SMART LIGHTING

General Rules

1. Regulations concerning the robot:

   (a) The maximum dimensions of the robot before it starts the mission must be within 300 mm X 300 mm X 300 mm. After the robot starts, the dimensions of the robot are not restricted.
   (b) Except for special designations in competition rules, any action or movement deemed as interference or assistance to the team while the robot is functioning is disallowed.

2. Regulations on the competition event:

   (a) The competition consists of 3 rounds.
   - Round 1 (Autonomous) – complete missions in 120 seconds autonomously where robots are operated via pre-programmed instructions only.
   - Round 2 (Remote Control) – complete missions in 120 seconds using remote control. The robot must be controlled by another EV3/ NXT intelligent brick via Bluetooth.
   - Round 3 (Technical Presentation) – Present your robot and all the thoughts and considerations that went into your final model.

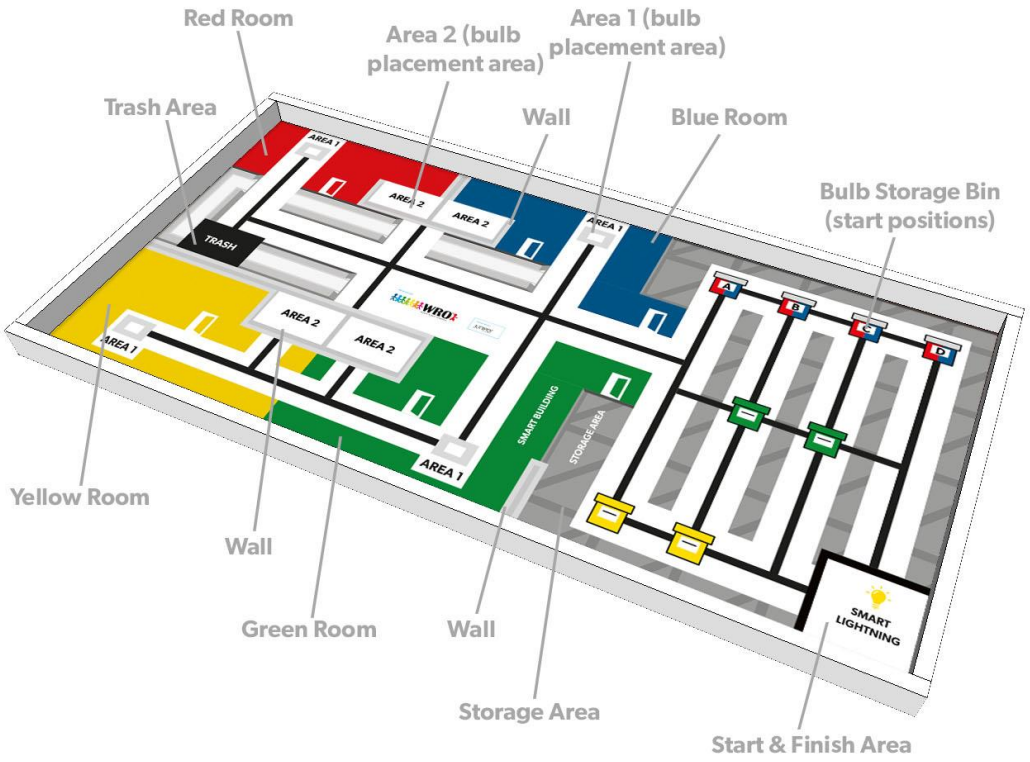
   (b) There will be 90 minutes testing time before round 1 and 60 minutes testing time before round 2.
   (c) Teams must place robots in their designated inspection area when assembly or maintenance time ends, after which the judges will assess if the robots conform to all regulations. Upon successful inspection, the robots will be allowed to compete.
   (d) If a violation is found at the inspection, the judge will give the team 3 minutes to correct the violation but the contestant is not allowed to add any parts, nor download any program. If the violation is not corrected during the time given, teams will not be allowed to compete.
   (e) The robot will have 2 minutes to complete the challenge. Time begins when the judge gives the signal to start. The judge will give the signal for the NXT/EV3 brick to be switched on and a program to be selected (but not run). The robot must be placed in the starting area so the projection of the robot on the game mat is completely within the start area. The contestants are allowed to make physical adjustments to the robot in the starting area. However, it is **not allowed** to enter data to a program by changing positions or orientation of the robot parts **or to make any sensor calibrations of the robot**. If a judge identifies this the team could be disqualified from the competition.
   (f) Once physical adjustments have been made to the satisfaction of the contestants, participants must wait for the judge's signal to start before setting the robot into motion (run the program).

(g) If a team starts the run early by accident (without any tactical reasons, e.g. because of a nervous situation), the judge can decide that the team can start the run again.
(g) Your attempt and time will end if:

i. Challenge time (2 minutes) has ended.
ii. Any team member touches the robot or any mission object on the table during the run.
iii. The robot has completely left the game table.
iv. If a robot arrives in the finish area and a team member informs the judge that this is the final position. Time will stop if the robot does not move anymore.
v. Violation of the rules and regulations within.

Game Field

The following graphic shows the game field with the different areas

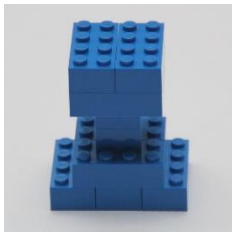


The mission is to design a robot that can take light bulbs from the storage area and bring them into different rooms (red, blue, yellow, and green areas) in the building. In addition, the robot will bring old light bulbs (black) to the trash area if the robot found it in storage area. The robot must start from the start and finish area, every part of the robot must be within the area completely.

Game Object

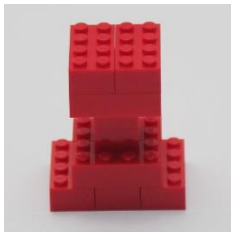
1. There are **5 bulbs (Red, Yellow, Blue, Green and Black)** that will randomly place in 8 of the bulb storage bins.

2x Old bulb (black)

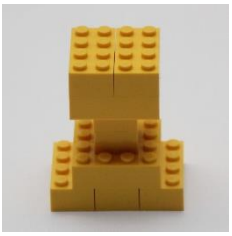


2x Smart bulb (blue)

2x Smart bulb (green)

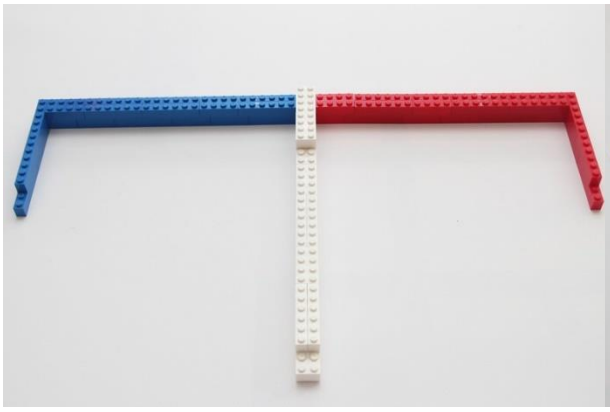


2x Smart bulb (red)

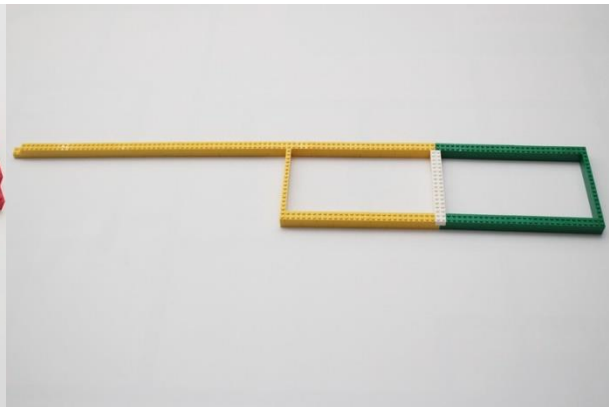


2x Smart bulb (yellow)

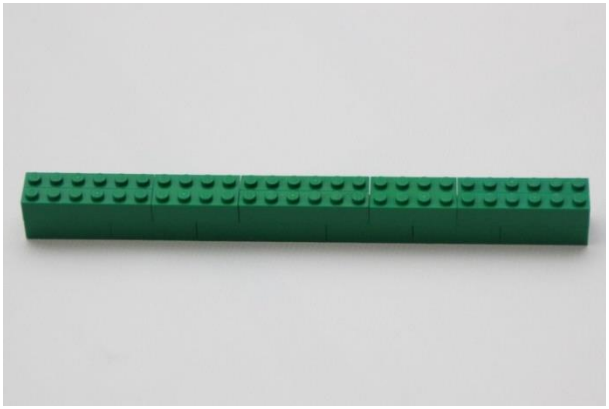
2. There are 3 walls on the field. The walls are placed on the dark grey areas that match exactly the size of each wall. One wall sits between the red and blue areas, one between the red and yellow areas, and one on the right side of the green area.



Wall between the red and blue area



Wall between the yellow and green area



Wall on the right side of the green area

Scoring

Definitions for the scoring

- **“Standing”** means that the game object is still in upright position (like the initial position). **“Not Standing”** means any other position.
- **“Completely”** means that the game object is only touching the corresponding area (not including the black lines). “**Partly”** means that the game object is at least touching the area with one part.
- **Please remember:** Only one smart light per area counts.

Tasks	Each	Total
Red / **Yellow** / **Blue** / **Green** smart bulb: • **Standing** in the **correct** colored room • **Completely** in AREA 1 or AREA 2	**25**	**100**
Red / **Yellow** / **Blue** / **Green** smart bulb: • **Not Standing** but in the **correct** colored room • **Completely** in AREA 1 or AREA 2	15	60
Red / **Yellow** / **Blue** / **Green** smart bulb: • **Standing** in the **correct** colored room • **Partly** in AREA 1 or AREA 2	10	40
Red / **Yellow** / **Blue** / **Green** smart bulb: • **Not Standing** but in the **correct** colored room • **Partly** in AREA 1 or AREA 2	5	20
Black (old) bulb**:** • **Standing** inside the Trash Area • **Completely** in the Trash Area	**20**	**20**
Black (old) bulb**:** • **Not Standing** inside the Trash Area • **Completely** in the Trash Area	10	10
Black (old) bulb**:** • **Not Standing or Standing** in inside the Trash Area • **Partly** in the Trash Area	5	5
Robot completely stops within the Start & Finish Area. *(only if other points are assigned)*		**10**
Robot damages or displaces a wall from its initial position.	-15	-45
Maximum Score		**130**