# RobIntro and RobAdvance Rulesets

Author :        Marc TEUSCH (marc@makeit.lu)

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Modern technology is built to help us. One of our most challenging issues in the future will be the correct recycling of our waste. This year, the LYRC challenge will turn around collecting and recycling the different waste types in a modern city.

As such, the main topic/question in this year's Concept challenge is

# [Domestic] Robots help recycle waste [correctly]

As the main topic of LYRC is turning around waste management, the challenge around the RobIntro category will be defined upon planning the most efficient way to collect and recycle waste bins around a neighborhood, defined by a jury. Depending on the robot system your team will be using to compete, there are different maps available for this challenge :
- Wonder workshop Dash robot
- OZOEdu Ozobot robot



| Ozobot | Dash |
| --- | --- |

In all cases, the robot needs to perform in an "autonomous" way (for example following a predefined way using color coding (ozobot) or object detection (Dash)) to find its way around the map and propose an efficient way to "collect" the waste from the neighborhood.

In the beginning of the challenge, the jury will define the kind of waste to be collected (by color). Each household which wants its garbage to be collected will be defined by a colored bin placed close to the house.



*Figure 1: Waste-bins with 3 colors*

The waste-bins have the dimensions 4,5 cm x 6 cm x 6.5 cm and will be placed in a non-disruptive way[1] onto the house image.

The competitors need to develop a strategy to find a pathway to the bin and "code" the robot accordingly. A waste bin is considered as "picked up", when the robot :

| Ozobot | Dash |
|---|---|
| Spins 2 circles before the household which wants its trash to be picked up | Plays a sound when can was detected |
| Shows the color to be picked up || 

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1    Away from the road
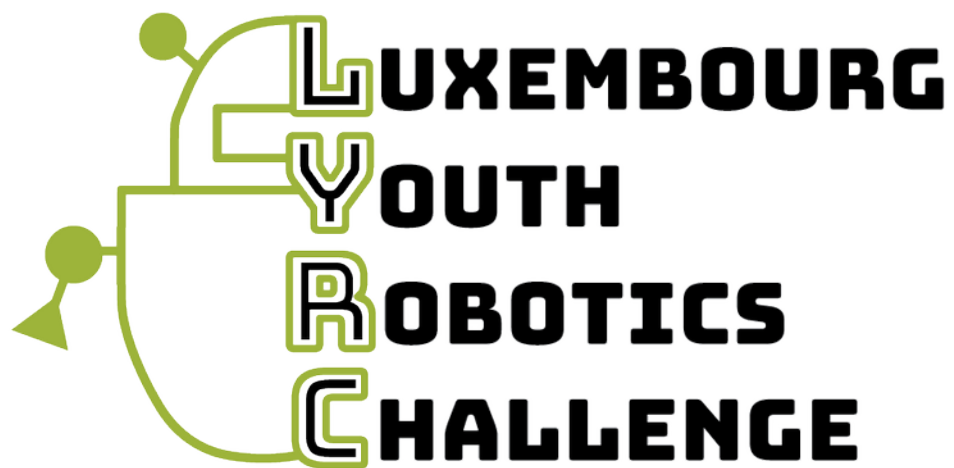
# RobIntro Rulesets

# General Ruleset

Teams must follow the general ruleset of the competition, available online through [lyrc.lu](lyrc.lu).

## RobIntro Challenge description

The playfield, to complete the mission for the RobIntro challenge, will be presented to teams 10 minutes before the competition itself. Teams can look at the field but not take it away from the competition area. They then have 10 minutes to complete a plan how to fulfill the mission. Colors of the bins to collect as well as the distribution of the latter will also be defined 10 minutes before the competition starts.

After these 10 minutes, teams will be called upon the playfield and will have 10 minutes of competition time. During this time, teams will have the opportunity to

- choose a strategy of how to get to the bins,
- complete color codes on the playfield,
- start their robot to complete the mission(s).

Once the robot has started, the scoring will be taken into account. Each time, a robot finishes its movement by either completing the mission or running into a problem, scoring will be stopped. Teams will have the opportunity to restart the parcours indefinitely as long as they are still in their run time of 10 minutes. However, each time they restart their mission, the scoring will be backed to zero points and they will start over.

## Parcours ruleset

Teams are not allowed to modify the parcours in any way except for the ozobot participants, coloring the code on the road.

# Examples of competition field
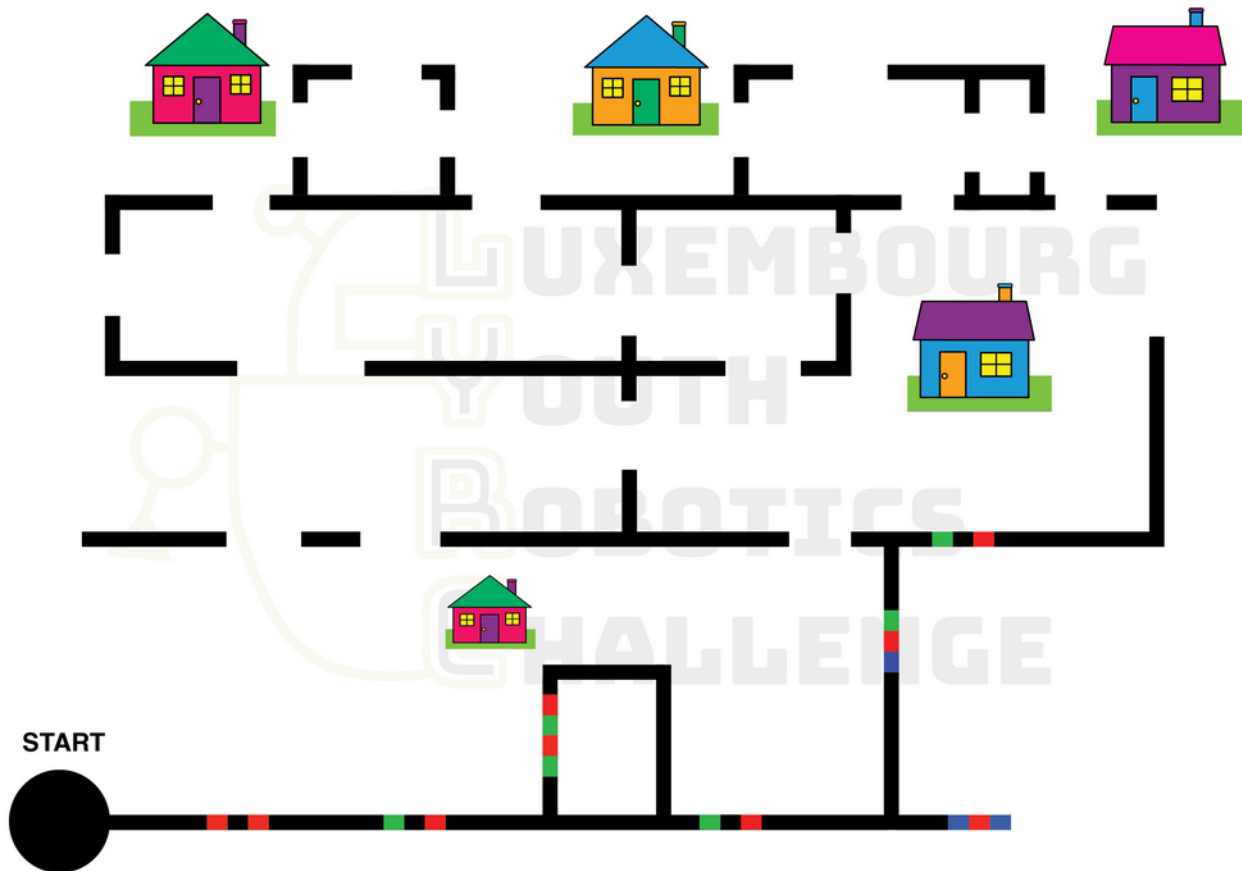


*Figure 2: Ozobot competition field example*

The required strategy to reach the placed waste bins depends entirely on the team. The more waste you "collect", the more points your team gains.

As an example, the lower part contains already a solution if a bin would be placed in front of the lower smaller house. In the competition, the color "commands" would be empty as shown for all other houses. It's up to your team to fill the colors in.
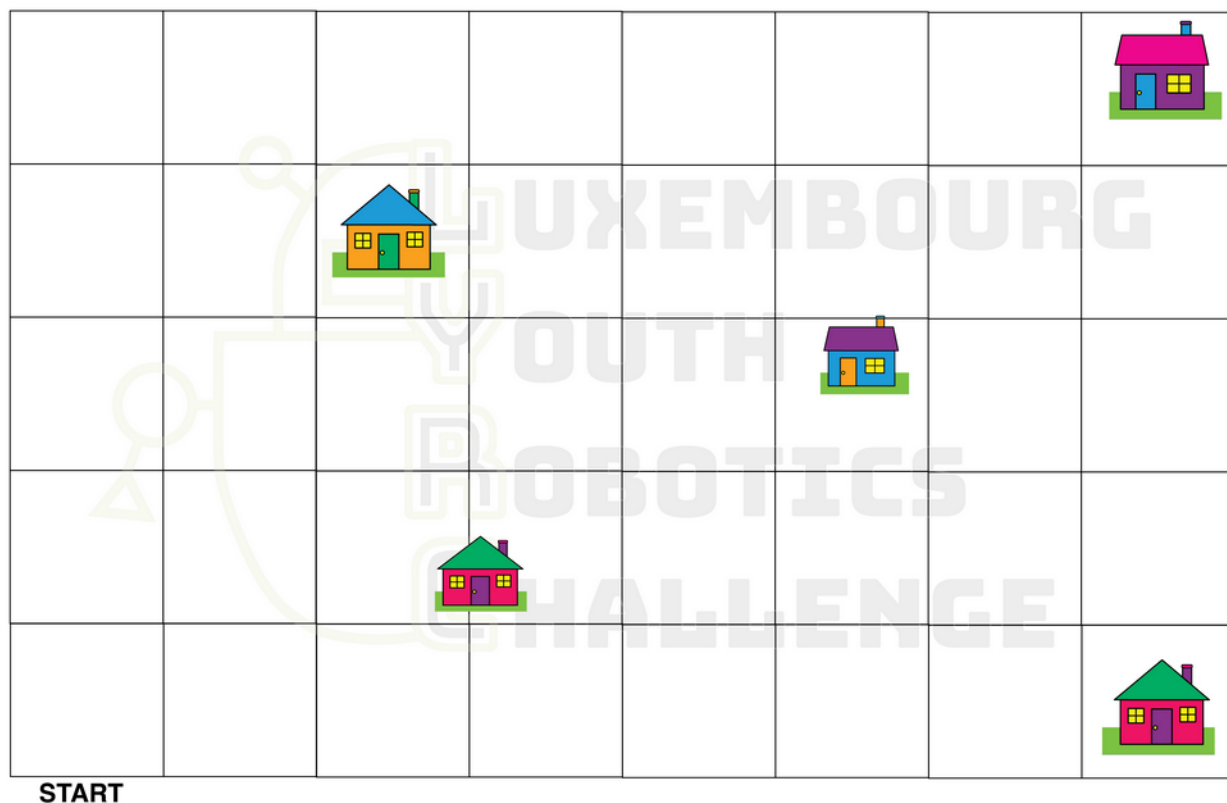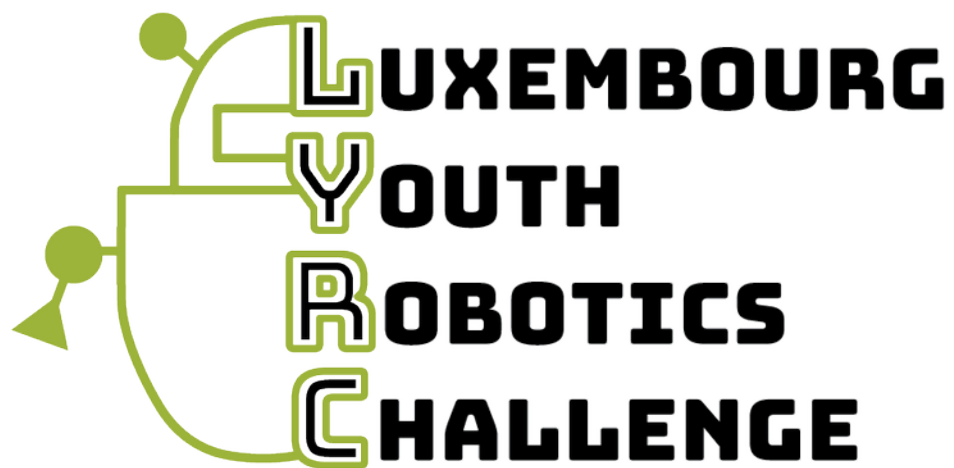
*Figure 3: Dash competition field example*

The Dash needs to find the bins to be collected within a build labyrinth. The coding of Dash depends on the strategy of the team. It can either be done via object detection or predefined way programming.
In any case, none of the objects found in the parcours can be moved or touched by Dash, but rather maneuvered past

# RobAdvance Rulesets

# General Ruleset

Teams must follow the general ruleset of the competition, available online through lyrc.lu.

# RobAdvance Challenge

The RobAdvance challenge is based upon the RobIntro challenge but requires teams to actually code their robots using a software like Blockly, mBlock or similar. Before making the teams take up the challenge, the code used must be shown to a jury member. The latter will then decide whether the team will be able to compete or not.

# Optional enhancements

In RobAdvance, teams are allowed to build a hardware which can enhance their robots' functions, such as, for example, a pickup mechanism for Dash.

Using such en extension needs to be declared before the competition and teams must pass a jury inspection in order to receive an official clearance for their robot. This compliance certificate, in form of a sticker, needs to stay on the robot during competition. If it is removed the robot cannot participate in the competition and will be sent back to the jury's inspection table. If this happens before/during a competition round, the team will be disqualified from the current round and receive zero (0) points.

## Technical limitations

- Extensions to robots must not be over 50 grams of weight,
- Only passive elements are accepted (no sensors, motors, etc),
- Any material is allowed and must be competition savvy. No unsavvy parts (like glass or sharp aluminum, for example) are allowed,
- All extensions must explicitly be allowed by a jury member via inspection.