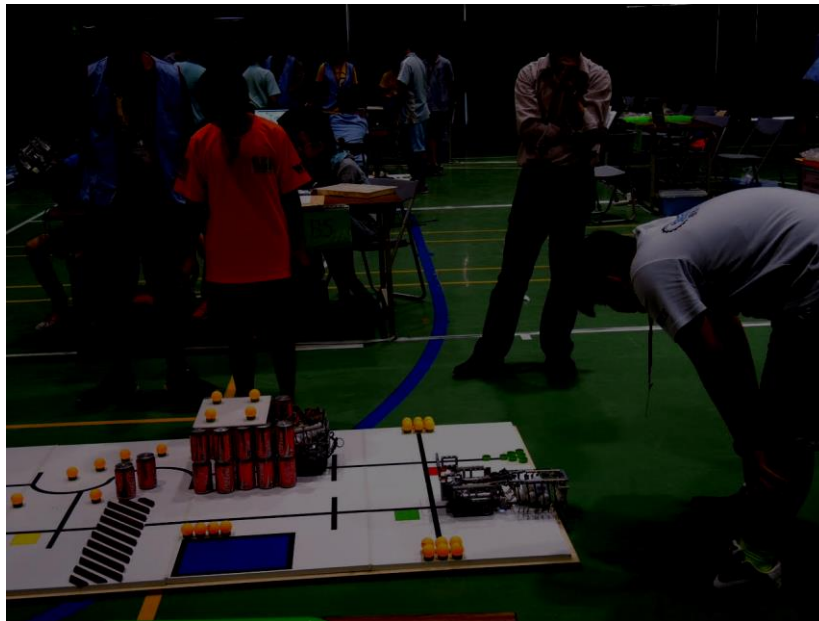




FIRA Youth - Laws of the Game

City Racer

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Abstract

The following rules and regulations govern the city racer event of the FIRA Youth Competition - an event for junior and high school students to expose them to robotics problem solving and to spark their imagination.

摘要

以下規則和條例適用於 FIRA Youth 青少年競賽的 City Racer 賽事，這是一個讓國中和高中學生接觸機器人解決問題並激發他們想像力的活動。

Latest Version of the Rules for City Racer

The latest official version of the rules of the game for City Racer is always available from the [FIRA Facebook Page](#).

城市賽車規則的最新版本。

城市賽車遊戲規則的最新正式版本可從FIRA官方臉書獲得。

Changes to the City Racer rules of FIRA Youth

The city racer competition will be organized for the first time in 2017.

FIRA Youth 青少年城市賽車規則的變化

City Racer 比賽將於2017年首次舉辦。

City Racer

The goal of the city racer competition is to design a challenging and interesting environment for U14 and U19 students. Students develop a robot that can track a line, manipulate small objects, and traverse uneven terrain.

City Racer 比賽的目標是為14歲以下和19歲以下的學生所設計的一個充滿挑戰和有趣的環境。學生開發的機器人可以追蹤線條，搬運小物體，並穿越不平坦的地形。

City Racer - Laws of the Game

The following laws describe the specifics of the city racer event. For general specifications relevant to all FIRA Youth events (e.g., robot dimensions, playing field and lighting, responsibility of the referees) please refer to [General - HuroCup Laws of the Game](#).

以下明文敘述了城市賽事事件的具體規則。有關所有FIRA青少年活動（例如機器人尺寸，比賽場地和照明，裁判責任）的一般規範，請參閱總則-HuroCup規則。

[CR-1]: Field of Play

[CR-1.1]: The city racer competition is played on a field with a minimum dimension of 3.5 m by 1.5 m. See Fig. [City Racer Field](#).

[CR-1]: 比賽場地規格

[CR-1.1]：City Racer 比賽在最小尺寸為3.5公尺×1.5公尺的場地上進行。詳請參見圖城市賽車場。

The sports field (court) will be composed of 9 pieces 600 mm square white foaming board and 10 mm high, the black line will be 18mm wide, might be arranged as the picture above. The arrangements could be changed by the referees. The field will have different kinds of material ex: woods, plastic...etc, and will be colored for a different mission.

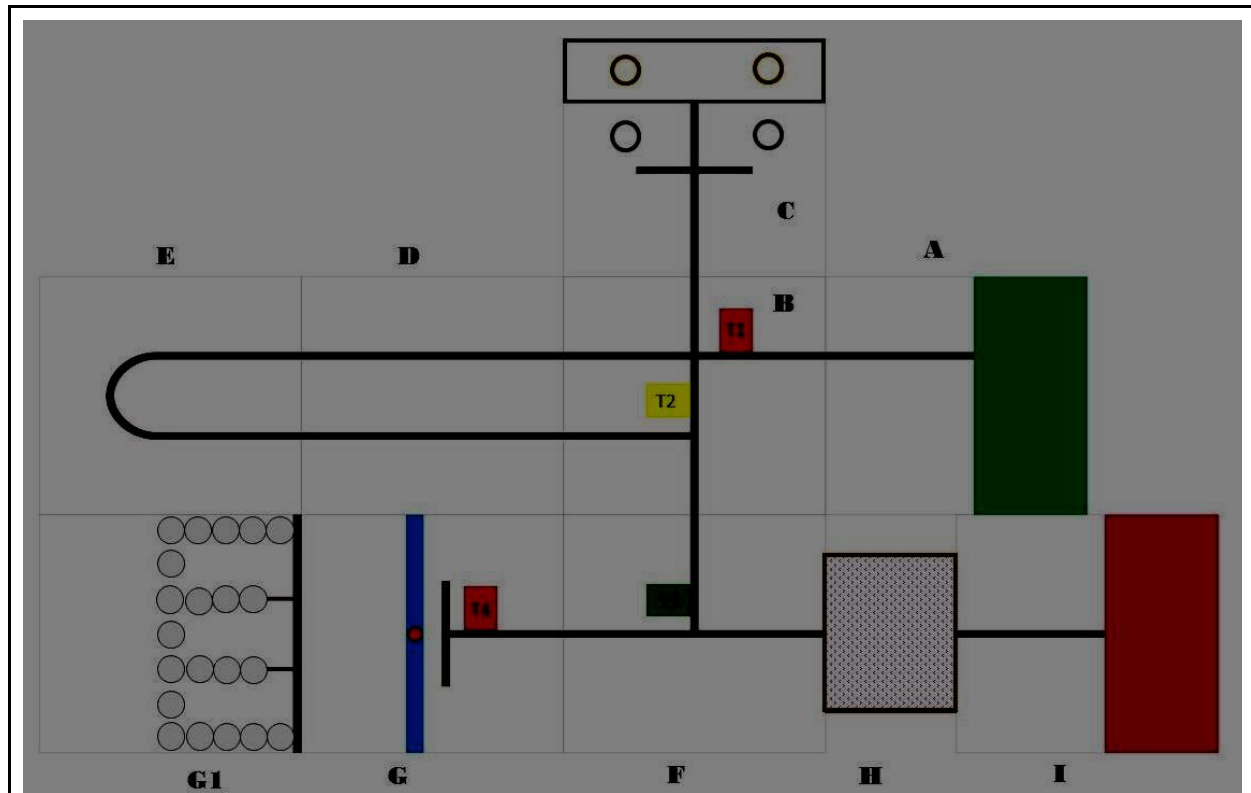
比賽場地由9片600毫米正方形白色發泡板和10毫米高的高度所組成，黑色線寬18毫米，可按上圖所示排列，排列方式可以由裁判改變。該場地將會有不同種類的材料，例如：樹林，塑料等等，並且將被用於不同的任務。

[CR-1.2]: The field divided into 9 areas. B and F area are the required missions area, included T1, T2 , T3 color cards (T1, T3 are for directions and T2 is for the number of laps, the referees will announce the details. For example, a red card on T1 may mean turn right at the next intersection or yellow on T2 may mean three laps in total, whereas red on T2 may mean 1 lap only). Area C is the area for weight lifting. robots are required to lift the barbell and put it in the target position. Area D and area E are for the track field event. (The referees will announce the meaning of the T2 cards - how many laps the robot must follow around the track). Areas G and G1 are for football. The card T4 indicates the target area for the shot. A ping pong ball will be used as ball and placed on penalty marker; G1 is the goal area with three different directions. Area H is the jumping pit. Area I is the goal.

[CR-1.2]：該場地分為9個區塊。B和F區域是必需的任務區域，包括T1，T2，T3三種色卡（T1，T3為方向，T2為圈數，裁判會公佈色卡的詳細信息，例如T1上的紅卡可能意味著在下一個路口右轉，或者T2上的黃色可能意味著總共三圈，而T2上的紅色可能意味著只有一圈。）C區是舉重的區域，機器人需要舉起槓鈴並將其放在目標位置。D區和E區用於田徑賽事。（裁判員將宣布T2卡的含義-機器人必須在賽道上繞多少圈）。G和G1區用於足球。T4則為表示拍攝的目標區域。

[CR-1.3]: The width of all lines is approximate \$L

[CR-1.3]:所有線的寬度大約為\$L



Dimension 尺寸	Comment 註解	U14 14歲以下	U19 19歲以下
\$RL	Width, length, and height of box that the robot must fit in with its maximum extension 機器人必須要能夠裝入所規定長寬高大小的盒子內	40 cm	40 cm
\$L	Width of the tracking line 循跡線寬	15 mm - 25 mm	15 mm - 25 mm
\$WLH	Lifting Height 舉起高度	6 cm	12 cm
\$WLD	Weight lifting distance 舉重距離	32 cm	32 cm

City Racer Field 賽車場地

[CR-2]: The Lifting Bar and the Weights

[CR-2.1]: Barbell

The barbell is a bolt (about 9 mm, made from iron, length: 40 cm, weight: 270 grams) plus two screw nuts and two plates, total weight: 370 grams. Weight: CD-R*2 (Diameter: 12 cm, 1.2 mm thickness, 17 grams). Barbell's base: the base will use 1.2 cm width tape (diameters: 7.6 cm) then put it horizontally on each side (as the picture above). The barbell has 3 different level weight:



- (1) Feather level: each side with two CDs, taped with blue tag
- (2) Light level: each side with four CDs, taped with orange tag
- (3) Heavyweight level: each side with six CDs, taped with red tag

槓鈴是一個螺栓(約9毫米，由鐵製成，長度：40公分，重量：270克)加上兩個螺母和兩個光碟片，總重量：370克。重量：CD-R * 2(直徑：12公分，厚度為1.2毫米，17克)。槓鈴的基座：基座將使用1.2厘米寬的膠帶(直徑：7.6公分)，然後將其水平放置在每側(如上圖所示)。槓鈴有3個不同等級的重量：

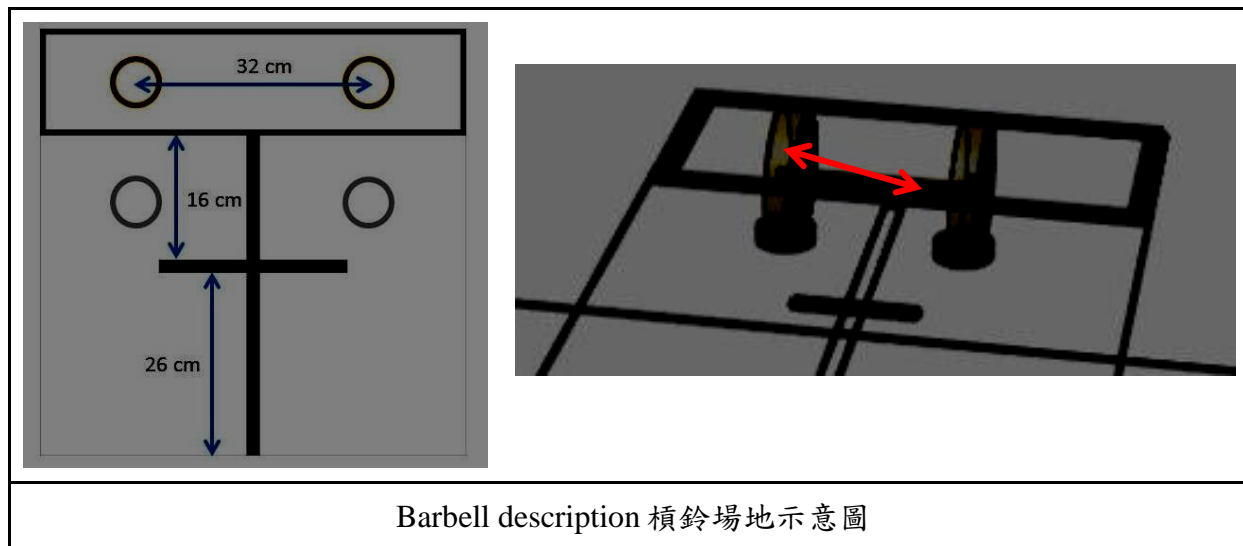
- (1.) 羽量級：每面有兩張CD，用藍色標籤貼上
- (2.) 輕量級：每面有4張CD，貼有橙色標籤
- (3.) 重量級：每面有6張CD，貼有紅色標籤

[CR-2.2]: The lifting bar is a wooden, metal, or plastic bar with a width between 8 mm to 15 mm. Two stops are used to mount the weights. The distance between the inner stops is at least 40 cm. The total length of the lifting bar is between 50 cm to 80 cm.

[CR-2.2]：舉重桿為寬度在8毫米至15毫米之間，材質為木製，金屬或塑料條。兩端用於安裝槓鈴。內部之間的寬度至少為40公分。舉重桿的總長度在50公分至80公分之間。

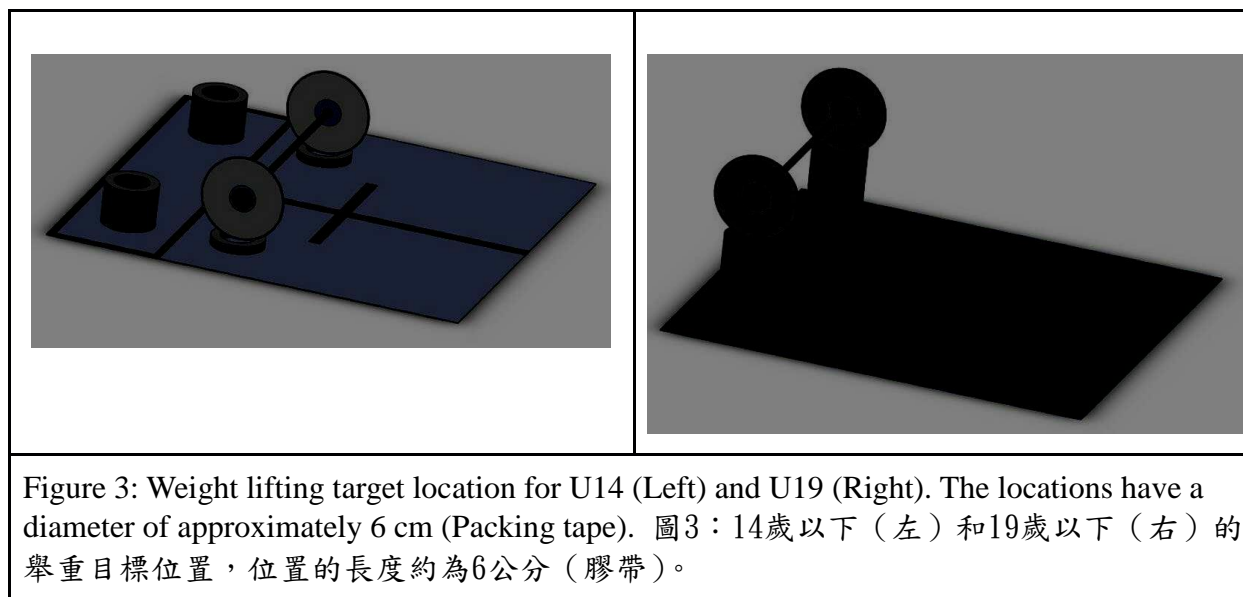
[CR-2.3]:] The “weights” used in the competition are standard 5 1/4 inch CDs or DVDs that must be lifted by the robot as seen in Figure [Lifting Bar](#).

[CR-2.3]：]比賽中使用的“重量”是標準的5.25英寸大小的CD或DVD的重量，必須由機器人舉起，如圖例舉重桿所示。



[CR-2.4]: Lifting height level: \$WLH. The lifting bar must be put on a target location \$WLD in front of the middle of the barbell.

[CR-2.4]: 舉升高度: \$ WLH。舉重桿必須放置在槓鈴中間前方的目標位置\$ WLD。



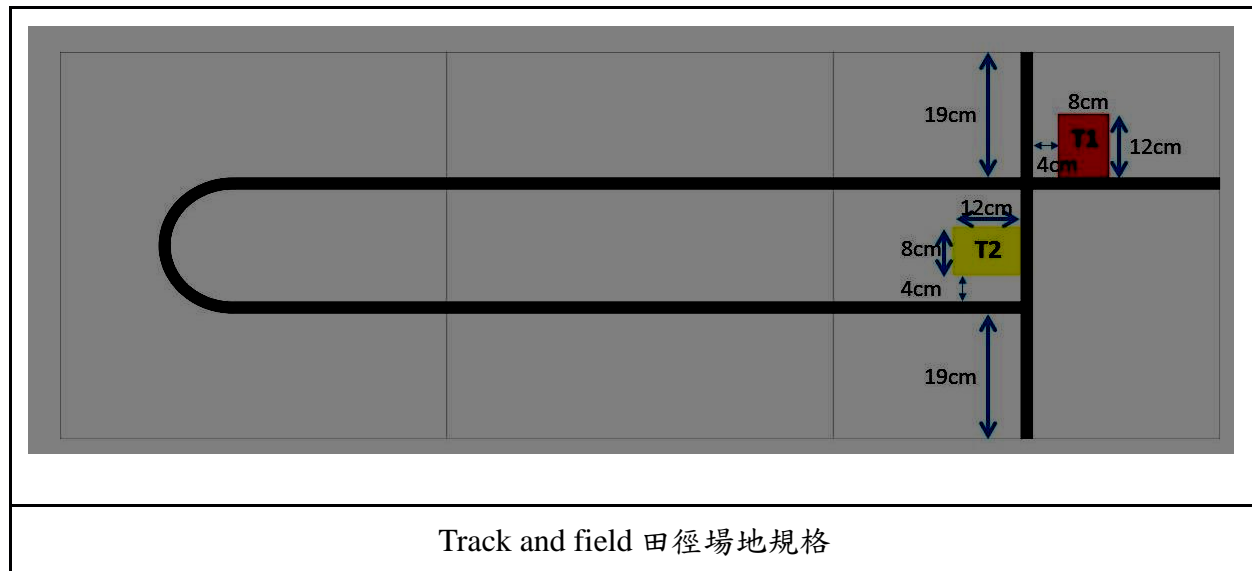
[CR-3]: Track and field

The track and field event uses colored cards with the following colors: red, yellow, or green. T1 and T2 will put at the intersection's right side. The color of the card indicates the direction at T1 and T3. For example, color1

may mean turn right. The referees will announce the exact color and its meaning before the competition. T2 uses one of three colors to indicate the number of laps.

[CR-3]: 田徑

田徑賽事使用色卡顏色如下：紅色，黃色或綠色。T1和 T2將放在交叉路口的右側。卡的顏色表示 T1和 T3的方向。例如，color1可能意味著右轉。裁判員將在比賽前公佈準確的顏色及其含義。T2則使用三種顏色之一來表示圈數。

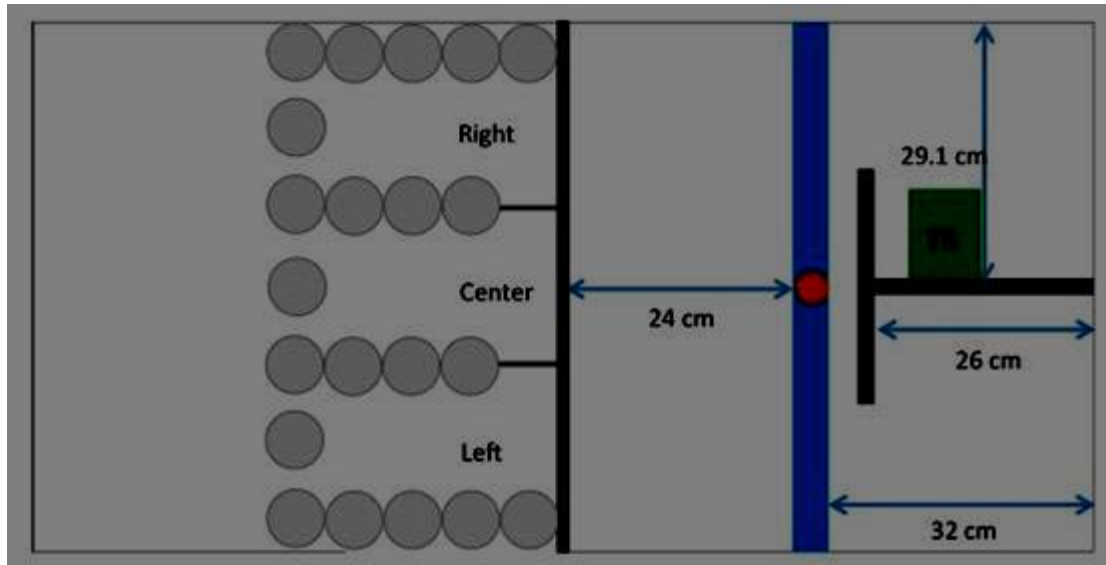


[CR-4]: Shoot football(ping pong ball) and field

The referees will announce T4 card's color which is for the shooting direction. The gate is made from 10 aluminum cans (330 ml). Ping Pong ball will be put on the bottle top (3.2 cm*1.2 cm), ping pong's size is 4 cm.

[CR-4]: 射擊足球（乒乓球）和場地

裁判員會公佈 T4卡的顏色，其為射門方向。大門由10個鋁罐（330毫升）製成。乒乓球將被放在瓶頂（3.2公分* 1.2公分），乒乓球的大小為4公分。



[CR-5]: Jumping pit

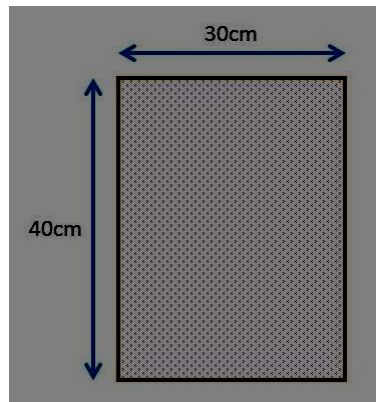
The field's size: 300 mm*400 mm, made from PVC board (thickness of 2 mm), surrounded by phone wiring duct type 3. The jumping pit will be filled with 3 mm to 8 mm plastic balls (200 g to 600 g, measure by the size and weight of balls, the referee will decide)

H area will put aluminum cans each side, the referees will announce the quantity.

[CR-5]：跳遠

該場地的尺寸為300毫米* 400毫米，由 PVC 板（厚度為2毫米）製成，由電話配線槽圍繞四周。跳遠坑內將裝滿3毫米至8毫米的塑料球（200克至600克，數量及大小由裁判決定）。

H 區將放鋁罐，裁判將公佈擺放數量。



Except the starting and the goal area, others will be white. The venue's black trajectories' have a width of \$L\$.

除了起點以及終點之外的場地皆為白色，場地內黑色軌跡寬度為\$L\$。

The robot must cross the jumping pit from one side to the other. It is only allowed to enter and leave the field from the 40cm wide side lines

機器人必須從一側穿過跳坑到另一側，且只允許從40公分寬的方向進入和離開場地。

[CR-6]: Number of Robots

[CR-6.1]: A single robot competes in a match.

[CR-6]: 機器人數量

[CR-6.1]: 單隻機器人參加比賽

[CR-7]: The Players

[CR-7.1]: The robot in its maximum extension must fit into a cube of size \$RL by \$RL by \$RL.

[CR-7]: 參賽人員

[CR-7.1]: 機器人體積在最大範圍內必須裝入一個尺寸為\$ RL 的立方體，由\$ RL 放置\$ RL。

[CR-8]: The Referee

[CR-8.1]: Please refer to [General - HuroCup Laws of the Game](#) for detailed information about the referee and his or her duties.

[CR-8]: 裁判

[CR-8.1]: 有關裁判及其職責的詳細資料，請參閱[General - HuroCup Laws of the Game](#)。

[CR-9]: The Assistant Referee

[CR-9.1]: Please refer to [General - HuroCup Laws of the Game](#) for detailed information about the assistant referee and his or her duties.

[CR-9]: 助理裁判

[CR-9.1]: 有關助理裁判及其職責的詳細資料，請參閱 [General - HuroCup Laws of the Game](#)。

[CR-10]: Game Play

The referees will score each sports items by performance of the robots.

[CR-10]: 比賽規則

裁判將通過機器人的表現來評分每項運動項目。

[CR-10.1]: Sports Items

1. The robots start from A area, any part of the robot cannot cross this area before the referee has started the trial by blowing the whistle. The robot must be placed completely in the starting area.
2. B area: the required missions' area, T1 is for the sports, T2 is for number of laps.
3. C area is for lifting. Robots are required to lift the barbell and put it in the certain position. Different age classes have different target height.
4. D and E area are for the track and the field; follow the direction from L1 to L5.
5. F area: the required missions' area, follow T3 card's instruction.
6. G and G1 area for football, T4 card is for shooting direction.
7. H area is the jumping pit.
8. The robots should be stopped at I area (red zone).
9. The referees will announce all the colored cards' content.

[CR-10.1]: 運動項目

1. 機器人從A區開始，在裁判吹哨開始之前，機器人的任何部分都不能穿過該區域。機器人必須完全放置在起始區域。
2. B區：需執行的任務區，T1代表運動，T2代表圈數。
3. C區為舉重區。機器人需要舉起槓鈴並將其放在特定位置。不同的年齡段有不同的舉起目標高度。
4. D和E區域用於賽道和場地；按照L1到L5的方向。
5. F區：執行任務區，按照T3卡的指示。
6. G和G1區為足球，T4卡為射門方向。
7. H區是跳遠區。
8. 機器人應該停在I區（紅色區域）。
9. 裁判將宣布所有色卡的內容。

Different groups' sports item detail will be announced by the referees. The sports item will be announced before the assemble time and will announce the colored cards color and position before each round.

裁判將公佈不同組別的運動項目細節。運動項目將在組裝時間之前公佈，並在每輪之前公佈色卡的顏色和位置。

[CR-10.2]: The maximum time for one trial is 5 minutes.

[CR-10.2]: 每次評分時間最長為5分鐘。

[CR-11]: Method of Scoring

Scoring: Sport items points and time points; the referees will score each performance of the robots.

[CR-11]: 得分方法

得分：運動項目得分和時間；裁判將評分機器人的每場表現。

[CR-11.1]: The field will divide into 9 major squares, after pass each part will have one score. The robots need to finish the sports items by order.

[CR-11.1]: 場地將分成9個大方格，傳球後每個部分都會獲得一分。機器人需要按順序完成運動項目。

[CR-11.2]: A area: started from here, will get 50 points after getting in the B area.

[CR-11.2]: A area: started from here, will get 50 points after getting in the B area.

[CR-11.2]: A區：從這裡開始，進入B區後將獲得50分。

[CR-11.3]: B area: the referees will announce T1 and T2 colored card, the robots should complete the T1's instruction can get 50 points.

[CR-11.3]: B區：裁判將公佈T1和T2色卡資訊，機器人應完成T1的指令可獲得50分。

[CR-11.4]: C area: If the robot successfully lifts the weight bar off the ground, it will receive 20 points.

C區：如果機器人成功將舉重桿抬離地面，則會獲得20分。

Group/Height	Pioneer \$H	Explorer \$H
Feather	50 points	50 points
Light	70 points	70 points
Heavyweight	100 points	100 points

組別/高度 量級	先鋒者 \$H	探險者 \$H
羽量級	50 points	50 points
輕量級	70 points	70 points
重量級	100 points	100 points

[CR-11.5]: D and E areas: The referees will announce T2 card, the robot should run from L1 to L5 in order as a round. Each section is worth 10 points. If complete the goal will get total 100 points, if not will get 70 points.

[CR-11.5]: D區和E區：裁判將宣布T2色卡資訊，機器人應該從L1至L5依序進行。每個部分都可獲得10分。如果完成將獲得總分100分，否則將獲得70分。

[CR-11.6]: F area: The referees will announce T3 card. If the robot successfully completes area F and enters the next area, it will receive 50 points.

[CR-11.6]: F區：裁判將公佈T3色卡資訊。如果機器人成功完成區域F並進入下一個區域，則將獲得50分。

[CR-11.7]: G area: If the robots kick the football off the base will get 20 points. Kick into a goal which is not as requested will get 50 points, into the goal will get 100 points. After football and

get in the F area will get another 50 points.

[CR-11.7]: G區：如果機器人踢足球離開基地將獲得20分。踢進非要求的目標將獲得50分，踢進目標將獲得100分。踢進F區後將獲得另外50分。

[CR-11.8]: H area: the robots can leave jumping pit will get 50 points also only can push out a maximum of 10 plastic balls. If more than 10 balls will minus 2 points for each.

[CR-11.8]: H區：機器人如果可以離開跳坑將獲得50分，但最多也只能推出10個塑料球，如果超過10個球會減去2分。

[CR-11.9]: I area: The robots get into red zone completely and stop will get 50 points. If cross over the red zone will get 30 points.

[CR-11.9]: I區：機器人完全進入紅色區域後，在紅色區域停止將獲得50分，如果越過紅色區域將獲得30分。

[CR-11.10]: If the robots didn't pass any area or not follow the order rules won't get any points on.

[CR-11.10]: 如果機器人沒有通過任何區域或不遵守規則，則不會得到任何分數。

[CR-11.11]: The referees will finish the game as long as the competitor's touching the field or the robot couldn't follow the rule, time's up or the robot couldn't finish the game.

[CR-11.11]: 只要參賽者觸及場地或機器人無法遵守規則，時間到或機器人無法完成比賽，裁判將宣布比賽結束。

Time points

1. Can only get the time points as long as the robots finish the sports items by itself on time, if not, the sports items score still can be counted but not the time points.
2. Timing points: 120 secs – (total finishing time(sec))

時間分數

1. 只要機器人在時間內完成運動項目，同時能獲得時間分數，如果不是的話，運動項目的得分依然可以被計算，但無法獲得時間分數。
2. 計時分數：120秒 - (總計完成時間(秒))。

Scoring

1. Every round score will have sport mission points and time points.

評分

1. 每一輪評分都包含運動任務分數和時間分數。

[CR-12]: Fouls and Misconduct

[CR-12]: 犯規和不當行為

[CR-12.1]: The robot handler touches the robot.

[CR-12.1]：機器人操作人員觸摸機器人。

[CR-12.2]: Any infractions as listed by [General - HuroCup Laws of the Game](#) as far as they are applicable in this event.

[CR-12.2]: 只要適用於[General - HuroCup Laws of the Game](#) 所列遊戲規則之規行為，都將視為違規。

[CR-12.3]: Any team that commits one of the infractions listed in this section will be penalized by receiving 0 points for the trial.

[CR-12.3]：任一球隊若發生本篇所列出的違規行為之一的將受到0分的處罰。

[CR-13]: Ranking and Tie-Breaker

The ranking of the teams is according to the following procedure:

1. The highest score of two rounds, if the score are same then
2. Compare with the second high score, if same then
3. Compare the time of the highest score round (shortest win), if the time is same then
4. The weight of the robots (lightest win)

[CR-13]：排名和獲勝條件

球隊排名按照以下程序進行：

- 1.兩輪的最高分，如果得分相同的話
- 2.與第二個高分相比，如果相同的話
- 3.如果時間相同的話，則為比較最高分的時間（最短勝率）。
- 4.機器人的重量（最輕盈）