make it
ASSOCIATION SANS BUT LUCRATIF

FIRST GLOBAL

Luxembourg Youth Robotics Challenge (LYRC)

Ruleset and recommendations

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Introduction

Make it asbl

Make it asbl[1] (non profit) was created in April 2018 to support the maker movement with focus on Luxembourg and its surrounding areas. The main goal of this association is to help prepare young talents to be ready for the upcoming challenges by bringing them a safe environment where they can learn new skills, share their ideas and engage in social responsible ways with our world.

Make it organizes a yearly national robotics challenge to ignite a passion for Science, Technology, Engineering, Arts and Mathematics (STEAM) among the many youths across Luxembourg. By bringing these future STEAM leaders together in an engaging and collaborative competition that drives home the importance, excitement, and applicability of STEAM education, Make it inspires students to learn the skills they will need to make the discoveries their parents and grandparents would consider miracles, impossibilities, or just plain science fiction.

With the support of the national ministry of education's innovative cell, SCRIPT[2], Make it plans these robot challenges to find a team capable of representing the Grand Duchy of Luxembourg during the FIRST Global robotic challenge[3] competition in Summer.

As such, Make it thrives to foster understanding and cooperation among the youth as they use their abilities to solve the world's problems. Participation in this challenge is about so much more than just robots. As participants learn to find solutions to the world's grand challenges – water, energy, security, medicine, food, and education – they learn how to work with each other, trust each other, and become part of a truly global community.

This Document and Its Conventions

These rules are explicit. All teams are expected to abide by the LYRC competition rules as they are written and must follow the intent of the rule.

This rules manual is originally written in English but may be translated into other languages to improve the ease of access and understanding for teams. In the case of apparent conflicting meanings between a translated version and the English language version, the English version published on the Make it website will be considered the correct version.

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1 www.makeit.lu
2 www.script.lu
3 www.first.global

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Participation rules

Teams

The LYRC challenge brings together young talents from the country in order to find the most talented ones to bring together a team representing Luxembourg on the upcoming FIRST Global Challenge. As such, the competition is looking for

- young girls and/or boys,
- aged between 14 and 18 years (inclusive),
- with no skills or prerequisites required to participate.

We are looking for teams between **2 and 6 members** (youngsters) plus **one mentor** (preferably with a 5+ years experience in a science/technological domain). The team should be able to work together, meet in regular moments and provide feedback of their progress.

A team can be composed of people from all regions with the requirement to be able to work as a team and have a positive attitude towards the competition.

Registration

When you have your team ready, please fill in the following registration sheet and send it back to first@makeit.lu before the given deadline (see Make it website). You will receive a confirmation of your registration and a specific identity of your team.

As soon as the registration is completed, you will be contacted within a few days to discuss the hardware needed to complete the challenge. Please note that the hardware section will detail all the information necessary concerning the material chosen.

make it

Registration form

Team Name : _____

Mentor Name : _____

Mentor Address : _____

_____

Mentor phone number : _____(+_____)_____

Mentor Email address : _____

Team members :

	Name	First name	Age	Town
1				
2				
3				
4				
5				
6				

I certify that all these informations are correct and that the parents have been informed of theirs children's participation in this competition. By signing this document, I confirm that I will be responsible for the children's transportation to the competition town as well as their behavior on site during the competition and that I am responsible for the hardware kit which will be handed to my team until the end of the competition.

Town and date signed : _____

_____
Mentor's name & signature

Competition rules

Hardware (in general)

In order to be able to participate in the LYRC competition, the competitors have to use a specific set of hardware which will be distributed by Make it to the mentor after the team registration has been confirmed. The hardware distributed is the sole hardware used in the competition. It is not allowed to modify the parts, add third party parts, or temper in any other way with the distributed hardware.

The set of hardware is and will remain the property of Make it, and the association retains itself the right to ask for compensation when parts are missing or have been destroyed during the competition process. The mentor will be asked to return the kit in its original state within one week after the competition took place. The return will be protocoled by a Make it member of office and the mentor will receive a confirmation paper that the transaction was successfully performed or, if necessary, parts must be replaced in the kit.

The robot [hardware]

To make the competition fair, the robot has to follow certain restrictions when it comes to software and hardware. This will allow the competition to be more balanced.

Hardware rules

Dimensions	The final robot cannot exceed the dimensions of 45cm x 30cm x 30cm [length x width x height] at the start of the competition. During the competition, it is possible that the robot extend itself in any way to any dimension.
Aggressive behavior	Robots must not be build to harm or interfere with competitors' robots. It is strictly forbidden to make the robot engage in aggressive behavior like rampage, shooting or hindering other competitors. Teams with such a behavior will be disqualified immediately and cannot continue the competition.
Spare parts	During the competition event, there will be no spare parts available other than the ones the teams have in their kit. Whenever a motor dies or pieces are broken, teams must find an innovative solution to be able to continue the competition.
Checkup	Every robot must be inspected by the LCR jury (see inspection booth) prior to engaging in the competition. Refer to the upcoming Inspection section for more details.

The robot [software]

The competition will require some programming. This can be done with several tools and the team can choose the one they prefer. Some recommended examples are the makeblock app, Arduino coding app, Scratch or Google Blockly. The task(s) the robot must fulfill has (have) to be achieved partly manually (executed by a human team member) and automatically. Here is a list of tasks to be done for either category. Software must be shown at registration booth before the event. It is not allowed to drastically change the software during the competition. Only minor changes are allowed. When both manual and automatic are allowed, the team can decide which implementation they want.

Task	Manual	Automatic
Movement on field (forward, backward, left and right)	X	X
Movement of the arm (up, down)	X	X
Detection of ID/RFID		X
Clamp activation (open, close)	X	X
Detection of home/base field		X

Inspection

Each robot (hardware and software) has to be inspected by a member of the jury of LYRC before the robot and its team can present themselves to the competition. Each team must present their robot at the inspection desk at least one hour before the competition starts. Each robot, which has been cleared for the competition, will receive a sticker that has to be worn at all times on the robot. If your sticker is lost or gets destroyed, you must get a new one as teams without stickers will be disqualified.

Rules of behavior on the field

Follow the schedule. Teams may not be in the pits outside the designated pit hours.

Personal safety comes first.

- All team members must wear safety glasses (only ANSI-approved, UL Listed, CE EN166 rated, AS/NZS certified, or CSA rated non-shaded) while in and around the playing field and in the pit area. Lightly tinted lenses are permitted provided eyes are clearly visible to others, but reflective lenses are prohibited.

- All team members must wear closed toed/heeled shoes.

- All team members must tie back long hair.

- All team members must wear appropriate clothing.

No saving seats. Teams are not permitted to save or designate seats for team members that are not present.

Don't throw items from the stands. Items may not be thrown from audience seating.

Some things don't belong at events. Do not bring or use the following:

- skateboards, 'hoverboards', roller-skates, inline skates

- drones or any other flying object

- any electronic device disturbing either bluetooth or WiFi frequency bandwidth (2.4GHz – 5GHz)

- bottled gas tanks (e.g. helium)
- noisy devices or noisemakers, such as floor stompers, whistles and/or air horns

- walkie-talkies

Do not arrange for Internet access or phone lines from venue service providers or attempt to use venue internet connections reserved for event purposes (e.g., FMS or streaming).

Don't sell stuff or distribute food. This includes, but is not limited to, raffle tickets, food, hats, shirts, candy, water, soft drinks, fruit, or any promotional products.

Keep unnecessary noise to a minimum. Do not invite or bring live bands to play in the audience. Do not play loud music.

Respect the venue. Teams may not damage the venue in any way, including, but not limited to bleachers, floors, walls, railings, etc.

Practice in the pits or on the Practice Field. Teams may only practice with their robot in their pits or in designated practice areas that are open to all teams at events.

No wireless communication. Teams may not set up their own 802.11a/b/g/n/ac (2.4GHz or 5GHz) wireless communication (e.g. access points or ad-hoc networks) in the venue.

Don't interfere with other wireless networks. No Team or Team member shall interfere or attempt to interfere with any other Team's or Make it wireless communication. Except as

expressly allowed for purposes of communicating with the Team's own robot on the Field or a Practice Field, no Team or Team member shall connect or attempt to connect to any other Team's or Make it's wireless network.

Children under 12 must be accompanied in the Pit by an adult at all times.

Flags / Posters

We encourage teams to bring team flags and/or signs for display in their pits and/or the playing field area, under these rules:

- Be respectful when hanging your flags and banners.

- Do not cover or move other team or sponsor signs already in place.

- Share the available space fairly with other teams.

- Do not obstruct the view of spectators.

- Hang signs in a safe manner.

Respect venue-specific rules regarding sign location and hanging methods. At the end of the event, safely remove all signs and anything used to hang the signs (tape, string, etc.).

Competition & game

General rules & scoring

There will be as many games required as necessary to determine a winner of the competition. Each game will last three (3) minutes and oppose two (2) teams.

Scoring for the competition will be split into several categories and the game is based on a simple knockout principle.

| Award	Description	Points
Public Relations	Each team can decorate their booth with the story of their robot. The use of posters, videos, flyers, etc is encouraged. However, the cost of these items remain within the team.	20 points
Ingenious	Build your robot in an ingenious way. Make it smart by adding cool and interesting features that will help its performance	40 points
Competition	Each round will have a counting of the items collected. Scoring will be added depending on the items in your home base.	
Boxes	Bring back your boxes to your team zone	4 points / box
	Take your opponent's box to your zone	-6 points / box
Park	Bring your robot to its home zone	10 points

The competition

The competition field is a flat surface of size 3m x 4m with several zones for different purposes. Each team has a colored "home base" zone (red (#FF0000) and blue (#0000FF)), where the robot will start and end its course. There is a "pit" zone where your team members can freely move around. You can touch the robot only when it's in this team pit (about 25cm x 1m space, where the pit overlaps the home base). At all the other times, interfering with the robot is forbidden.

The purpose of the game is to make your robot collect boxes tagged for your team with a certain ID. Those tags can be read through an RFID shield, which needs to be attached to your robot.

Every time, your robot has detected one of its packets, it must collect it to its home. At the end of the game, the more boxes your robot has brought into your home zone, the more points your team gets.

There's a bonus score on the robot being parked inside your team zone when the game has ended.

In the field will be two randomly setup obstacles which your robot has to avoid. The dimensions of these obstacles cannot exceed 1m x 1m (see picture below for an example).
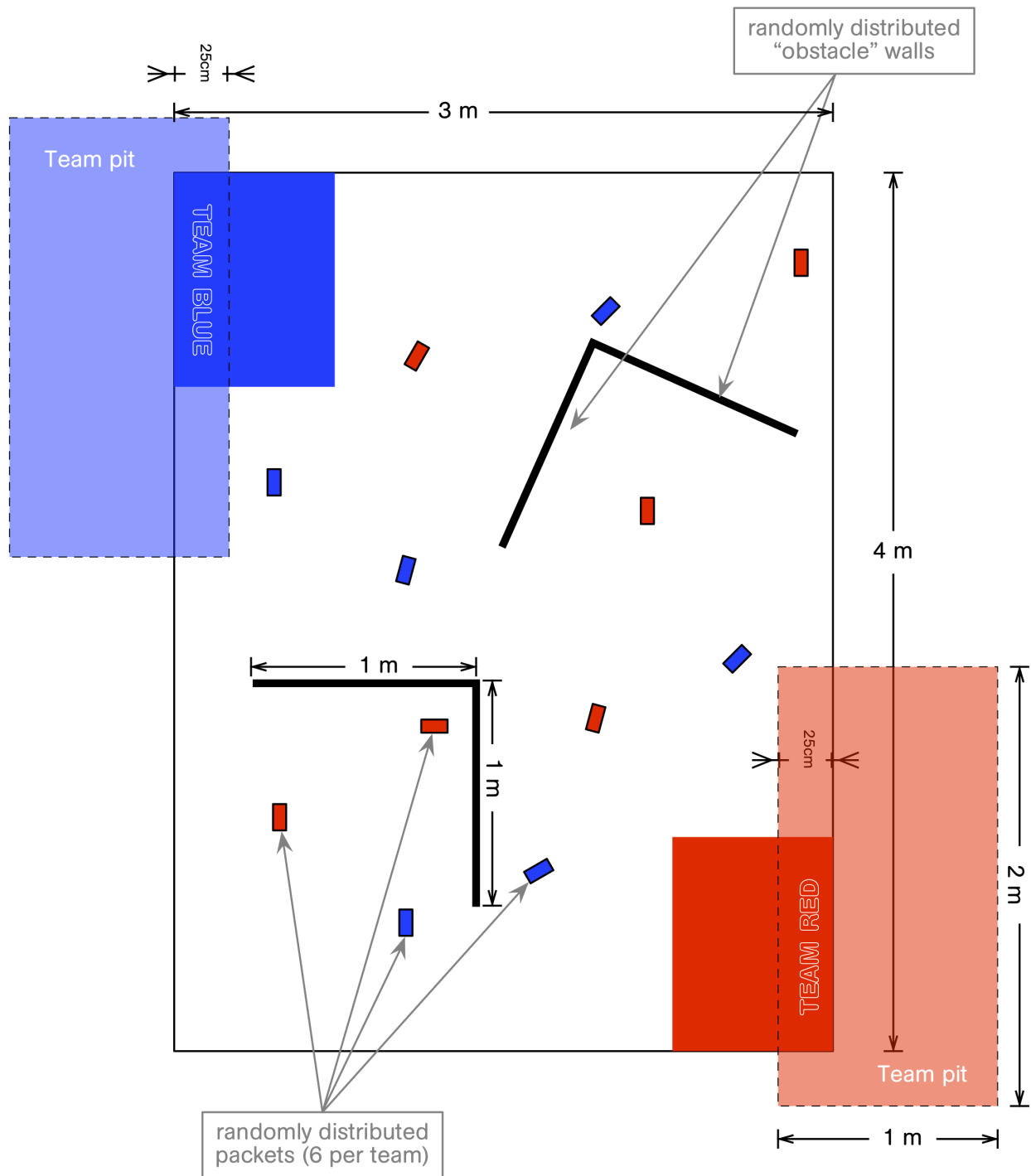
Example of a competition field

Game rules

1. During the competition, there can only be a maximum of two (2) team members in the pit area. The mentor is not allowed in the pit area. Team members can move freely in the designated pit area but cannot leave this areas. When in the pit, safety goggles must be worn at all times and calls from the jury must be observed.

2. Robots must stay on the competition field. If a robot goes completely out of bounds or appears to have a high likelihood of interfering with the game, it will be disabled by the Head Referee for the rest of the match. The robot can be attended after the match has finished and can be reenrolled in the next match.

3. Robots must not be dangerous or damaging to the field, or humans around the field. Robot or team actions should not damage the field or field elements or pose a safety risk to other team members or volunteers. If the Head Referee determines the team to be in violation of this rule, or that the team has a high likelihood of violating this rule, the robot may be disabled for the match and must be re-inspected before taking the field again.

4. Play the game as written. These rules are written as simply as possible to make them as accessible as possible, regardless of a team's native language. Attempts to gain competitive advantage by employing an unintended method of play violates the rules and does not meet the spirit of the competition.

5. Robots must start the match within a 45cm x 30cm x 30cm volume. Before a match can start, all robots on the playing field must meet this requirement and carry the "checkup" sticker obtained from the Jury's inspection desk.

6. Each drive team may consist of up to 2 members. These are the only team members allowed at the field and to set up the robot. Team members must remain in the pit during a match.

7. No communication is allowed with persons outside the team during a match.

8. Team members should not contact anything inside of the playing field until a referee indicates that it is safe to do so. Team members should not reach into the playing field and contact the field surface, field structures, any game elements, or robots, either directly or transitively through an object, unless the flags on the field are Green to indicate that the playing field is safe to enter. This rule applies both before and after the match, and in all situations.

9. Robots should stay in one piece on the field and may not intentionally detach and/or shoot parts on the field during a match. If a piece falls of the robot, the head referee will decide upon the action to be taken.

10. Don't intentionally damage, tip over, or disable other robots. Strategies which are aimed at damaging, tipping or disabling other robots are not allowed. Teams are responsible for the actions of their robots at all times. Driving recklessly is not an excuse for tipping or damaging another robot. Teams are also responsible for building a robust robot which will not easily tip or become entangled due to minor contact.

11. Scores will be calculated when everything comes to rest at the end of the match.

12. Robots must function in imperfect situations. The field and placement of items within the playing field may vary by up to ± 25mm except if specifically noted in the field build guide. Robot designs should be robust enough to work effectively even if the field or game elements are not perfectly sized or have a slightly different texture or color.

13. After the match has started, if a team's robot can only be interacted with in the team "home base" zone. Outside this area, no touching is allowed.

14. Communication with spotters in the stands or via any wireless communication means is not allowed. This rule is not intended to apply to general cheering and support.

15. Accidental tipping and entanglement may occur and is part of normal game play, however intentional or egregious violations as determined by the Head Referee may result in disqualification. Repeat offenses may result in a team being disqualified from the rest of the event.

16. Once the robot has moved under its own power, the robot may not be touched by any humans until the match has ended. Teams should be careful that they do not touch other mobile robots or any part of the playing field while attempting repair on their immobile robot, as that contact would be considered a violation of ruleset.

17. Strategies aimed at causing an opponent to violate a rule are not allowed. If an alliance forces an opponent to violate a rule, the penalty that would typically be assigned to the opponent will instead be assigned to the alliance that forced the violation.

18. Robots may not grab, grapple, or grasp field elements unless otherwise explicitly permitted. Robot mechanisms should not be designed to react against multiple sides of a field element. This rule excludes game objects.

19. Scores are final and there are no replays, all Head Referee decisions are final and not up for discussion. All of the volunteers at LYRC work hard to provide fair and consistent game experience for all teams, but they are human and may make mistakes. How teams deal with adversity will say as much about their character as how they deal with success. Teams should avoid situations which could be rules violations and make their scoring actions very clear to avoid misunderstandings.

20. All teams are expected to behave in a respectful and professional manner when interacting with other teams and Staff during the LYRC event. Students and adults are held to the same standard, and teams may be disqualified from the LYRC competition for uncivil or egregious behavior from any party affiliated with the team.

21. This rule is intended to prevent teams from damaging the field, either intentionally or unintentionally.

22. If teams have questions about rules or rulings, there will be a designated area near the field where the team can wait for the Head Referee or Technical Advisor and discuss the concern.

23. Robots must start each match inside the "launch" area located on the home base zone (colored in the respective team's color).

24. Game objects should stay on the playing field. Game objects should stay on the playing field or be scored in designated goals. Items accidentally ejected from the playing field will be reintroduced at the approximate location they exited when safe to do so. Intentional ejection of game pieces from the playing field will result in a verbal warning.

25. Human players must not directly interact with robots during the match. They are never allowed to touch robots, either directly or transitively through an object, except if the robot is totally inside the home base zone.

The team booth

At the LYRC, each competing team will have a booth space of 3m x 3m. The space provided should be divided in different areas, for example a repair area, where they can attend to their robot, but most importantly, also a public relations area, where the team should present their robot and its history. The space should be used to present how their robot was built by showing some initial ideas, drafts, sketches up to the final result. Visitors should get a good idea of the effort the team made to build their robot. Exhibitors should also present the code used to program the robot.

The teams can use and method to present their work (slideshows, posters, pictures, printouts,…). The only limit teams have is the space they occupy. It cannot at any time, exceed the initial measures of 3m x 3m. Any excess will result in not scoring the PR points.

The jury will look at the booth and interview your team in order to distribute the points awarded to the PR section of the competition.