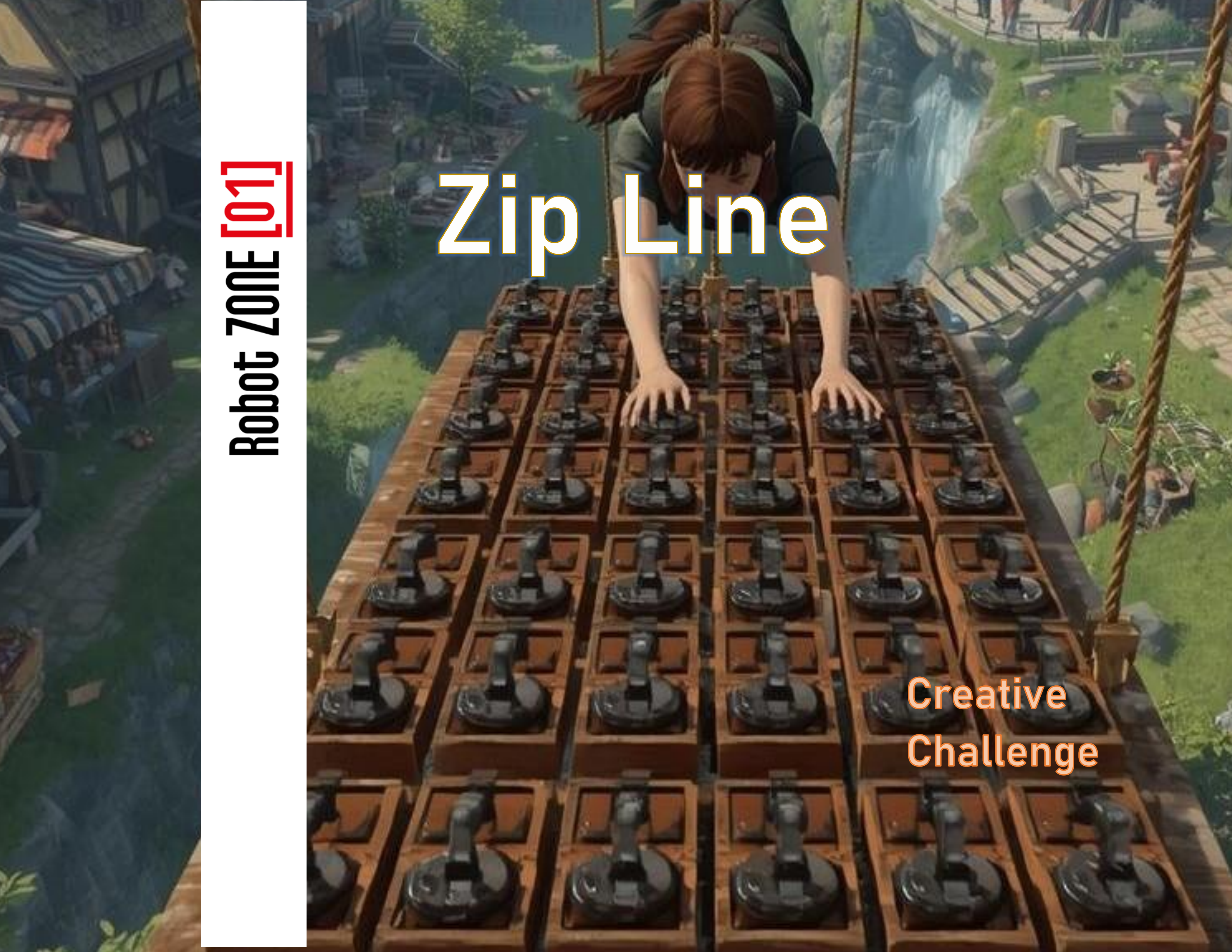
Robot ZONE [01]

Zip Line



Creative Challenge

Context

In this game of skill, balance, memory, and strength, you are suspended from a zip line. You must move over rows and columns of switches and activate those that correspond to the instructions you have been given.

Be careful to keep your balance!

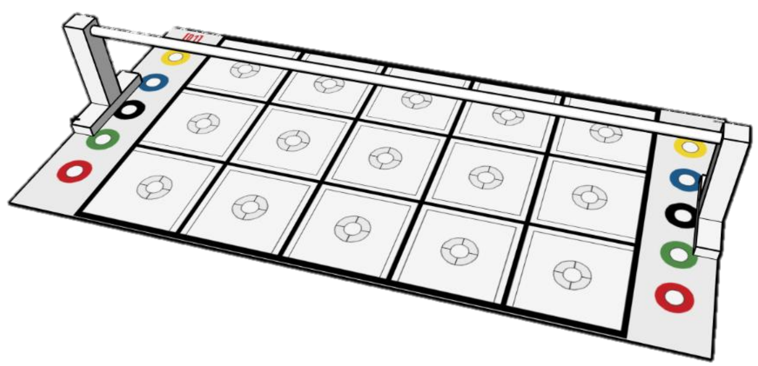
Robot Description

Robots must comply with the following constraints:

1. The robot must start attached to the rod over the starting area. The robot cannot touch the ground at any time.
2. The projection of the robot must enter completely in the starting area. Height is not limited. After the timer has started the size constraints no longer matter.
3. The challenge is performed in autonomous mode. The program must be downloaded to the robot BEFORE the round.

Playing Field

View of the playing field in 3D



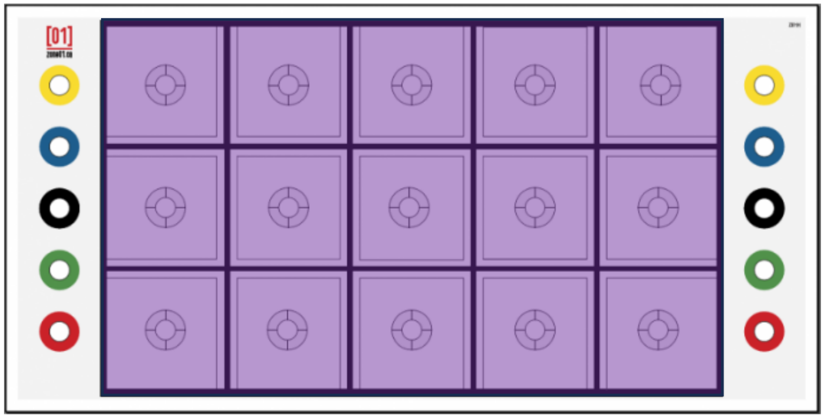
Surface used: Z01-H Mat

The mat is highly recommended for this challenge, as the mat lines and circles define the precise locations of the objects and zones.

The mat is available at the Zone01 shop.

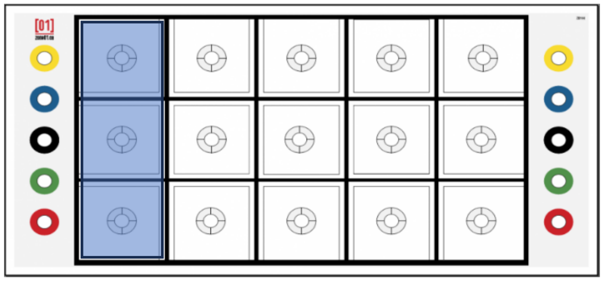
Board Area

The board area is the section of the mat made of 3 rows of 5 white squares surrounded by black lines (shown in purple).



Regular Starting Area

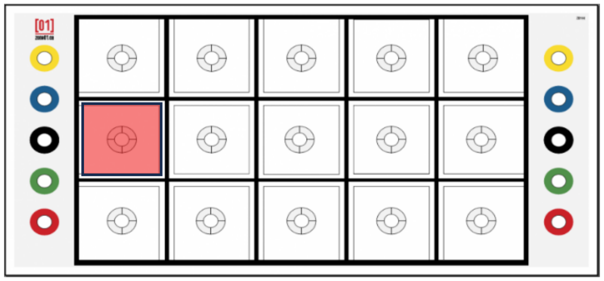
The starting area is the first column of 3 squares (show in blue). The starting area does not include the thick black border. The projection of the robot must fit completely in this area at the start.



Ultimate Starting Area

The Ultimate starting area is the middle square of the first column, excluding the thick black border (shown in red).

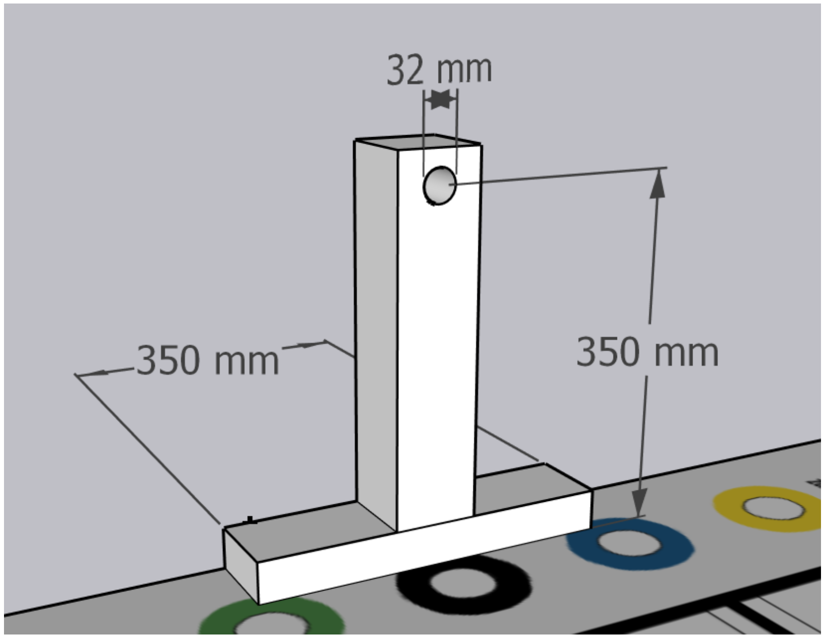
Make the projection of the robot fit completely in this area at the start to deserve the Ultimate Bonus.



Description of the Accessories

Pillars

There are 2 pillars, one at each end of the mat. Pillars are built out of wood. The important dimensions are shown in the picture below.



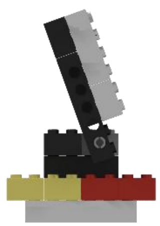
Rod

A long dowel extends from one pillar to the other. It is made of hardwood with a smooth finish. Diameter is 32mm and standard length is 2.44m (1 ¼" X 96").

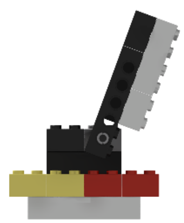
It can be found in stores such as Rona or Home Depot and cut to fit the right length for the playing field.

Switches

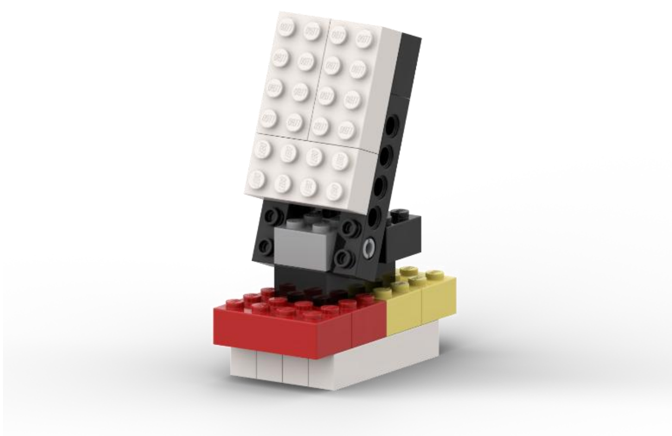
There are 10 uniquely colored switches that cover the grid. They can be switched ON or OFF depending on their position.



Switch ON

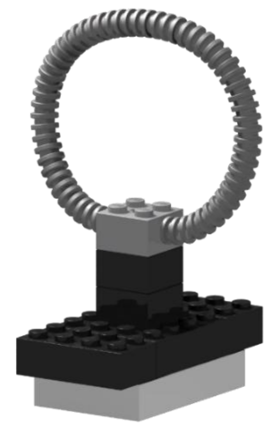


Switch OFF



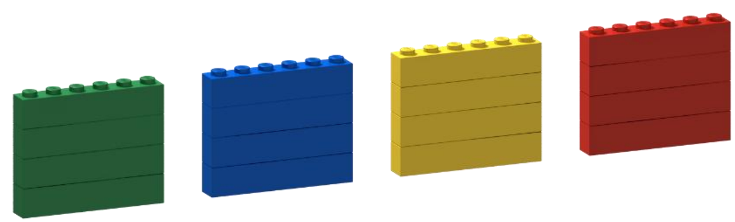
Broken Switches

Two switches on the grid are broken and need to be removed.



Color Tiles (Nationals only)

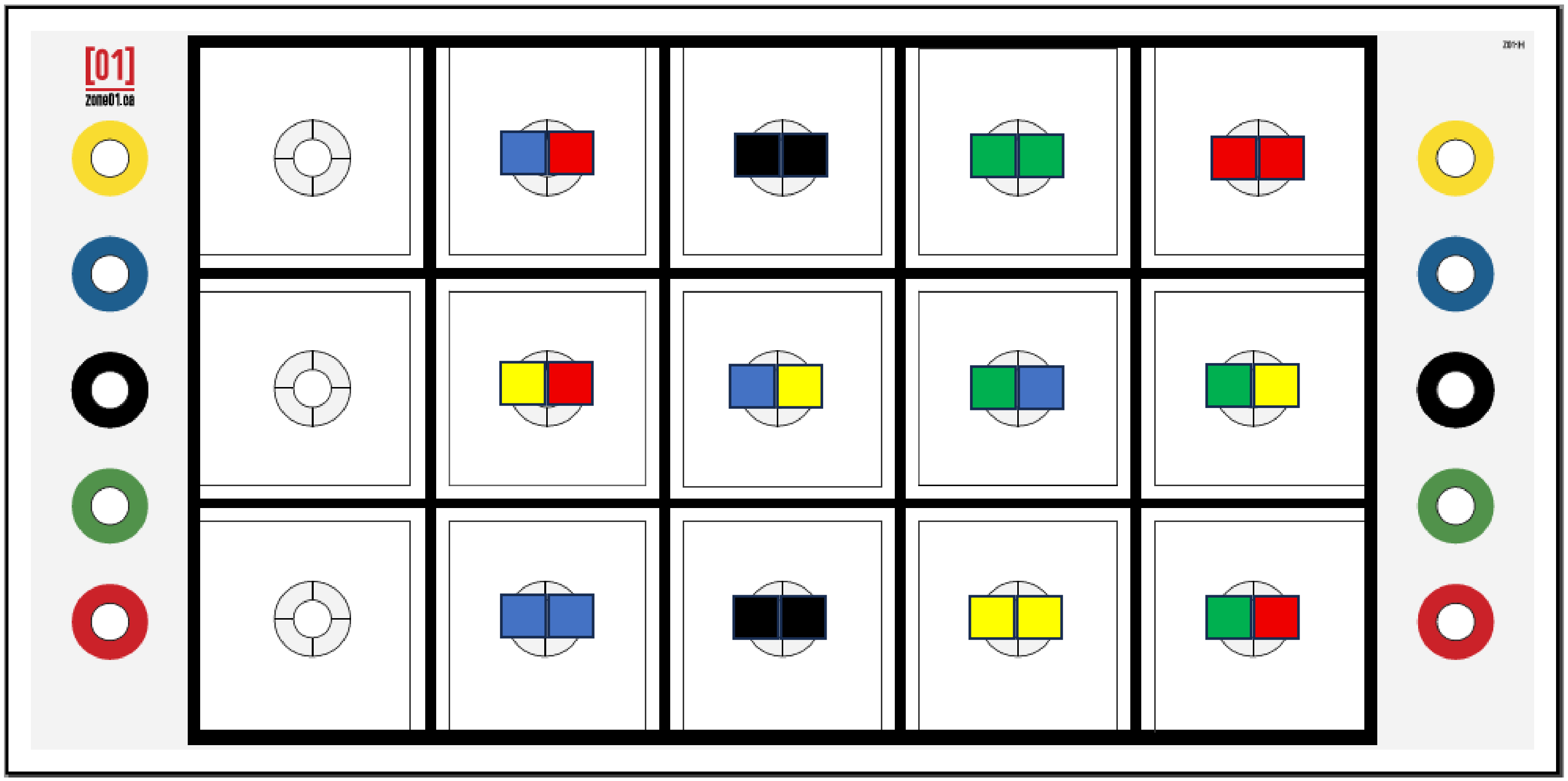
Used to tell the robot what colors where selected.



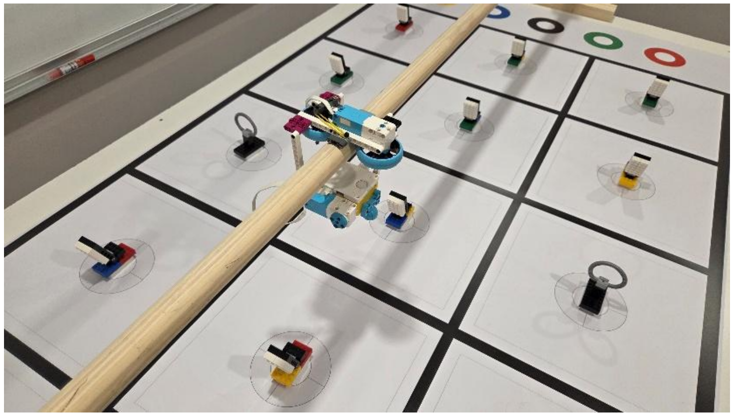
Position of the Switches

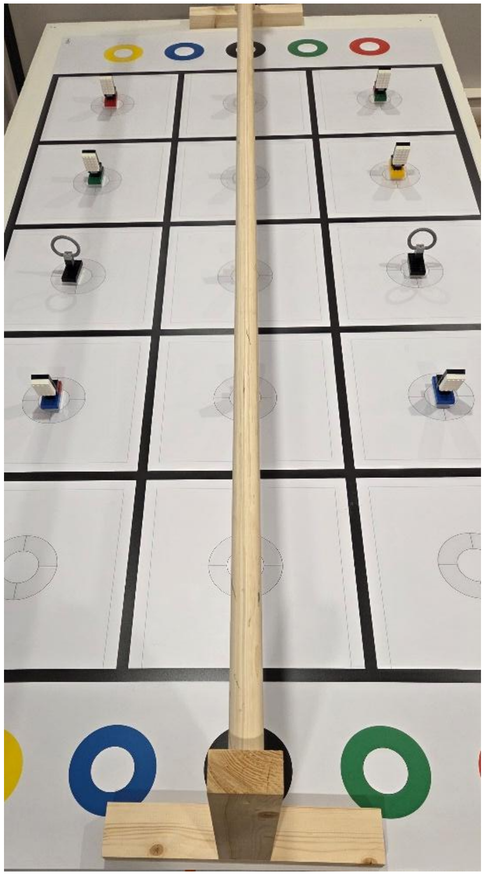
The switches will always be positioned as shown below. The positions can be hardcoded in the robot's program.

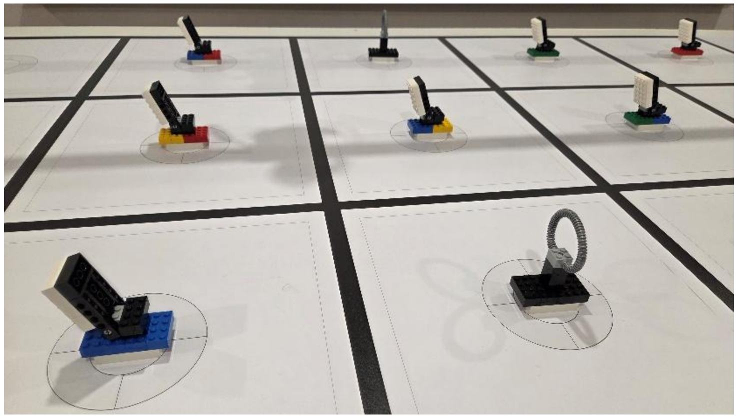
The white side of the switches always faces in the direction of the starting area.



3D View with Accessories







Description of the Challenge

Premise

Two colors are active at each round. The robot needs to flip the switches so that every switch with at least one of the 2 colors is switched on and all the others are switched off. There are also two broken switches that need to be removed from the board area. All while the robot doesn't touch the ground!

Setup

Regionals: At the beginning of the day the judge will announce the two active colors of each round.

Nationals: The colors are pick right before each round and the information is transmitted to the robot through the color tiles with the use of a color sensor.

Starting

The robot is placed completely within the starting area and its projection must fit within the regular starting area or the ultimate starting area.

At the judge's signal, the team starts the program, and the timer starts.

From then on, no team member can touch the robot or the playing field.

Ending

The round ends when any of the following happens:

- Team member touches the robot
- Team member says "Stop"
- The robot touches the board
- The robot touches the end pillar
- Or the 2-minute timer runs out

Missions

Mission 1
Flip all the switches with at least one color that matches the active colors for this round. They must remain unbroken and within the bigger circle they where found in. There should be 7 switches ON.

Mission 2
Keep all the switches that do not match the two active colors flipped OFF. They must remain unbroken and within the bigger circle they where found in. There should be 3 switches OFF.

Mission 3
Remove both broken switches from the board and place them on the playing field (outside of the 3X5 grid), in upright position.

Mission 4
Have the robot stop within 55 mm of the end pillar without touching it. The judge will use a LEGO beam of 7 to verify.

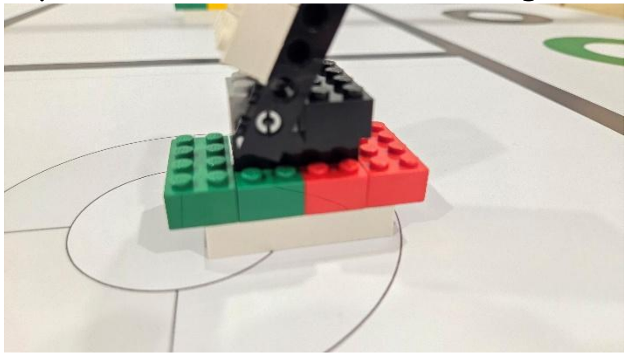
Scoring

Missions	**Points Per**	**Max Points**
Switches of the right color ON (7)	7	49
Switches not of the right color OFF (3)	5	15
Broken switches removed from grid (2)		
On the mat outside of the grid, upright	9	18
On the mat outside of the grid, not upright	*6*	*12*
Off the grid but not on the mat	*5*	*10*
Robot stops within 55 mm of pillar	11	11
Robot started in the ultimate starting area	7	7

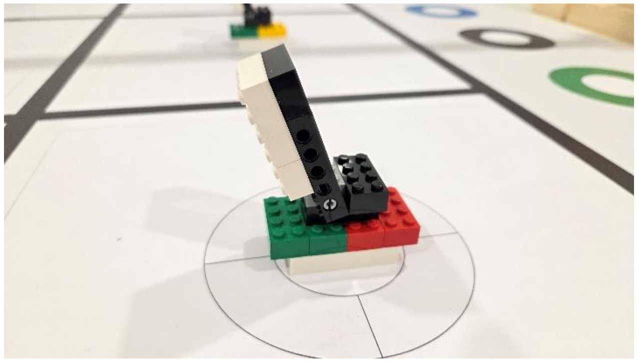
Solve the possible surprise rule	20
Total points max	**120**

Score Interpretation

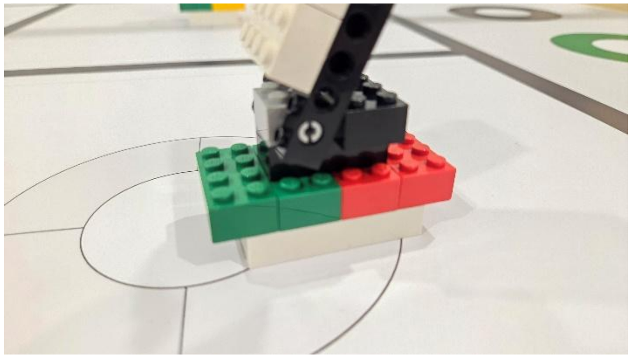
Flip the switches with at least one good color



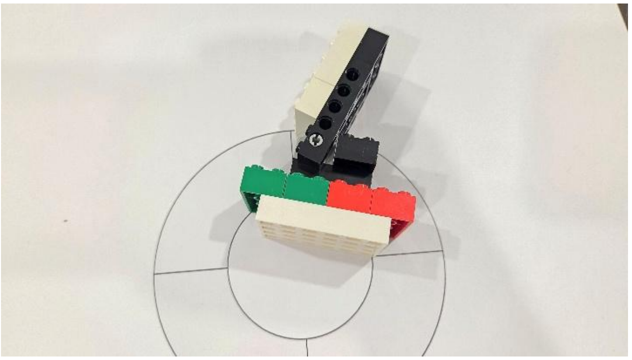
Switch flipped and within large circle = 6 points



Switch not flipped = 0 point

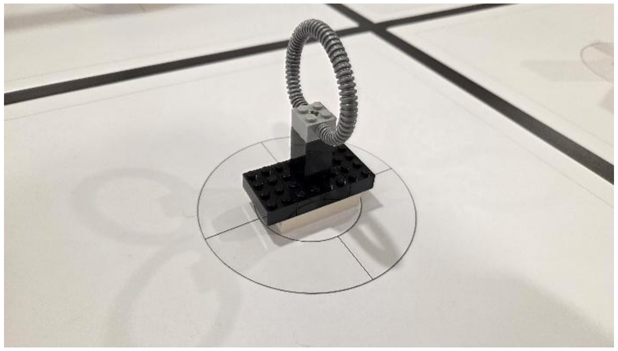


Switch flipped and moved out of circle = 0 point

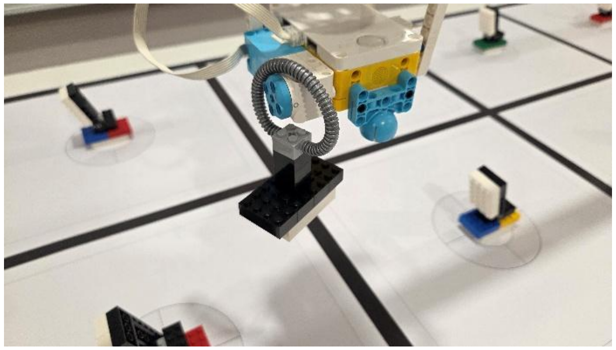


Switch broken or damaged = 0 point

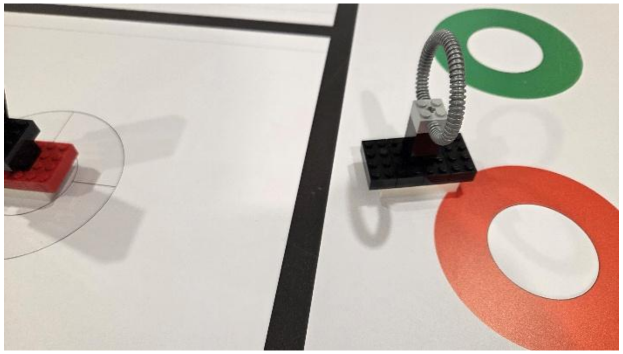
Remove broken switches



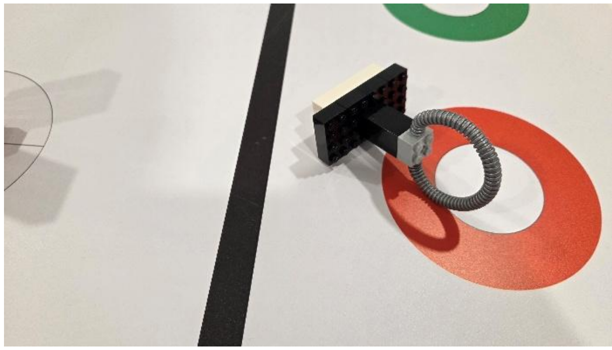
Broken switch not moved = 0 point



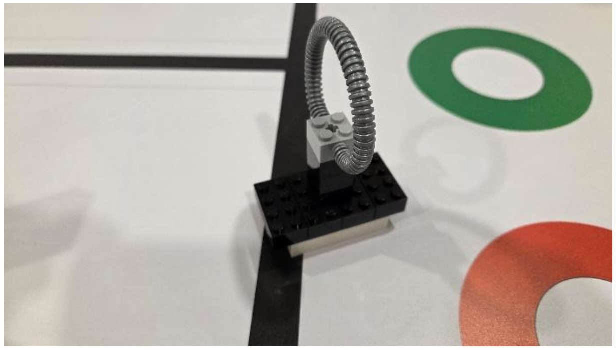
Broken switch not touching the board = 5 points



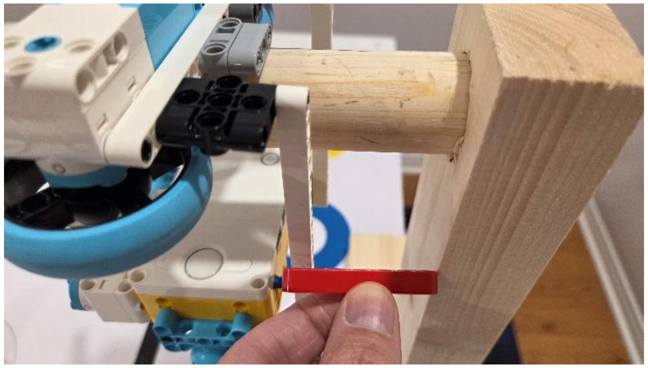
Broken switch placed upright outside of the board = 9 points



Broken switch placed outside of the board but not in an upright position = 6 points

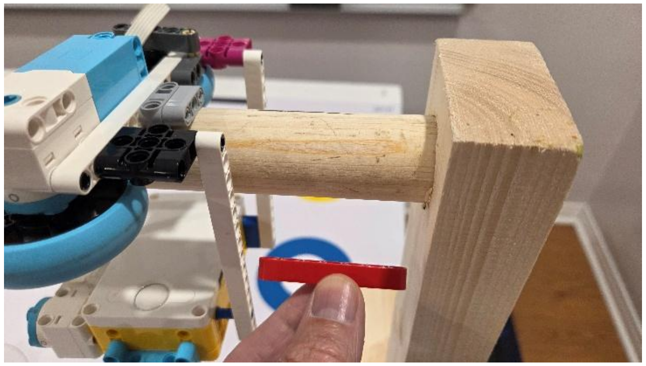


Broken switch still touching the board = 0 point



Robot within 55 mm from the end of rod pillar = 11 points

Finish with 55 mm of the end of rod pillar



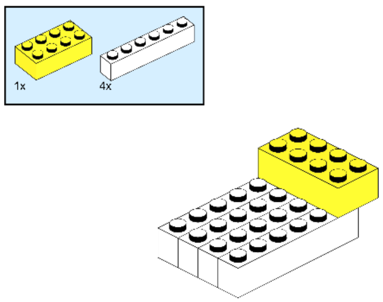
Robot not within 55 mm from the end of rod pillar = 0 point

Building Instructions

Switch (10x)

There are 10 switches each have specific colors.

1



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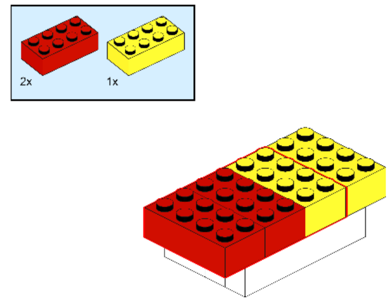

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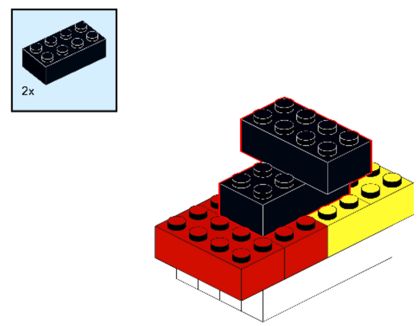

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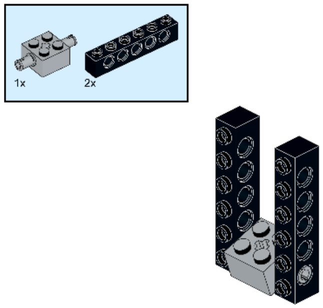

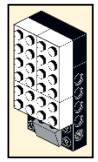

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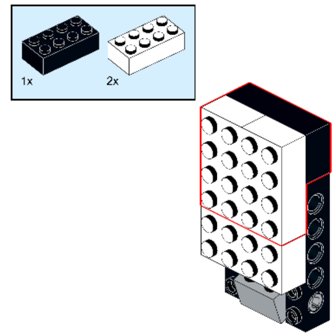

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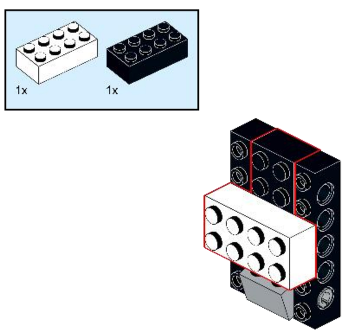

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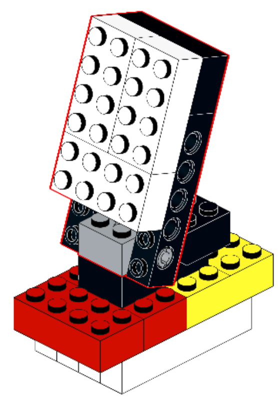
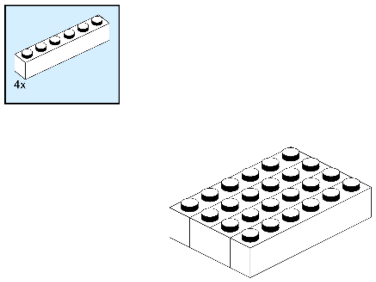


Broken Switch (2x)

1



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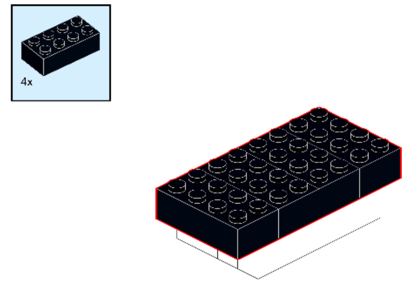

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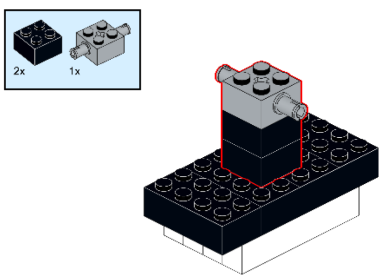

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