

In-House Challenge 1: Preparing the Fields

Game Rules



**IN-HOUSE
CHALLENGE**



WORLD ROBOT OLYMPIAD™



SOUTH AFRICA

Date: 06 May 2024

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PART ONE – GAME DESCRIPTION

1. Introduction

Robotics is a wonderful platform for learning 21st century skills. Solving robotic challenges encourages innovation and develops creativity and problem-solving skills in students. Because robotics crosses multiple curricular subjects, students must learn and apply their knowledge of science, technology, engineering, math, and computer programming.

The most rewarding part of designing robots is that students have fun. They work together as a team, discovering their own solutions. Coaches guide them along the way, then step back to allow them their own victories and losses. Students thrive in this supportive and immersive environment, and learning occurs as naturally as breathing air.

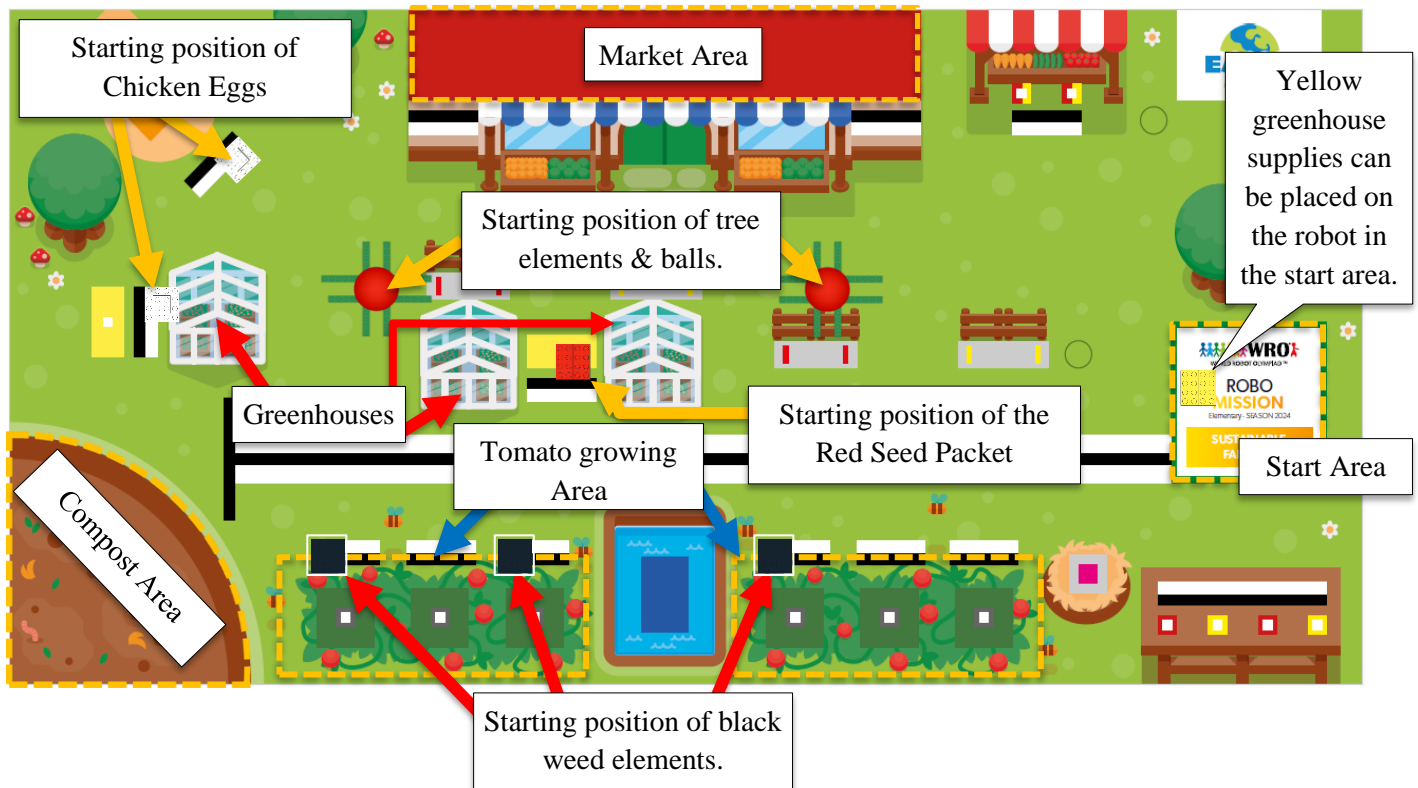
At the end of the day, at the end of a fair competition, students can say they did their best, they learned, and they had fun.

**There is no international component for the In-House challenge.
The In-House challenge is run by coaches in their own capacity.
Score submission takes place between the 10th and 21st of October**

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 on the wall with the start area side touching the table wall.

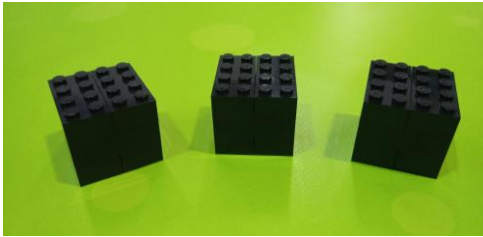


1. Use the Ultrasonic/Distance sensor to start the robot moving.
 2. Follow a line with a light/colour sensor.
 3. Move the black weed elements into the compost area.
 4. Deliver the yellow greenhouse supplies to any greenhouse.
 5. Deliver the red seed packet to a tomato growing area.
 6. Deliver the white eggs to the market area.
 7. Touch the robot and say STOP to show you have ended your scoring run.
- Bonus:** Don't move the red balls off of the tree elements.

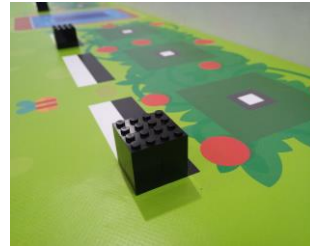
3. Game Objects & Positioning

Black Weed Elements (x3)

There are three (3) Black Weed Elements. These weed elements start on the white and black lines above the tomato areas. One element is placed on the line closest to the compost area. One element is placed in the black and white line area to the left of the pool and one element is placed in the black and white area to the right of the pool. All elements are placed so as they are closest to the compost area.



Weed Elements



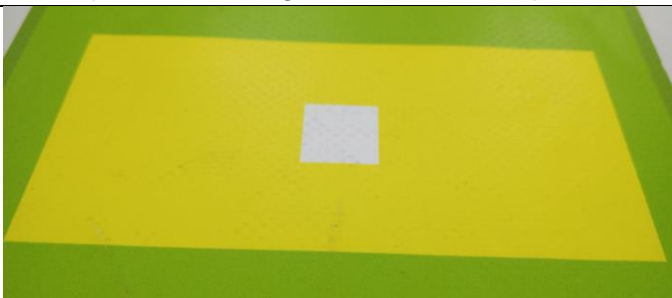
Placement of a weed element



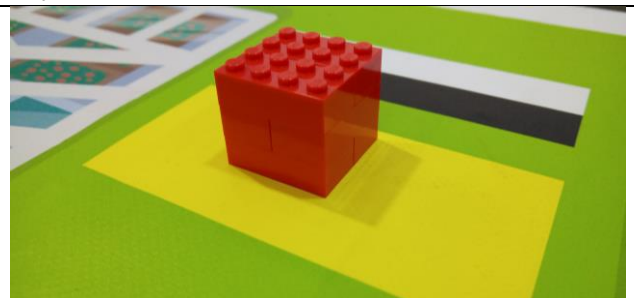
Starting positions of all 3 Weed Elements

Red Seed Packet (x1)

One Red Seed Packet is placed inside the yellow area closest to the start area. The element is placed covering the small white square inside the yellow area.



Yellow starting area for the red seed packet.



Red seed packet placed covering the small white square.

Yellow Greenhouse Supplies (x1)

The yellow greenhouse supply element starts inside of the start area. The element can be placed on the robot before the robot begins moving.



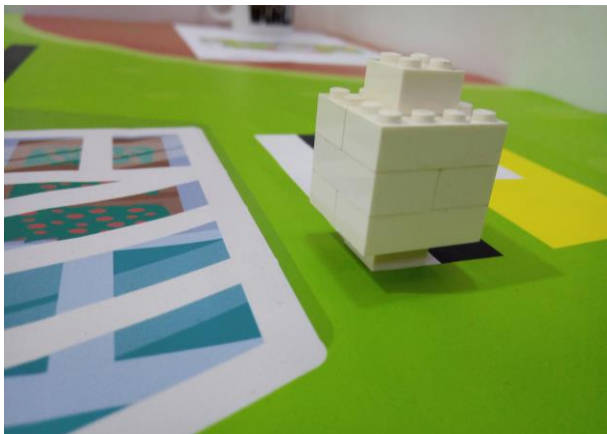
Yellow greenhouse supplies starting positioned in the robot.



Yellow greenhouse supplies starting positioned on top of the robot.

Chicken Eggs (x2)

There are two chicken eggs placed on the game mat. One egg element is placed in the black and white line area near the furthest greenhouse. One egg element is placed in the black and white line area near the orange circle on the game mat.



Egg element placed in its starting position.



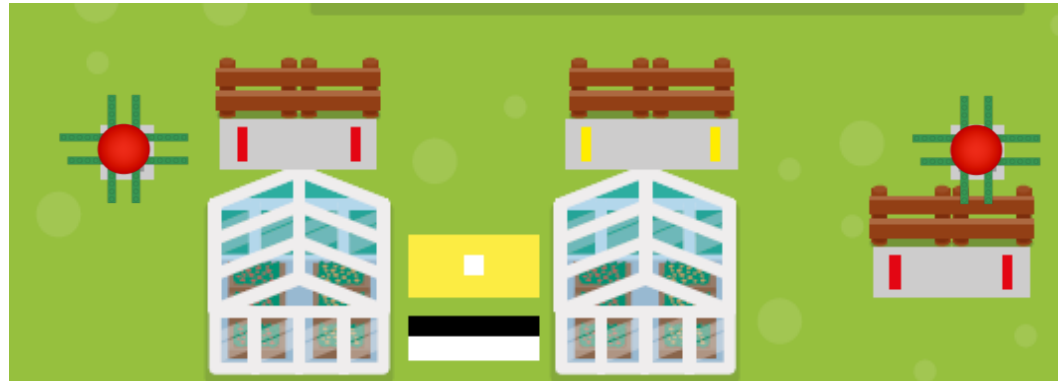
Egg elements shown in their starting positions.

Trees & Balls (x2)

Two tree elements are placed on the game mat on the dark grey squares near the green houses.



Tree element starting position.



Starting position of the trees on the game mat.

4. Robot Missions

4.1 Points for use of sensors

Teams should program the robot so that when a team member or judge breaks the ultrasonic/distance sensors beam the robot waits for 1 second and then begins moving out of the start area before completing any of the missions on the game table. (if a judge can't verify this on the game mat, they must check the team's program)

Teams should program the colour/light sensor, so the robot follows a line of any colour anywhere on the game mat. (if a judge can't verify this on the game mat, they must check the team's program)

4.2 Move the black weed elements.

There are 3 black weed elements on the game mat. These must be moved completely inside of the compost area.

4.3 Deliver the red seed packet.

The robot must collect and move the red seed packet so it touches one of the two tomato growing areas. The seed packet can be placed in either of the two seed areas.

4.4 Deliver the yellow greenhouse supplies.

The robot must deliver the yellow greenhouse supplies to one greenhouse area. The supplies must be placed completely inside of the greenhouse area.

4.5 Collect and deliver the chicken eggs.

The robot must collect the chicken eggs and deliver them to the Market Area. The eggs must be placed completely inside the Market Area. The eggs can be placed in any orientation.

4.6 Don't touch the trees.

The red balls must not have been moved from the top of the two trees.

4.7 Stop the robot.

One team member must **touch** the robot while saying “STOP” and **end the program** to indicate their run has finished. The robot should remain in the position the team stopped it in and not have been moved anywhere else on the game table.

In-House rule adaptations:

The In-House challenge is designed for teams to have fun, test their abilities and to encourage robotics in schools and clubs.

NB: Coaches may alter the rules to assist their teams if the coach deems it necessary. For example, where elements must be completely inside to score a coach may determine that elements only need to touch the scoring areas to score full points. All teams should be judged fairly and in the same way with the same rules.

Changes or adaptations of these rules do not need to be checked by WRO SA or agreed upon by WRO SA for teams to have scores submitted during the challenge week.

5. Scoresheet

Challenge 1 - Preparing the Fields

Team Name: _____

Task	Each	Points	1st Score	2nd Score	3rd Score	4th Score	
Ultrasonic/Distance Sensor Used to start the robot.	Yes / No	20					Diamond 300+ points
Used a light sensor to follow a line	Yes / No	20					
Moved the black weeds into the composting area.	0 1 2 3	20 each (Max 60)					Gold 226 - 299 points
Delivered the yellow greenhouse supplies to any greenhouse.	Yes / No	50					Silver 151 - 225 points
Delivered the red seeds packet to a tomato growing area.	Yes / No	50					Bronze 76 - 150 points
Delivered the chicken eggs to the market area.	0 1 2	20 each (Max 40)					
Team touched robot, ended program and said STOP to indicate the run is over.	Yes / No	20					Participation 0 - 75 points
Bonus Points:							
Red Ball still on top of tree.	0 1 2	20 each (Max 40)					
Surprise rule:	Yes / No						
Teams should be given a maximum of 3 hours to program, test and score.	Total:	300 Max:					

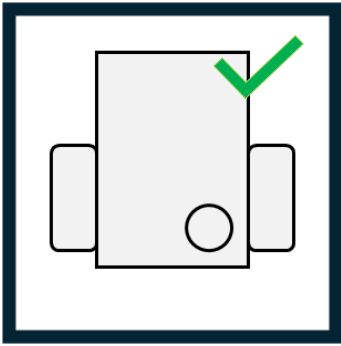
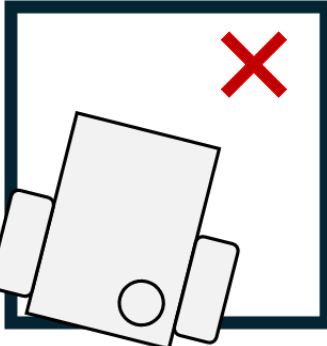
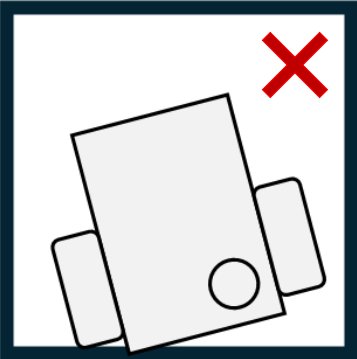
Judge Name: _____ Team Member Signature: _____

6. Scoring Interpretation

The images in this section will help to explain the scoring options available to teams. In cases where scoring is unsure the judge must bias their decision to the best possible outcome of the team.



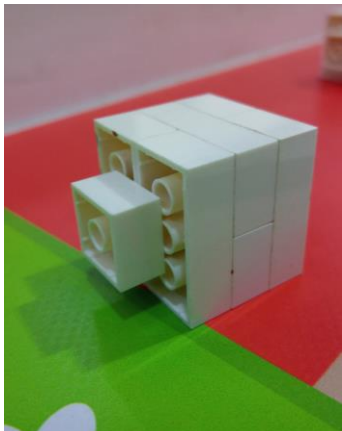
Robot start area

The robot must start completely inside the start/finish area. All parts of the robot must fit into this area **including robot cables**. No part of the robot is allowed to project outside of the start/finish area or into the surrounding line. The start/finish area is defined as the white area only and not the surrounding different colour line/square.

 <p>Robot completely inside the start/finish area. No part overhanging or touching the surrounding line.</p>	 <p>Robot outside of the start/finish area. Robot will not be allowed to start.</p>	 <p>Robot projecting out of the start/finish area. Robot will not be allowed to start</p>
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Chicken Eggs:

The below images apply to the chicken egg elements in the market area.

 <p>Chicken eggs completely inside the market area. 20 points each Max 40 points</p>	 <p>Chicken egg completely inside the market area. 20 points</p>	 <p>Chicken egg not completely inside the market area. 0 points</p>
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Weed Elements:

The below images apply to the three weed elements in the compost area.



Weed elements completely inside the compost area in any orientation.

20 points each

Max (60 points)



Weed element completely inside the compost area.

20 points



Weed element completely inside the compost area.

20 points each

Max (60 points)



Weed element not completely inside the compost area.

0 points

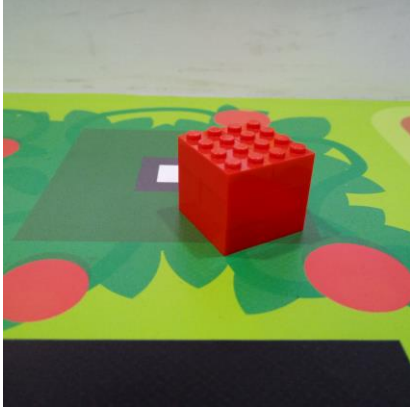


Weed Element not completely inside the compost area.

0 points

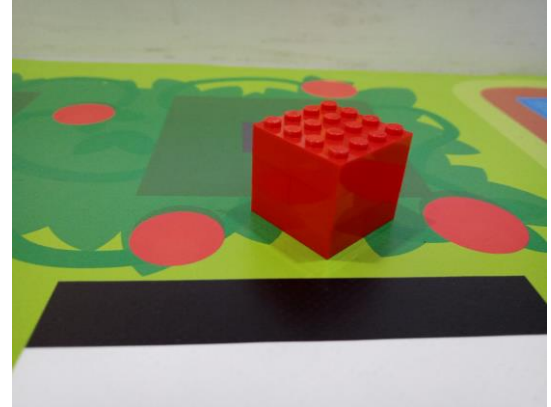
Red Seed Packet:

The below images apply to the red seed packet being delivered to a tomato growing area.



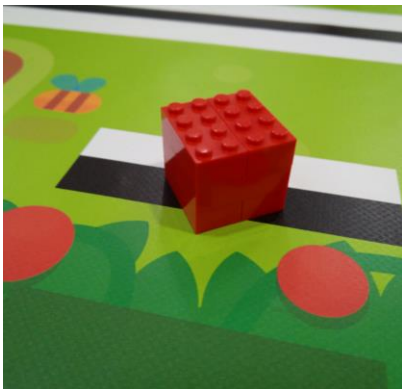
Red seed packet completely inside of a tomato growing area.

50 points



Red seed packet touching a tomato growing area, not completely inside.

0 points

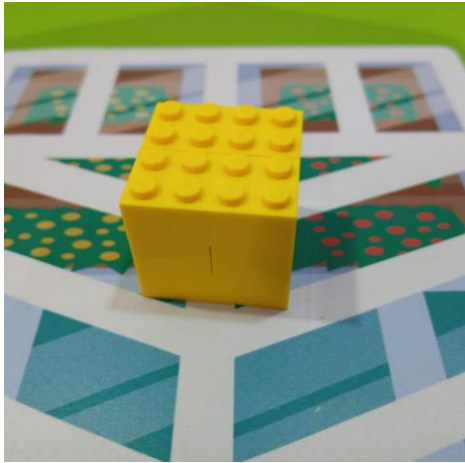


Red seed packet not inside of a tomato growing area.

0 points

Yellow greenhouse supplies

The below images apply to the yellow greenhouse supplies and the greenhouse areas.



Yellow greenhouse supplies completely inside of a greenhouse area.

50 points



Yellow greenhouse supplies touching a greenhouse area.

0 points



Yellow greenhouse supplies not touching or inside of a greenhouse area.

0 points

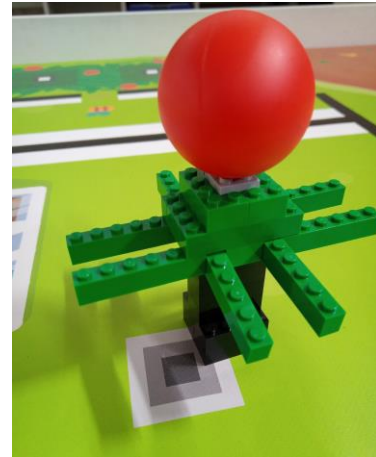
Trees & Balls

The below images apply to the tree and red ball elements.



Red ball on top of the tree element, tree element is unmoved.

20 points



Red ball on top of tree element. Tree element has moved and is touching outside of the grey start area.

0 points



Red ball has moved and is not on top of the tree element.

0 points



Red ball has moved, not in original start position.

0 points

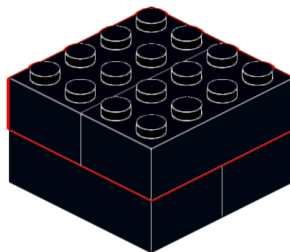
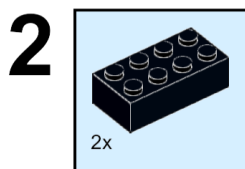
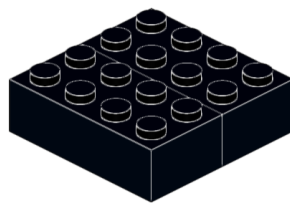
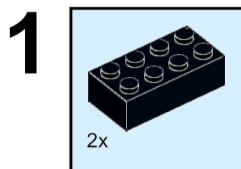
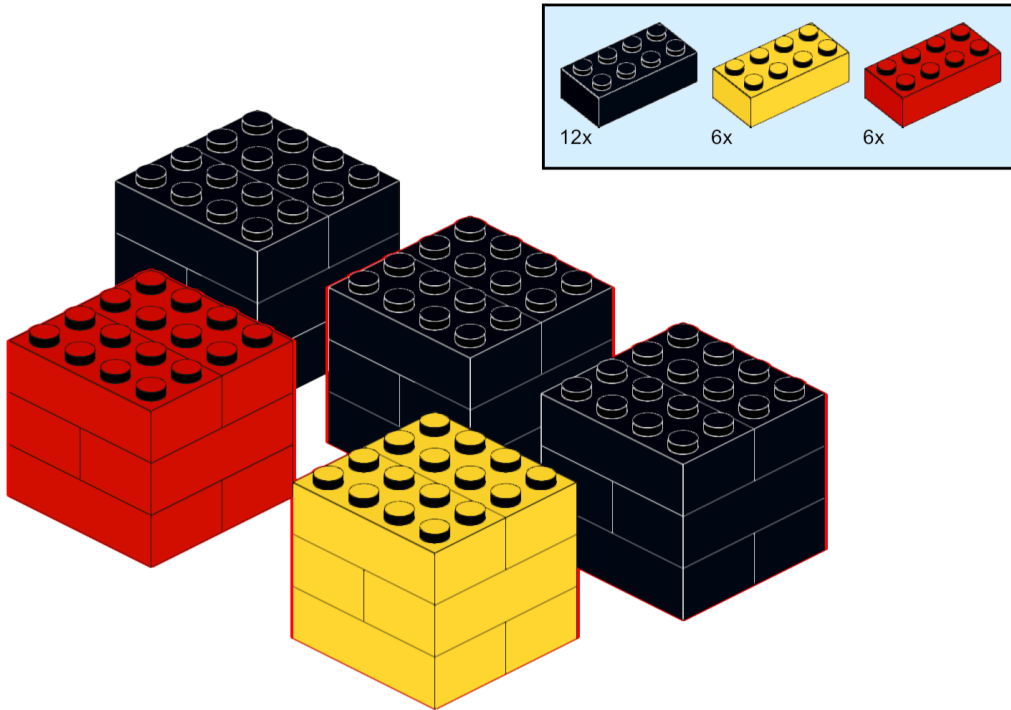
Robot finishing points

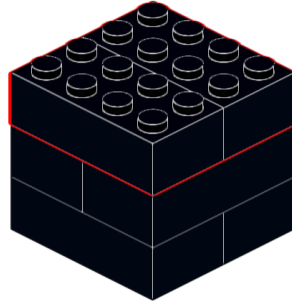
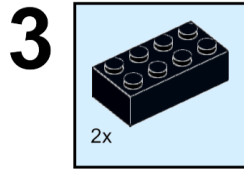
The team must touch the robot and say stop to indicate the robot has finished its run.

The robot program must be ended, and the robot must no longer move. The robot must remain on the game table until the judge requests the robot to be removed.

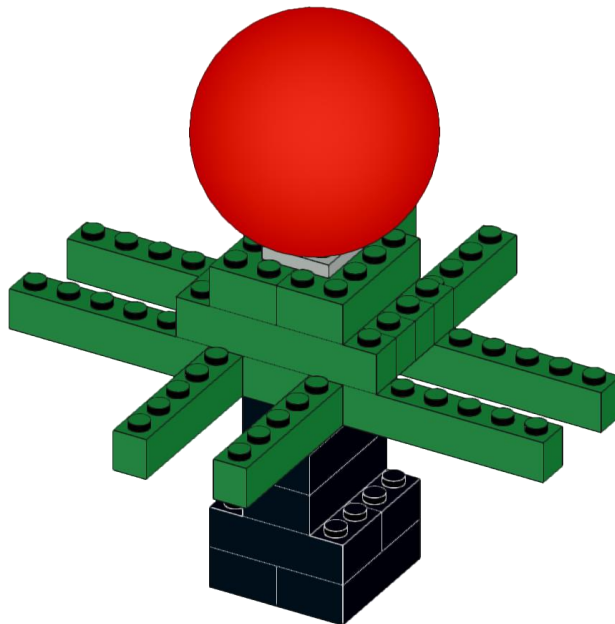
PART TWO – ASSEMBLY OF GAME OBJECTS

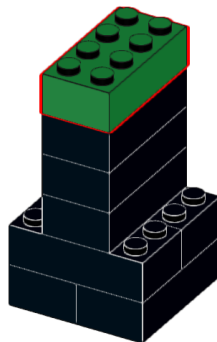
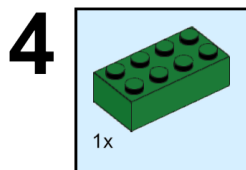
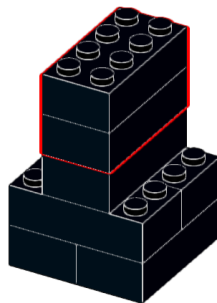
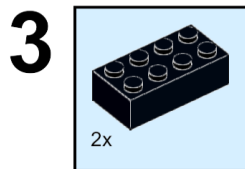
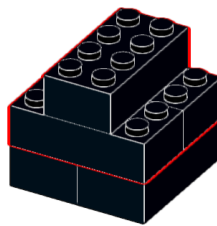
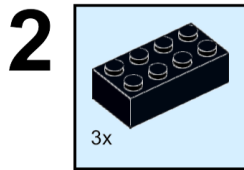
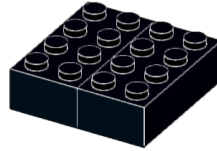
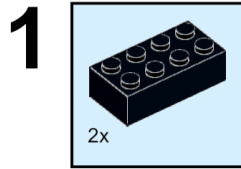
Blocks: Red (x1), Yellow (x1), Black (x3)



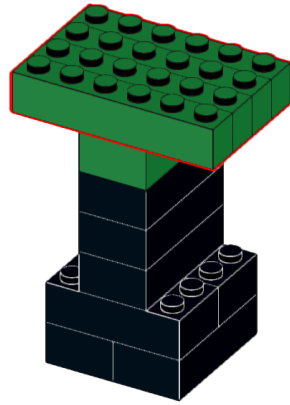
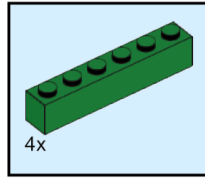


Tree Element (x3)

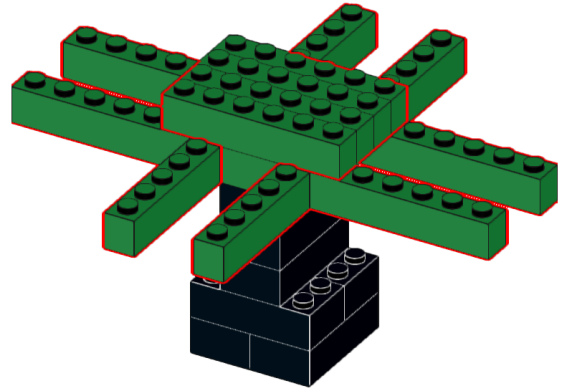
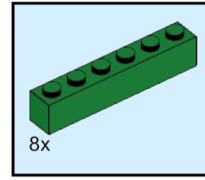




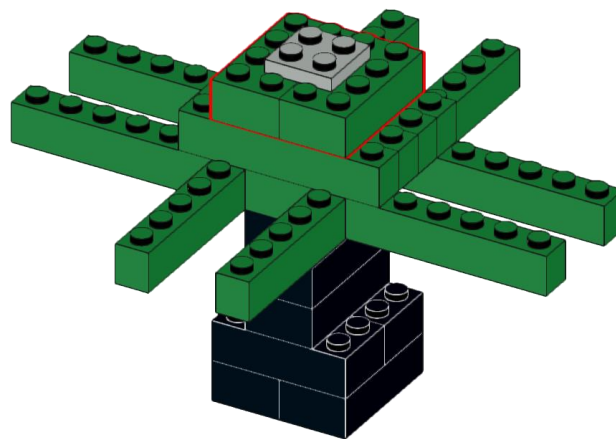
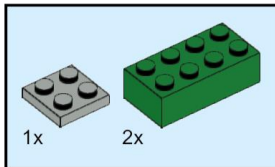
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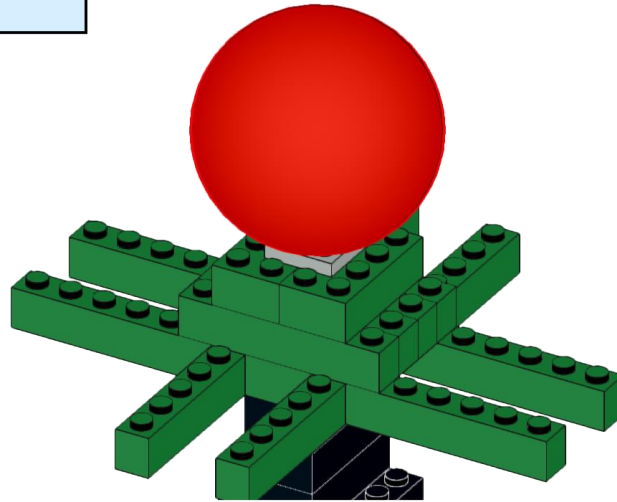
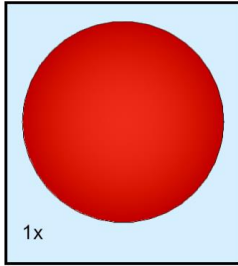
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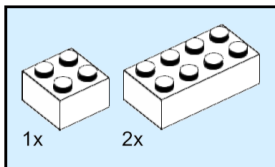


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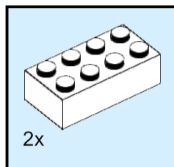


Chicken Eggs (x2)

1



2



3

