

8 7 6 5 4 3 2 1

A

B

C

D

E

F

G

H

GAMES AND RULES

Teens 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

Book(s)



Number: As many as needed

Size: The book(s) should be at least 2 cm and maximum 5 cm thick

Placement: The book(s) should be placed next to the lower end of the chess table, touching the bordering line of it. The books should be closely fitted to each other and the two ends of the line of books should be somewhere inside the two green areas, but not stretching over it.

White chess pieces



Number: 6 pieces (1 pawn, 1 knight, 1 bishop, 1 rook, 1 queen and 1 king)

Size: various (see pictures to build the pieces)

Placement: the white pieces should be placed on the book(s) next to the chess table in a randomized order (see randomization)



To build the light pieces you will need the following LEGO bricks:

- 2x2 white: 6 pieces
- 2x4 white: 20 pieces
- 1x6 white: 12 pieces
- 2x4 yellow: 6 pieces
- 2x4 green: 6 pieces
- 2x4 red: 6 pieces
- 2x4 blue: 6 pieces
- 2x4 black: 6 pieces

Black chess pieces



Number: 4 pieces (pawn, knight, rook, king)

Size: various (see pictures to build the pieces)

Placement: completely inside the squares of the chess table: pawn on A4, knight on D4, rook on F3 and king on F1



To build the black pieces you will need the following LEGO bricks:

- *2x2 black: 3 pieces*
- *2x4 black: 22 pieces*
- *1x6 black: 6 pieces*

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

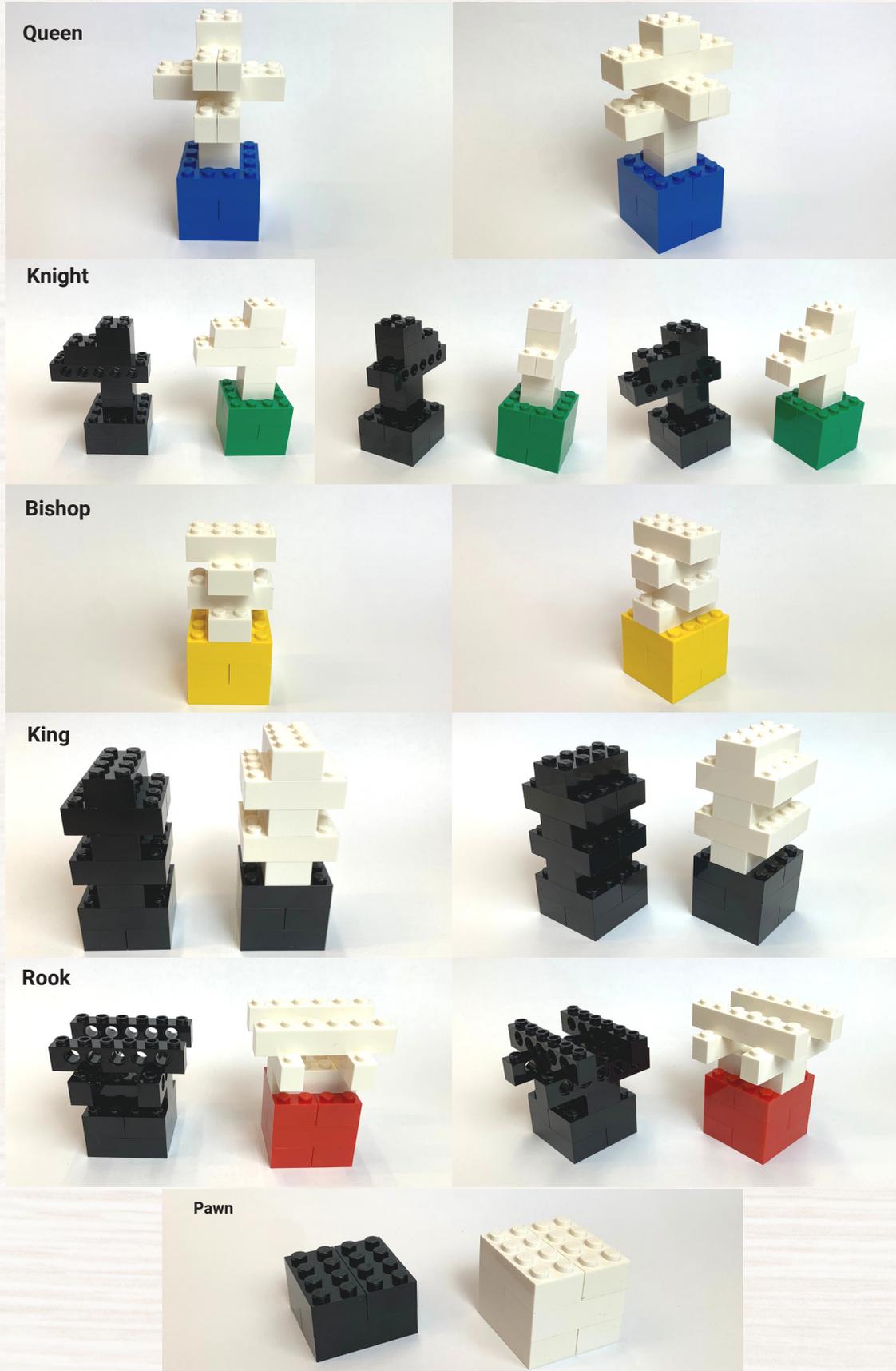
Placement: on the chess table, standing completely in square F2



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).

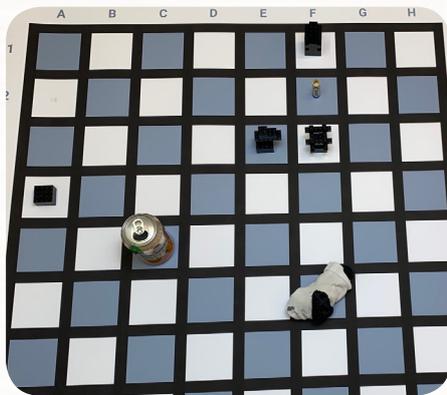
Building instructions

Here are pictures from more angles of the chess pieces to build. Make sure to double-check you have them built correctly, there are some minor differences between the same chess pieces of different color. As you can see the white pieces have different colored bases, this is to make sure the robot can identify the pieces with its sensor.



3. Game object placement

The **white chess pieces** should be placed on the game field as shown in the picture. They should be **placed upon the book(s) next to each other in a line**. You should imagine the top of the book(s) as the **9th row of the chess table (B-G9)**. Randomization will tell the order of the pieces from B to G (see randomization).



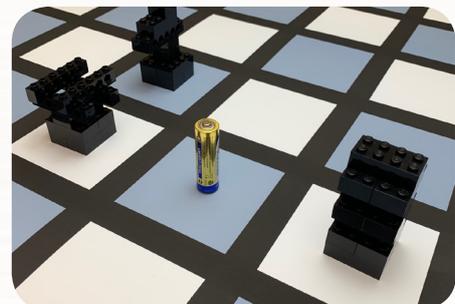
The **black pieces** should be placed on the game field as seen in the picture.

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 white chess pieces in a non-transparent bag, pouch or box. Start drawing them one after another and place them in that order starting from the imaginary B9 square (from left to right on top of the book(s) to G9.

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. Checkmate

Grandpa has already placed the black chess pieces on the table. Now it is up to you to place the white pieces in the correct squares to achieve an inevitable checkmate. To do this you have to place the white pieces accordingly:

- pawn: C6
- bishop: A6
- knight: E4
- rook: B1
- queen: G7
- king: H5

4.3. Avoid black pieces

When placing the white pieces on the chess table you must be careful to leave the black pieces completely inside their starting square.

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	15 5 / object
Checkmate	
The white chess piece is completely inside the correct square and is not damaged	60 10 / piece
The white chess piece is partly inside the correct square and is not damaged	18 3 / piece
Avoid black chess pieces	
The black chess piece is completely inside its starting square and is not damaged	20 5 / piece
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	130

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:

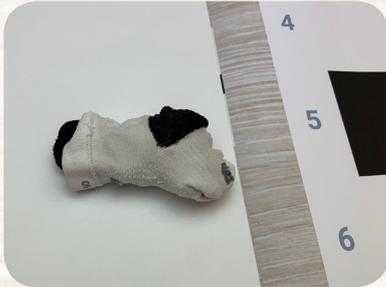
The game object or robot is partly inside an area if it at least touches the area, but also touches other areas or its projection from above reaches out of the area.

6. Scoring manual

Tidying the desk

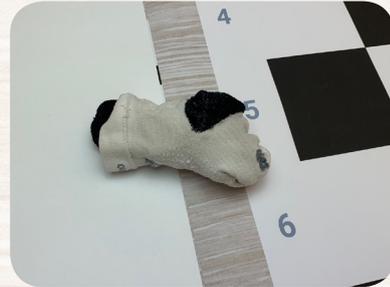
10 points

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



5 points

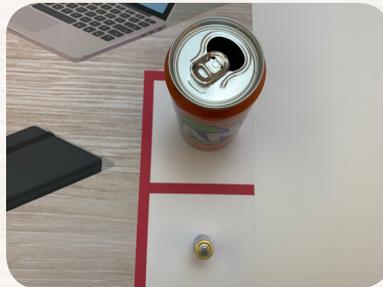
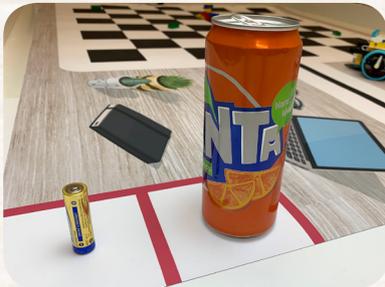
The robot **partly removed** the sock from the game field so **5 points awarded**.



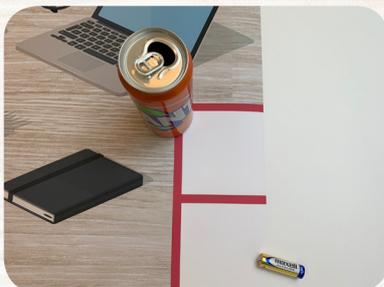
20 points (10/piece)

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.

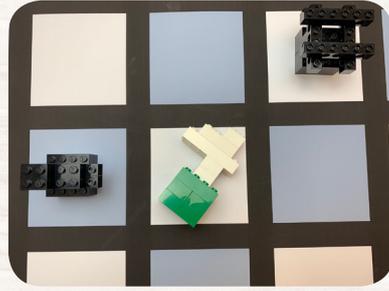
Checkmate

60 points (10/piece)

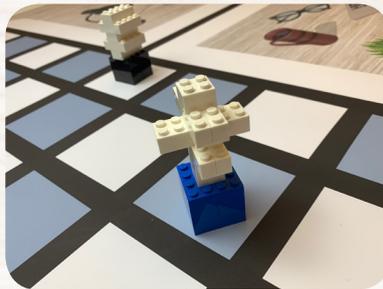
White piece completely inside its correct square on the chess board so 10 points awarded.



White piece is completely inside the correct square, no problem if it is lying on the game field, 10 points.

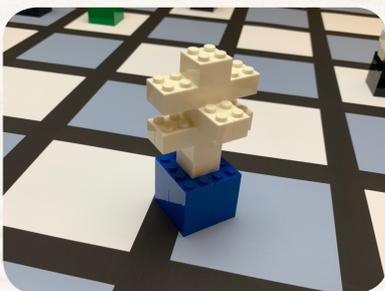


Both are completely inside the correct area, only the base matters, no problem if the projection might be on the black line or even outside for the queen. 20 points for the two pieces.



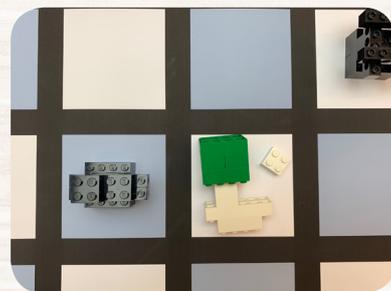
18 points (3/piece)

White piece is partly in the correct square means 3 points.



0 points

White piece is completely inside the correct square, but it is damaged so 0 points awarded.



Avoid black pieces

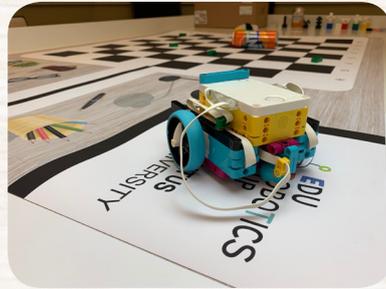
20 points (5/piece)

For guiding pictures of the scoring of black pieces please consult the pictures above, same rules apply as for the white pieces. Remember that black pieces need to stay completely inside their starting squares undamaged for maximum points.

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.

