



## RoboMission ミドル競技 Junior Game Rules

Ver. 1.0



## Earth Allies Green City

Official Game Rules for WRO RoboMission Junior.  
Version: January 15th 2024  
(Note: Rules for local WRO events may vary!)



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## Important information for reading this document:

- These game rules are made for local and national competitions.
- National Organizers in WRO countries are allowed to simplify the missions.
- For the International Final, one extra mission will be released on October 8<sup>th</sup> 2024. The extra challenge will work with the same game mat and brick set. It is not mandatory to do this extra mission to participate in the event.
- Because of possible surprise rules and the extra mission for the International Final, the game field may contain areas and markings that are not used at local or national events.
- For greater clarity, the robot missions are explained in multiple sections. But the teams can decide which missions they will do and which order.
- The game missions have easy and more complicated tasks. This makes the competition suitable for beginning and more experience teams. It is not obligated to solve all missions to enjoy a WRO participation.
- General information on game table setup and fixing of game objects on the field you find in the WRO RoboMission General Rules, chapter 6.

We wish everyone much success and a lot of fun with our WRO 2024 challenges!

Your team of World Robot Olympiad Association

※ このルールブックは、WRO 2024 RoboMission Juniorのルールをもとに、WRO Japan RoboMission 競技委員会がWRO 2024 Japan決勝大会 ミドル競技 Junior 部門用に一部を修正し、作成しています。

## 1. Introduction

Green cities are urban areas that are designed to be more sustainable and environmentally friendly. They have several advantages that help to improve the quality of life for their residents and live more in harmony with nature. Some of the advantages of green cities are:

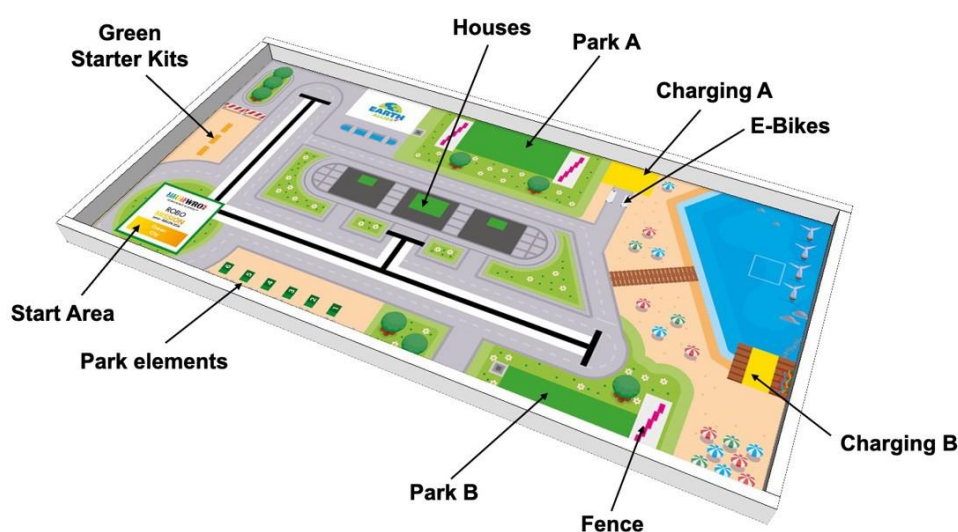
- Green cities have cleaner air, which is better for our health.
- Green cities have more parks and gardens, which are great places to play and explore.
- Green cities use renewable energy, which is better for the environment.

Examples of modern and transforming green cities are Singapore or Paris where more trees and green areas have been installed to transform the cities into a green city.<sup>1</sup>

**On the Junior game field, the robot will help transforming a city to a greener place by setting up new parks, helping people make a (roof top) garden and making use of renewable energy.**

## 2. Game Field

The following graphic shows the game field with the different areas.



If the table is larger than the game mat, place the mat against the wall with the sides of the park A and the water area.

<sup>1</sup> For example, see those YouTube videos on Singapore (<https://www.youtube.com/watch?v=QCZ8jInO7UY>) or Paris (<https://www.youtube.com/watch?v=3kZ3rWHs9wU>).

### 3. Game Objects, Positioning, Randomization

#### Park elements

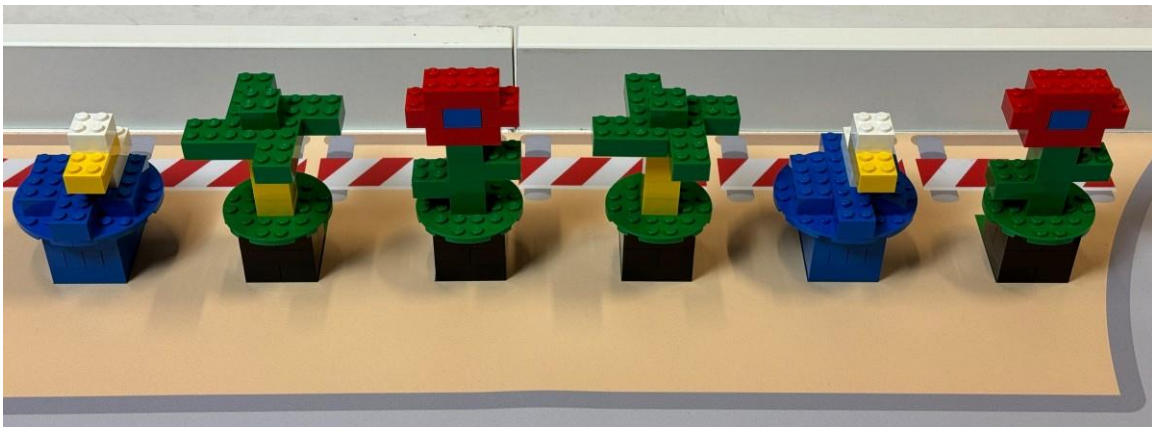
There are **2 blue lake elements** and **4 green elements (2 trees, 2 flowers)** on the field. All elements are **randomly placed** on the green rectangles that are numbers 1-6 on the bottom of the game field.



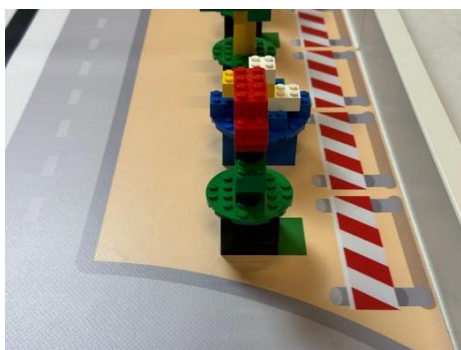
Lake elements



Green elements



One possible position of the elements



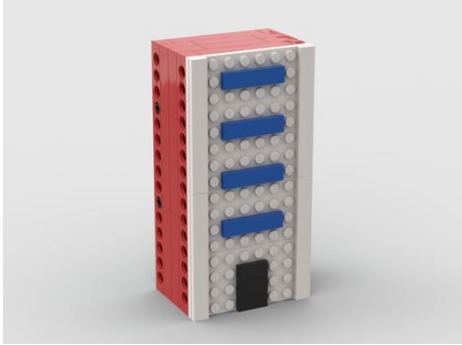

Please note:

The green elements are always placed in the front of the green marking on the field (because their base is 4x4) and the lake elements use the full space of the green marking (because their base is 4x6). The lake elements are always oriented so that the yellow beaks of the ducks point towards the centre of the game field. The flowers are oriented parallel to the border, with the higher leaf of the flowers pointing towards the start area



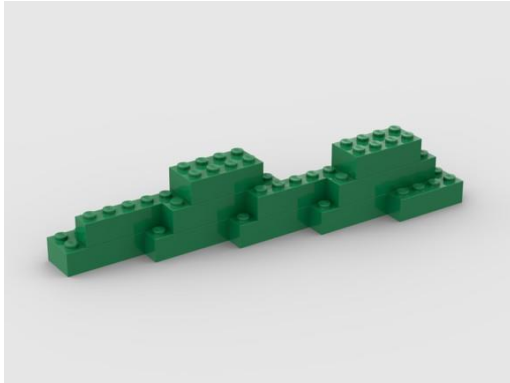
## Houses

There are **2** apartment buildings. They are placed on the positions in the house areas in the middle of the game field.

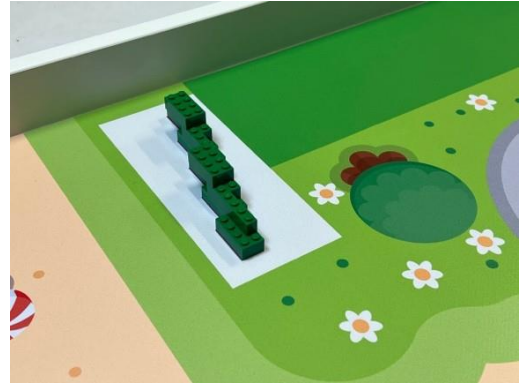
	 <p>Apartment building</p>
	 <p>Placement of an apartment building</p>

## Fence

There are **3 fences** that are placed around the two park areas. They are always placed on the same positions on the game field and are not allowed to be moved or damaged.



Fence



Short fence next to park area B, all fences are always placed that the lower part of the fence is at the front of the park area.



Fences next to park area A



**WRONG placement** of the fence with the higher part to the front



## 4. Robot Missions







### 4.1 Create new green areas

The robot should help to create new green areas in the city. Two new parks (park A and park B) should be created. It is the task of the robot to bring:

- One lake element to each park
- Two green elements to each park (flower or tree element, does not matter which)

The following table shows the scoring of this task and the photos show scoring situations apply for both the lake and green elements. Please note the following aspects for this task:

- Maximum one lake element and two green elements count per park area (no matter if touching or completely in). Points for are only awarded if the elements still stand upright.
- Definition “completely in”: Completely means that the game object is touching the corresponding area only.

	Each	Max.
Lake or green element partly in a green park area	4	
Lake or green element completely in a green park area	8	48
		
4 points (partly in)		
		
8 points (completely in)		
		
4 points (partly in)		
		
0 points (element not standing anymore)		
		
24 points (3x8 for completely in the area)		
		
24 points (only one lake and two green elements count)		



 <p>16 points (max. one lake element per area counts)</p>	 <p>24 points (two green and one lake element, all good)</p>	 <p>24 points (two green and one lake element count and the ones with higher points)</p>
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## 4.2 Bonus for fences & Apartment houses

It is not allowed to move (outside of light or dark grey areas) or damage the fences and houses.

If those objects are not damaged and moved, you will always get bonus points.

The following table shows the scoring of this task and the photos show scoring situations that apply for both the fences and the houses. Please note for this task:

- § Definition “damaged”: Any situation that means that the game object is not exactly like at the start of the run, e.g. a brick fell off.
- § Definition “moved”: The game object is considered as moved if a part of the game object is touching the mat outside of the grey area (light grey area for the fences, dark grey area for the houses).

	Each	Max.
Apartment house is not damaged or moved	3	6
Fence is not damaged or moved	3	9

 <p>3 points (moved inside grey area is OK)</p>	 <p>0 points (damaged)</p>	 <p>0 points (moved outside)</p>
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### 4.3 Park the robot

The mission is complete when the robot returns to the Start area, stops, and the projection of the robot is **partly (top-view)** within the Start area.

	Each	Max.
Projection of the robot is partly in the Start Area (only if other points, not bonus, are assigned)		13

Projection of the robot is partly in the Start Area  
(only if other points, not bonus, are assigned) → 13 points

*Please note: The green line surrounding the area does not belong to the area, the project has to be over the white inner area. Cables only do not count for the projection of the robot.*



The projection of the robot is not in the area, 0 points.



The projection of the robot is partly in the area, 13 points.



The projection of the robot is completely in the area, 13 points.

## 5. Scoring Sheet

Team name: \_\_\_\_\_

Round: \_\_\_\_\_

Tasks	Each	Max.	#	Total
<b>Create new green areas</b> <i>Maximum one lake element and two green elements count per park area. Objects must stand upright.</i>				
Lake or green element partly in a green park area	4			
Lake or green element completely in a green park area	8	48		
The element is completely out of the initial square area.	4	24		
<b>Bonus for Fences &amp; Apartment houses48+</b>				
Apartment house is not damaged or moved	3	6		
Fence is not damaged or moved	3	9		
<b>Park the robot</b>				
Projection of the robot is partly in the Start & Finish Area (only if other points, not bonus, are assigned)		13		
<b>Maximum Score</b>		100		
<b>Surprise Rule</b>				
<b>Total Score in this run</b>				
<b>Time in full seconds</b>				