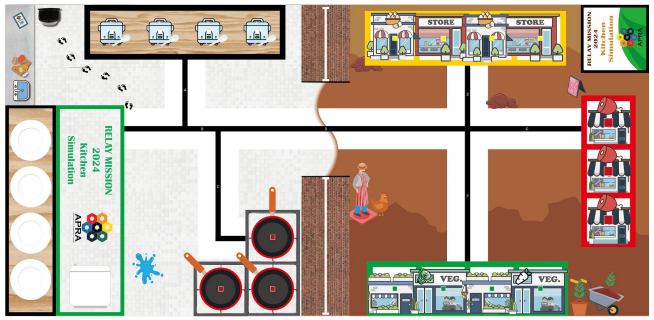

Kitchen Simulation Relay Mission
Junior Category
Game Description, Rules and Scoring

Updated: 10/05/2024

APRA
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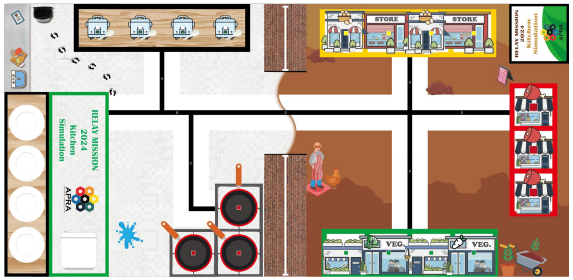
B. Game Description
C. Scoring
D. Game Rules
E. Other Rules
F. Competition System
G. Assembly Of Game Objects



Mission field

Kitchen Simulation Relay Mission
Junior Category
Game Description, Rules and Scoring

A. Brief

A1. In recent years, it has become more and more common to install food delivery robots in restaurants, however, can it have more functions besides? This competition is to let the robots make designated menus as required. From purchase, collect, process different foods, and to deliver completed meals to customers automatically.

A2. The participating teams are composed of two to three members, and each team will use two robots. They will start at the same time to complete the tasks that can only be scored individually and cooperatively.

A3. The quota for each school or organization will be determined according to the actual number of participating teams.

A4. Participating age: Participants must be 13 - 18 years old (birth date in 2024 season is 2006 – 2011).

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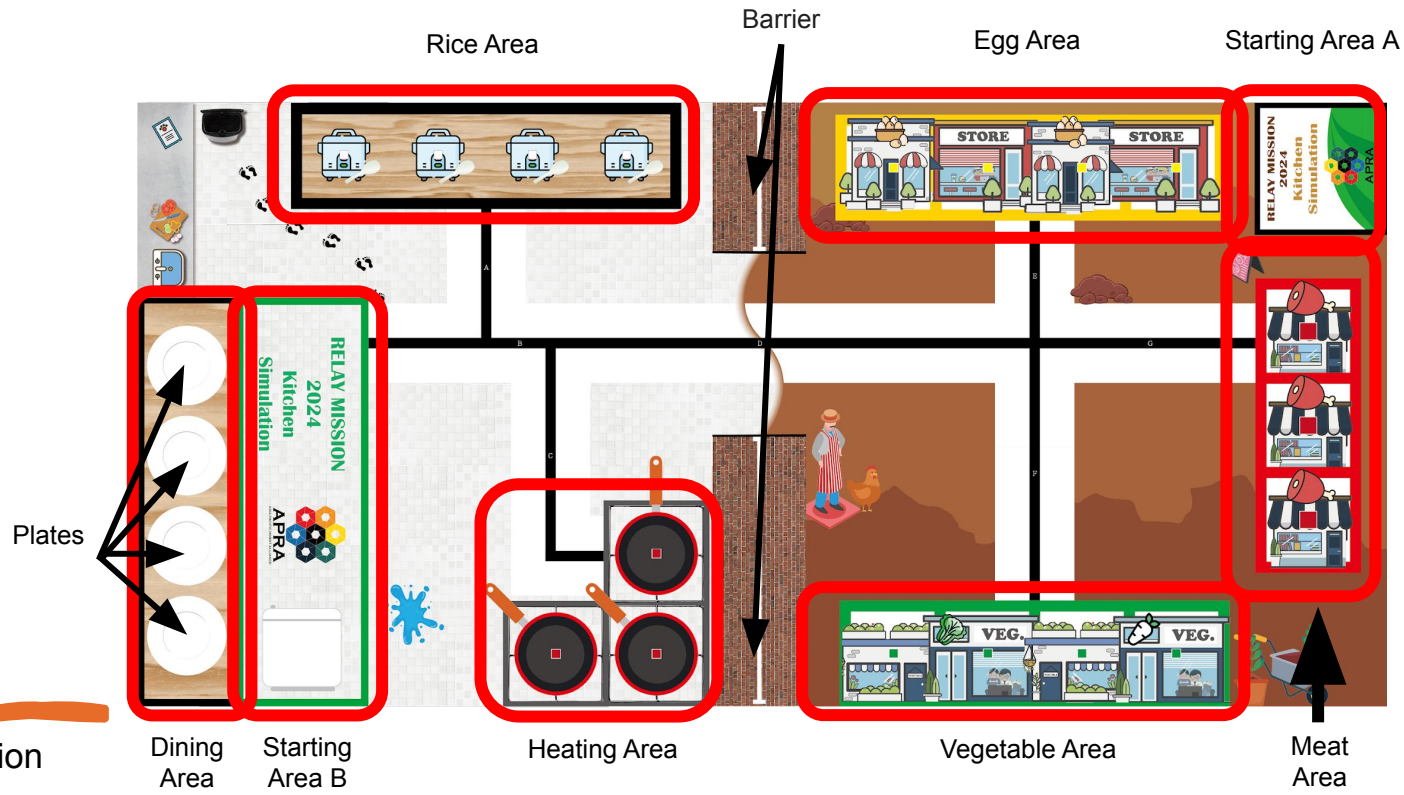
B. Game Description (Field setup and specifications)



Kitchen Simulation Relay Mission
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Kitchen Simulation Relay Mission
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Game Description, Rules and Scoring

B. Game Description (Field setup and specifications)

B1. The mission area is divided into two zones, the Food Warehouse (ZONE A) and the Kitchen Area (ZONE B). The two zones are connected by a passage in the middle.

B2. Food Warehouse (ZONE A) has four areas, which are the egg area, the meat area , the vegetable area and the starting area for robot A.

B3. Kitchen (ZONE B) has four areas, which are the rice area, the heating area , the dining area and the starting area for robot B.

B4. There will be walls around the game table with a height of approximately 80mm.

B5. Four pieces of cooked food (2 x 2 brick) will be placed sequentially from left to right in each area. YELLOW in the egg area, GREEN in the vegetable area and WHITE in the rice area.

B6. Three pieces of raw food (RED 4 x 4 brick) will be placed in the meat area.

B7. Three pieces of cooked food (RED 2 x 2 brick) will be placed in the heating area.

B8. Before the game starts, robot A and B will be loaded respectively with 5 and 5 pieces of token. (Gear 20 tooth double bevel)

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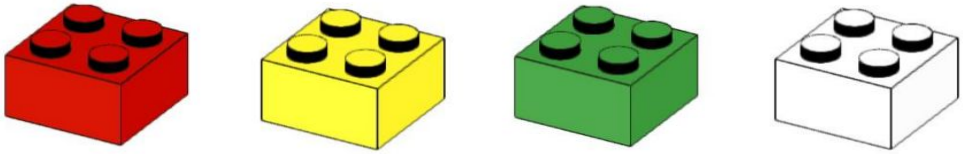
B. Game Description (Field setup and specifications)

B9. ‘Barriers’ will be placed in the middle of the field.

B10. The 2 x 2 brick will be called ‘Cooked Food’.



Kitchen Simulation Relay Mission
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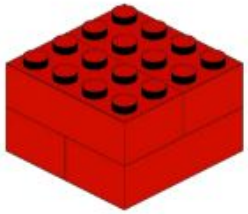
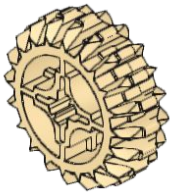
B. Game Description (Field setup and specifications)

B11. The 4 x 4 brick will be called ‘Raw Food’.



B12. A gear 20 tooth double bevel will be called a ‘Token’.



Kitchen Simulation Relay Mission
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Kitchen Simulation Relay Mission
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B. Game Description

B13. There are 3 rounds on tournament day, and each round lasts 120 seconds.

B14. When the game starts, robot A and B can start at the same time.

B15. When the time exceeds 120 seconds or the participating member says "finish", the timing ends.

B16.The vertical projection of the robot including wires must be completely within the starting area before starting the game.

B17. There are seven types of meals:
Meal Set no.1 : '**YELLOW + GREEN**' cooked food
Meal Set no.2 : '**YELLOW + WHITE**' cooked food
Meal Set no.3 : '**GREEN +** WHITE' cooked food
Meal Set no.4 : '**YELLOW + GREEN + WHITE**' cooked food
Meal Set no.5 : '**RED + YELLOW**' cooked food
Meal Set no.6 : '**RED + GREEN**' cooked food
Meal Set no.7 : '**RED + Red**' cooked food

B18. The type of meal completed is determined by the referee based on the type and quantity of cooked food that "**completely entered**" each plate in the dining area after the timing ended. If the number of meals is larger than one and is not repeated, a bonus of **15** points will be awarded.

B19. **One** token is needed to be paid for **one** cooked food which is taken from the egg, vegetable or rice area, While **two** tokens are needed to be paid for **one** raw food which is taken from the meat area. The payment is completed when the token is **partially entered** in the area.

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B. Game Description

B20. **One** raw food is needed to be paid for **one** cooked food in the heating area. The payment is completed when the raw food has **partially entered** the area.

B21. After the timer stops, if the food is taken but equal or excess value is not paid, it will be judged as **incorrect payment**, and the food will not be scored.
(the definition of taking is that the food "**completely leaves**" the area)

B22. The score for **correct payment** will only be calculated when food is taken in the area; for example, if a token is placed in the rice area with no white cooked food is taken, the score of correct payment will not be calculated.

B23. 20 points will be deducted if any object causes the barrier to move or fall.

B24. The maximum deduction is 0 points, and there will be no negative points.

B25. There are 5 areas for calculating correct payment: egg area, meat area, vegetable area, rice area and heating area. The score definition will be based on the requirements of B19, B20, B21 and B22.

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Kitchen Simulation Relay Mission
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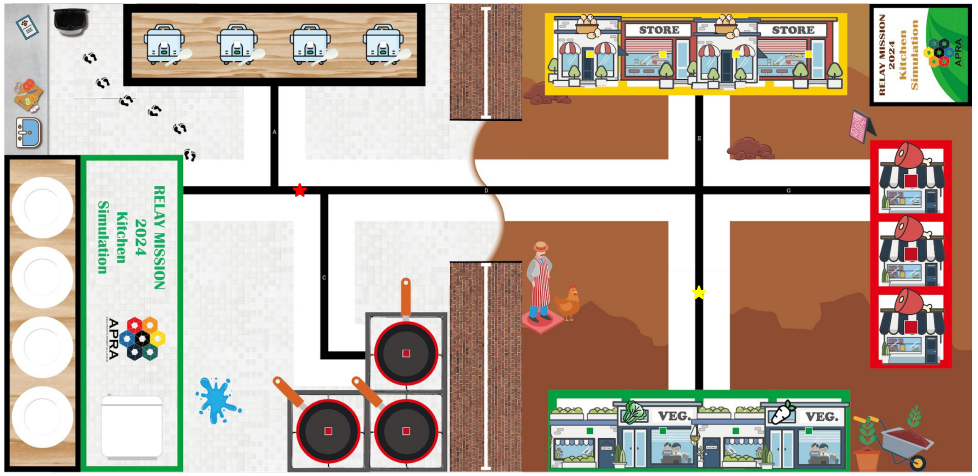
B. Game Description (Bonus mission)

B26. **Two** additional tokens will be added as a bonus mission on the day of the tournament. Their positions will be drawn randomly in English letters A - G. (The result will be drawn before the simulation time on the day of the tournament, and it will be uniformly used in the three rounds of the tournament.)



i. ZONE A and ZONE B are marked with English letters on the black lines.

ii. Example 1 : The result of the draw is B and the token will be placed in the **red star** position.

iii. Example 2 : The result of the draw is F and the token will be placed in the **yellow star** position.

iv. If the team chooses not to take on the bonus mission, they can ask to remove it from the field.

v. Either Robot A or Robot B can get tokens for bonus missions.

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Kitchen Simulation Relay Mission
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Game Description, Rules and Scoring

C. Scoring

Robot	Mission (Scoring Item)		Score
A	Mission 1	Robot A **completely leaves** the starting area A. (only counted once)	0 / 10
B	Mission 2	Robot B **completely leaves** the starting area B. (only counted once)	0 / 10
A + B	Mission 3	As soon as the timer stopped, two robots stopped completely.	0 / 15
A + B	Mission 4	As soon as the timer stopped, two robots **entered completely** into the starting area B or dining area .	0 / 20
A / B	Mission 5	Correct payment for the cooked foods. (only counted once in each area)	0 / 15 / 30 / 45 / 60 / 75
	Mission 6	Completed one set of meal no.1 [**YELLOW** + **GREEN**] (18 points)	0 / 18 / 36 / 54 / 72
	Mission 7	Completed one set of meal no.2 [**YELLOW** + **WHITE**] (20 points)	0 / 20 / 40 / 60 / 80
	Mission 8	Completed one set of meal no.3 [**GREEN** + **WHITE**] (20 points)	0 / 20 / 40 / 60 / 80
	Mission 9	Completed one set of meal no.4 [**YELLOW** + **GREEN** + **WHITE**] (33 points)	0 / 33 / 66 / 99 / 132
	Mission 10	Completed one set of meal no.5 [**RED** + **YELLOW**] (35 points)	0 / 35 / 70 / 105
	Mission 11	Completed one set of meal no.6 [**RED** + **GREEN**] (35 points)	0 / 35 / 70 / 105
	Mission 12	Completed one set of meal no.7 [**RED** + **RED**] (45 points)	0 / 45
	Mission 13	The number of meals is larger than one and is not repeated.	0 / 15
	Foul	Any object causes the barrier to move or fall.	0 / -20 / -40

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C. Scoring

C1. Definition of completely entered: The vertical projection of an object **completely overlaps** the pattern.

C2. Definition of completely left: The vertical projection of an object is **completely separated** from the pattern.

C3. Definition of partially entered: The vertical projection of an object **partially overlaps** the pattern.

C4. There is no requirement for the direction in which the objects are placed, as long as they meet the scoring requirements.

C5. Mission 6: **YELLOW** + **GREEN** cooked food (2 x 2 brick) **completely entered** the plate, getting **18** points.

Kitchen Simulation Relay Mission
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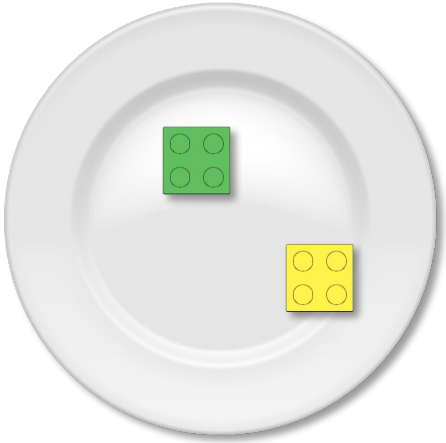
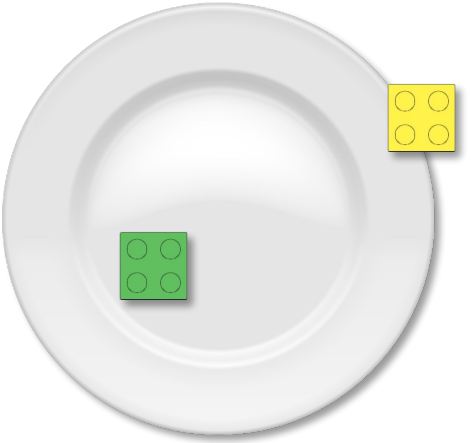


18 Points



0 Points

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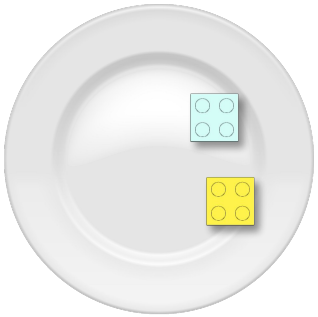
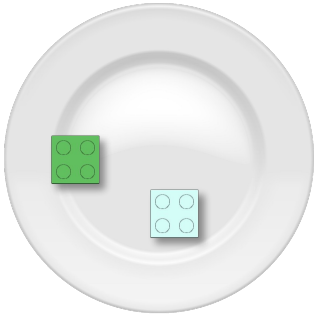
C. Scoring

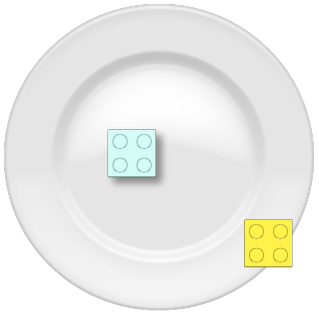
C6. Mission 7 & mission 8 : **YELLOW + WHITE** or **GREEN + WHITE** cooked food (2 x 2 brick) **completely entered** the plate, getting **20** points.



20 Points

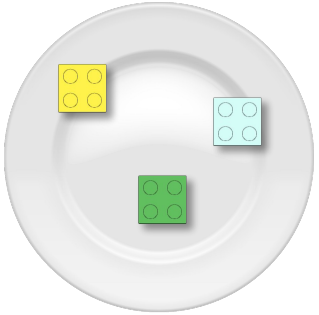


20 Points

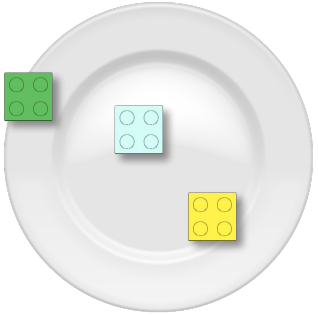


0 Points

C7. Mission 9 : **YELLOW + GREEN + WHITE** cooked food (2 x 2 brick) **completely entered** the plate, getting **33** points.



33 Points



0 Points

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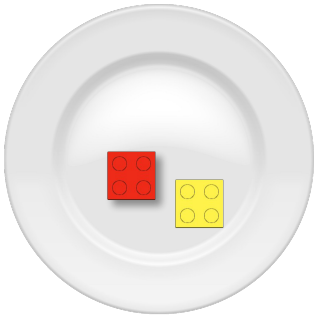
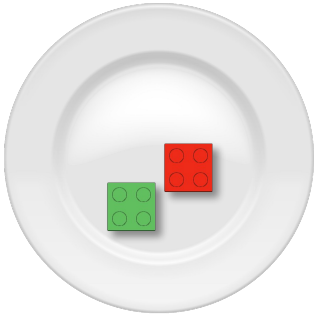
C. Scoring

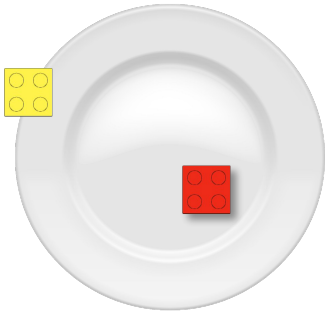
C8. Mission 10 & mission 11 : **RED** + **YELLOW** or **RED** + **GREEN** cooked food (2 x 2 brick) **completely entered** the plate, getting **35** points.



35 Points

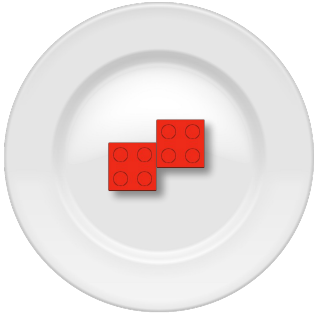


35 Points

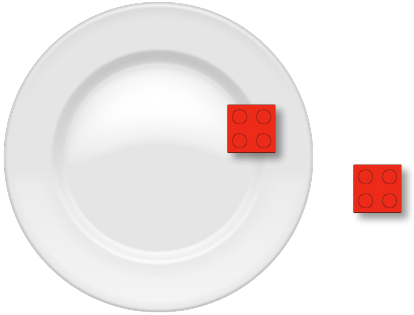


0 Points

C9. Mission 12 : **RED** + **RED** cooked food (2 x 2 brick) **completely entered** the plate, getting **45** points.



45 Points



0 Points

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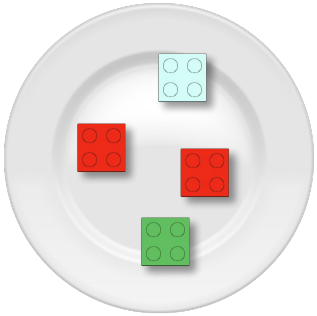
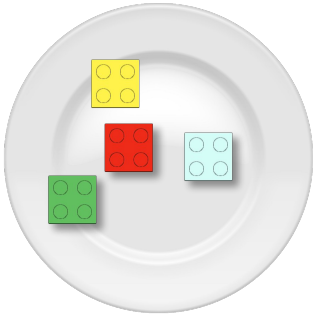
C. Scoring

C10. If more than one set of meals appears on the plate, the combination with the higher points will be scored.



45 Points



35 Points

C11. (Mission 5) The definition of **correct payment** for the cooked food is that the following three conditions must be met at the same time :

i. At least one cooked food (2 x 2 brick) has been taken from its area.
ii. Equal or excess value has been paid.
iii. 'Object' is partially entered in the area.
('Object' refers to raw food (4 x 4 brick) for heating area, while referring to token for other areas.)

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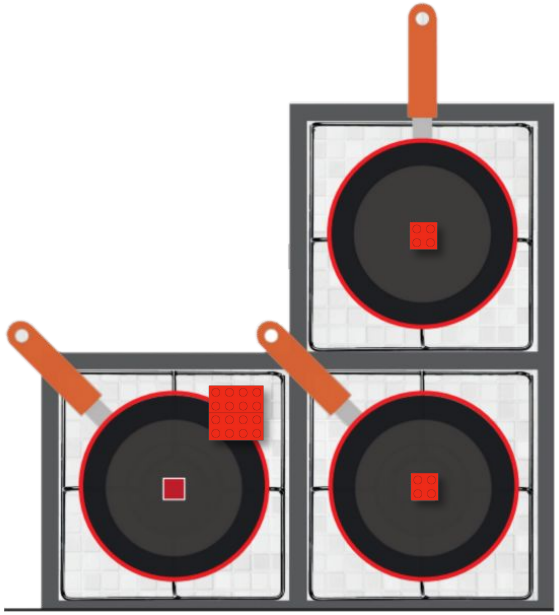
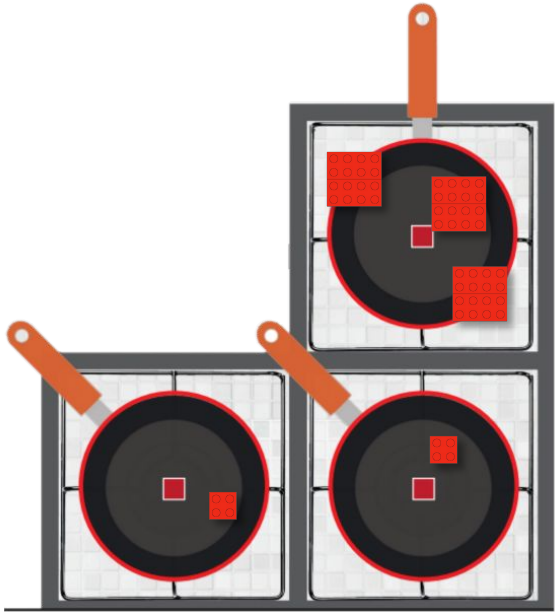
C. Scoring

- At least one cooked food has been taken
- Equal or excess value has been paid.
- Object is partially entered the area.



15 Points

- At least one cooked food has been taken
- Equal or excess value has been paid.
- Object is partially entered the area.



15 Points

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C. Scoring

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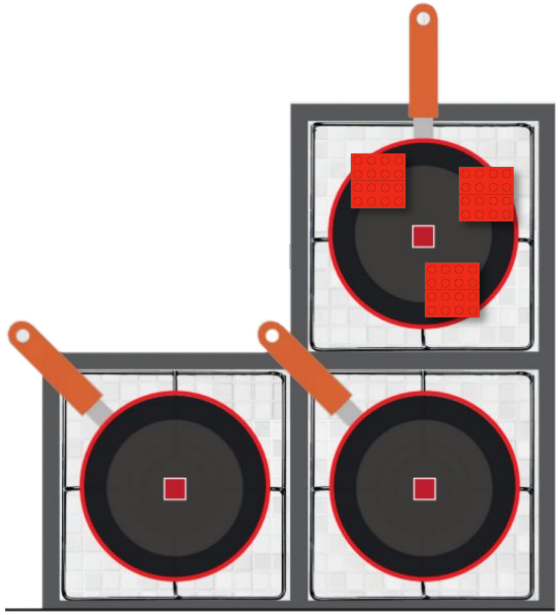
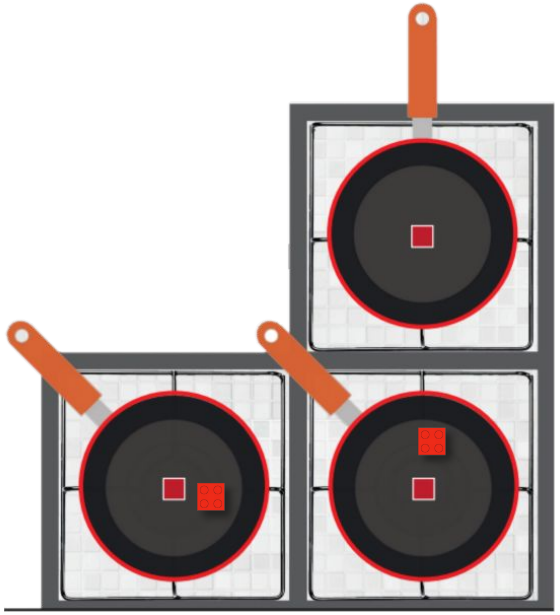
- At least one cooked food has been taken
- Equal or excess value has been paid.
- Object is partially entered the area.



15 Points

- At least one cooked food has been taken
- Equal or excess value has been paid.
- Object is partially entered the area.



0 Point

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C. Scoring

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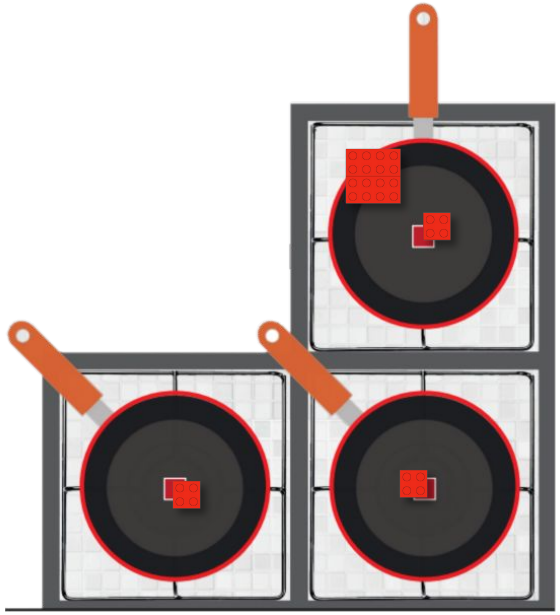
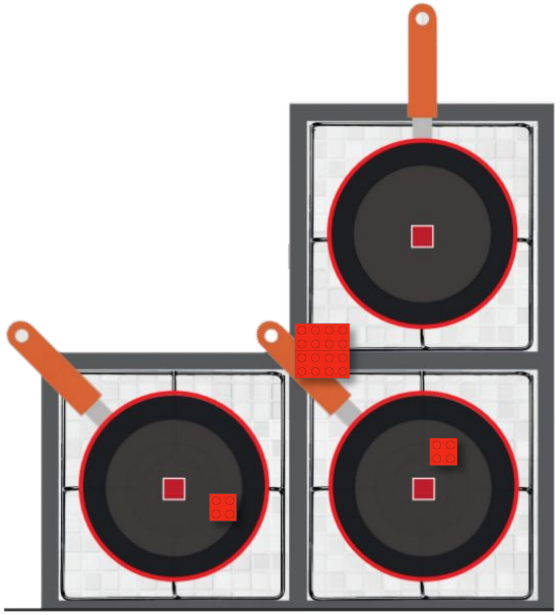
- ✗ At least one cooked food has been taken
- ✓ Equal or excess value has been paid.
- ✓ Object is partially entered the area.



0 Point

- ✓ At least one cooked food has been taken
- ✗ Equal or excess value has been paid.
- ✗ Object is partially entered the area.



0 Point

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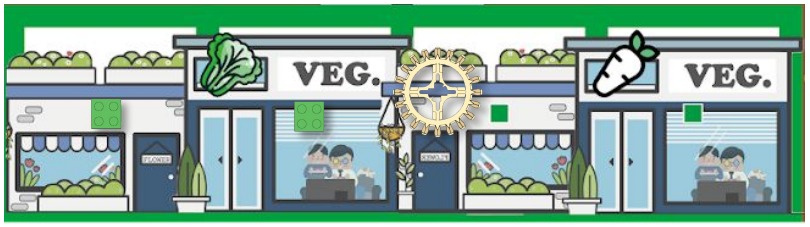
C. Scoring

- At least one cooked food has been taken
- Equal or excess value has been paid.
- Object is partially entered the area.

15 Points

- At least one cooked food has been taken
- Equal or excess value has been paid.
- Object is partially entered the area.



0 Point

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C. Scoring

- ✗ At least one cooked food has been taken
- ✓ Equal or excess value has been paid.
- ✓ Object is partially entered the area.

0 Point

- ✓ At least one cooked food has been taken
- ✗ Equal or excess value has been paid.
- ✗ Object is partially entered the area.

0 Point

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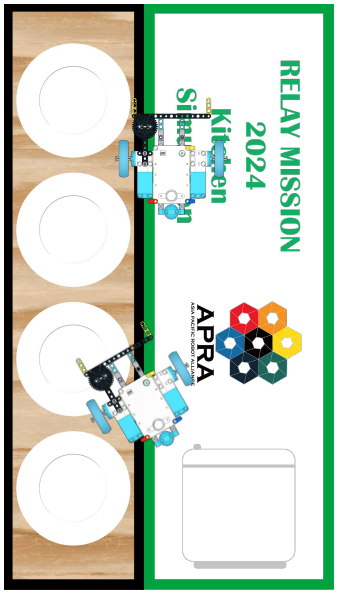
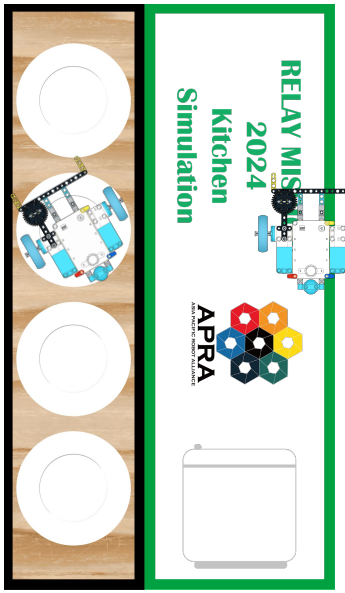
C. Scoring

C12. (Mission 4) As soon as the timer stopped, two robots **entered completely** into the starting area B or dining area .

20 Points



20 Points



0 Point

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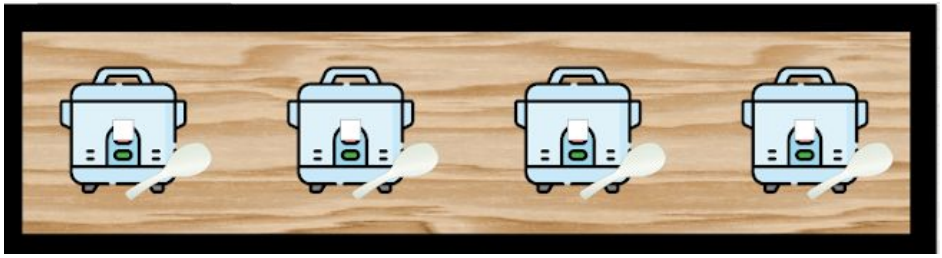
C. Scoring

C13. The pattern for each area is shown as follows.



Rice Area

Egg Area

Vegetable Area

Kitchen Simulation Relay Mission
Junior Category
Game Description, Rules and Scoring

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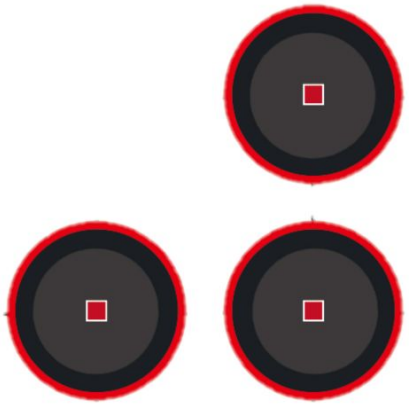
C. Scoring

C14. The pattern for each area is shown as follows.



Heating Area

Meat Area

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Junior Category
Game Description, Rules and Scoring

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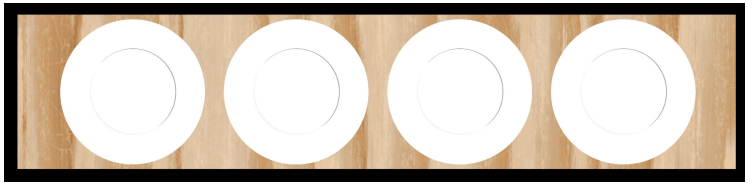
C. Scoring

C15. The pattern for each area is shown as follows.

Starting Area A

Starting Area B



Dining Area

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Junior Category
Game Description, Rules and Scoring

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Kitchen Simulation Relay Mission
Junior Category
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D. Game Rules

D1. The size of the robot should be within 25 cm(L) x 25 cm(W) x 25 cm(H), but no limit after the game started.

D2. The electronic components (including motors, sensors and microcomputer controllers) used to build the robot must be from LEGO® and Hitechic products.

D3. Only one microcomputer controller can be used for each participating robot.（SPIKE™、Robot Inventor、EV3 or NXT）

D4. SPIKE™ or Robot Inventor can only use official rechargeable batteries, but EV3 and NXT can also use lithium batteries with a maximum voltage of 1.5V per battery (total voltage not exceeding 9V). The referee has the right to ask the contestants to turn on the microcomputer controller and check it.

D5. The parts for building the robot must be strictly LEGO® parts, and other building materials such as glue, tape, screws, etc. must not be used.

D6. The control program must be written by LEGO® MINDSTORMS® Robot Inventor, LEGO® SPIKE Prime, LEGO® classroom, LEGO® MINDSTORMS™ EV3, LEGO® MINDSTORMS™ NXT or ROBOLAB software.

D7. Robots must operate automatically and cannot be operated by remote control.

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D. Game Rules

D8. Participating teams can bring pre-built robots for the tournament.

D9. If the referee finds a robot that does not meet the specifications at any time, the team must modify the offending parts within 1 minute. If teams do not meet the requirement within the time limit, they will not be allowed to participate in the existing round.

D10. Only two robots can be used in each round of the tournament. Teams can use different robots in the next round of the tournament, but it is strictly forbidden for different teams to exchange robots or parts. Once violations are found, the relevant teams will be disqualified.

D11. The preparation time before the existing round is 1 minute. A maximum of two participants can enter the competition field, and the team can adjust their robots.

D12. During the preparation time before the existing round and after the start of each round, it is not allowed to load the program from the computer to the robot.

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Kitchen Simulation Relay Mission
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D. Game Rules

D13. There is no limit to the number of motors and sensors that can be used. The types that can be used are as follows:

9842-NXT Motor	9843-NXT Touch Sensor	9844-NXT Light Sensor	9845-NXT Sound Sensor	9846-NXT Ultrasonic Sensor
9694-NXT Color Sensor	45502-EV3 Large Motor	45503-EV3 Medium Motor	45504-EV3 Ultrasonic Sensor	45505-EV3 Gyro Sensor
45506-EV3 Color Sensor	45507-EV3 Touch Sensor	HiTechnic-NXT Color Sensor V2	45602-SPIKE Large Motor	45603-SPIKE Medium Motor
45606-SPIKE Force Sensor	45604-SPIKE Ultrasonic Sensor	45605-SPIKE Color Sensor	88017-Inventor Large Motor	88018-Inventor Medium Motor

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Kitchen Simulation Relay Mission
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Game Description, Rules and Scoring

D. Game Rules

D14. After the start of each round, if any parts of the robot accidentally fall off, it is no longer part of the robot, and the referee can remove it and give it to the team.

D15. After the start of each round, it is not allowed to reassemble all the components of the robot or replace parts and batteries, and it is not allowed to suspend the tournament.

D16. All teams are not allowed to bring the game field to the venue for practice. The organizer will provide simulation time to all teams, and each simulation time is limited to two minutes.

D17. Participants must bring their robots to line up, otherwise the simulation will be cancelled, and they need to line up again.

D18. After the game starts, if the participating member interferes with the game in any ways, the round will be regarded as 0 point; if the contestant is influenced by others, the round will not be scored.

D19. Teams are strictly prohibited from interfering with their opponents in any way, otherwise they will be disqualified immediately.

D20. If there are any special circumstances, all decisions shall be based on the decision of the chief referee, and no objection shall be allowed.

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E. Other Rules

Responsibility of the parties

E1. In the tournament, the referee has the final decision.

E2. Any objections to the decision of the referee will be warned. If participants continue to argue, the team will be immediately disqualified from the tournament.

E3. After the game, participants in each team need to sign the score sheet for confirmation.

E4. When confirming the score sheet, a protest can only be lodged if the score is incorrect or if there is a problem with the result of the game. Once the score sheet has been signed, no protest may be made by either party.

E5. The referee may interpret the rules.

E6. In special circumstances, such as unforeseen problems or the ability of robots that everyone agrees in the tournament, the rules can only be changed with the consent of the chief referee.

Inspection of Robot

E7. If the robot is modified during the game, the referee may ask the robot to check again.

E8. Any robot that does not comply with inspection regulations, it will not be able to be used in the game until it is corrected.

E9. Modifications must be made within the time schedule of the game and teams must not delay game play while making modifications.

Kitchen Simulation Relay Mission
Junior Category
Game Description, Rules and Scoring

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E. Other Rules

Fair Play

E11. Except for the participants and staff, no one is allowed in the game area.

E12. No one other than the participants is allowed to modify the robot or the program.

E13. Participants are not to be prompted or assisted in any way during the tournament.

E14. If the above situations are found during the game, the team may be disqualified from the tournament.

Rule's Content

E15. When the team registers for the tournament, it is also necessary to clearly read the relevant registration terms and competition rules.

E16. When the content of different files conflicts, the order of precedence of the rules is:
Final Decision of Organizer > Rules Update > Kitchen Simulation Relay Mission Rules.

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F. Competition System

F1. During the tournament, each team will have three rounds, and the score and time of each round will be recorded.

F2. The scores of the three rounds of each team will be sorted from high to low. If the scores are the same, the team with the shorter completion time will be sorted first.

F3. Teams will be ranked according to their highest scores. If the scores are the same, the team with the shorter completion time will be ranked higher.

F4. If the scores and time of teams are the same, the best scores and times of the next round will be compared.

Kitchen Simulation Relay Mission
Junior Category
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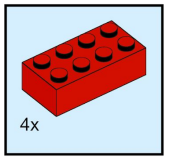
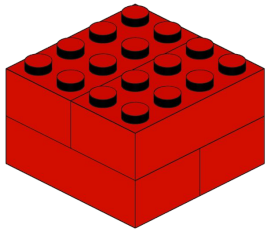
G. Assembly Of Game Objects

1





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G. Assembly Of Game Objects

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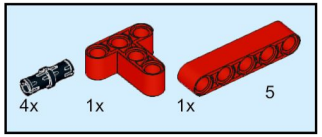

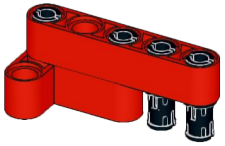

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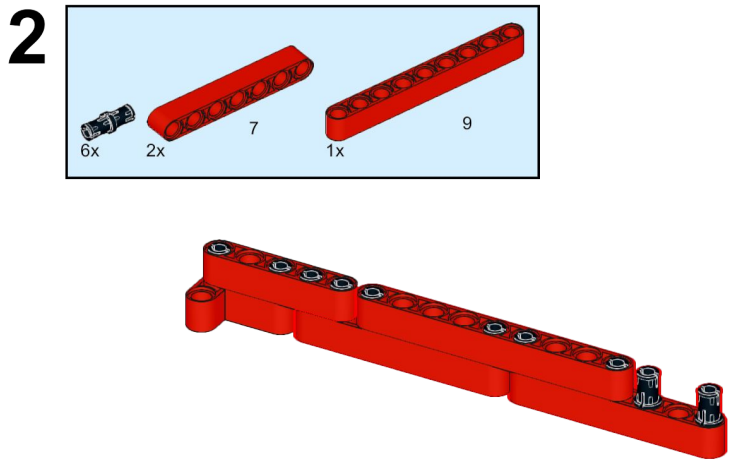
G. Assembly Of Game Objects



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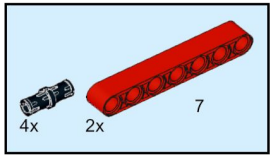
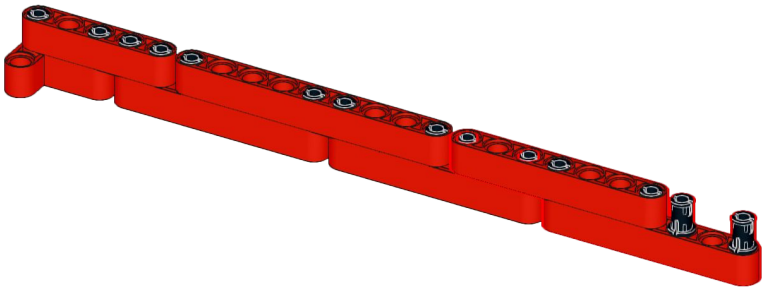
G. Assembly Of Game Objects

3





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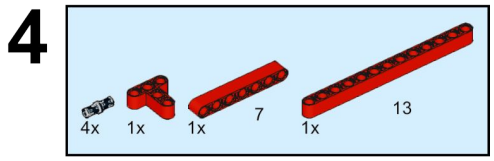
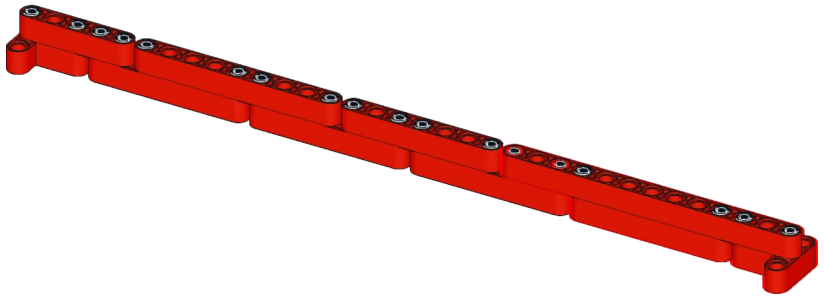
G. Assembly Of Game Objects





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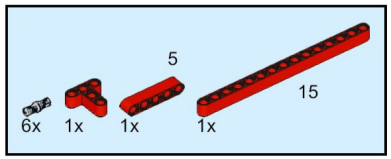
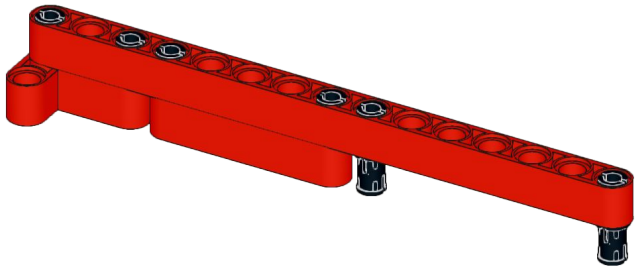
G. Assembly Of Game Objects

1





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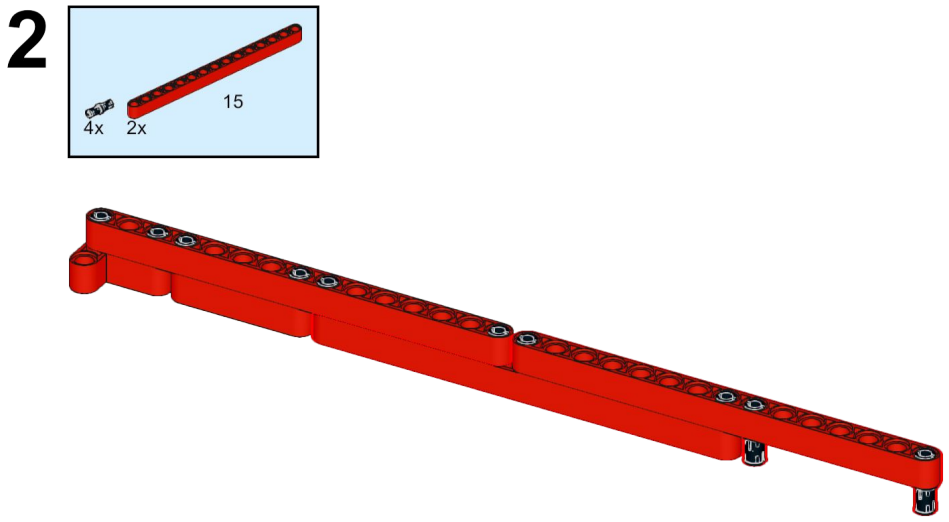

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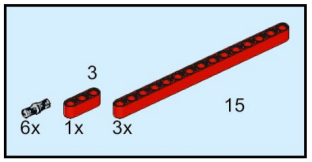
G. Assembly Of Game Objects

3



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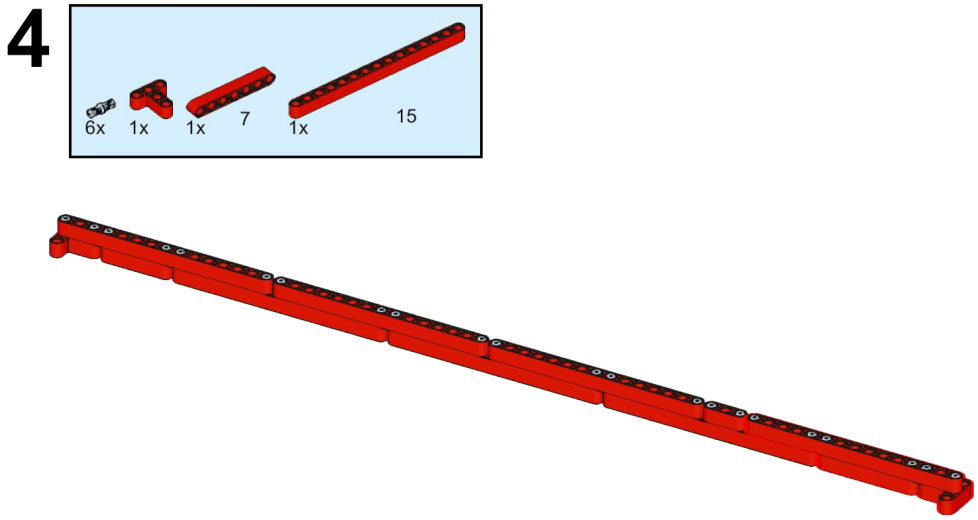

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