EDU ROBOTICS CUP

2025

Engineer Challenge General Rules

1.1 v – 17/12/2024

1. THE ROBOT

1.1. This year, the following rules apply to robot building:
Only the following microcontrollers can be used to build the robot:

- Micro:bit
- Arduino
- Lego Midstorms EV3
- Lego Mindstorms Robot Inventor
- Lego Spike Prime

1.2. Up to **8 sensors** and / or **motors** can be connected to the robot at a time.

1.3. Teams have to make sure they have all the needed equipment to compete: robot, spare parts, laptop/tablet, software, cables, game mat, game objects etc.

1.4. Teams have a **free choice of what software or firmware they use on the controller**.

1.5. The maximum dimension of the robot before it starts the robot run is **25 cm length and 25 cm width**. The **height of the robot is not limited.** After the robot starts the robot run there is no limit to its dimension.

Rule infringement: *In case a robot does not fit the mandatory dimension limits before it starts the robot run, depending on the scale of infringement the team will either get a 50% deduction from its final score or will be disqualified from the competition.*

1.6. The robot has to function autonomously during the robot run.

Rule infringement:
In case of any rule infringements see points 4.3. and 4.4.

1.7. Before the robot run starts, but the robot is already on the game mat, it is forbidden to upload any program (both using a wire or wireless method) or to make any calibrations of the sensors.

 Rule infringement:
In case a team violates the rule the team is disqualified from the competition.

1.8. It is **forbidden for two or more teams to compete with the same robot**, even if they share a
common location (e.g. school, home etc.).
Robots have to be distinctively different in appearance,
structure and programming.

Rule infringement:
In case the rule is violated, both or all teams involved are disqualified from the competition.

2. GAME FIELD SPECIFICATIONS

2.1. Size of the game mat is the same in all four age groups:
2362 mm x 1143 mm(Expected release date: 20th November 2024)

2.2. The registered teams have to make sure to acquire the game mat in time (print, order etc.). The acquired game mat has to have the exact same dimensions, areas, colors and graphics as the shared document.

Rule infringement: *In case the game mat is manipulated by any means, the team will be disqualified from the competition.*

2.3. The team can decide what material they choose for the game mat. It is important to keep in mind that it should not wear out easily as a lot of practice will take place on it. We recommend the following materials as they proved to be good for this purpose:
- 510 g/m2 PVC tarp (Frontlit),
- 170 mic ploypropylene film matte grayback paper

2.4. The printable, finalized version of the game mats will be available for registered teams via the platform after logging in.

2.5. The game mat should always be placed on a leveled horizontal surface.

2.6. All game objects should be acquired by the teams based on the list of game objects sent to them by the organizers. Game objects will be everyday household items or easy to access objects that have an approximate standard size globally.

2.7. Teams cannot place any objects next to the game mat that alters or affects the functioning of the robot. This means that no such object can be used as a barrier or reference point by the robot.

Rule infringement: *In case this rule is violated by a team, the team will be disqualified from the competition.*

2.8. There are explanatory videos created about the general and age group rules that you can and should watch. (Coming soon...)

3. THE COMPETITION

3.1. The Engineering Category **competition period will start** with an official opening ceremony (online) on **16th January 2025**

3.2. **The video recording** of the robot run and the documentation of the program **has to be uploaded to the competition platform by 19th January 2025 (23:59 CET).**
Recordings and documentations will be rejected after the deadline.
We encourage teams to upload the video and the documentation earlier then the deadline and not to leave it for the final moments.

3.3. **The recorded video of the robot run has to include the followings:**

3.3.1. The recording has to include an all-angle view of the robot with a zoom in on the display of the robot, which also shows that Bluetooth and WiFi are switched off. The team also has to show that the robot is within the legal dimension of 25 cm width and 25 cm length by placing the robot inside the 25 x 25 cm start area.

3.3.2. The video has to include an overall recording of the game field where judges can clearly see the 30 cm rulers placed on the reference points and all graphic images on the mat are visible. This way judges can make sure that the game mat has the valid size, colors and graphic images and there it is not manipulated in any way.

3.3.3. It should also include a zoomed in view of all the game objects and their positions on the game field.

3.3.4. Robot can start after these are recorded and the whole robot run has to be on the video as well.

3.3.5. At the end of the robot run (no matter how it ends) when the robot is not moving anymore the team has to record a zoomed in view of the end positions of all the game objects on the game field.
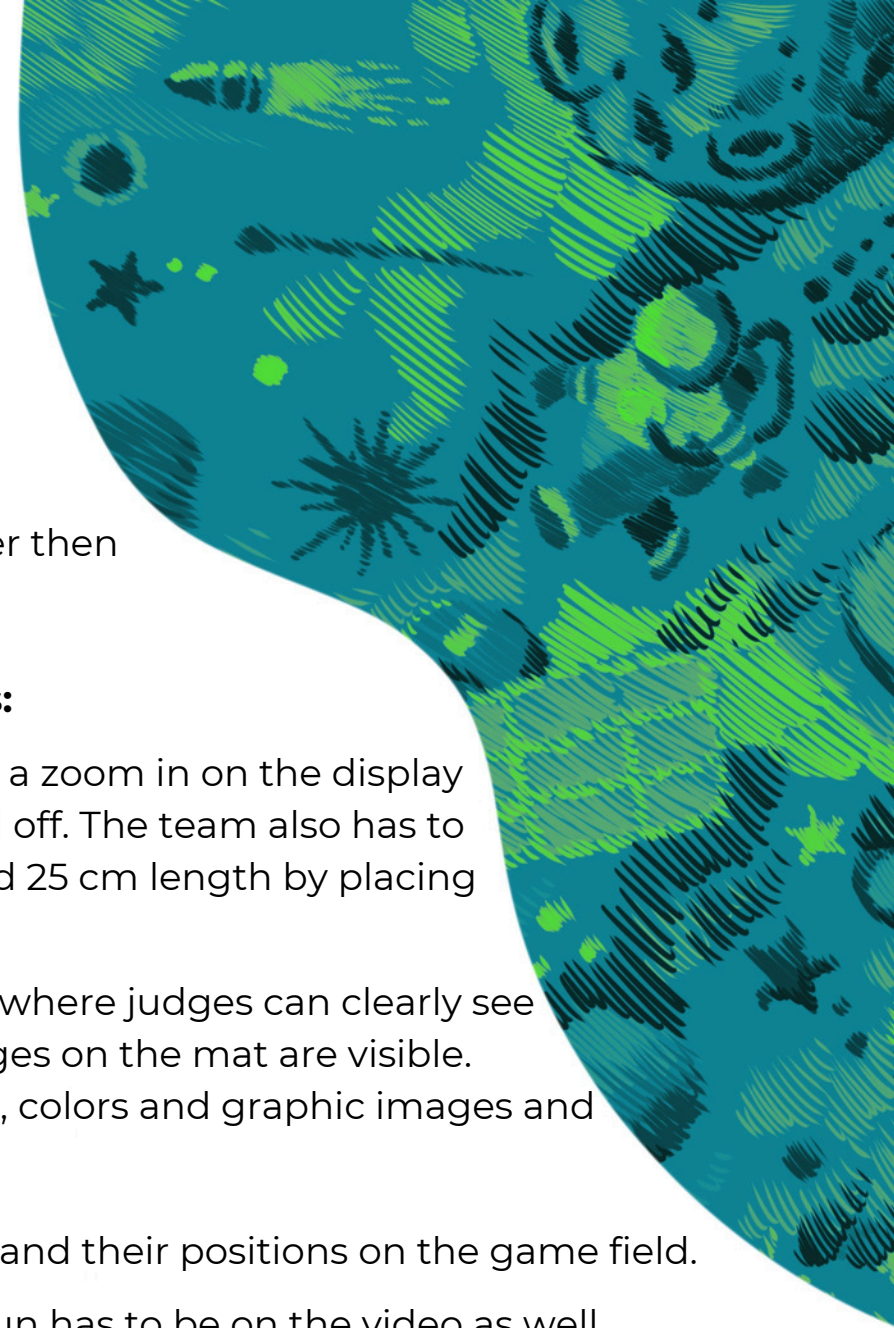
3.4. The video has to be one uncut recording. It is forbidden to manipulate the video, including any cuts, movie tricks, etc. Important to note that the competition round technically starts when the recording starts, meaning that all competition run rules apply to the whole recording. However, the time of the robot run starts when the button is pushed on the robot and ends according to points 3.9. and 3.11. We suggest that teams should practice the recording before doing the actual footage. It is also worth recording even the practice runs as well, because you never know which one is going to be the best one.

Rule infringement: *In case a team applies any cuts, movie tricks or any other manipulations to deceive the judges, the team will be disqualified from the competition.*

3.5. One team can only submit one video file by uploading it on the competition platform.
The file should be named: TEAM NAME_AGE GROUP_EDUROBOTICSCUP2025
(e.g.: MARIOBROTHERS_ROOKIE_EDUROBOTICSCUP2025)

3.6. Allowed formats are: **mp4, avi, wmv**

3.7. The uploaded videos will be publicly available online for anyone to watch once the upload deadline expires **(19th January 2025 (23:59:59 CET))**

3.8. Teams have to upload **the documentation in PDF format** to the competition platform with the name: TEAM NAME_AGE GROUP_EDUROBOTICSCUP2025
(e.g.MARIOBROTHERS_ROOKIE_EDUROBOTICSCUP2023)

3.9. **The robot has 2 minutes at maximum to do all the tasks**, the maximum time of a robot run is 2 minutes (120 seconds). The timer starts when the team member pushed the start button on the controller. At this point the timer and the robot run starts even if the robot does not start to move.
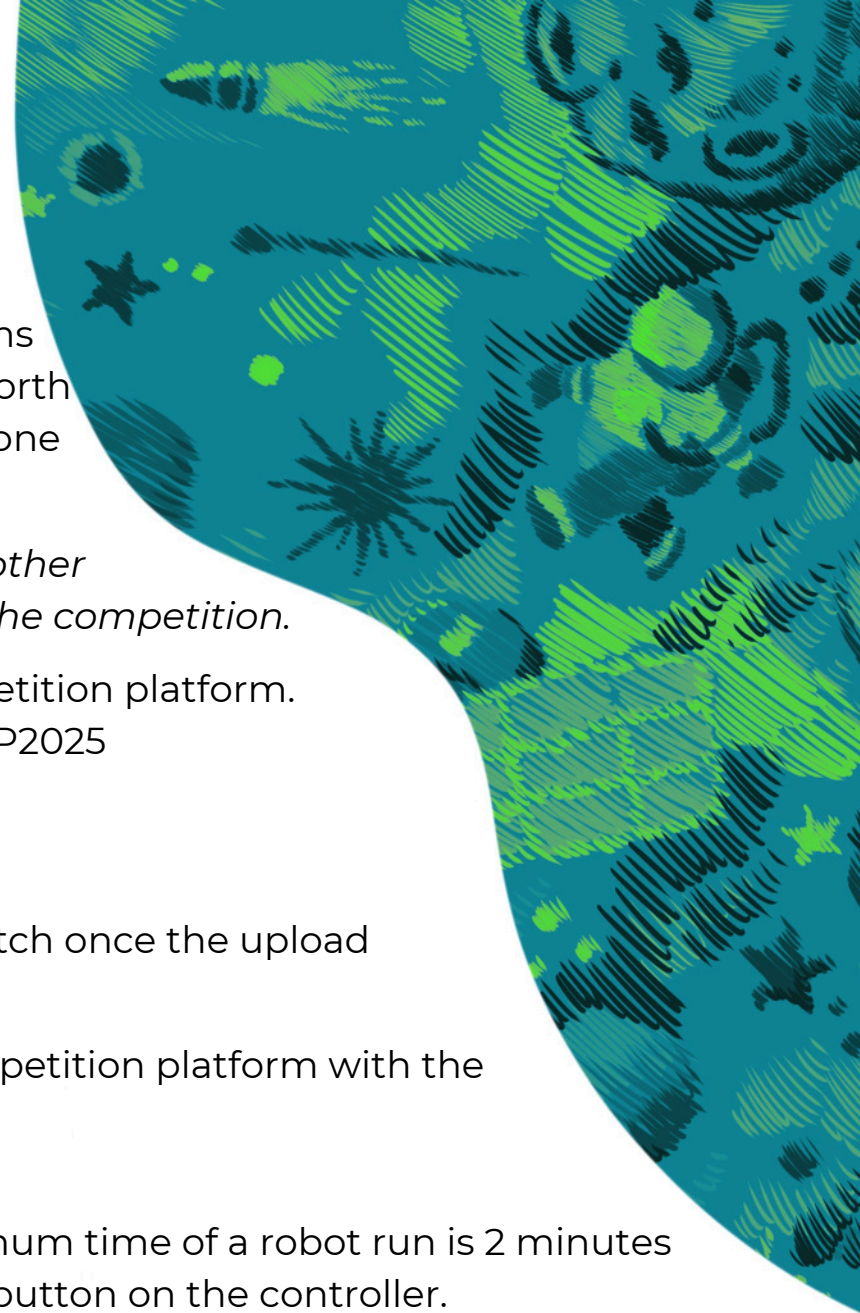
3.10. The robot can solve the tasks in any order.

3.11. The robot run ends and the timer stops when:
- the available 2 minutes are over,
- a team member or anyone else touches the robot, the game mat or any game objects,
- the robot completely leaves the game mat, meaning that no part of the robot is touching the game mat.

3.12. Judges will measure time with a stopper when they watch the uploaded videos. In case the robot is not finished within the limit of 2 minutes, the judge will stop the video at the 2 minute limit and tries to give scores that are earned up to that point. Since in this case the judge does not have a definitive recording of all the game objects, they will give only points that are achieved undoubtedly. This makes it even more important that teams check their recording before upload to make sure their robot finishes all tasks within the 2 minutes.

3.13. Once the deadline for uploading the videos is over and judges are finished with the scoring teams have to confirm their score to finalize it.
Deadline for confirming the score is: 21st January 2025 (23:59:59 CET)

3.14. Teams have a chance to appeal against their scores in email sent to **judge@wro.hu**.
Deadline for sending an appeal is the same as the deadline of score confirmation: 21st January 2025 (23:59:59 CET)

3.10. Ranking is done separately in each age group and is based on the score the team achieved. In case there two or more teams have the same score the team who was quicker achieving that score is ranked higher. If the score and robot run time are both equal then both teams are ranked in a tie.

3.11. The final score can never be minus, the minimum score is 0. If a team achieves 0 points, their robot run time is automatically 120 seconds. Teams with 0 points will be listed at the end of the ranking table.

3.12. If a team fails to upload a video by the deadline the organizers will consider that a 'no-show' and the team will not appear in the official rankings.

4. PROHIBITIONS AND RULE INFRINGEMENT CONSEQUENCES

4.1. It is forbidden to use colors different than those mentioned in the official rules regarding lines, areas on the game mat and game objects. In case of game objects where color is not important (meaning the color is not specified in the rules) teams can use any colors they want.
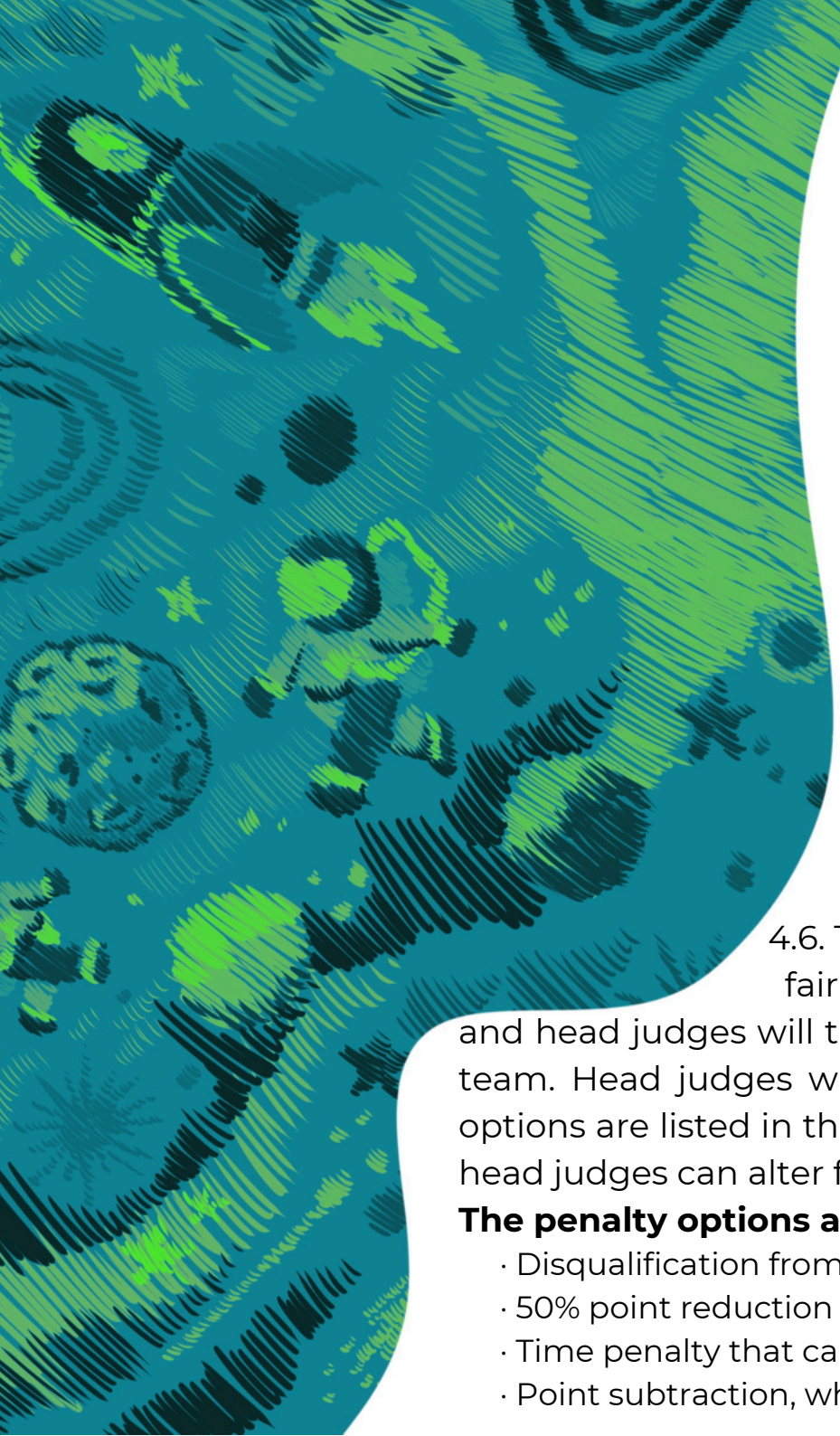
Rule infringement: In case a team violates this rule regarding the game objects, the team will not get points for that object. In case the team violates this rule regarding the lines, areas of the game mat, the team will have a 50% deduction from their final score.

4.2. Two or more teams cannot use the same robot or have identical robots. In case two teams appear to be using the same robot or have identical robots the head judges will investigate the case.

Rule infringement: In case a violation is established the violating teams will get a 50% reduction from their final score or get disqualified from the competition depending on the extent of the violation.

4.3. It is forbidden to control the robot by wire or remotely in any way. Suspicious cases will be investigated by the head judges (e.g. matching the uploaded program with the movement of the robot etc.).

Rule infringement: If a team violates this rule they will get disqualified from the competition.

4.4. After the start button is pushed it is forbidden to touch the robot, the game mat or the game objects, especially to move or push them.

Rule infringement: *in case the rule is violated the robot run ends at that moment (see point 3.11.). The team will not get any points for the game objects that has been manipulated by the violation but can receive points for other tasks solved up to that point.*

4.5. The robot is not allowed to entirely leave the game mat, meaning it at all times it has to touch the game mat with at least one part of it. If the robot is no longer in contact with the game mat in any way, the robot is considered to left entirely the game mat. In these cases any game objects that the robot is handling are not considered part of the robot.

Rule infringement: *If the robot leaves the game mat for the first time during the robot run, the team will get a 50% reduction from their final score. If the violation happens a second time, the team is disqualified from the competition.*

4.6. The main aim of judges and head judges is to provide an equal and fair competition for all participants. In case of a rule infringement judges and head judges will try their best to impose a necessary and proportionate penalty for the team. Head judges will always be the ones who confirm the final penalties. The penalty options are listed in the rules, however after further investigations if the violation is complex head judges can alter from those.

The penalty options are:
· Disqualification from the competition.
· 50% point reduction from the final score.
· Time penalty that can be 30 or 60 seconds and is added to the robot run time.
· Point subtraction, when points are not awarded for a game object or a task.

5. GUIDELINES

5.1. Participating teams understand and accept that the main aim of the competition is to score teams by their own intellectual and engineering skills. Organizers of ERC believe that the competition in itself is rewarding for the teams and it provides development and entertainment for the teams. With registration teams announce that the team developed, built and programmed their robot on their own with guidance and technical help from parents, teachers, coaches.

5.2. All organizers of the competition stand for a fair, sportsmanlike competition and will maintain the integrity and clarity for the rules at all times.

Maximum number of teams allowed in Engineer Challenge: **150 teams**

So hurry up with the registration to secure your place among the participants of Edu Robotics Cup 2025!

Registrations are accepted in the order of fully completed registrations, that also includes the payment of registration fee.
When number of maximum teams are reached we are closing registration even if the registration period is not expired yet.
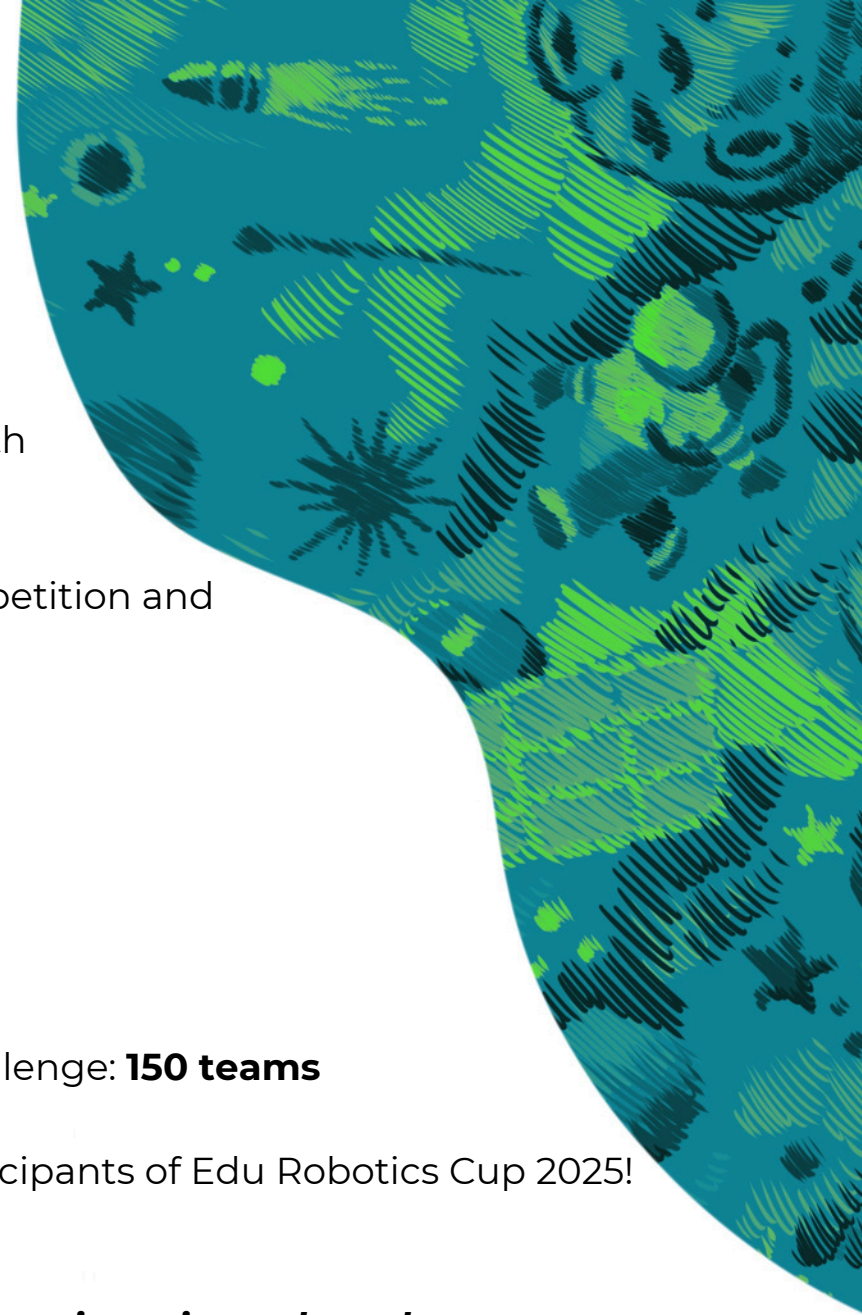
1. THEME

The main theme of the 2024/2025 Edu Robotics Cup is the 50th anniversary of the European Space Agency (ESA).

Have you ever reflected on the profound impact that space exploration has on humanity? The extraordinary achievements of the past fifty years in scientific breakthroughs, technological advancements, and the exploration of the universe highlight the crucial role played by the European Space Agency (ESA).
These accomplishments not only signify immense progress in science and technology but also serve as an inspiration for all of humanity.

On this significant anniversary, the integration of robotics and digitalization offers opportunities to contribute to ESA's legacy, presenting new visions and innovative solutions. Are you ready to impact the future and play a part in the ongoing exploration of our universe?

Be a pioneer! Use your ideas, solutions, and inventions to broaden our understanding of space and enhance the quality of life on Earth.
Observe opportunities for further exploration, innovation, and collaboration in your surroundings. How can your contributions create a difference?

Do you believe that robotic solutions can advance our endeavors in space exploration?

"Think Global, act local!" Or as we might say, **"Think big, but act small!"**

Consider investigating the following topics further, but remember, these are just suggestions. You have the freedom to explore and provide solutions for any relevant issue related to space exploration and its impact:

#spaceresearch   #newtechnologies   #sustainability   #education   #Internationalcollaboration
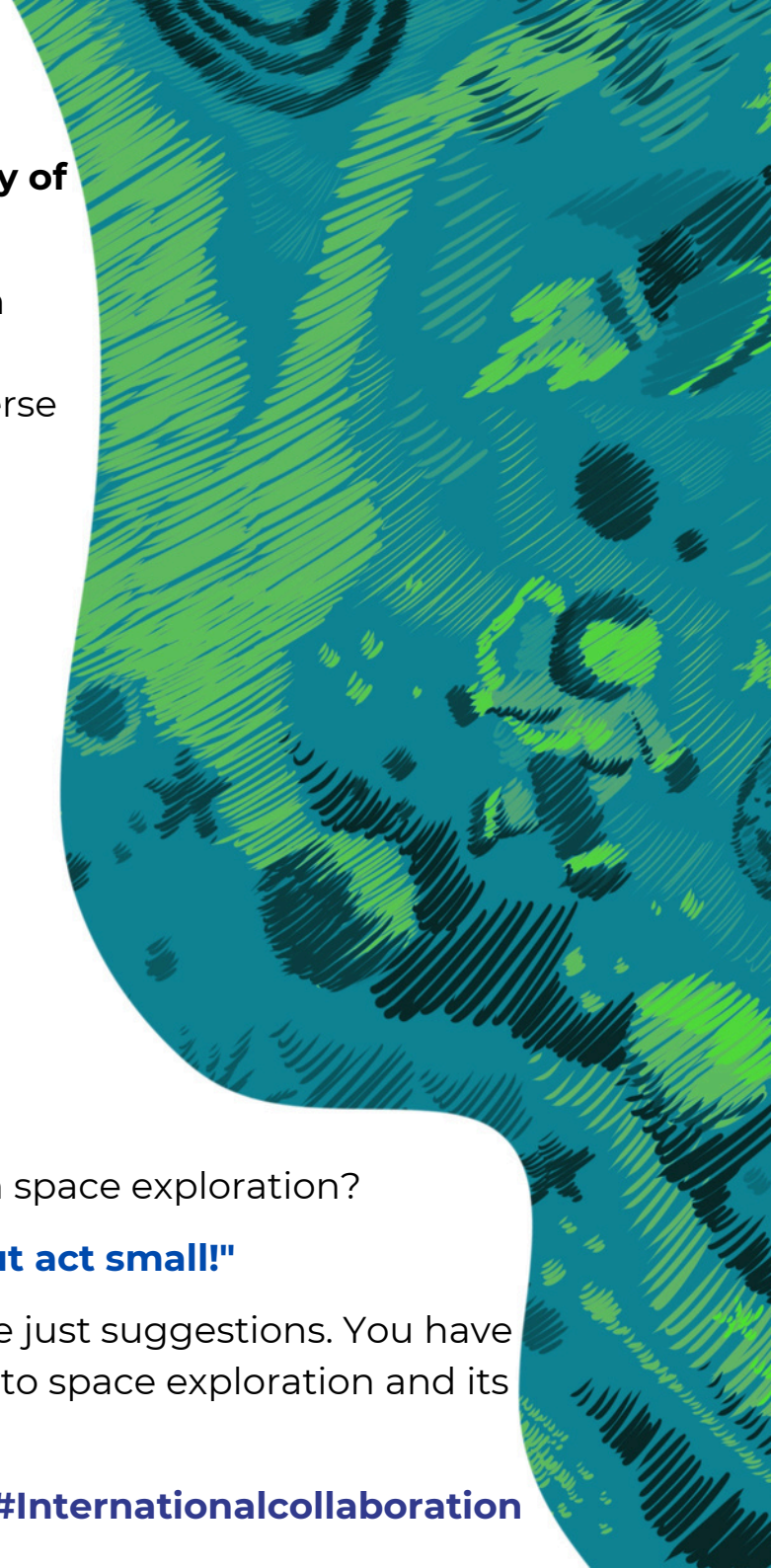
2. APPROVED MATERIALS

The project presented by the teams must contain at least one robotic solution, beyond that the teams can use any material to present their idea.

Important!
Keep the idea of sustainability in mind when selecting materials and designing the project!
Take cost efficiency into consideration at any time!

For the robotic solution the teams are free to use any micro-controllers and building platforms!
Teams can use any software and an unlimited number of controllers, motors, sensors to present their project!

3. THE PROJECT

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Teams have to submit and present their projects in the following formats:

- written documentation of the project, presentation video of the project, live interview with a team of judges

Judges will consider all three when they determine the team's final score.

3.2.Written documentation: Teams have to submit a written documentation of their project in which they present their project including the followings:

- how the team picked their sub-team and the problem they have a solution for, how the project relates to the official main theme,
- how the project relates to digitalization and robotics,
- what research methods they used and what results they got, what is the exact problem and solution,
- how their solution can be put to use in a wider environment.

The text of the **Written documentation should be at least 2 - 3 and maximum 6 A/4 pages long**, including pictures, tables, etc. It is possible to include pictures as well in the documentation, but that should not be the focus.

Length: **2-6 pages**   Format: **PDF**   Language: **English**

Deadline to upload the first draft of the Written Documentation:
5th January 2025 (23:59:59 CET)
Deadline to upload the final version of the Written Documentation:
8th January 2025 (23:59:59 CET)

3.3. Presentation video

Teams have to upload a video in which they present their project. Teams have to build a presentation area with the aim of presenting the project. The dimensions of the presentation area is not limited in any way. Judges will base the scoring on the how the presentation area fits the theme, the sub-theme, how creative the team was designing it and if it helps the understanding of the project. The all team members have to appear somehow in the video. For better understanding an English language subtitle is required and teams have to make sure to record the video in the best possible quality. if needed you can ask someone to do the recording for you so that all of you can be on the footage or you can use a camera stand as well. If needed you can record the presentation many times and pick the best one to show us. Before you submit it please check the video to see that the sound is audible, visuals are not blurred, the video is not shaking etc. The video can be edited as you wish but make sure that the project stays in focus and not the movie effects sell it.

Length: **maximum 2 minutes**   Format: **avi, mp4, wmv**

Minimum resolution: **1920 x 1080 (FHD)**   Orientation: **horizontal**(landscape)   Language: **English**

Deadline to upload Presentation Video:
8th January 2025 (23:59:59 CET)

3.4. Online interview:

Each team will have one online interview with a team of judges. The exact date and time of the interview will be communicated to teams in due time. At the interview teams are not required to repeat what they have recorded in their uploaded video because judges have already seen that footage. It is an interactive discussion between the team and the judges about the project. It is not required for the whole team to be at the same location but we want all team members to participate and join the online session. Coaches are also welcome to join the team.

4. COMPETITION FORMAT

4.1. This category is announced for two age groups:
Kids (10-14 year old) and **Teens** (15-19 year old)

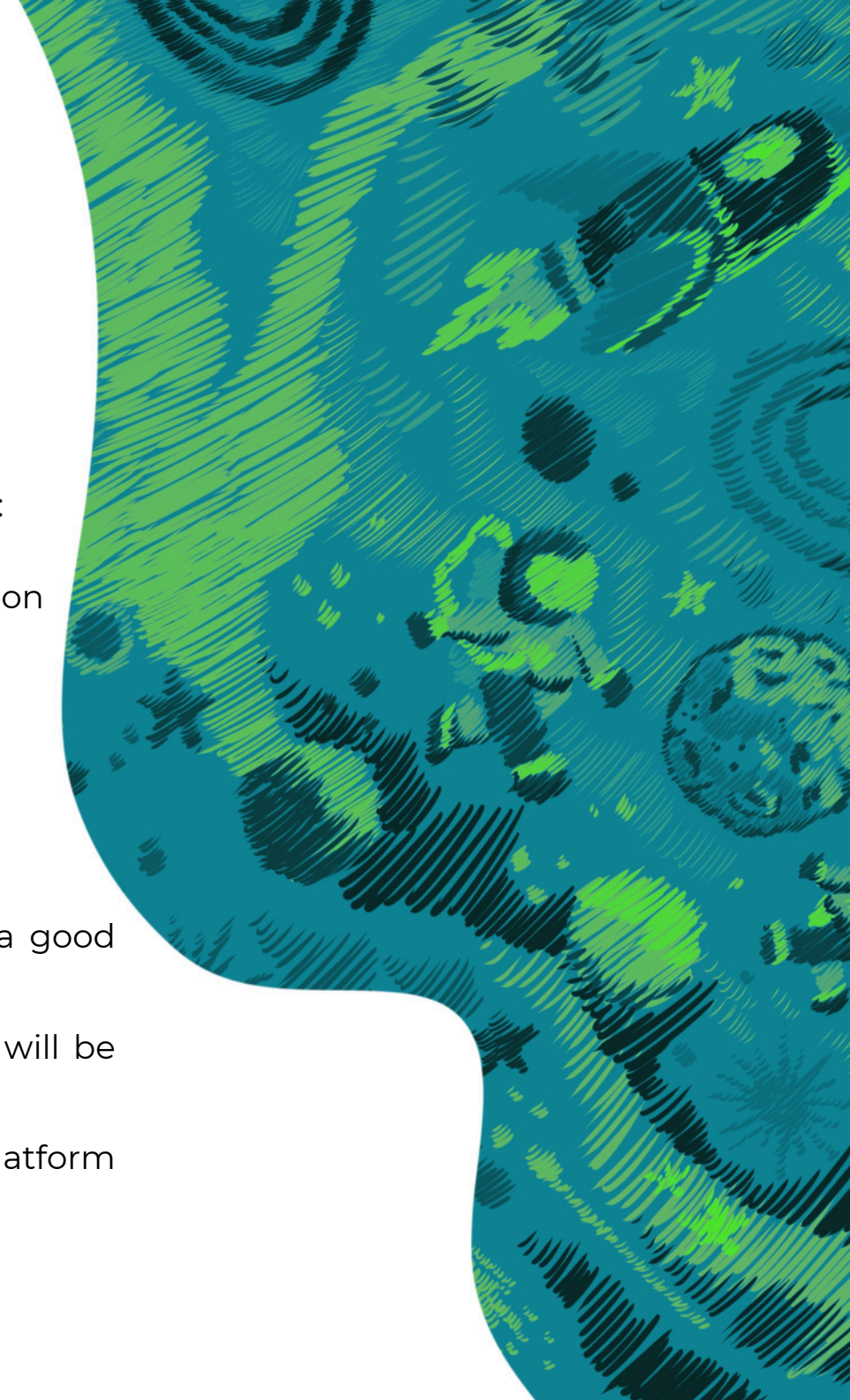4.2. Official language of the competition: **ENGLISH**

4.3. Important dates are:

- Deadline for registration:
  5th January 2025 (23:59:59 CET)
- Deadline to upload the first draft of the Written Documentation:
  5th January 2025 (23:59:59 CET)
- Deadline to upload the final version of the Written Documentation
  and Presentation Video:
  8th January 2025 (23:59:59 CET)
- Online interviews:
  10th – 15th January 2025 (according to schedule)
- Results and closing ceremony:
  23rd January 2025

4.4. After registration starts teams will be provided examples of a good documentation and presentation video.

4.5. Once the final deadline is up, submitted presentation videos will be available to watch freely by anyone on the official website.

4.6. All requested files have to be uploaded on the competition platform by the coachafter logging in.

5. SCORING

Criteria	Notes	Max. points
Research	The team conducted a research for their project. Methodology is similar to scientific researches in any way, results and conclusions are related to the project and make it better to understand.	10
Creativity	The team shows signs of a new approach to problems and solutions, thinking outside the box and finds unique ways of presenting their project.	20
Innovation and value	The team presents a solution or a prototype that is not an exact copy of those that can be already found on the market. It can of course be one that exists but with added value from the team.	10
Robotics	The software and hardware solutions used by the team in their project is complex, reliable and represent a high standard (within their age group expectations). Engineering concepts are efficient and solid.	20
Difficulty	The team chooses a sub-theme or problem that is complex and their answer to that is thorough and well designed. The presentation of the project includes all parts of the project and it is visible that the team put a lot of effort in creating it.	15
Aesthetics and presentation	The project presentation, documentation and video is clear, well designed and helps the understanding of the project. Visual elements are created with care and look nice.	10
Impact and sharing	The project has something to offer beyond the project as well and could make an ever bigger impact if further developed. The team also includes information on how they shared their project with others in their environment.	15
	Max. score	100

6. REGISTRATION AND PAYMENT

Maximum number of teams allowed in Project Challenge: **50 teams**

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