services, while ensuring profitability and social and economic equity" (FAO, 2014).

In the face of these challenges, technology has become a key ally in transforming agricultural practices. For example, precision-agriculture technologies such as GPS-guided machinery have revolutionized sowing and harvesting, allowing farmers to maximize yields and reduce waste. Drone technology is also widely used to monitor crop health and optimize irrigation systems, demonstrating the practical impact of technological advances on agriculture. Breakthroughs in robotics and artificial intelligence offer innovative solutions to optimize resource use, increase efficiency, and protect biodiversity. Agricultural robots have the potential to perform critical tasks such as crop selection, irrigation, pest control, and harvesting, minimizing waste and maximizing precision.

In this context, the **Robotics for Good Youth Challenge 2025-2026**, curated by **make+learn**, focuses on tackling these critical issues through robotics applied to agriculture. The competition challenges participating teams to design, build, and program robots capable of solving real-world problems in the agricultural sector, fostering technological innovation worldwide.

Teams, which may include a maximum of eight participants, will work with robots designed to identify crop needs, allocate water efficiently, and manage pest control. These tasks address key agricultural challenges, such as ensuring that crops receive the right amount of water to avoid waste during droughts, reducing the use of harmful pesticides to protect ecosystems, and optimizing available resources to increase field yields. Through these simulations in a competitive environment, students will experience how technology can transform traditional agriculture into a more resilient practice that is better adapted to today's challenges.

The **Robotics for Good Youth Challenge 2025-2026** emphasizes the importance of collaboration and creativity in tackling critical challenges in agriculture. Through this competition, participating children and young

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people can develop practical and innovative solutions that help drive technologies with a positive and lasting impact on food systems and the environment.

Taking part in this challenge not only provides hands-on experience in engineering and programming, but also inspires children and young people to imagine new possibilities for robotics applied to the agricultural world.

b. Mission for the Teams

In this year's challenge, the mission is divided into two main actions inspired by real agricultural processes: **selective cultivation and irrigation, and fruit harvesting and sorting**. The game field is designed to simulate these processes and test the robots' ability to operate autonomously within a limited time.

Each match lasts **2 minutes**, during which the robots **must operate autonomously**, with no human intervention once the round begins.

Start zone

Each robot (or set of robots) must begin entirely within a clearly defined area marked by a black line at the bottom of the board. Each team may place as many robots as can fit completely inside this area, although using multiple robots is optional.

This zone is marked with 20 mm wide black adhesive tape. The same type of tape may also be used in other areas of the field to indicate specific zones or reference points.

Mission 1: Cultivation and Irrigation

At the top of the field there are three crop plots in different colors (orange, gray, and green), each made up of a 2×3 grid of squares. At the start of every match, the referee selects two of these three plots, leaving one unused. This selection will be symmetrical for both teams, meaning that the same two active plots will be used on each half of the board.

- **Step 1 – Planting:** While the robot is inside the start zone, it may receive seeds from a team member. The team has a total of 18 seeds (6 of each size) and may transfer them to the robot all at once or at different moments, depending on their strategy. There is no limit to the quantity or number of transfers, as long as it is done while the robot is inside the start zone.

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Each seed type corresponds to a specific plot color:

- **Small seed → grey plot**
- **Medium seed → green plot**
- **Large seed → orange plot**

Next, the robot must navigate to the corresponding plots and properly deposit the seeds to promote plant growth.

- **Step 2 – Selective Irrigation:** Once plots are sown, the robot must water only those containing seeds. It does this by opening a gate that drops two blue balls as a symbol of water. Watering a plot without seeds may incur a penalty.

  Note: Robots may move over the crop plots if needed, although it is recommended to do so before planting, to avoid displacing the seeds once they have been placed by the robot itself. Mission 2: Harvesting and Sorting

Mission 2: Harvesting and Sorting

On one side of the board there are three rows of pieces in different colors (green, red, and black), one of which is elevated on a wooden platform. These pieces represent fruits in various states:

- **Green:** unripe fruit (must not be harvested)
- **Red:** ripe fruit (must be harvested and placed in the area called “Fruits”)
- **Black:** diseased fruit (must be removed and placed in the area called “Waste”)

The robot must collect **only the red and black** pieces and transport them to their respective sorting areas. The green pieces **must not be moved** under any circumstances.

The two missions can be carried out in any order chosen by the team, or even in parallel if more than one robot is used. Completing all actions is not mandatory, and there is no penalty for missions that are not performed.

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c. Materials for the Game

1. Game board. The game board is where the robot game takes place and is divided into two competition fields.

1.1. Components

- Game board surface: 2362 ± 5 × 1143 ± 5 mm
- Competition field surface: 1181 ± 6 × 1143 ± 5 mm
- Long sides: 2402 ± 5 × 20 ± 1 × 65 ± 2 mm
- Central wall: 1143 ± 3 × 19 ± 1 × 70 ± 3 mm

1.2. Game field surface finish

At the international final, the game board surface will be white, smooth, and glossy, with a finish similar to that of a whiteboard.

For regional or national phases, alternative surfaces such as MDF or other flat and stable materials are allowed.

Teams will have time to adapt before starting their matches at the international final to adjust the behavior of their robots to the official surface.

2. The game uses a combination of specific physical materials to recreate an agricultural environment and demonstrate the sector's workings in an interactive way.

3. The main elements include:

Note: The visual representations of the elements (fruits, seeds, water drops, etc.) are schematic and may not reflect the exact scale. The indicated technical dimensions are the ones that apply.

3.1. Seeds: pieces in three sizes (small, medium, large), differentiated by color and adapted to the assigned plots.

- **Small seed (gray plot)**:
  - Quantity: 6
  - Material: wood
  - Dimensions: 20 × 20 × 20 mm
  - Finish: raw natural wood (lightly sanded)

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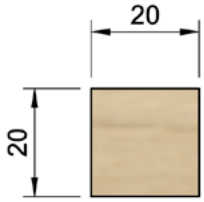
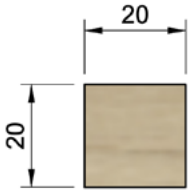


- **Medium seed (green plot):**
  - Quantity: 6
  - Material: wood
  - Dimensions: 20 × 20 × 40 mm
  - Finish: raw natural wood (lightly sanded)



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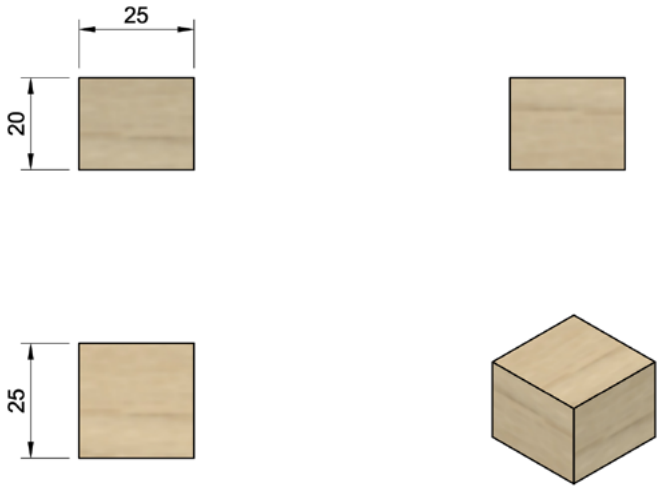
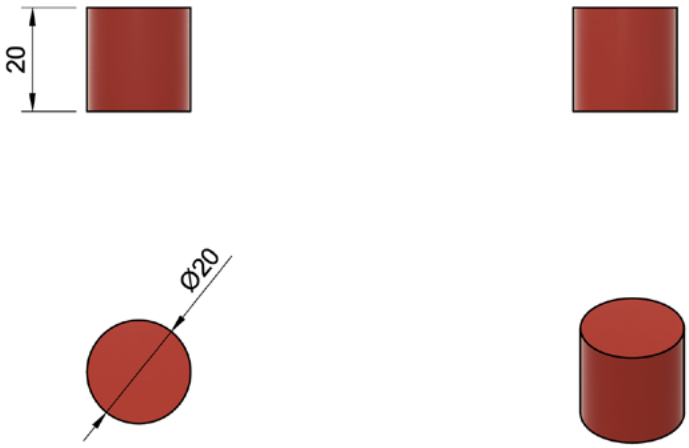
- **Large seed (orange plot):**
  - Quantity: 6
  - Material: wood
  - Dimensions: 25 × 25 × 20 mm
  - Finish: raw natural wood (lightly sanded)



3.2. Fruits: pieces in green, red, and black with uniform dimensions and weight.

- **Ripe fruit:**
  - Quantity: 6
  - Material: wood
  - Dimensions: ø20 x 20 mm
  - Finish: red acrylic paint



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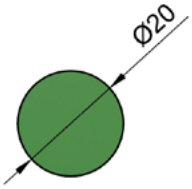
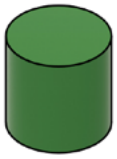
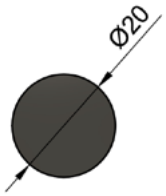
- **Green fruit:**
    - Quantity: 6
    - Material: wood
    - Dimensions: ø20 x 20 mm
    - Finish: green acrylic paint





- **Diseased fruit:**
    - Quantity: 6
    - Material: wood
    - Dimensions: ø20 x 20 mm
    - Finish: black acrylic paint



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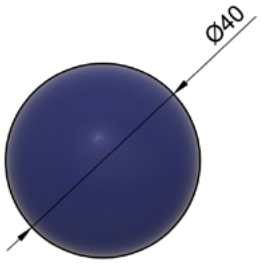
3.3. Water drops: represented by blue balls simulating irrigation.

- Quantity: 6
- Material: hard plastic
- Dimensions: Ø40 mm
- Finish: blue acrylic paint



4. All materials must be arranged according to the assembly instructions provided by the organizers.

5. The organizers reserve the right to introduce minor variations in the design of the materials as long as they do not alter the balance of the challenge.

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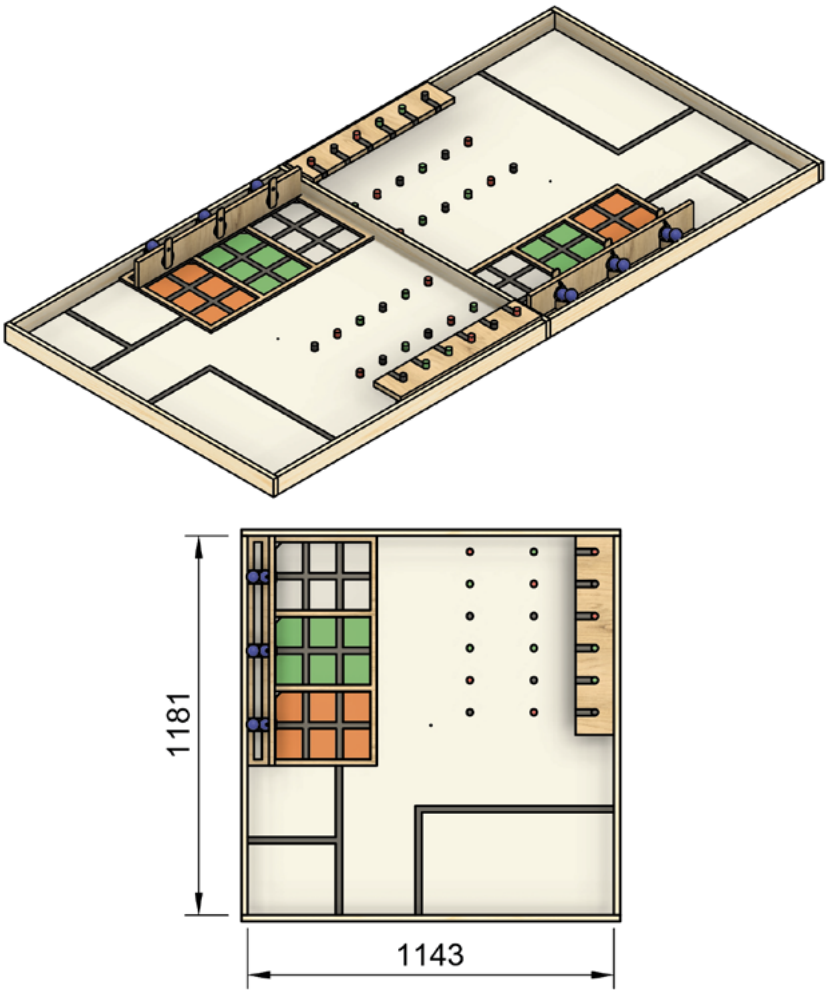
Robot Game Rulebook

d. Game Field

1. The game field simulates an agricultural farm divided into different work areas.
2. General characteristics:
   - **2.1.** Total dimensions of the game board: 2362 ± 3 mm × 1143 ± 3 mm.
   - **2.2.** Division into two equal halves for the simultaneous competition of two teams.



(Here is the competition field for one team)

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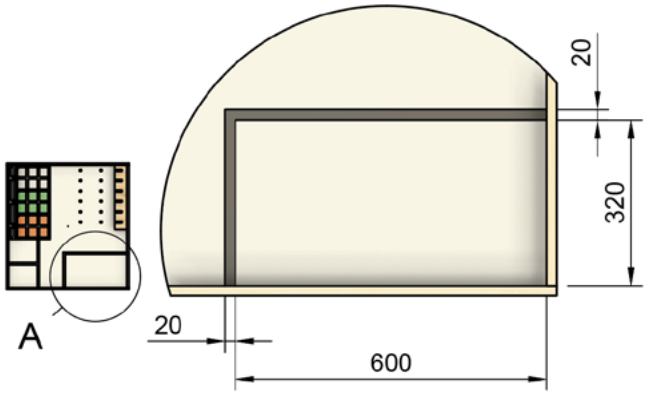
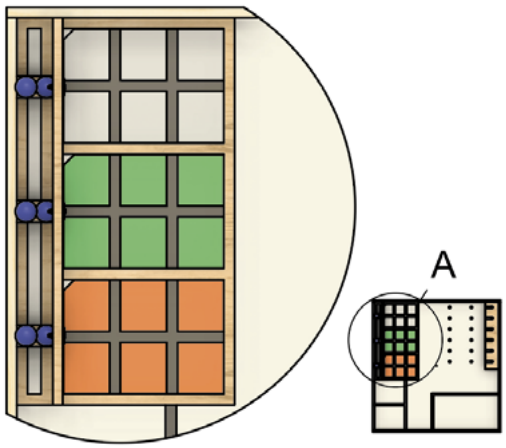
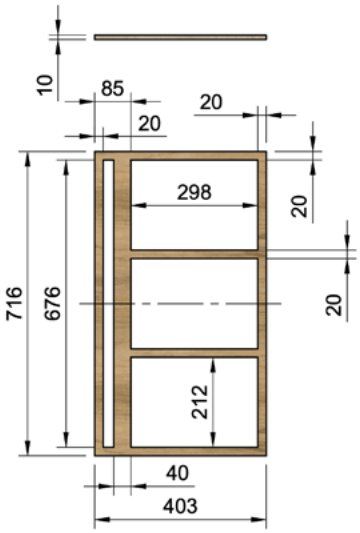
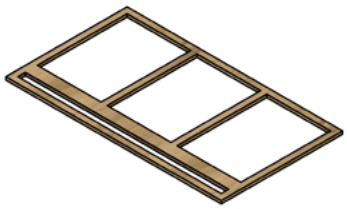
2.3. Robot start zone, marked with 20 mm wide black adhesive tape. The same type of tape may be used in other parts of the field as a visual reference or to mark other game areas.



2.4. Crop plots (2×3 grids), located at the top of the field within a wooden structure.







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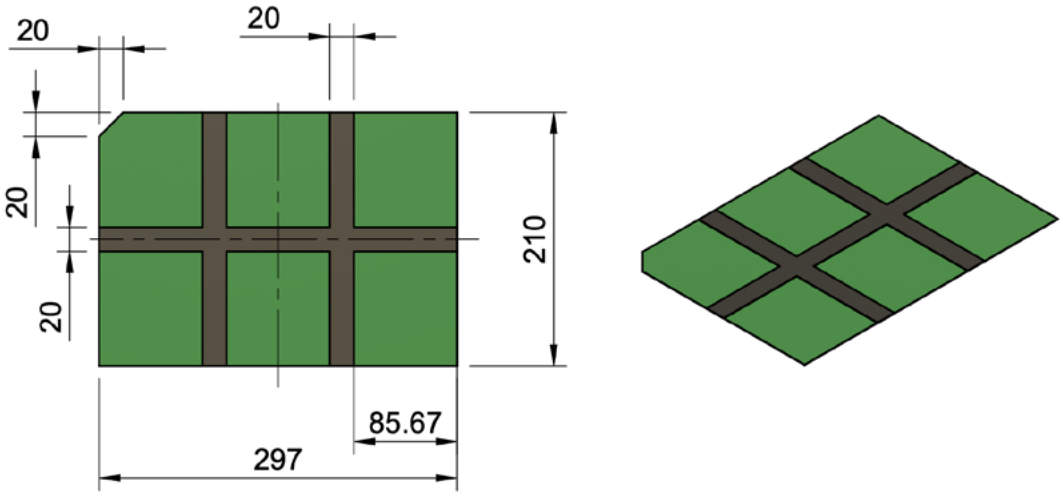
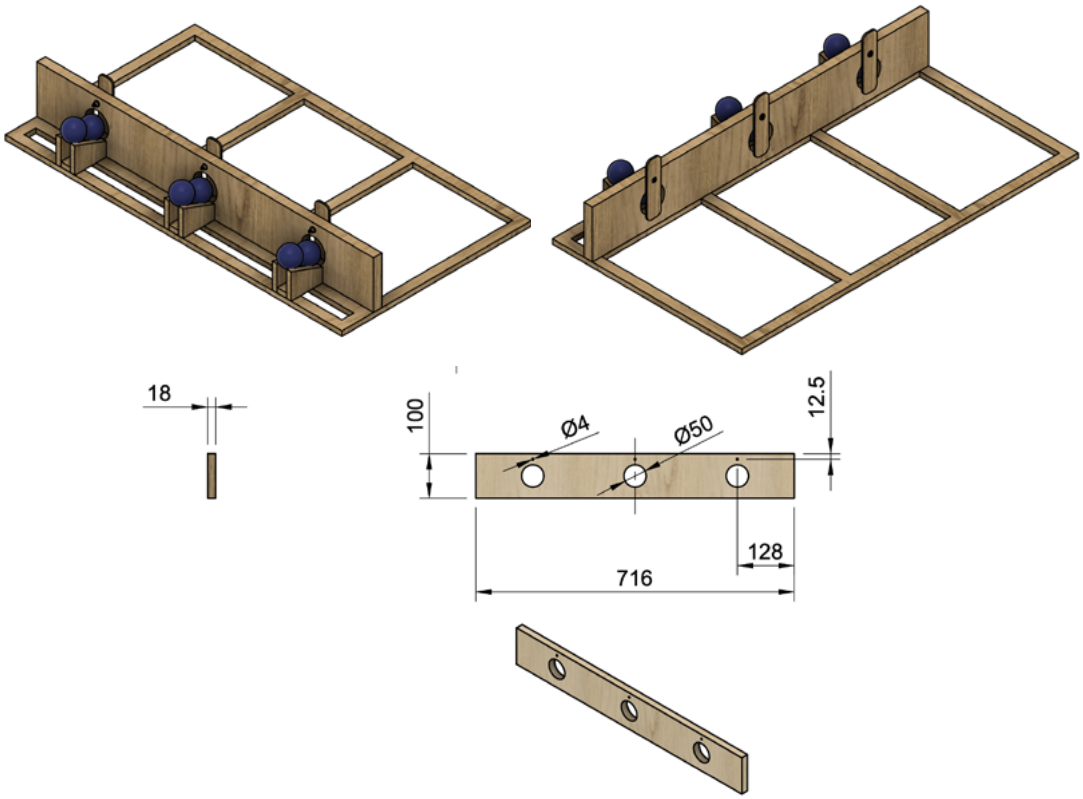


(Material: A4-size cardstock)

2.5. Irrigation gate: a mechanism that releases two blue balls to symbolize the watering of a plot. It operates through a mechanical rotation action that must be physically triggered by the robot. The full operation will be demonstrated in the official challenge video.



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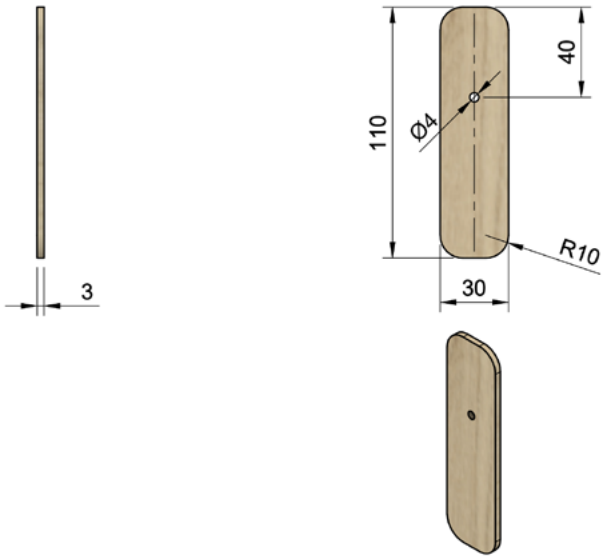
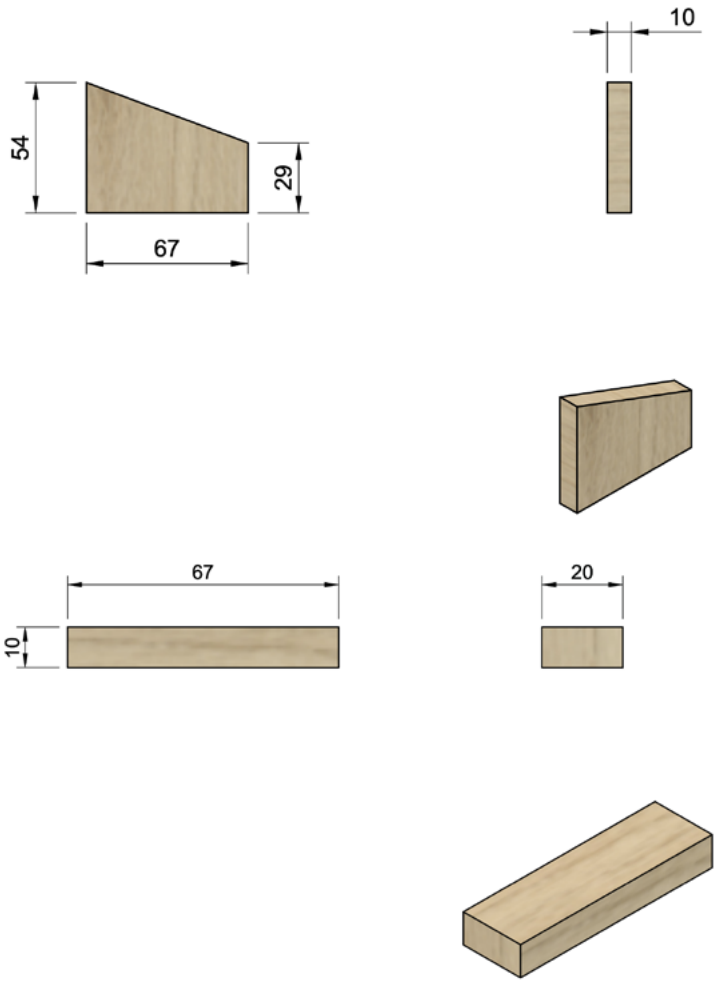


(Requires an M4 x 30 mm screw with a self-locking nut and two washers)



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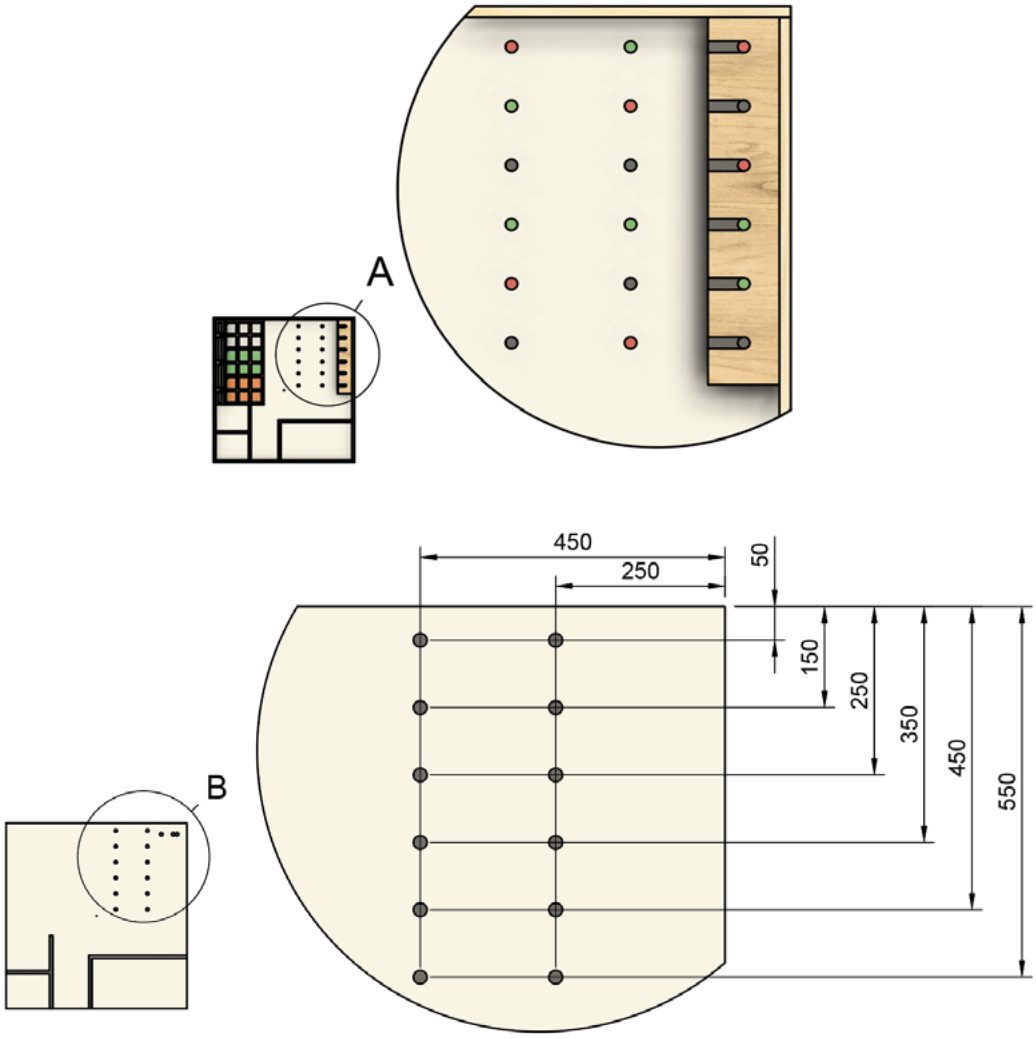
2.6. Three rows of **fruits**, one of which is placed on an elevated platform. The order of the fruits (green, red, and black) is **randomly** decided by the referee before each match. This arrangement will be symmetrical across both fields, meaning that both teams will encounter the same fruit configuration.

Note: Robots are not allowed to climb or move over the elevated platform. They must interact with the fruits placed on the platform from ground level.



(Marks made with circular stickers in black)

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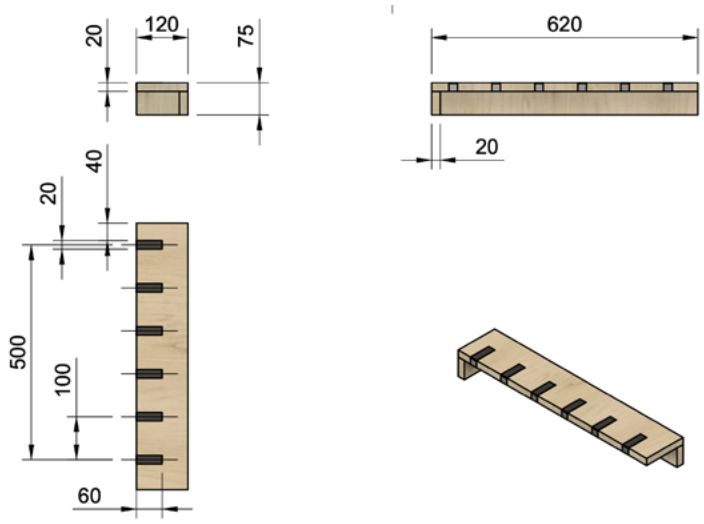
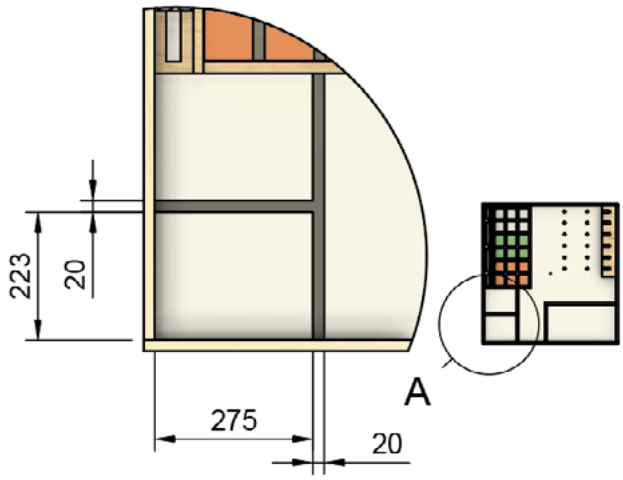


2.7. Fruit and waste sorting zone, along the sides of the field.



3. The field must be perfectly aligned and assembled to ensure equal conditions.

4. Teams may request a brief visual inspection before each match to detect any irregularities.

e. Robots

1. Each team must enter at least one robot. There is no upper limit on the number of robots, provided that all begin completely within the start zone.

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2. Robots must be fully **autonomous** during the match. Only activation or stopping before or after game time is allowed.
3. Any type of materials and programming platforms may be used.
4. All robots must be **decorated in line with the food-safety theme**. This decoration will be verified during a **prior visual inspection**.
   - **4.1.** If a robot fails the visual inspection or poses a risk to the field or to people, it will not be allowed to participate.
   - **4.2.** If multiple robots are entered, all must comply with the decoration requirements and pass the inspection.
5. A robot is considered active when it begins executing instructions without human intervention. It does not have to move immediately.

f. Operation of the Round

1. Each round will have a maximum duration of **2 minutes**.
2. Preparation before the round:
   - **2.1.** Place the robots powered off inside the start zone (marked with black tape).
   - **2.2.** Inspect the field and report any issues to the referee before starting.
3. Start of the round:
   - **3.1.** The game begins when teams activate their robots after the timer starts.
   - **3.2.** Once the robots are running, teams may not intervene in their operation.
4. Human interaction:
   - **4.1.** The only permitted action is to **hand seeds to the robots while they are inside the start zone**.
   - **4.2.** No interaction with the robots is allowed outside this zone.
   - **4.3.** Touching the robot, activating devices, or manipulating the field during the round may result in penalties or disqualification.

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5. End of the round:

5.1. The game ends when the 2 minutes have elapsed or when the team chooses to stop it early.

5.2. At the end, robots must be stopped and remain in their final positions for the referee's evaluation.

6. General conditions during the round:

6.1. All robots must remain within the field boundaries at all times.

6.2. If a robot exits the field completely, it must stop immediately.

6.3. The field must be left ready for the next round (teams are responsible for removing their robots when instructed).

g. Operation of the Game

1. The scoring system will be calculated separately for each category, adapting the missions to the corresponding age group.

2. Junior Category (ages 10 to 14)

2.1. Mission 1: Cultivation and selective irrigation

Before each match, the referee marks two of the three crop plots (orange, gray, or green) as "active", leaving one inactive. The selection is random and symmetrical across both fields.

Action	Points
Place a seed correctly in its corresponding colored plot	+10
A single seed fully within a subdivision (2 × 3)	0
Misplaced seed	0
Correctly water a seeded plot	+30
Water a plot without seeds	0

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2.2. Mission 2: Harvesting and Sorting

Action	Points
Move a red or black fruit out of its adhesive circle	+5
Place a red fruit in the “Fruits” zone	+5
Place a red fruit in the “Waste” zone	0
Place a black fruit in the “Waste” zone	+10
Place a black fruit in the “Fruits” zone	0
Move a green fruit out of its adhesive circle	0

3. Senior Category (ages 15 to 18)

3.1. Mission 1: Cultivation and Selective Irrigation

Before each match, the referee marks two of the three crop plots (orange, gray, or green) as “active”, leaving one inactive. The selection is random and symmetrical across both fields.

Action	Points
Place a seed correctly in its corresponding colored plot	+5
A single seed fully within a subdivision (2 × 3)	+10
Misplaced seed	-5
Correctly water a seeded plot	+30
Water a plot without seeds	-10

3.2. Mission 2: Harvest and sorting

Action	Points
Move a red or black fruit out of its adhesive circle	+5
Place a red fruit in the “Fruits” zone	+5
Place a red fruit in the “Waste” zone	-5
Place a black fruit in the “Waste” zone	+10
Place a black fruit in the “Fruits” zone	-10
Move a green fruit out of its adhesive circle	-5

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4. Penalties (applicable to both categories)
For a full description of the penalties, see the section "Penalties during the game."

Action	Points
Unauthorized interaction with the robot during the round	-20
Manipulating the field or its pieces during the round	-20
Handing seeds to the robot outside the start zone	-20
Robot exits the field completely	-20
Robot damages field structures or pieces	Referee's assessment
Robot endangers the public or other participants	May result in disqualification
Serious breach of the rules	May result in disqualification

h. Competition structure

1. The competition is divided into two phases: a qualifying phase and an elimination phase.

2. Round organization:

2.1. Each team will play a minimum of two rounds in the qualifying phase.

2.2. Matches are paired. Two teams compete simultaneously on the two competition fields of the same game board (each team uses one competition field).

3. Qualification:

3.1. Teams are ranked based on their highest score obtained during the qualifying rounds (from highest to lowest).

3.2. In the event of a tie, the following criteria will be applied in order:

- The number of absences will be considered (from lowest to highest).
- If there is still a tie, the total sum of points obtained across all qualifying rounds will be considered only for the teams that have the same maximum score (from highest to lowest).

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- If the tie still persists, the tie can be resolved by ignoring all the negative points and adding up only the positive score from both qualifying rounds.
- Finally, if the tie remains, the ranking will be decided randomly among the tied teams.

4. Elimination phase:

4.1. Depending on the number of teams per category, the elimination phase may include pre-quarterfinals and/or quarterfinals to determine the semifinalists.

4.2. In the pre-quarterfinals and quarterfinals, teams are ranked based on the total points obtained in that respective round.

4.3. From the pre-quarterfinals, the eight highest-scoring teams advance to the quarterfinals. From the quarterfinals, the four highest-scoring teams advance to the semifinals.

4.4. Head-to-head knockout duels are applied only from the semifinals onward (semifinals and final).

4.5. Pairings in the elimination phase follow a crossover format (1st vs last, 2nd vs penultimate, etc.).

4.6. Winners of the semifinals advance to the final; the losing teams compete in a consolation final to determine 3rd place.

5. Incidents:

5.1. Any serious incident during a match will be reviewed by the referee committee.

5.2. If a team fails to arrive on time for a round without valid justification, they will automatically lose that match.

i. Penalties during the Game

1. Any action that violates the operation or conduct rules may incur a penalty.

2. Unauthorized interactions:

2.1. Touching the robot while the round is in progress: **-20 points**

2.2. Manipulating the field or its pieces during the round: **-20 points**

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2.3. Handing seeds to the robot outside the start zone: **-20 points**

3. Robot conduct:

3.1. If a robot leaves the field completely: **-20 points**

3.2. If a robot damages field structures or pieces: **penalty assessed by the referee committee**.

3.3. If a robot endangers the public or other participants: **possible disqualification**.

4. Mission-specific penalties (see Section 6):

4.1. Misplaced seed: **-5 points**

4.2. Water a plot without seeds: **-10 points**

4.3. Place a red fruit in the "Waste" zone: **-5 points**

4.4. Place a black fruit in the "Fruits" zone: **-10 points**

4.5. Move a green fruit out of its adhesive circle: **-5 points**

5. Other cases:

5.1. Serious breaches of the rules **may lead to disqualification**.

5.2. All decisions by the referee committee are final and must be respected.

j. Sanctions during the Competition Day

1. Teams must be punctual and adhere to their assigned schedules. Any delay may incur penalties.

2. If a team fails to show up for its round without valid justification, the match will be considered lost and will not be scored.

3. No interference with other teams, their materials, or their robots is allowed. This behavior may result in immediate disqualification.

4. Any act of disrespect toward other participants, the referee committee, or the public may incur penalties or, in severe cases, expulsion from the tournament.

5. The organizers reserve the right to stop a round or disqualify a team if they detect any conduct that goes against the competition's values or compromises safety.

International Telecommunication Union · Place des Nations · CH-1211 Geneva 20 · Switzerland
Tel: +41 22730 5111 · Fax +41 22733 7256 · E-mail: itumail@itu.int · www.itu.int