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Presentation

Eurobot^{open} and Eurobot^{open} Junior are two events open to young robotics amateurs teams. These teams can be composed of students involved in Eurobot^{open} in the frame of a school project, group of friends, or independent clubs. Eurobot^{open} and Eurobot^{open} Junior share the same goal: to allow young people to be involved in an active-learning process and put into practice their knowledge and know-how by participating in a friendly event.

About Eurobot^{open}



The age limit for participating in the Eurobot^{open} final is **30** years. Each team may have a supervisor for whom the age limit does not apply. Teams that do not respect this age limit will not be allowed to participate in the Eurobot^{open} final. The technical challenge is to build an **autonomous robot** as well as an optional secondary autonomous robot.

About Eurobot^{open} Junior

The age limit for participating in the Eurobot^{open} **Junior** final is **18** years. Each team may have a supervisor for whom the age limit does not apply. The technical challenge is to build a remote controlled robot as well as an optional autonomous robot.

Be careful, according to your country's educational system, this age limit may be slightly different. Check the registration requirements stated by your National Organising Committee.



A team is a group of young people who have built one robot (and optionally a secondary robot) for the event. One person can be part of one team only, **even if both teams belong to the same organisation**, but we encourage teams to share their experiences. The project can be supervised by someone over the age limit (teacher, parent, group leader, etc.), but the robot must be designed and built by the team's members, not the supervisor.

One organisation (club, school, etc.) can register several teams, if permitted by the registration requirements set by your National Organising Committee. The acceptance of these requirements is compulsory.

Eurobot^{open} and Eurobot^{open} Junior are intended to take place in a friendly and sporting spirit. As in sports event, refereeing decisions are final, except if an agreement between all parties is met.

Countries where more than 3 teams are register must organise a national qualification, in order to select the 3 teams that will attend the international final. Teams from countries with fewer than 3 registered teams can attend the international final without the need for a national qualification event. These final events take place in Europe, but remain open to countries from other continents.



As usual, some parameters can vary from year to another. Accordingly, please read all the rules carefully even the chapters that may seem familiar to you (playing field dimensions, robots dimensions, etc.).

The regulation for both events (Eurobot^{open} and Eurobot^{open} Junior) is similar. The aim of this approach is to provide an almost common platform for the Eurobot^{open} event, dedicated to autonomous robots, and for Eurobot^{open} Junior event, dedicated to wire-guided robots. Thus:

- an Eurobot^{open} organiser has also the ability to organise a Eurobot^{open} Junior contest, and vice versa.
- Exchanges of experience, emulation, are favoured between participants from the 2 events

WARNING! Although there are very few differences between Eurobot^{open} and Eurobot^{open} Junior rules, the document you are currently reading describes only the Eurobot^{open} rules.



1. RULES OF THE GAME

This year, robots want to celebrate their birthday in an unforgettable way. For this purpose, a set of actions will be proposed in order to score as much points as possible with their guests.

- **The gifts:** robots must unwrap the gift in order to reveal its content.
- **The candles:** robots must blow out as many candles as possible (and cooperate to blow even more candles).
- **The fruit juice fountain:** robots must serve drinks to the guests.
- **The cherries on the cake:** robots must put as many cherries as possible on the top of the cake. Beware of the rotten cherries!
- **The party:** at the end of the game, stationary robots can blow up embedded balloons.

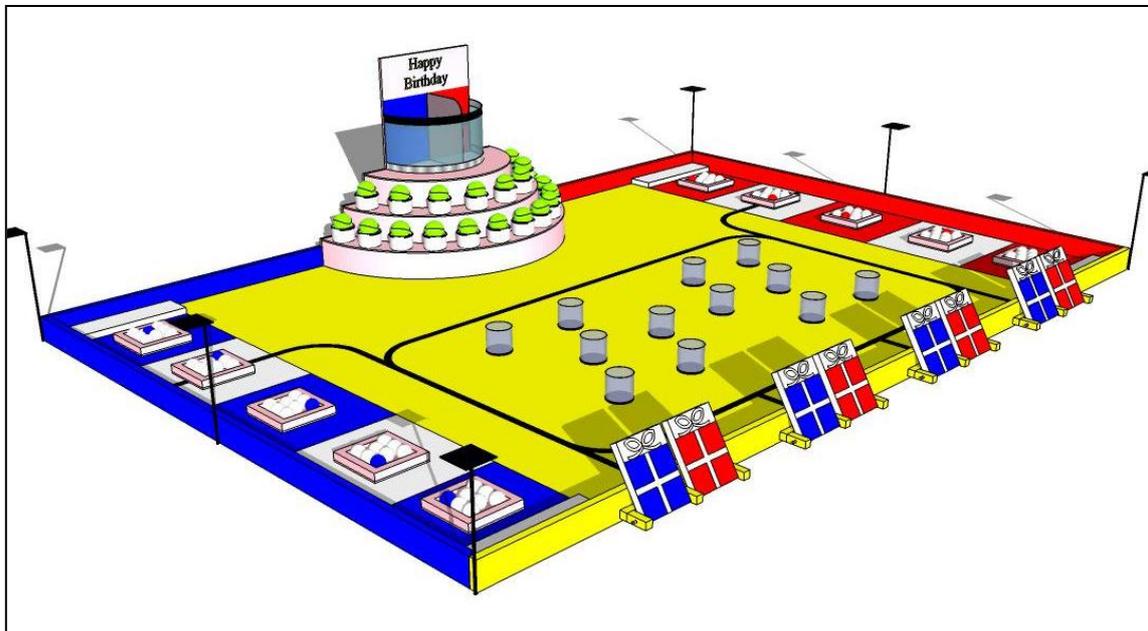


Figure 1 : Overview of the playing area (table and components)

Beware! All the actions are independent from each other and no order has to be followed to realize them. Performing all the actions is not mandatory, so think carefully about defining your own priorities.

2. PLAYING AREA AND ACTIONS

Important information:

Organizers commit themselves to build the playing area with as much accuracy as possible. Nevertheless, they allow themselves some modifications if they think it is necessary. No reclamation about size differences will be taken into account. Eventual changes of the technical specifications will be notified on your National Organization Committee's website (NOC).

Teams are advised that the state of the surface's painted areas can vary from one table to another, and can deteriorate as time goes by.

If any problem about the regulation appeared, playing area and component's specifications could vary during the year. We strongly encourage participants to regularly check our website: <http://www.eurobot.org/> as well as your NOC's own website for news. You can also follow the discussions and get information on the forum: <http://www.planete-sciences.org/forums>

2.1. Playing area (*Eurobot^{open}* and *Eurobot^{open}* Junior)

The playing area is a 3000x2000 mm ridged rectangular flat, which can be made in two (or more) equal parts, with a 10% tilt towards the public (only for the *Eurobot^{open}* Junior contest). Colour specifications are listed in appendix.

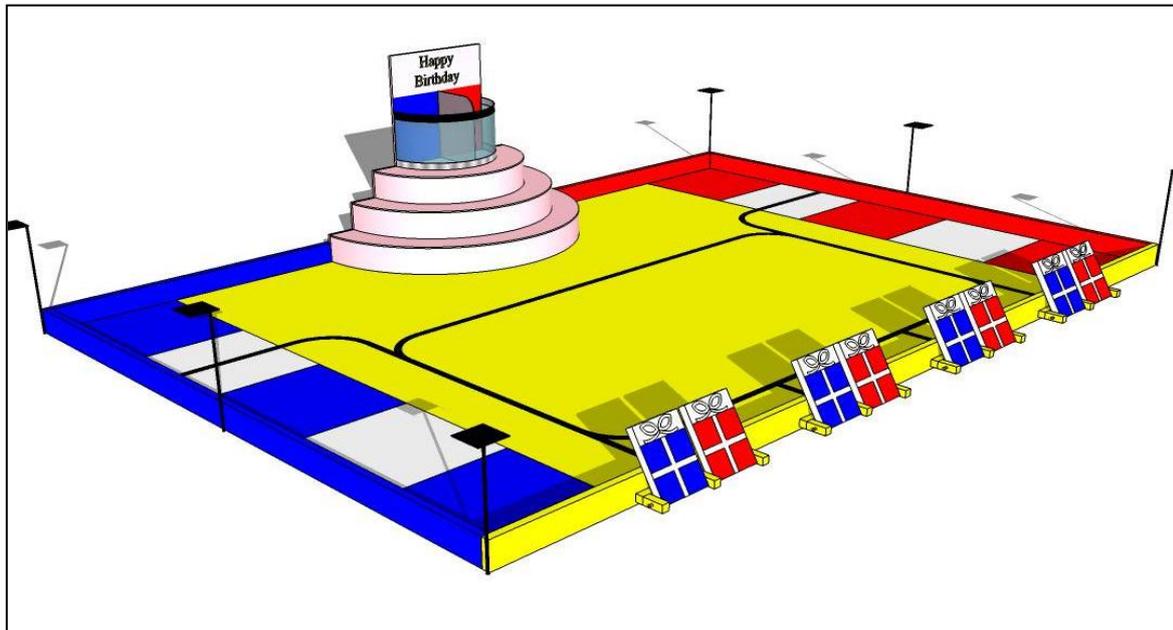


Figure 2 : Overview of the playing area (table) without components



Full specifications of the playing area dimensions/measures and mobile game components are listed in appendix only.

2.2. Starting area

Starting areas consist of five squares, located on the edges of the table and recognizable by a ridge painted in the specific colour allocated to each team. The two robots of each team must stand against the ridge (contact point) in a square of their choosing (a different square can be chosen for each of the two robots among the five squares available). Before starting, participants must check that the robots stand within the limits of the chosen “square one” and not encroach on the adjacent squares.

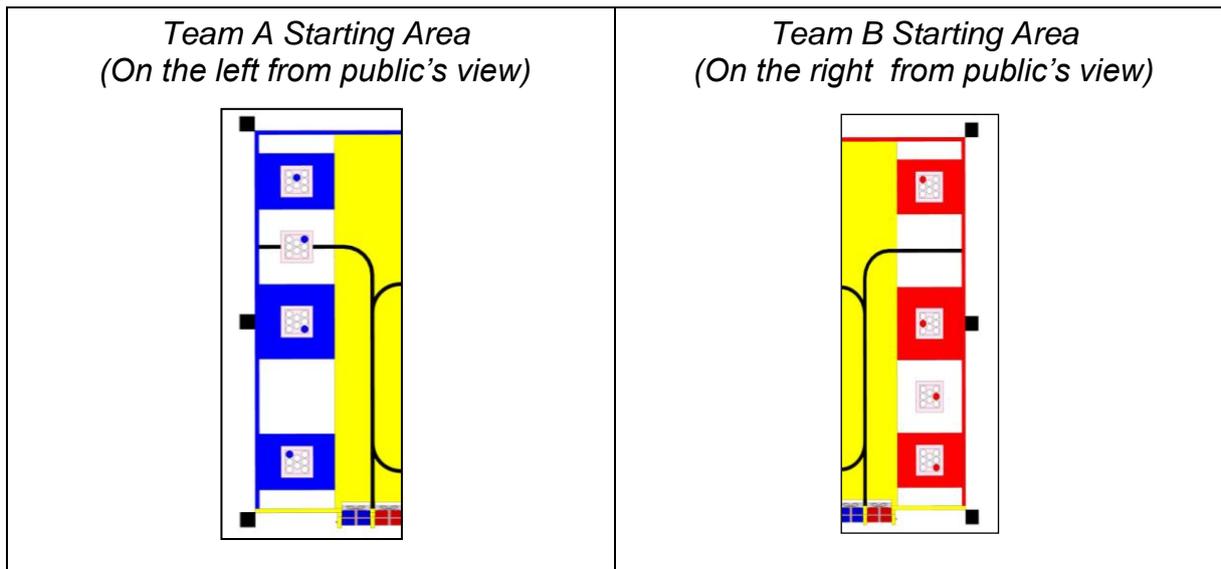


Figure 3 : Overview of starting areas

Any team whose none of the two robots has not entirely left the starting area before the end of the match will be disqualified for the match.

2.3. Unwrap the gifts

Your birthday gifts are waiting for you to be unwrapped. Let's come and see what's hidden inside the parcel!

a. Description of the game components and layout at the beginning of the game

For this action, the following game components are available:

- **The gifts:** they are represented by thin wooden boards, painted in the specific colour allocated to each team. The side visible from the public depicts a gift and the other shows a picture edged with the team's colour. These boards are centred around a pivot so that they could fall over. At the beginning of the match, the gifts stand against the front ridge of the table. There are eight gifts in total, gathered in pairs.

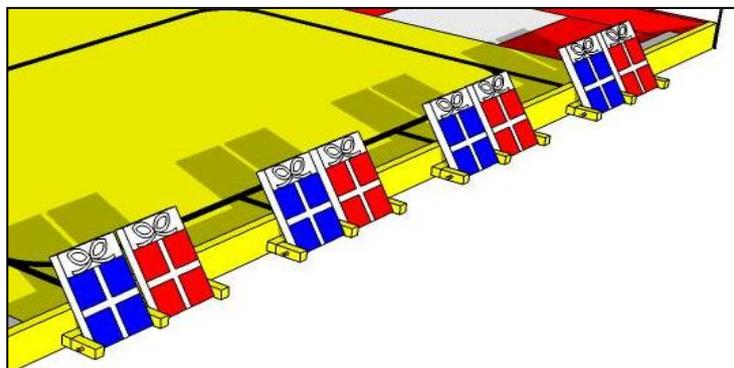


Figure 4 : Position of the gifts at the beginning (view from the public)

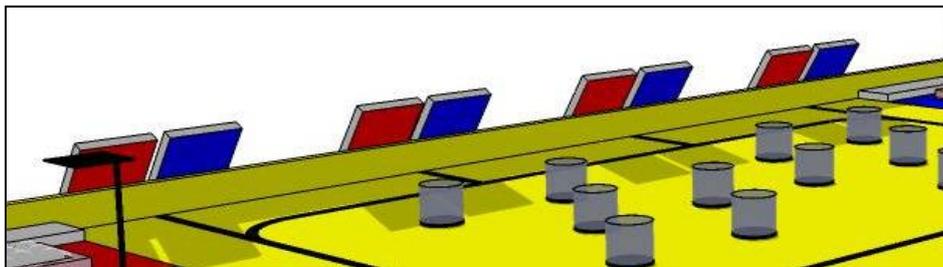


Figure 5 : Position of the gifts at the beginning (view from the team)

- **The black line:** It starts from the second square from the back and shows the access to the gifts. It goes all over the playing area.

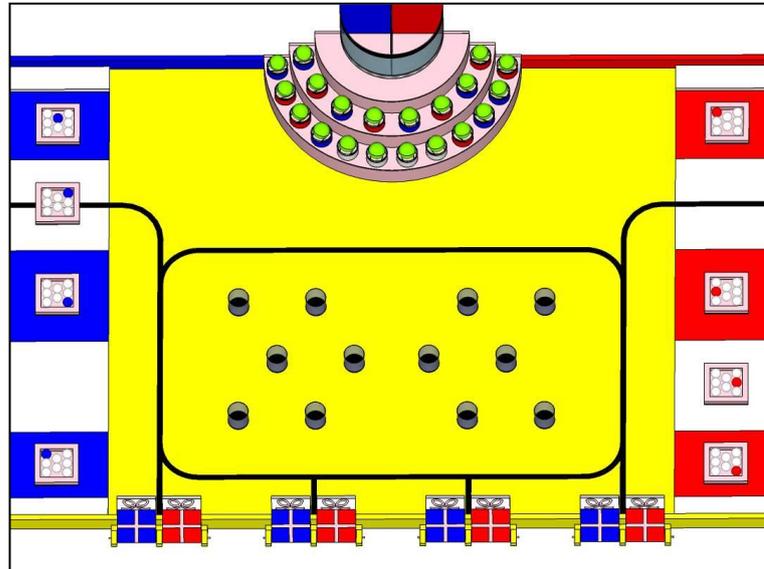


Figure 6 : position of the black line on the playing area

b. Actions and constraints

Actions

Robots must knock over the gifts so that the public could see what is hidden behind.

At the end of the game, only the fallen gifts are counted.

Constraints

Robots must only knock over the gifts of their own colour. If a team knocks over the gifts of the opponents, points of the action will be given to these at the end of the match.

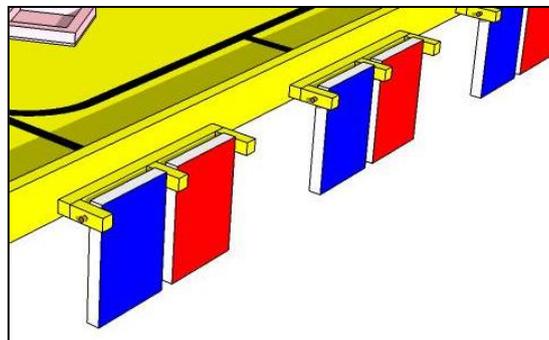


Figure 7 : Example of gifts' position at the end of the game

2.4. Blowing up the candles (Partnership action)

A birthday couldn't be celebrated without a cake and candles! Twenty candles will be lit to celebrate this birthday. It's up to your robots to blow them out.



a. Description of the game components and layout at the beginning of the game

For this action, the following game components are available :

- **The half-cake:** a three-levels tank-topped half-cake stands against the back ridge of the table.

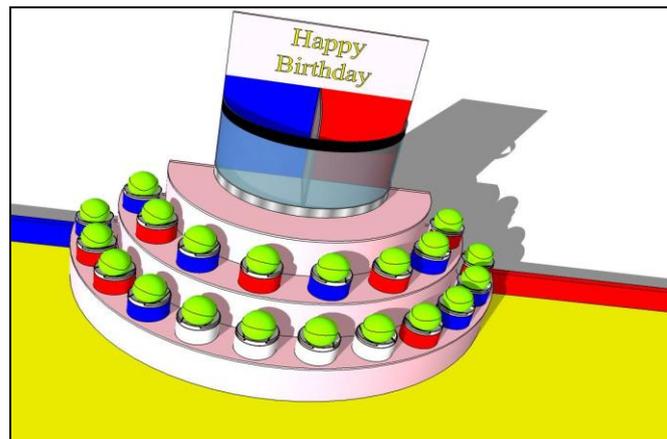
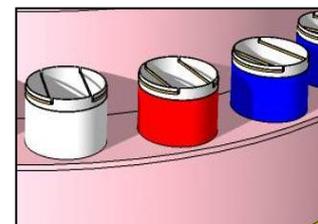


Figure 8 : Cake with candles

- **The candles:** they are represented by coloured hollow pipes, and are set on two levels.

1. Qualification rounds: 12 candles stand on the first level (4 blue, 4 red and 4 white) and 8 on the second one (4 blue and 4 red). Only the white candles and those on the edge of each level are fixed.



2. Final rounds: the general layout is almost the same. The only slight difference is the replacement of the 4 white candles by 2 red and 2 blue randomly-set candles.

Figure 9 : View of the candles from the top (without flames)

- **The flames:** they are represented by tennis balls, and fixed on the top of the candles by rubber bands.

b. Actions and constraints

Actions

In order to blow out the candles, robots must push in the tennis balls into the coloured pipes until they completely disappear.

Partnership action

The two teams must blow out the four white candles set on the centre of the first level. At the end of the match, the white blown out candles will give points to both teams.

Constraints

The robots must only blow out the candles of their own colour and the “partnership candles”. If a team blows the candles of the opponents, points will be given to these ones at the end of the match.

Only blown out candles will give points.

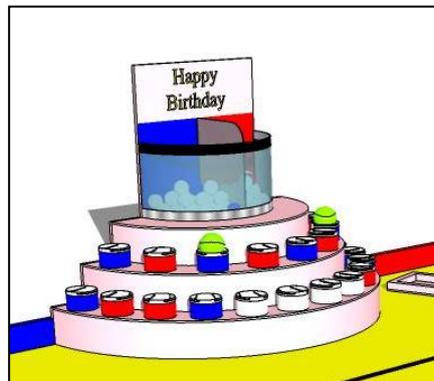


Figure 10 : Example of candles' position at the end of the match

2.5. The fruit juice fountain

Candles are blown out, gifts unwrapped: everything seems to be OK for this big party. The weather is nice, so what's better than a glass of fruit juice to quench one's thirst?

And what about serving drinks to the guests and making a pyramid of glasses? It can be fun, isn't it?

a. Description of the game components and layout at the beginning of the game

For this action, the following components are available:

- **The glasses:** the glasses are common to both teams and are depicted as mobile pipes. In total, there are 12 transparent, black-painted wooden-bottom pipes.

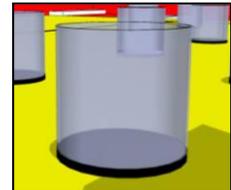


Figure 11 : A glass

- **The building area:** the building area is the same as the starting area, i.e a strip of five squares, located on the edges of the table and recognizable by the ridge painted with the specific colour allocated to each team

- **The sideboard:** a slightly-raised small area is located at each end of the building area. This allows securing the building works in case of involuntary contact of the robot with this area.

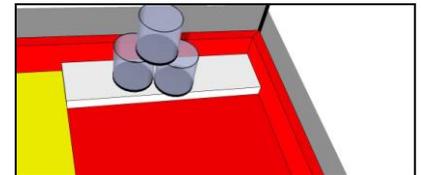


Figure 12 : Pyramid of glasses on the sideboard

b. Actions and constraints

Actions

During the match, robots will have to pick glasses in the central area, bring them back to their building area and try to make a pyramid with them.

The gathered glasses will give points only if a pyramid is built with them. The higher the pyramid, the more points the team will score. (§6.3 points counting).

Constraints

- Pyramids of glasses built on the sideboards have no height limitation. Don't forget to take into consideration your own beacon supports.

- Every pyramid built within the starting area, at the table level, should not be higher than 350mm in order not to prevent opponents' team to use its own beacons.

- A team can pick glasses within the opponents' building area.

- The glasses in the building area will be counted only if they entirely stand within the limits of this area (even if they are knocked down)

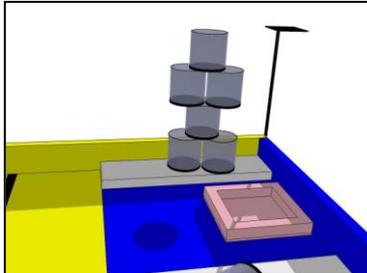


Figure 14 : In this case, only 2 counted glasses (the ones standing within the limits of the starting area) out of the 6 in total

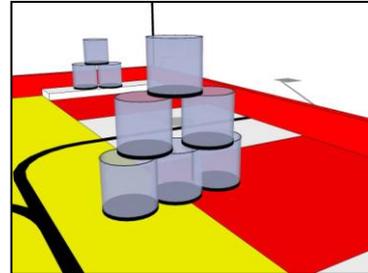


Figure 13 : Glasses standing within the limits of the sideboard = counted points

2.6. Cherries on the cake

So that we could get a perfect party, we need a cherry on the cake... It's up to you to aim carefully at the cake... but take care, some cherries are rotten, don't throw them in order not to contaminate this wonderful cake.



a. Description of the game components and layout at the beginning of the game

For this action, the following components are available:

- **The plates:** these are some rimmed, pink square plates, designed for containing the cherries. They are located on the table's edges, within each square of the starting area.

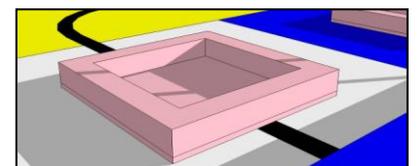


Figure 15 : Empty plate

- **The cherries:** the cherries are represented by tennis table balls. There are eight balls in the plate: seven of them are white, good cherries and the last one, which has the same colour as the team, is a rotten, non-edible cherry

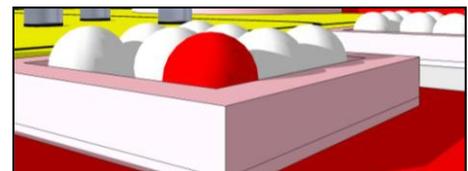


Figure 16 : Plate with cherries

- **The basket:** the basket is set on the third level. It has an open top in order to get the good cherries. It is divided in two equal parts, which allows having a distinct zone for each team. The basket is trimmed with a black strip on the top and a reflecting strip on the bottom. The basket's bottom is fitted with protection foam in order to avoid bounces. At the beginning of the match, the basket is empty.



Figure 17 : Basket on the top of the cake

b. Action and constraints:

Actions

Robots must pick the good cherries in the plates and send them to the basket, into their own compartment (painted in the team's own colour) ,above the candles.

Constraints

At the beginning, each team chooses on which square of its starting area will place its robots (the main robot and the secondary one).

Each square contains a plate with cherries. Positioning a robot on a "square one" implies the removal of the plate (In case of having the two robots on two different "square one", two plates are removed).

The cherries fallen on the playing area can be picked up by both teams. The rotten cherry can not be sent to the opponents' basket.



Figure 18 : Example of basket filling situation at the end of the match



2.7. Balloon's blowing up (Funny action)

It lacks a bit of design, isn't it? It's up to you to decorate your robots with a multicolour array of embedded balloons that they will blow up themselves.

a. Description of the game components

- **The balloons:** the teams must load their own balloons into their robots.

b. Actions and Constraints

Actions

At the end of the match, robots must inflate balloons.

Constraints

At the end of the 90-seconds round, the robots must stop and only at that point the devices dedicated to the balloons' blowing up can start working during 10 extra seconds. In any case, the inflated balloons must remain fastened to the robot(s).

So that the point could be counted, at least one of the inflated balloons shouldn't burst (in any case, the team will get the same number of points whether its robot have inflated one or many balloons). Furthermore, the balloons must have been inflated only during the extra-time and should be visible from the public.



3. PROJECT PRESENTATION

Both Eurobot^{open} and Eurobot^{open} Junior encourage you to practice science through entertainment. One of the fundamental objectives is to assist and value your work and projects of this year. For this, we require you to make a **Technical survey** and a **Poster**.

3.1. Technical survey

Over the year, each team is required to submit a technical survey to the refereeing committee; the submission deadline is specified by your national organiser. The purpose of this paper is to provide a clear and concise vision of your project, focusing on 2 topics:

- General information (team, schedule, budget)
- Technical information (strategy, technical choices, etc.). It should include details about mechanics, electronics and the software your team plans to use. If possible, your technical survey should include illustrative charts and pictures. This part must be written using a template (downloadable from the registration website).

The goal of the technical survey is not to give the teams more work, but to help them achieve their project successfully. The refereeing committee will study it in order to identify possible misunderstandings of the rules, etc. as soon as possible in the development process. Thus it will allow us to identify doubtful solutions and to help the teams to avoid failure situations.

3.2. Technical poster

Each team is required to provide a technical poster. This poster should present information related to the design of the robot (drawings, technical references, design specifications, etc.). It should be at least DIN A1 (594x841 mm) in size, and ideally should be printed. The poster is intended to promote exchange and communication between the teams.

Special effort should be made to make the poster understandable to a novice audience. Ideally the poster should include pictures and charts to explain the concepts.

The poster must also include:

- the team's name,
- the team members' names,
- the team's nationality.

This poster will be displayed in the team's stand. **An English version of the poster must be supplied.** Optionally, the team can provide other language versions as well. The poster must be supplied to the Eurobot^{open} association in **PDF Format**. The



chosen resolution of the PDF must guarantee that all texts on the poster will remain readable. If possible, the file size of the PDF should remain below **25 MB**.

The PDF Version of the poster may be sent to Eurobot^{open} beforehand via your National Organising Committee, or may be provided on CDROM or USB key during the contest, when presenting your robots for the approval test.

In a general way, we strongly encourage the teams to communicate about their projects, by posting information on Internet or in the Eurobot^{open} forums, for example.

4. THE ROBOTS

4.1. General notes

- Each team can use up to two autonomous robots, a "Main Robot" and a smaller "Secondary Robot"
- Building a secondary robot is optional. One of these objectives is to allow teams with many members to work on a second project. It is advised for inexperienced teams to focus on building a single robot first. Indeed, it is better to have one robot that works well instead of two that don't work at all!
- The path leading to the playing fields may include stairs, especially for the access to the stage. Only two members per team are allowed to access the backstage and the stage. Therefore, we recommend developing easily transportable equipment.
- A robot should not cause any intentional damage to the opponent robot, the playing area, or any of the playing field components.
- The Main Robot and the Secondary Robot must both be made of joined parts (they cannot drop parts or components on the playing field).
- It is not allowed to use colours or objects in the construction of your robot(s) that look similar to the components of the playing field. This may confuse the opponent. This detail will be checked during the approval of your robot.
- Robots shouldn't fasten themselves to the playing field (e.g. by using suction). At any time during the match, the force required to lift the robot must not be greater than its own weight.

- Robots will not be approved if they use systems that deliberately make the table vibrate or designed to make any other illegal action. If you have any doubts, please contact the referees.
- Be creative! In order to innovate or to entertain the public and the media, your robots can use sounds, or display facial expressions...

4.2. Dimensions

Warning: Respective size of the main robot and the secondary robot will remain the same for both Eurobot^{open} and Eurobot^{open} Junior events, in order to encourage the younger participants to take part in Eurobot^{open} contest. Thus, a robot built for Eurobot^{open} Junior can potentially compete in Eurobot^{open}.

Dimensions of the Main Robot and the Secondary Robot

For measurements of the robot's perimeter, see the picture below :

Main robot dimensions :	Secondary robot dimensions :
 <p>Stationary ≤ 1000mm</p> <p>Open out ■ ≤ 1400mm</p>	 <p>Stationary ≤ 600mm</p> <p>Open out ■ ≤ 800mm</p>

The perimeter of the Main Robot at standstill should not exceed 1000 mm. The perimeter of the Main Robot open out must not exceed 1400 mm during the match.

The perimeter of the Secondary Robot is independent of Main Robot's one. It should not exceed 600 mm at standstill and not exceed 800 mm open out during the match.

The height of the Main Robot and the Secondary Robot must not exceed 350 mm in height, excluding beacon support and possible sensors and electronic circuits associated to the beacon and integrated in the beacon support mast. However, it will

be tolerated to have the emergency stop button exceeding this height limit up to 375 mm.

No robot component an/or game component manipulated at any moment by the robot should exceed 350 mm in height, in order not to disturb the use of the beacons for localization.

In any case, at the beginning of the match, the set (Main + Secondary Robot) should not protrude from the starting area.

4.3. Energy sources

- All forms of energy sources stored in the robot are allowed (batteries, springs, compressed air, gravitational energy...), with the exception of energy sources using chemical reactions like combustion or pyrotechnic processes, which are prohibited for safety reasons. Furthermore, either use of corrosive products prohibited and splash of liquids are prohibited.
- If you have any doubt about an unusual energy source, ask the refereeing committee ahead of time.
- To avoid fire risks, it is requested to pay special attention to the choice of conductors, depending on the intensity of current passing through them. It's also recommended to protect the wiring with a fuse, wired to the nearest battery.

Battery

Robots must be able to play three consecutive games. Note that this includes the time required for the stand by, during which the robot is powered and waiting to start. Therefore, we strongly recommend that teams bring several sets of batteries, provide easy access to them in the robot for their replacement, and keep permanently a set of batteries fully charged.

For Note on the use of Lithium-based batteries see chapter 4.5.5

4.4. Other design constraints

a. Visibility

Two rectangular areas of 100 x 70 mm should be left free on two sides of the robot (choice of the sides in the team's discretion). The teams will receive stickers printed



by the organization (displaying team's number, sponsors of the event). These stickers must be placed on these 2 rectangular areas.

Teams are strongly encouraged to make visible the mechanism inside the robot(s), in order to allow the audience and other participants to see how works the transport of the components inside the robot(s).

b. Starting cord

The robot(s) must be equipped with a starting device that should be easily accessible. It should be triggered by pulling a cord, **at least 500 mm** long. This cord should not remain attached to the robot after it had started. Any other system (remote control, toggle switch directly activated by hand, etc.) will not be approved.

c. Emergency OFF button

The robots must include an emergency off button, with a diameter of **at least 20 mm**, painted in red (for example a safety emergency stop button). It should be placed on the top of the robot, in a conspicuous position and in a safe zone, which should be immediately accessible to the referee at any time during the match. The stop button must be actuated by a simple downwards motion (such as a hit with the fist).

Pressing the emergency button must result in the immediate shut down of all of the robot's actuators, leaving them "limp" (not actively braked nor energized).

d. Automatic shut down

All autonomous robots should accommodate a system that should stop the robot automatically at the end of the 90 seconds match duration.

e. Obstacle avoidance system

Teams are required to equip their robots with an obstacle avoidance system. This system is intended to prevent collisions between robots, and resulting damages, during a match.

This will be systematically checked during approval. Teams are not allowed to deliberately disable their avoidance system after the approvals.

f. Embedded robot's beacon support

It is strongly recommended to design the robot(s) with a support to accommodate a beacon prepared by the opponents' team as an obstacle avoidance system.

If desired, the support can be designed to be removable, so that it could be only used in case of needs. In that case, the support must be designed to be easily set before the match.

Although this embedded beacon support is optional, we strongly recommend you to install such a device on your robot(s), as you could be disqualified for not providing

this equipment if the opponent's team really needs it to make work its obstacle avoidance system.

The beacon support should at all times comply with the following specifications:

- It should have an **80x80 mm** square surface, located at **430 mm above the floor level**, in order to allow the placement of the other teams beacon.
- The platform surface of the support should be fully covered with Velcro™ (rough "hook" side)
- This area must be located in the middle of the stationary robot and must remain as centrally as possible on the open out robot.
- The structure supporting the platform must stay within the vertical projection of this platform
- The mast can only host sensors and electronic circuits
- The mast should be stable and must be able to support a weight of at least 300 g.

4.5. Safety

a. Overview

- All the systems (robot(s) and beacons) should comply with current national and European safety regulations. They must not endanger neither the participants nor the public during matches, as well at stands and backstage.
- The robots must not have any protruding or sharp parts that can cause injuries
- The use of liquid, corrosive, pyrotechnics and living components is strictly prohibited.
- All robots must comply with the legal standards concerning "low voltage". Therefore, the internal voltage of the robots **should not exceed 48 V**.
- Potentials higher than 48 V may be allowed, but only inside sealed commercial devices (such as lasers or LCD display back lighting) and only if these devices have been left unmodified, and if they comply with national and European regulations.
- As a general rule, any device or system considered as potentially dangerous by the referees will be rejected. It must be removed from the robot prior to competition, or will result in the team's disqualification.



b. Lasers

Only considerations based on laser class definition (in the “EN 60825-1:2007, Edition 2 -Safety of laser products– Part 1: Equipment classification and requirements” standard) will be taken into account. Teams using a laser will have to provide either the classification notice of the equipment, or the laser component data sheet. Not being able to provide such documents will prevent the robot to be approved.

Based on the classification, it is allowed to use lasers of Class 1, 1M, (2, 2M). All other classes (3R, 3B and 4) are strictly forbidden.

Lasers class 2 and 2M are accepted provided that the laser beam is never projected outside the table.

CAUTION: disassembling or modifying devices using laser sources often leads to a change of class. The laser devices should be used as originally marketed (laser device = Source + Electronics + Optical).

c. Powerful lights

When high intensity light sources are used, be aware that the light intensity can be dangerous for the human eye. Note that some commercially available high power LED devices can exceed this limit. Be responsible! Your machines are evolving in front of an audience that is not informed of the specificities of each robot!

d. Compressed air systems

All pressure systems must comply with the “Conseil Général des Mines” Decree 63 of January 18th, 1943 and Ministerial Order of July 25th, 1943:

- Maximum service pressure: **4 bars**
- Maximum pressure x Tank volume < **80 bar.liter**

e. Lithium-based batteries

This type of battery is allowed under the following conditions:

- A suitable charger must be presented at approvals
- Batteries are permanently contained in special fireproof bags (either inside the robot or on the stand, even in storage)

An underload-detecting system is also highly recommended.

These conditions apply except in the case of Lithium-based batteries used in LEGO Mindstorm/laptop/cell phone, as long as:

- They shouldn't be removed from the initial device
- They should be used only for the use intended by the manufacturer.

5. BEACON LOCATION SYSTEM

5.1. General points

The playing field includes beacon supports for the teams wishing to develop beacon-based localization system. The beacon supports are placed on the playing field and on the robots, as described below. They are positioned outside of the table.

The bottom sides of the beacons (fixed ones and embedded ones) must:

- be equipped with a Velcro (loops side) so that it can be fastened to the supports.
- stay on their supports during the whole duration of the game.

All the safety rules regarding the robots also apply to the beacons.

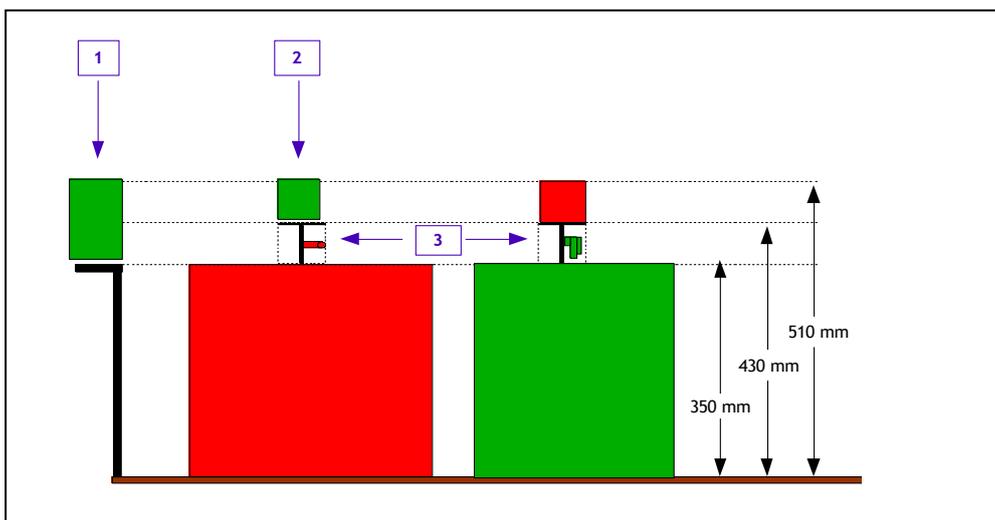


Figure 19 : Beacon location system

Legend:

- 1: fixed beacon (maximal size L x W x h: 80 x 80 x 160 mm)
- 2: embedded beacon (maximal size L x W x h: 80 x 80 x 80 mm)
- 3: support mast (can accept sensors and associated components only if they remain inside the vertical projection of the support)

5.2. Localisation Beacon placed on the robot

A beacon can be placed on the opposing robot in order to localize it. This beacon must be fixed on the dedicated support on the opposing robot. The maximum size of an embedded localisation beacon is a cube of 80 mm side.

According to fair play, the components used in the beacon must have a real use. The topside of the beacon must be covered with Velcro (hooks side) in order to receive the identification tag of the robot with the same colour as the team's one.

5.3. Fixed beacons

Each team can place a beacon on each of the fixed support attributed to the team and located on the edge of the playing field. (See appendix for the allocation of beacon support to each team).

The beacons must be fully contained in a square base of 80 mm sides and must not be higher than 160 mm. The fixed beacons can be connected to each other by a cable. This cable must not disrupt the match in any case. The installation of the whole system must be possible in the 3 minutes allowed for the preparation of the game and must not disturb the opposing team.

5.4. Communication signals

In order to prevent interference between the two teams, it is recommended to code the communication signals. We strongly recommend to the teams using infra-red devices to take into account the strong lighting conditions used during the games.

Moreover, those lighting conditions can change during the game, and may vary depending on the location of the playing field in the room.

We also remind you that the organisers' teams often use high frequency radio devices and that they cannot, in any circumstances, be held accountable for any malfunction experienced by the robots.

5.5. Robot identification

During the game, the robots will be assigned a coloured tag in the form of a small module in the colour allocated to the team. This marking is intended to help the public to understand to which team belongs a robot.

The weight of this tag module is insignificant, and is placed on the beacon support of the robot.



6. THE MATCHES

Every match lasts 90 seconds + 10 seconds for the funny action

Only 2 members from each team are allowed to access to the stage area (and backstage).

6.1. Set up

Initially, the playing components and the playing field are placed as shown in the pictures in the appendix.

Upon arrival at the playing field, both teams have 3 minutes to prepare their robots. Then the referees or the stage team randomly assign colour to the candles. After that, teams are not allowed to manipulate their robot anymore.

A non-fully prepared robot after the 3-minutes deadline will be disqualified. In that case, please note that the other team's robot will have to play the match alone on the playing field and score some points to be declared the winner.

When both teams have prepared their robots, the referee asks the participants if they are ready. No objection regarding the placement of the playing components will be accepted after the beginning of the match.

6.2. The match

Once the referee gives the start signal, the robot is turned on. In any case, it is forbidden to touch the robots, the playing components or the playing field during the match. Any manual intervention on a robot, a playing component or the playing field, without explicit permission from the referee, can lead to disqualification.

No component accidentally fallen from the playing field may be put back before the end of 90 seconds.

After the 90-seconds, robots must stop playing but get extra 10-seconds to perform the funny action.

At the end of the game, no one **but the referee** can manipulate the robots or the playing components. The referees count the points and then give the match result, including the points scored by each team.

If both teams agree, they sign the score sheet, and can then pick up their robot and return to their stand. If the teams disagree, each team will have to present **quietly** its arguments. The robots should remain in place until the problem is solved. Refereeing decisions are final.

If the referees can't decide the case, they reserve the right to make the teams replay the match.

If none of the two teams has scored during the 90 seconds, the match will result in a **double defeat**.

A team is declared **disqualified** either when none of its robots has entirely left the starting area during the match or as a result of a referee's decision.

6.3. Scoring system

Points will be counted by the referees as following:

- 4 points for each gift
- 4 points for each blown out candle (of your own colour + white candles) + 20 bonus points for each team if all the "partnership candles" are blown out.
- 2 points for each good cherry in the top-cake basket if no rotten cherry present. Points will be divided per two in case of one or more rotten cherries inside the basket.
- 4 points per glass into the area. In case of a pyramid of glasses, the number of points per glass will be multiplied by the level at which it is located (by example, a glass on the third level will give 12 points (4 points*3^d level)
- 12 points for a successful Funny Action

Penalties

A penalty results in a loss of 30 points on the match scoring and the global ranking. A negative score will be rounded to 0.



Reminder:

Penalties are intended to compensate for damage or disadvantages occurred after an incident during the match. A penalty situation is considered as a non-compliance with the rules: **such situation must remain exceptional!** In case of repeated penalties by a team, the referees reserve the right to declare the team permanently disqualified. The refereeing committee will also pay attention to the cumulated penalties given during the qualification phases (regional if some, national).



7. CONTEST

7.1. Forewords

Eurobot^{open} events are organised up to 2 levels:

- **National** qualifications: in countries where more than 3 teams are registered, it allows the qualification of 3 teams for the International final.
- **International final**: it brings together, always in the same friendly spirit, teams either qualified on the previous step, or coming directly to the final (countries with less than 3 teams registered)

The contest hosts mainly European countries, but also non-European countries.

7.2. Approval phase

- **Pre-approval**: Before the matches begin, the robots are examined by a referee who checks their compliance with the rules. The robots should be able of demonstrating all of their possible actions.
- **Approval**: Robots must, within 90 seconds, demonstrate at least one point-scoring action. The robots are tested under match conditions, but without the presence of another team. Some specific features stated in the rules can also be checked (timer, avoidance of the opponent for autonomous robots, etc.).
- If the set composed of the main robot and its secondary robot meet these requirements, it will be officially approved.
- **Significant technical changes after approval**. It is mandatory to inform the referees of any significant change (functional, structural, dimensional...) made to the set of robots after its approval. The referees will then verify the changes and may redo the approval process if necessary.

7.3. The qualification rounds

During the qualifying rounds, the approved teams will have the opportunity to participate in at least 3 matches (sometimes more, when organisers decide so). After each match, each team is awarded additional points as following:

- In case of victory : Number of accumulated points + 5 bonus points
- In case of draw : Number of accumulated points + 3 bonus points

- In case of loss : Number of accumulated points + 1 bonus point
- In case of disqualified : No point

In order to determine the teams qualified for the final round, a ranking is set up, based on points accumulated during the qualifying rounds.

In case of draw at the end of the qualifying rounds, teams will be ranked by comparing their scores without considering the bonus points. If teams are still level, the referees may decide to organise extra matches. In that case, pairs of teams competing for the same ranking will be drawn for lots and the winner of the resulting matches will move on to the final round. In case of an odd number of teams, one extra match will be drawn for lots and played on the same basis.

7.4. The final round

After the qualifying rounds, the first 8 or 16 teams (depending on number of approved teams) will participate to the final phase according to Figure 14.

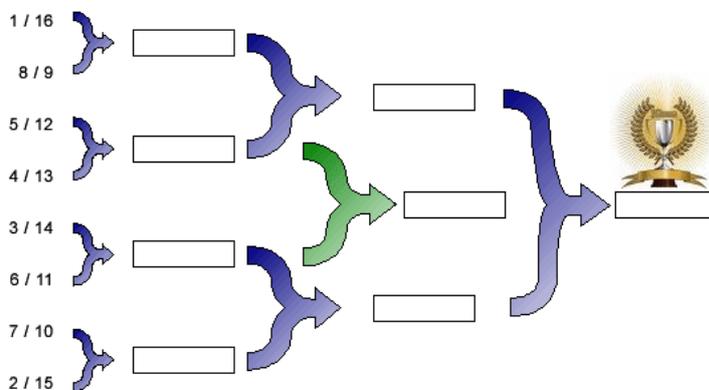


Figure 20 : Final rounds schemes

The matches of the final round are on a knock-out basis. In case of a double disqualification, double defeat or a tie, the match is played again immediately; if this second game is still a case of double disqualification, double defeat or a tie, the winner will be determined according to the points accumulated during the qualification rounds.

The matches for first and second ranks will be played as "best of three". Watch out: for autonomous robots, make sure to have enough batteries.

7.5. Qualification for the international final

Each country participating in Eurobot^{open} and / or Eurobot^{open} Junior organises a national contest to determine the teams qualified for the international phase. The National Organising Committee must send to the international final the teams ranked at the first and second position in their national qualifications but can choose freely the third team (a special prize, or the team ranked in third position, etc.)

The organisers of the international final of Eurobot^{open} and / or Eurobot^{open} Junior reserve the right to open the final event to more than 3 teams per country, and in this case will inform the National Organising Committees as soon as possible.



For questions and comments, a volunteer from the refereeing committee will answer you on the forum, in Eurobot^{open}, Eurobot^{open} sections

<http://www.planete-sciences.org/forums/>

Website of Eurobot^{open} and Eurobot^{open} Junior (Contains links to National Organising Committees)

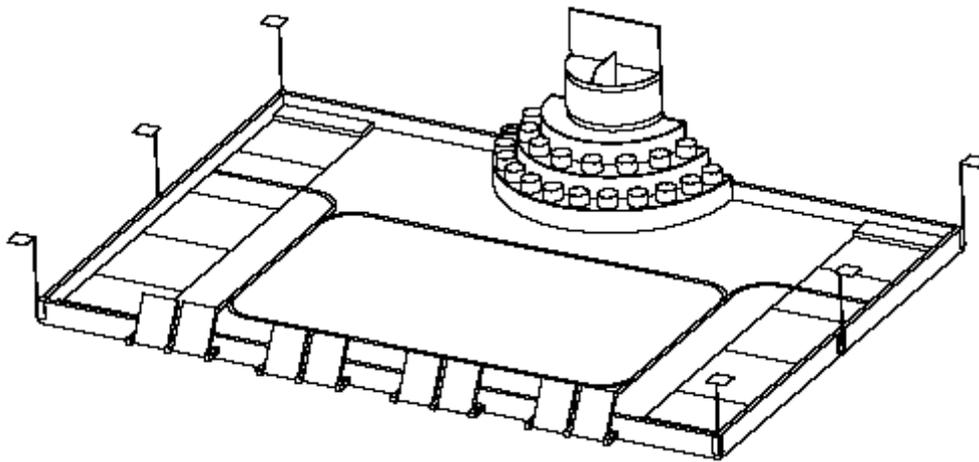
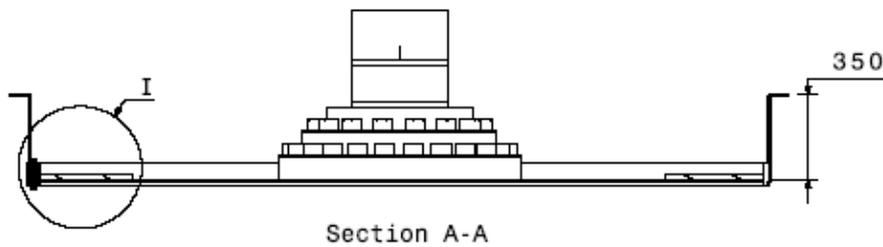
www.eurobot.org

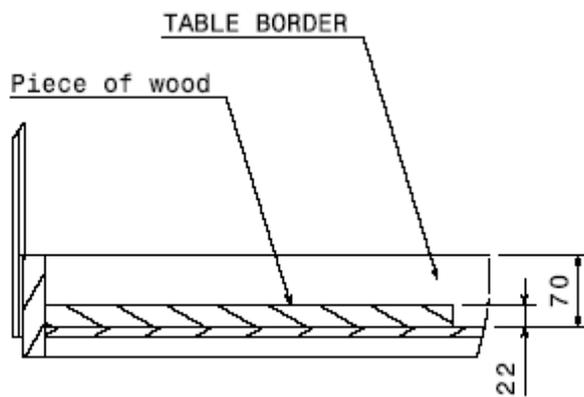
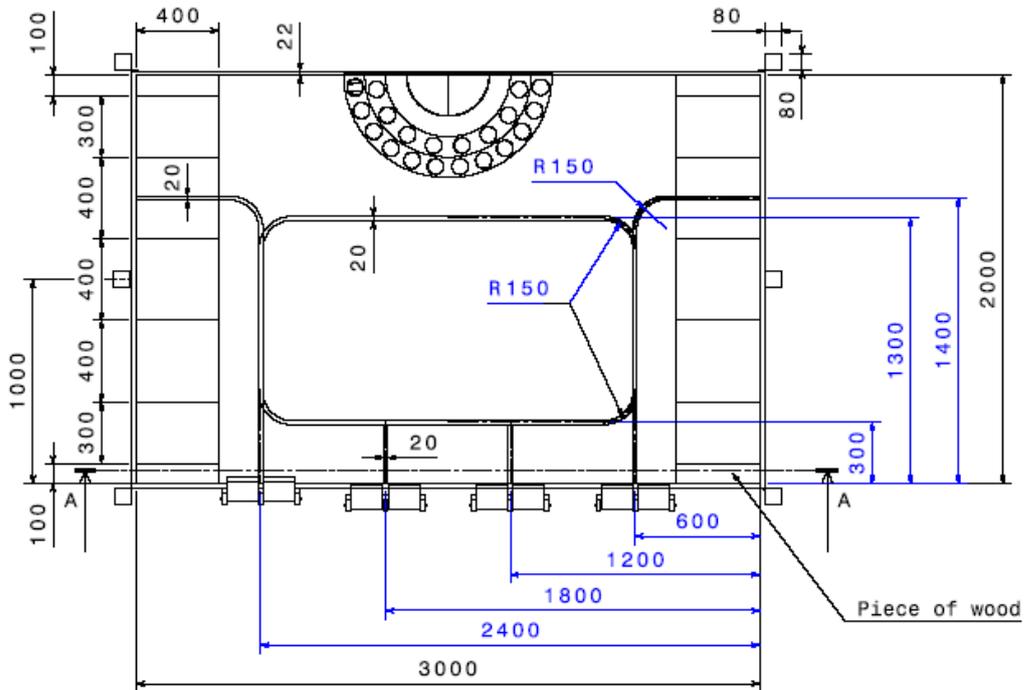
The whole organisation team wishes you much fun and success for the coming months, and looks forward to seeing you soon around a playing field for A HAPPY BIRTHDAY!

8. APPENDIX (TECHNICAL SPECIFICATIONS)

All measures are in millimetres.

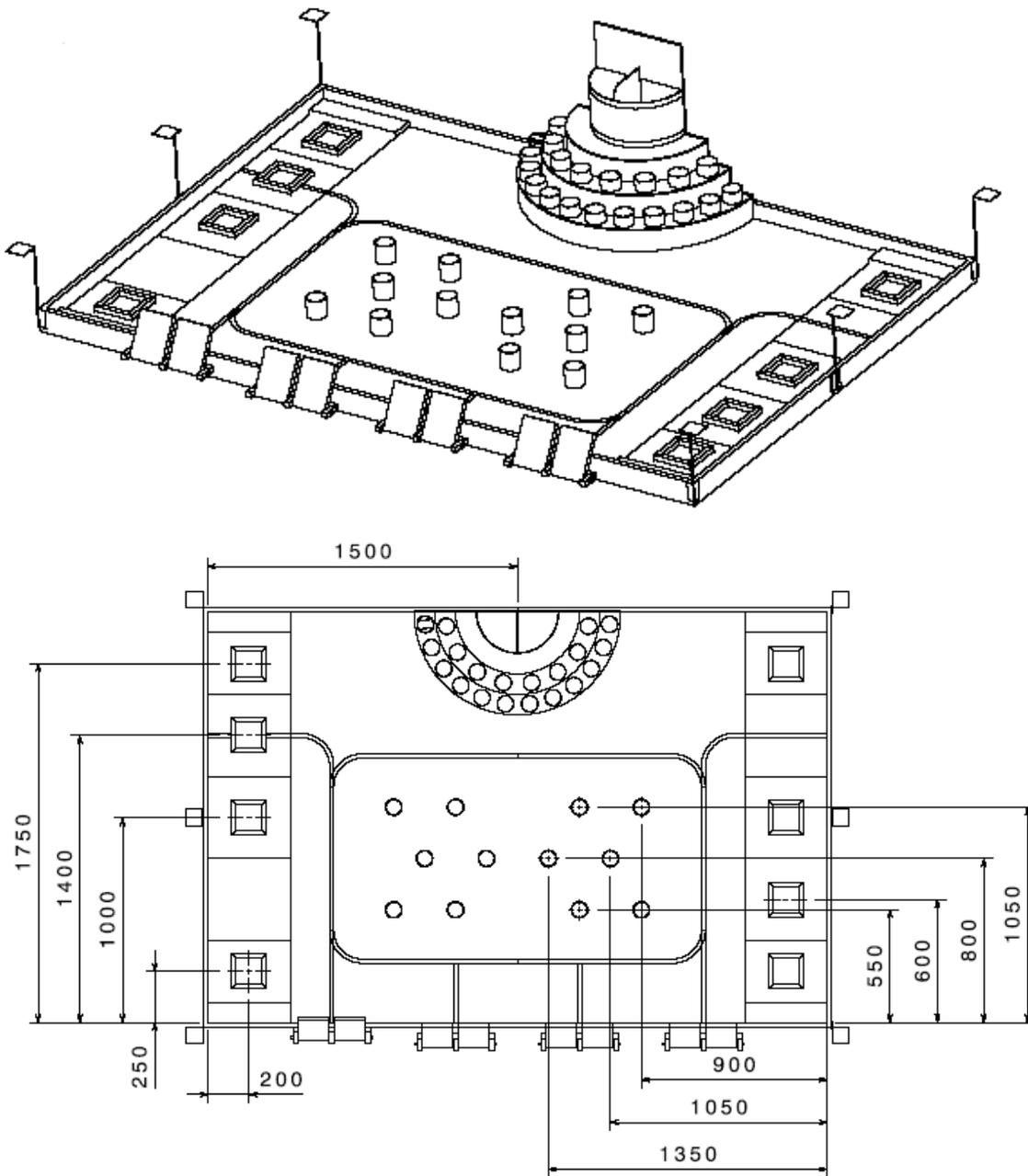
8.1. Playing area



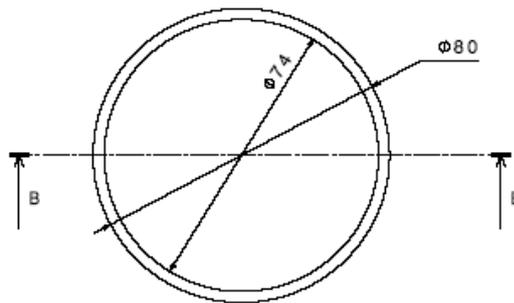
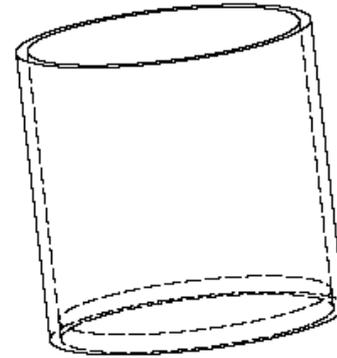
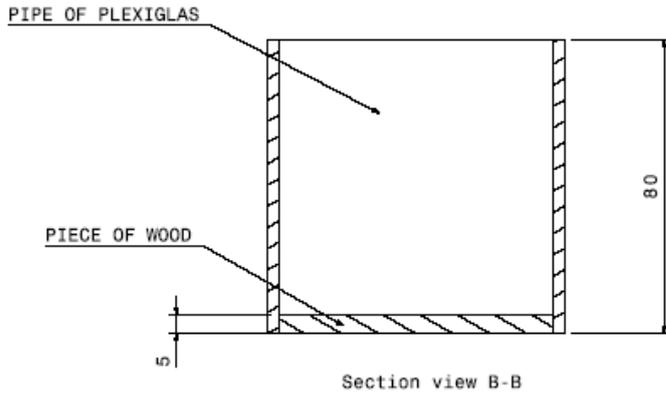


Detail I
Scale: 1:5

8.2. Layout of the game components

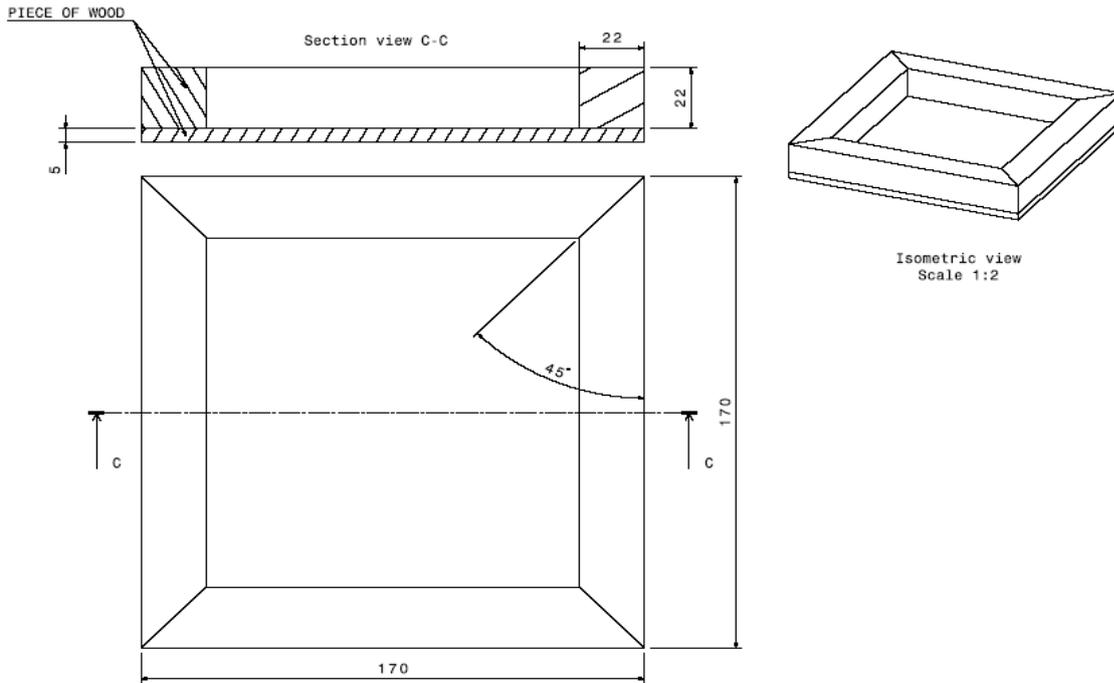


8.3. The glasses

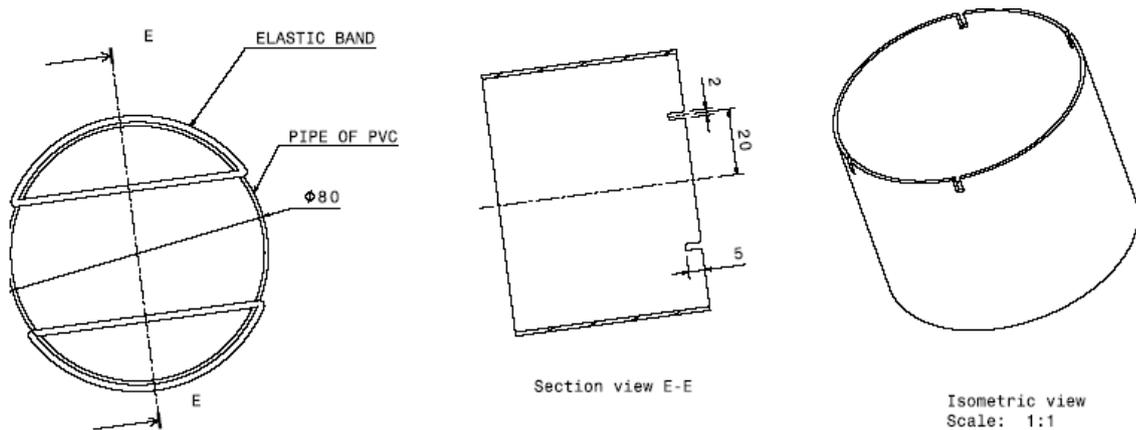


We advise you that using hole saw may create a small hole (a few millimetres in diameter) in the bottom of the glass, which can prevent you from using a suction system to pick up the glasses.

8.4. The plates

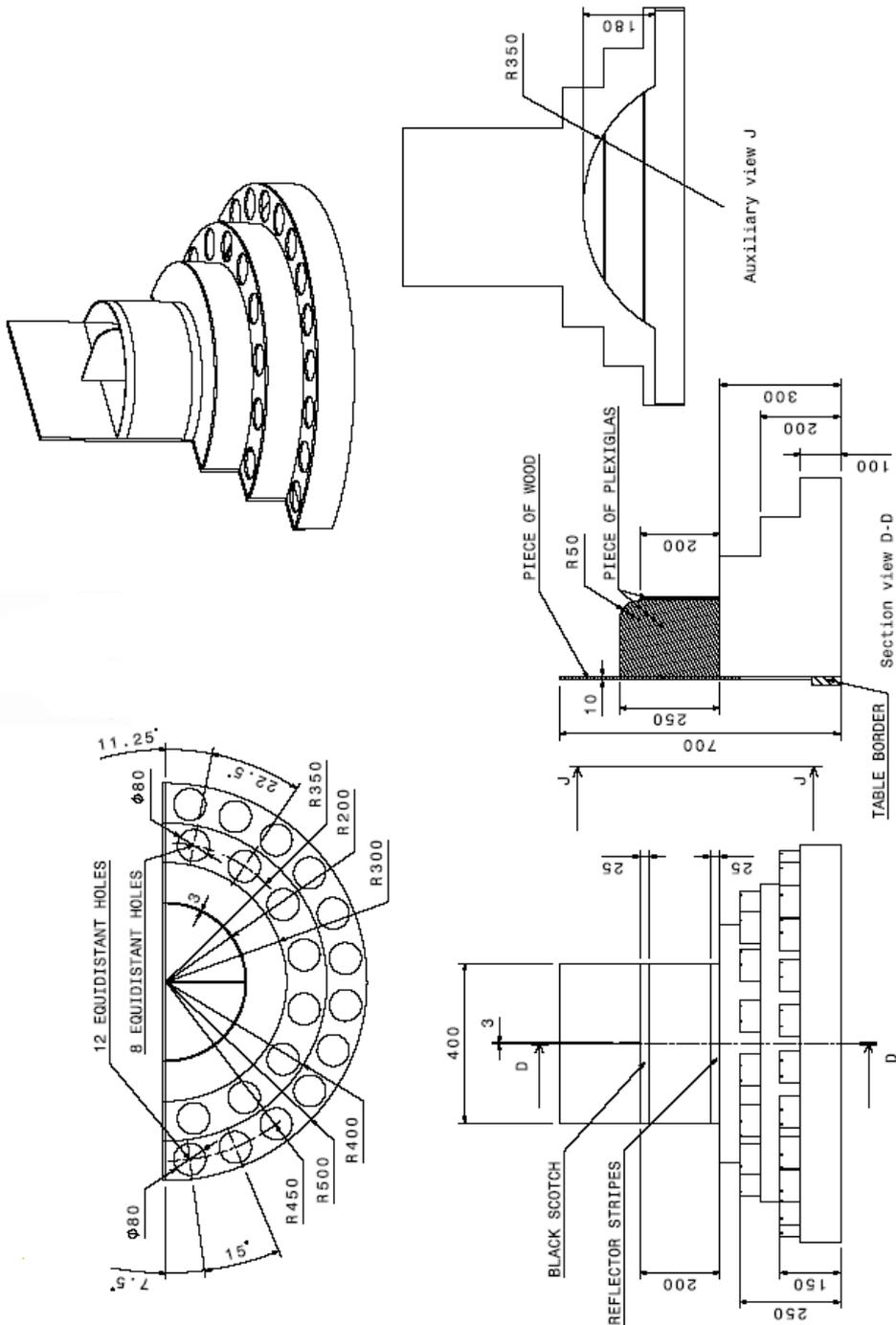


8.5. The candles

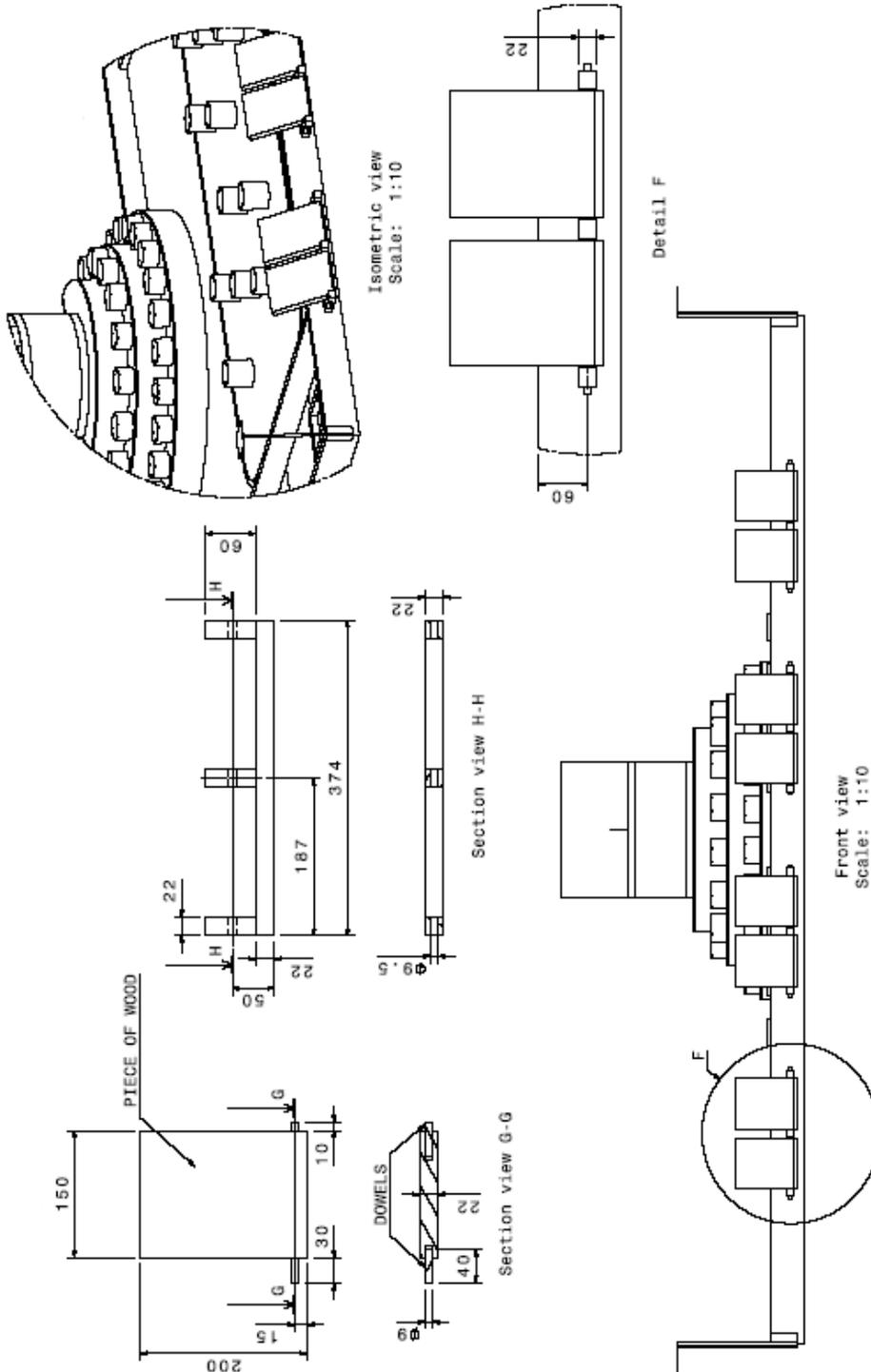


In order to change the candles' colour after each match, the uncoloured fixed PVC pipe will be covered with a second, removable, 40mm-high pipe. This second pipe will be painted in either blue or red, according to the team's own colour.

8.6. The cake



8.7. The gifts



8.8. Colours' references

Component	Colour	Reference
Ground and text above the cake	Yellow	RAL 1023 Mate
Plates and cakes	Pink	RAL 3015 Mate
Lines	Black	RAL 9005 Mate
Team A colour	Blue	RAL 5017 Mate
Team B colour	Red	RAL 3001 Mate
Neutral/Common colour	White	RAL 9016 Mate

8.9. Materials' references

Component	Material	Comment
Cake	Wood	
Gifts	Wood	
Plates	Wood	
Basket on the top of the cake	Plexiglas	
Candles	Pipe of PVC	Unknown density
Flames	Tennis balls	Diameter between 63,5 and 66,7 mm
Cherries	Table tennis balls	40 mm
Reflecting stripe	Radiospares website: réf 359-3151	
Black adhesive tape	Radiospares website : réf 744-2369	
Glasses	Plexiglas® pipe	

The wood density can vary according to the country you come from. You are advised to test different kinds of wood because weight can vary greatly from one kind to another.