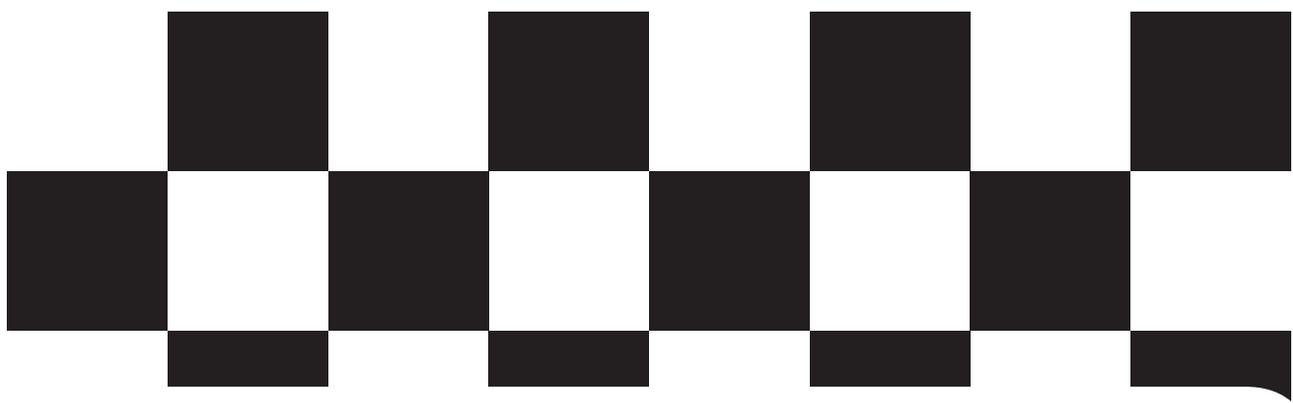


A
B
C
D
E
F
G
H

8
7
6
5
4
3
2
1

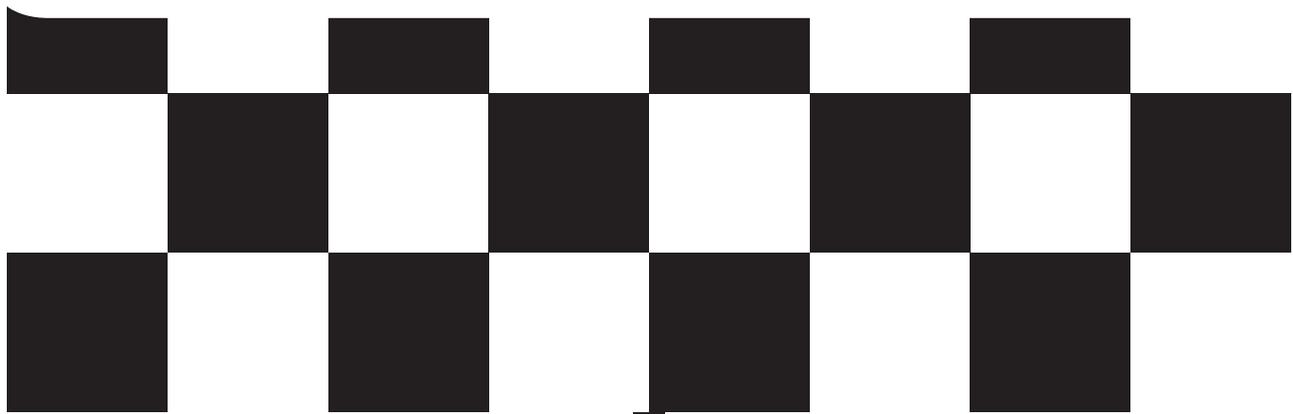


GAMES AND RULES

Masters Age Group



organized
by



1. Game field

You can see the game field and the areas on the picture below. For further information about the game field please check Engineer Challenge General Rulebook.



2. Game objects

LEGO bricks



Number: 16 pieces (4 pieces of yellow, 4 pieces of red, 4 pieces of blue, 4 pieces of green)

Size: 2x4 LEGO brick

Placement: on the chess table squares (see Game object placement)

Soda drink can



Number: 1 piece

Size: 0,33 l can, diameter 58 mm

Placement: on the chess table, standing completely in square C5

Sock



Number: 1 piece (does not have to be a pair)

Size: 35 - 52

Placement: on the chess table, touching square F6

AA battery



Number: 1 piece

Size: standard AA size battery

Placement: on the chess table, standing completely in square F2



When a game object is placed in an area that is limited by black or colored lines it has to be completely inside the area and it mustn't touch the lines (neither the object itself nor any parts of it).

3. Game object placement

You can see one possible arrangement of the 16 LEGO bricks, further details of randomization below.



The sock has to be placed on the chess field touching square F6.



The soda drink can has to be in a standing position and completely in square C5.

The AA size battery has to be in a standing position and completely in square F2.



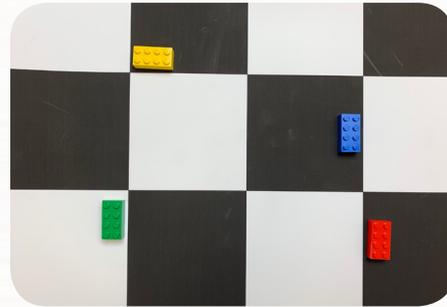
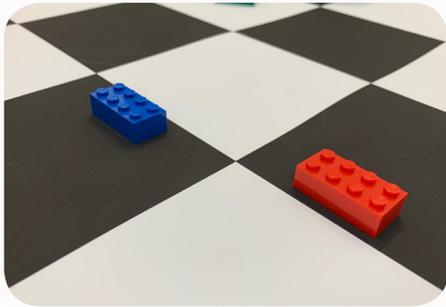
In case of rule violation:

If any of the game objects are not placed properly for the start, the team will not get the points for that game object.

4. Challenge tasks and randomization

The robot can start from anywhere on the game field.

Place the LEGO bricks (all 16) in a non-transparent box, bag or pouch. Without seeing them start drawing them one by one, and place them on the following chess table squares in order as they come: B1, F1, H1, D2, A3, H3, D4, F4, A5, H5, B6, E6, C7, H7, A8, D8



The colored bricks can be placed anywhere within the correct square and in any position (meaning it can lie on any of its sides) as long as it is completely inside the square.

4.1. Tidying the desk

You left one of your socks, your soda can and an AA size battery on the desk. You have to remove these if you want to start playing. You should remove the sock completely from the game field so that it does not touch the game field anymore. There are two square areas on the right side of the field marked with red lines. Put the soda can completely inside the upper one (that is the metal recycle bin) and the AA battery in the lower one (that is the used battery storage).

4.2. Build a tower

As you were looking for your chess pieces but could not find them you bumped into some colorful LEGO bricks, and you can pass time with those. You have to build a tower out of 12 bricks from the 16 available on the chess table. When doing the randomization, the last brick you draw (the one you put on square d8) will determine the color of the bricks you must not use for the tower. So, the 12 LEGO bricks you use to build the tower will be of three different colors. We will give points for many aspects so you have to carefully plan your tower.

Important: It must be clearly visible in the uploaded video that the tower stands still at least for 5 more seconds after the robot run has finished. It cannot touch any other game objects or the robot. Only one tower will give you scores, in case you built more than one towers, the one with the higher points is considered as the final score.

4.3. Avoid one color

To build the tower you only need LEGO bricks of the allowed three colors. One color has to be avoided by the robot (the color of the brick on square D8) and these have to stay completely in their initial square. Avoided bricks cannot touch the tower, or cannot be part of it.

4.5. Parking

After the robot finishes the tasks it parks completely in the finish area.

5. Scoring

Challenge tasks	Points
Tidy the desk	
The robot completely removed the sock from the game field	10
The robot placed the soda drink can completely in the metal recycle area (upper area marked with red line)	10
The robot placed AA battery completely inside the used battery storage (lower area marked with red line)	10
The robot completely removed any of the above-mentioned objects (sock, soda can, battery) from the chess table but not succeeded in correctly placing them in their target area	9 3 / object
Building a tower (All LEGO bricks are considered part of the tower that touch at least one brick of the tower.)	
The allowed LEGO brick is part of the tower and is <u>touching</u> the game field	48 4 / brick
The allowed LEGO brick is part of the tower and is <u>not touching</u> the game field	110 10 / brick
The tower consists of bricks of two different colors	10
The tower consists of bricks of three different colors	20
Avoid one color	
The LEGO bricks that should be avoided by the robot (colored the same as the brick on square D8) are still completely in their initial squares	20 5 / brick
Parking (points are only awarded if any other challenge points have been awarded too)	
The robot parks completely inside the Finish area	10
Technical points (points are only awarded if any other challenge points have been awarded too)	
The uploaded video includes all the required shots (see General rulebook): recording of the robot, recording of the game field and game objects, recording of the competition run, recording of the game objects and robot end positions	5
The team or individual uploaded only one video file and one program documentation file, which were in the correct format and also named correctly.	5
Max. points	204

5.1. Scoring terminology

Completely inside:

The game object or robot is completely inside an area if it only touches the area and its projection from above does not reach out of the area.

Partly inside:

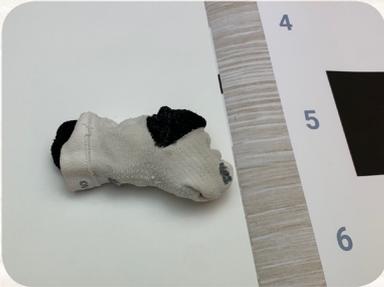
The game object or robot is partly inside an area if it at least touches the area, but also touches other areas or its projection from above reaches out of the area.

6. Scoring manual

Tidying the desk

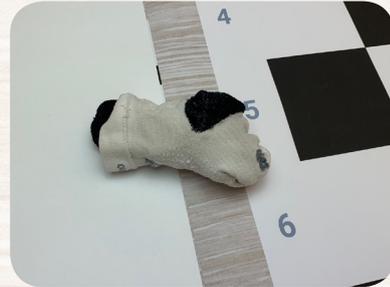
10 points

The robot **completely removed** the sock from the game field so **10 points awarded**.



5 points

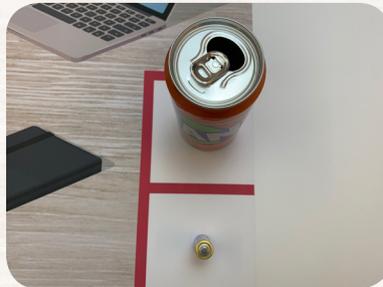
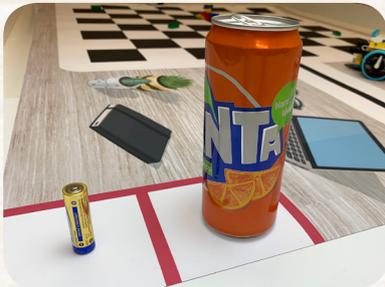
The robot **partly removed** the sock from the game field so **5 points awarded**.



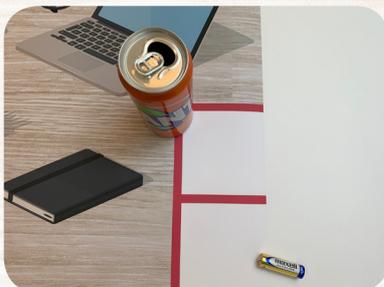
20 points (10/piece)

Soda drink can **completely inside** the upper area and the AA battery **completely inside** the lower area. Correctly done for **20 points**.

20 points also as it **does not matter** if the battery is standing or not.



Partial points



Soda can and battery are only partly inside the correct areas: $5+5=10$ points.

Build a tower

60 points (10/piece)

Here is a possible tower built by the robot. **Only touching bricks are considered part of the tower**, so the **rouge blue brick is not part and is 0 points**.

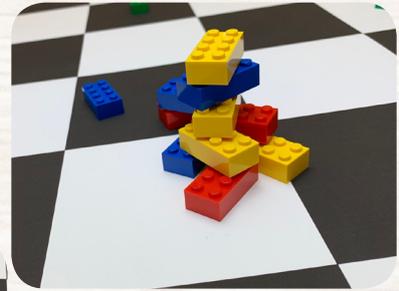
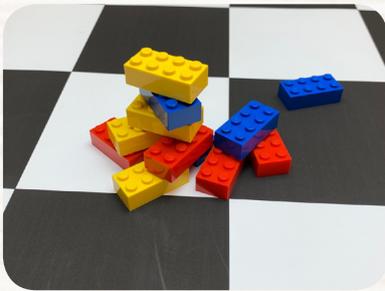
5 pieces are part of the tower and touching the game field which means $5 \times 4 = 20$ points.

6 pieces are part of the tower and not touching the game field which means $6 \times 10 = 60$ points.

The tower consists of bricks with three different colors which means another **20 points**.

This tower equals to $20 + 60 + 20 = 100$ points.

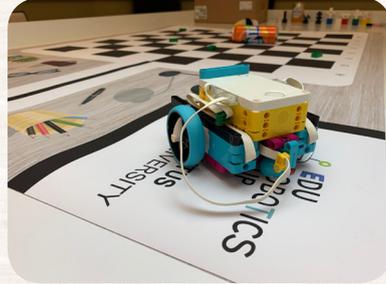
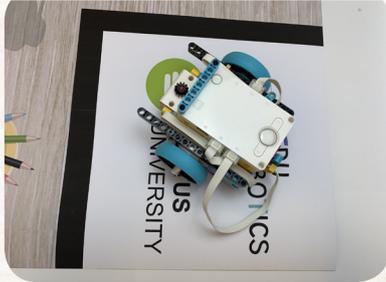
Any other format is acceptable, this is just as example how the scoring takes place.



Parking the robot

10 points

Parking **completely** inside the finish area.



0 points

0 points in both cases as **the cables** are counted as part of the robot for parking.

