Robot ZONE [01]

Toggle-Sumo

Duel challenge

Context

King Hex selects his best guardians after intensive training. The final selection takes place in a one-on-one battle where two Froola aspirants face off in an arena. Since they must be both strong and agile in order to properly protect the conquered territories, this selective battle evaluates them in two ways: repelling the opponent and properly arming the switch in the center of the arena.

Will you be the winning Froola apprentice and promoted to official guardian of King Hex?

Robot Description

Robots must comply with the following constraints:

- Maximum starting dimensions: **30 cm X 30 cm X 30 cm**
- Maximum weight: **850 g**
- Max motors: **3**
- Max controller: **1 (EV3 or Spike Prime)**

The robot must be built so that ONLY the robot's wheels touch the ground. Wheels include tracks and bead wheel. The other parts of the robot, excluding the color sensors, must remain at least the equivalent of the thickness of a LEGO Technic beam from the ground and remain there.

Robots must be equipped with at least one light/color sensor.

Robots must operate autonomously without remote control.

Defensive elements (bumpers, inclined planes, etc.) and offensive elements designed to knock down the opponent ARE permitted.

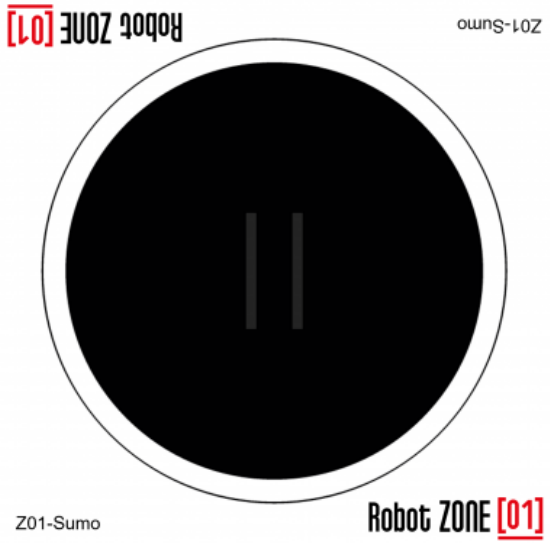
Rubber bands are permitted, except for use in ground friction.

Playing Field

Used surface: Z01-SUMO Mat

The surface is a black circular playing area, 90 cm in diameter, bordered by a white strip 5 cm wide. In the center of the arena, 2 parallel gray lines are placed 10 cm apart.

The mat is available at Zone01 shop.

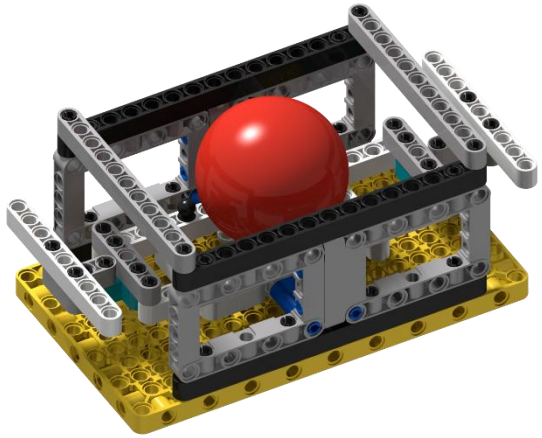


Game Object

Toggle Switch and Ball (new)

toggle switch is attached to the playing field between the two robots at the start. The switch is in the middle position.

When the switch toggles down on one side, the red ball rolls to this side.

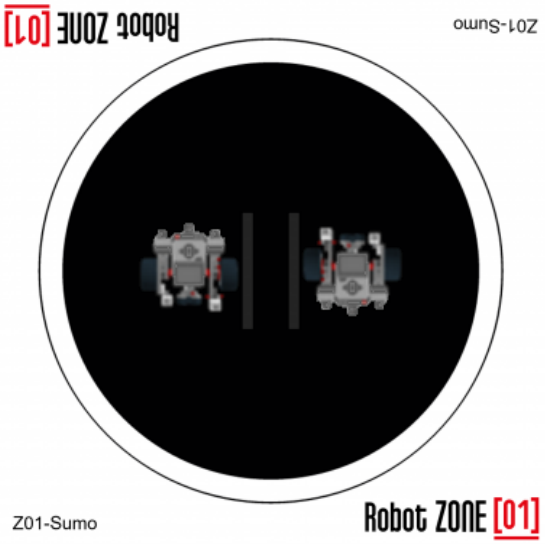


You can make one point if, at the end of the match, the switch is toggled so the ball is on the side towards the front of your robot at start.

Description of a match

Starting Position (new)

At the beginning of the round, each team's robots must be side-by-side, their left side close to the toggle switch. It should be easy to identify the front of your robot, so add a distinctive sign.



Pool System

Teams will be separated into pools, each corresponding to a table.

Each team will meet each of the other teams in its pool for a single match and accumulate points.

After all pool matches have been completed, an average of points per match will be calculated for each team and a ranking will be created.

The finalists will be determined from the ranking and placed in a bracket. Within the bracket, teams will compete in a best of 3.

Start of the Round

1. When two teams present themselves for the challenge, their robot must be inspected by a judge.
    a. Robots are weighed, measured, and inspected to ensure that they comply with the regulations.
    b. The judge checks that no part other than the wheels is within one beam of the floor.
2. Only two members of each team may approach the circle.
3. Both teams then position their robot in their starting area.
4. At the signal given by the judge, each team activates the program of its robot (see general rules for LEGO Spike Prime start-up procedure).
5. The robot must wait **5 seconds** before moving to give the students time to back up.
6. The robot must then move forward until it reaches the white border of the playing field.
7. From here, the robot then uses its own strategy to toggle the switch and push the other robot out of the game area.

False start

The judge may request, for any reason he considers valid, a new start. A false start is normally defined as:

1. Failure to respect the 5-second delay from the start.
2. Starting the program before the judge's signal.
3. Failure to advance to the white border.

Victory

A victory is defined by:

1. The opponent's robot leaves the arena. The robot is considered to have left the arena when **its driving wheels** are outside the black zone.
2. The opponent's robot is knocked down and out of action.
3. The opponent's robot makes two "false starts" in a row.
4. A student from the opposing team touches a robot.
5. The opponent's robot deliberately makes contact with the ball or breaks the switch.

Draw

A draw is defined by:

1. The robots are entangled or rotate around each other or more than 10 seconds without any noticeable change.
2. The robots seem to have come out at the same time, and it is not possible to know which one fell first.
3. The robots remain motionless for more than 10 seconds.

Scoring Sheet per Match

	Points max
2 points for a win - Take out your opponent	**2**
1 point for a draw	*1*
1 point for the switch toggled and the red ball on your side	**1**
TOTAL	**3**

Necessary for This Challenge

- Color sensor and loop
- Concept of friction and mass
- Defense and attack mechanisms
- Mechanism to toggle the switch
- Distance or touch sensors (optional)

Strategy Suggestions

- How important are mass and friction in this challenge?
- Do you have multiple programs or tactics?
- Will you toggle the switch early or wait for later?

Building Instructions

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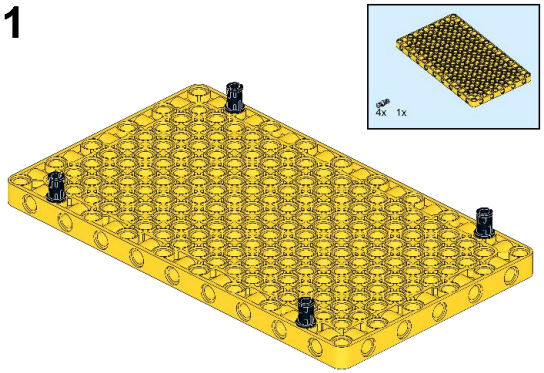

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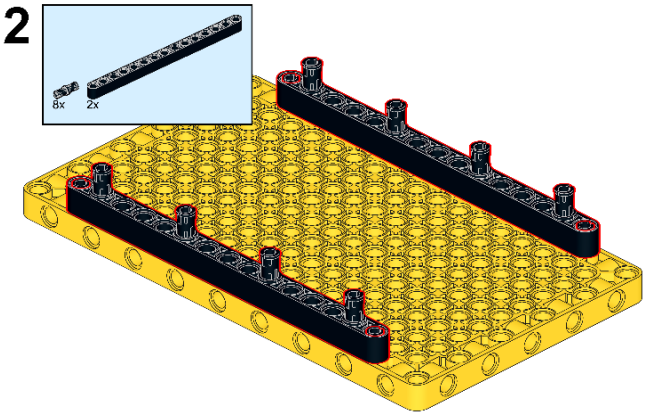

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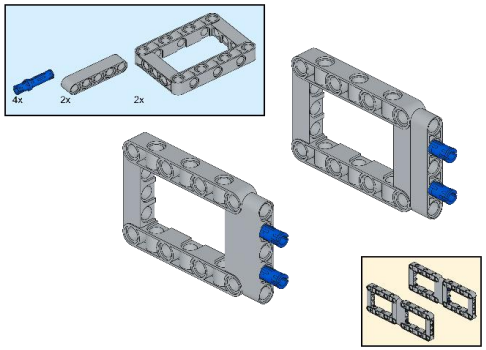

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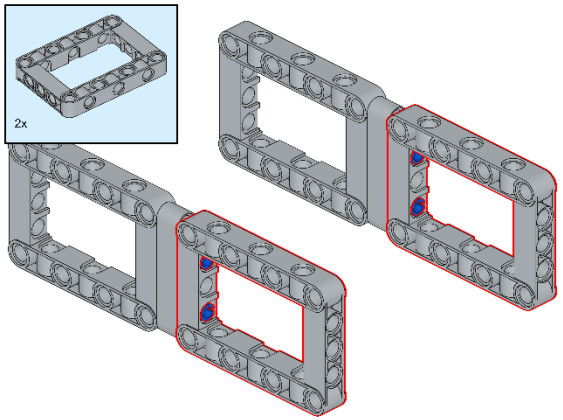

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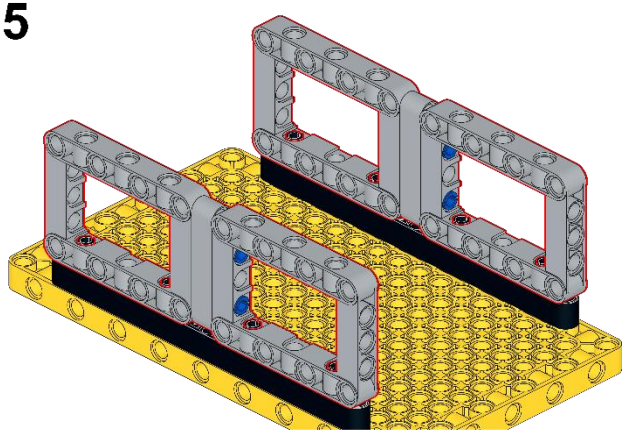

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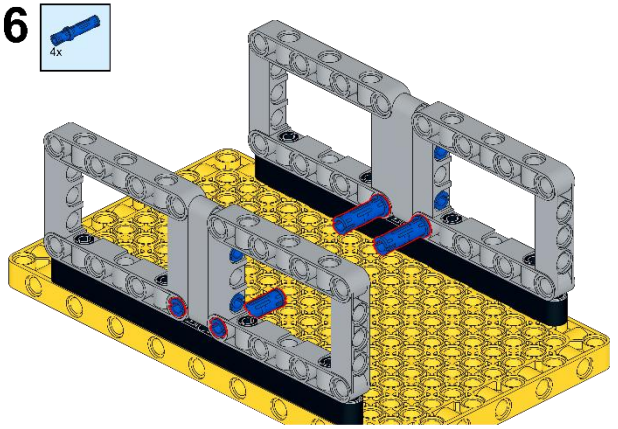

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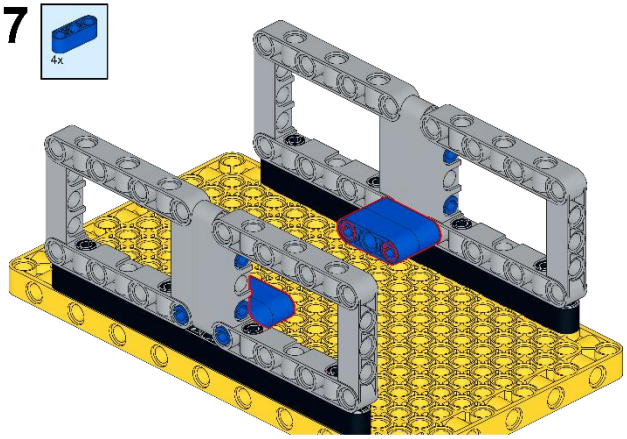
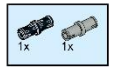
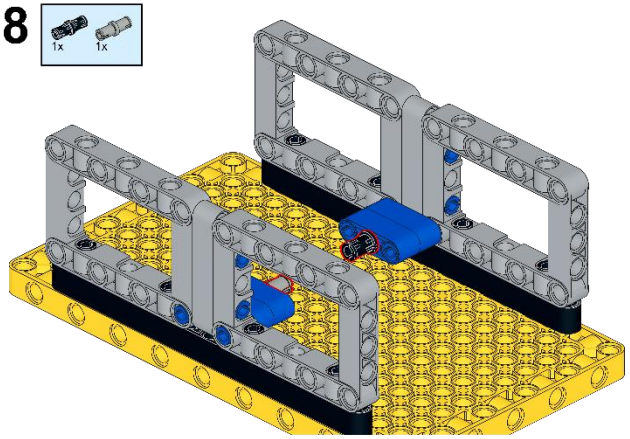


8 



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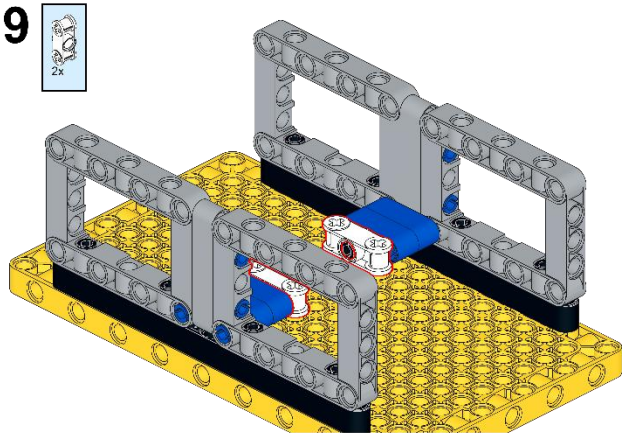

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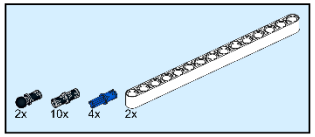

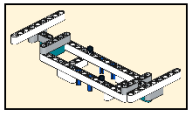

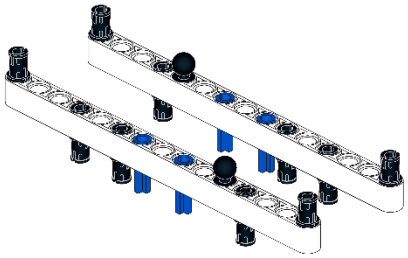

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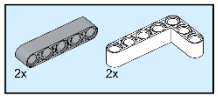

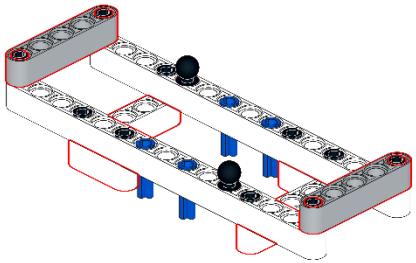

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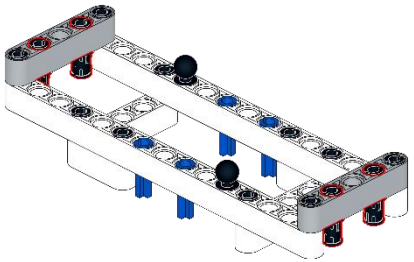

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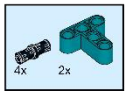

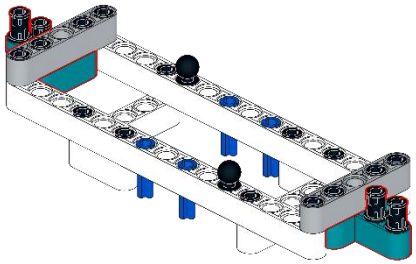

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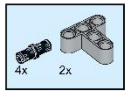

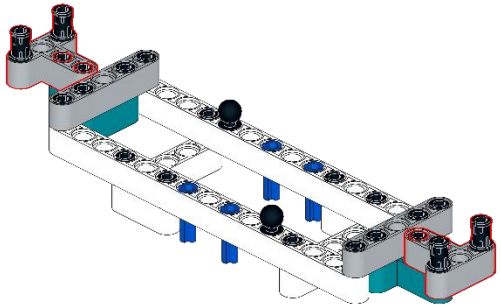

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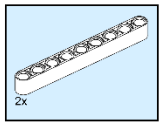

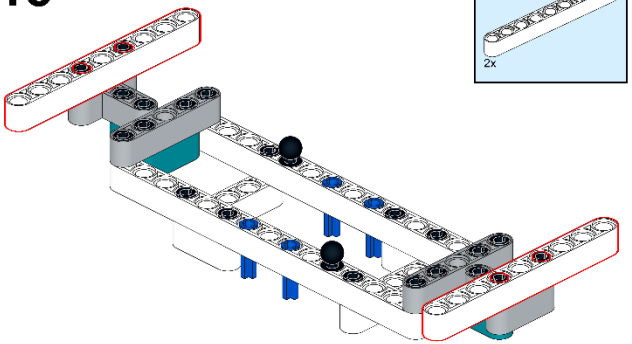

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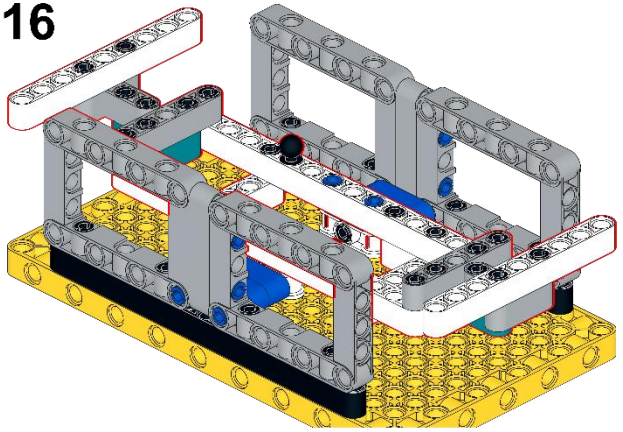

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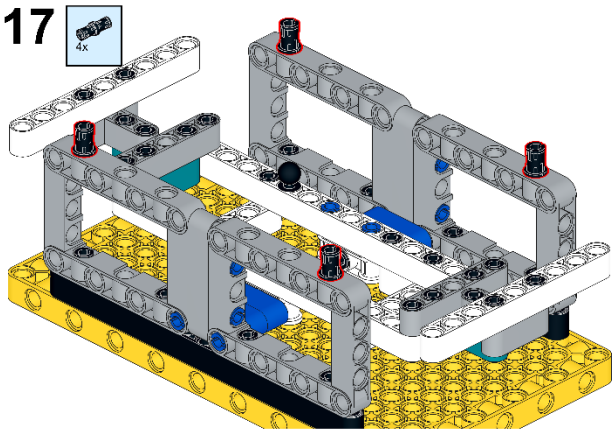

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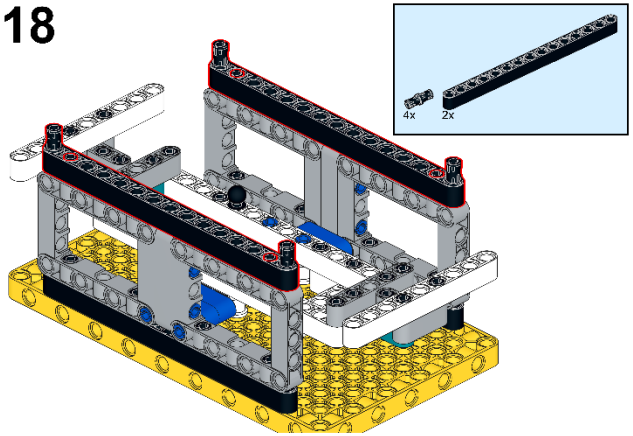

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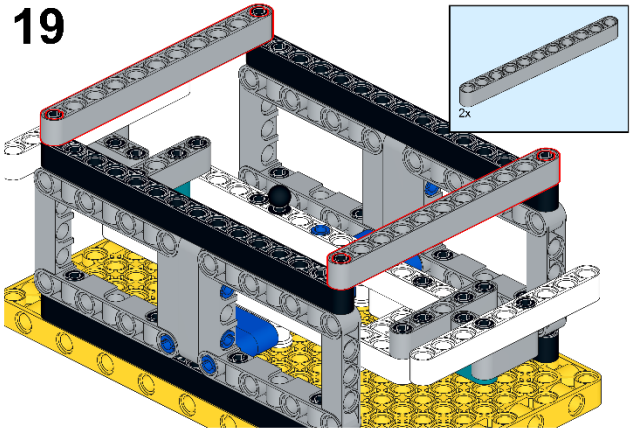

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