RoboCupJunior Rescue Maze Rules (2016)

Note: Changes from 2015 rules are highlighted in red.

Translated by RoboCupJunior Hong Kong

RoboCupJunior Rescue - Technical Committee 2016
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These are the official rules for RoboCupJunior 2016. They are released by the RoboCupJunior Rescue Technical Committee. The English rules have priority over any translations. Changes from the 2015 rules are highlighted in red.
這是RoboCupJunior 2016的官方賽規，由RoboCupJunior拯救技術委員會所發佈，本賽規的任何翻譯，如有歧義，一概以英文(原文)為準。紅字部修改自2015年的賽規。

Scenario 綱要

The land is simply too dangerous for human to reach the victim! Your team has been given the most difficult tasks. It must be able to carry out the rescue mission is fully autonomous mode with no human assistance. The robot must be strong and smart enough to navigate through a treacherous terrain with hills, uneven lands and rubbles without getting stuck. The robot needs to seek out the victims, dispense rescue kit, and signal the position to the rescuers so the humans can take over.
由人類到達遇難的場地簡直是太危險了！你的隊伍已被給予最困難的任務。它必須能夠執行拯救的使命且是完全自治的模式，無需人為幫助。機械人必須是足夠強悍和聰明去穿梭於危險的地形與小山，凹凸不平的陸地和瓦礫而不被卡住。機械人需要找出遇難者，分發救援包，和向救援人員發出位置信號，以便人類能夠接管。

Time and technical skills are the essential! Come and prepare to be the must successful Rescue Response Team.
時間和技術技能都是非常重要！快來準備成為必勝的救援響應隊伍。

Summary 摘要

The robot needs to search through a maze for heated victims. I.e. the robot should not find the fastest path through the maze, instead it should explore as much as possible of the maze. The robot will get 10 or 25 points for each victim found. If the robot can also deliver an item (designed by the team themselves) close to the victim it will earn an additional 10 points. The robot should avoid areas with black floor.
機械人需要在迷宮搜索發熱的遇難者，如機械人不應是以最快的路徑穿過迷宮，而是應盡可能表探索整個迷宮。每發現一個遇難者，機械人可獲10分或25分。如機械人把物品(由隊伍自行設計)遞送到遇難者附近，它將額外獲得10分。機械人應避開黑色的地板。

If the robot is stuck in the maze it can be restarted at the last visited checkpoint. The checkpoints are indicated with reflective floor so the robot can save its map (if it uses a map) to a non-volatile medium and restore it in case of a restart.
如機械人於迷宮某處滯留，它可於上一個到訪的檢查點重新開始。檢查點標示為反光的地板，所以機械人可以把地圖(如它使用地圖)存儲於不揮發的記憶媒體中，並在重新開始時再讀回資料。

If the robot can find its way back to the beginning after exploring the whole maze it will receive an exit bonus. The robot will also earn a reliability bonus if the robot didn't need so many restarts.
如機械人在探索整個迷宮後，能夠截返開始點，它將得到額外的分數。如機械人無需多次重新開始，它將獲得可靠性分。

There are also some obstacles where the robot can earn additional points:
機械人成功克服場上的障礙可獲得額外的分數，

- 5 points for each speed bumps 每個減速波得5分
- 20 points for going up a ramp 攀上斜坡得20分
- 10 points for each visited checkpoint 到達每個檢查點
- 10 points for going down the ramp 攀落斜坡得10分

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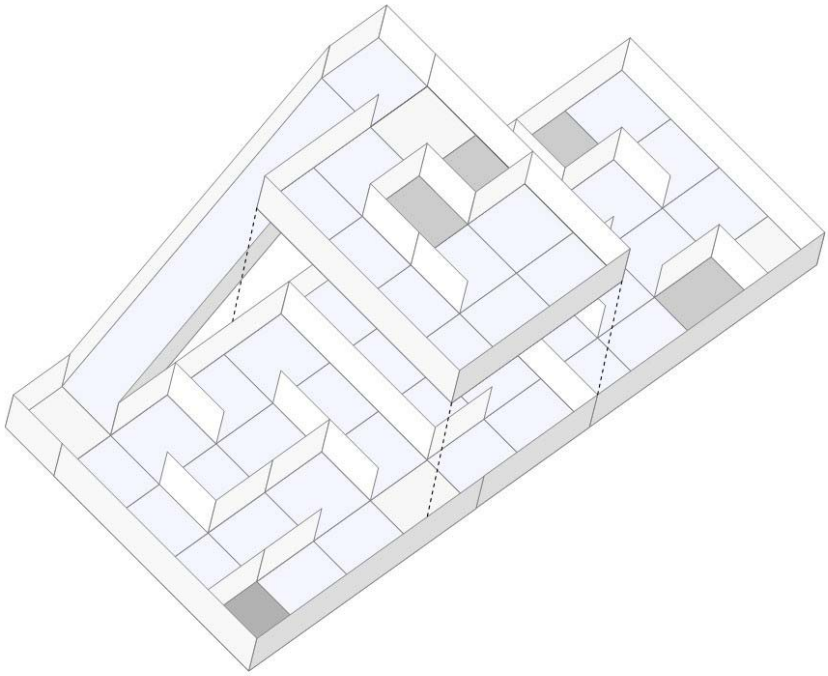
Rescue-B



1. Arena 場地

1.1. Description 描述

1.1.1 The maze may consist of multiple distinct areas. Areas will have a horizontal floor and a perimeter wall.
迷宮可以由多個截然不同的區域組成。區域有水平的地板及圍牆。

1.1.2 Areas may be joined together by doorways or ramps.
區域由門口或斜坡所連接。

1.1.3 Walls that make up at least 15 cm high.
牆最少高15cm。

1.1.4 Doorways are at least 30cm wide.
門口最少闊30cm。

1.1.5 Ramps will be at least 30 cm wide and have an incline with a maximum of 25 degrees from horizontal surface. The ramp is always straight.
斜坡最少闊30cm及斜面與水平面的夾角最大為25度。斜坡總是直的。

1.2 Floor 地板

1.2.1 Floors are white or close to white tone. Floors may be either smooth or textured (like linoleum or carpet), and may have steps of up to 3 mm in height at joints. There may be holes in the floor (about 5mm diameter), for fastening walls.
地板是白色或接近白色的色調。地板可能柔軟或粗糙(如油地毯、地毯)，接合處可能有高至3mm的落差。地板上有洞(直徑約5mm)，用以扣住牆。

1.2.2 Through the arena, there may exist black tiles that represent “no go” spaces. Black tiles will be placed randomly at the start of each round (see 3.3.7). Black tiles may not be completely fixed on the floor.
通過房間時，可能存在黑色階磚塊，表示”不可進入”的空間。黑色階磚塊將於每回合開始時隨機擺放(see 3.3.7)。黑色階

磚塊可能不是完全固定於地板上。

1.2.3 There may also exist silver tiles that represent checkpoints (see 3.6.2). Silver tiles may not be completely fixed on the floor.
可能存在銀色磚塊代表檢查點(見3.6.2)。銀色磚塊可能不是完全固定於地板上。

1.2.4 A tile is defined as a 30x30 space, which is aligned to the grid made up by the walls.
磚塊被定義為一個30×30的空間，這與由壁組成的網格相一致。

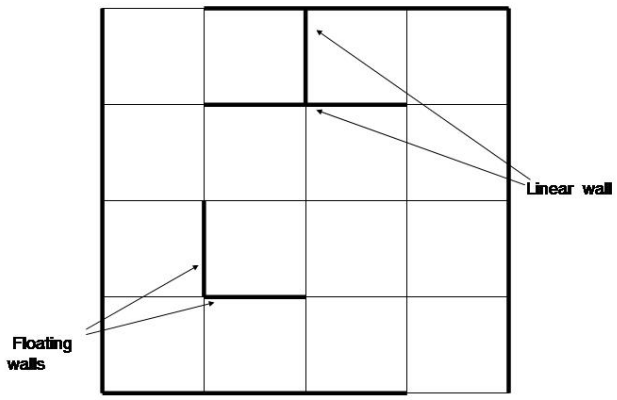
1.3 Path 路徑

1.3.1 Walls may or may not lead to the entrance/exit. Walls that lead to the entrance/exit are called linear walls. The walls that do NOT lead to the entrance/exit are called “Floating Walls”.
牆可能或不可能引路至入口/出口。牆可引路至入口/出口稱作線性牆。牆不能引路至入口/出口的稱作”流動牆”。

1.3.2 Paths will be approximately 30cm wide with +/-2cm variation, but may open into foyers wider than the path.
路徑將闊約30cm並容許+/-2cm偏差，但門廳可能打開而大於路徑。

1.3.3 One of the outermost tiles is the starting tile, where a robot should start and exit the run.
其中一個最外面的磚塊是起始磚塊，這是機械人開始和退出運行的地方。

1.3.4 The starting tile is always a checkpoint.
起始磚塊永遠是一個檢查點。



1.4 Debris, Speed Bumps and Obstacles 碎片、減速坡和障礙物

1.4.1 Speed bumps are fixed to the floor, and have a maximum height of 2cm.
減速坡固定於地板上，最高為2cm。

1.4.2 Debris will not be fixed on the floor, and have a maximum height of 1cm.
碎片將不會固定在地板上，最高為1cm。

1.4.3 Debris may be spread towards or adjacent to walls.
碎片可能伸展至靠近於牆。

1.4.4 Obstacles may consist of any large, heavy items and its shape can be anything from rectangular, pyramidal, spherical to cylindrical.
障礙物可能由任何大的、重的物品組成，及其形狀可以是長方體、錐體、球體以至圓柱體。

1.4.5 Obstacles have minimum height of 15 cm.
障礙物最小高15cm。

1.4.6 Obstacle must not prevent a robot from discovering routes in the maze. An obstacle may be placed in any location where at least 20 cm is left between the obstacle and any walls.
障礙物必定不會妨礙機械人在迷宮中發現路線。障礙物可放置在任何位置，但與各牆壁最少有20cm距離。

1.4.7 Obstacles that are moved or knocked over will remain where they are moved to/fall and will not be reset during the run.
被移動或打翻的障礙物將保留在被移動或打翻的位置，直至回合結束。

1.5 Victims 遇難者

1.5.1 Victims are heated sources located near the floor of the arena (centered approximately 7 cm above the floor).
遇難者的發熱源放置於接近賽場地板位置(其中心距離地板約7厘米)。

1.5.2 Each victim has a surface area greater than 16 sq cm.
每個遇難者表面面質大於16平方厘米。

1.5.3 The organizers will try to keep enough difference (minimum of 10 degrees Celcius) between victims' temperatures and the indoor temperature. The temperature of the victim simulates human body temperature between 28C to 40C.
大會將盡量使遇難者的溫度和室內的溫度保持足夠的差異(最少攝氏10度) 遇難者的溫度模擬人體溫度在28C至40C之間。

1.5.4 There will be a minimum of five (5) active victims in any round.
任何回合最少有五(5)個起作用的遇難者。

1.5.5 There may be objects that resemble victims in appearance, but are not heated. Such objects are not to be identified as victims by robots.
可能會有外觀類似遇難者的物件，但不是熱的。這些物件不應被機械人識別為遇難者。

1.5.6 Victims will never be located on black tiles or on tiles with obstacles.
遇難者不會放置在黑色的階磚塊或有障礙物的階磚塊。

1.6 Rescue Kits 救援包

1.6.1 A Rescue Kit represents a basic health package distributed to a victim caught in a natural disaster. It symbolizes tools or devices used in rescue process, such as GPS Transponders or even something as simple as light source providers.
救援包代表遇上自然災害的遇難者所配給的一個基本醫療包。這象徵著於救援過程中使用的工具或設備，如GPS轉發器，甚至一些簡單至提供光源的東西。

1.6.2 A Rescue Kit should preferably contain a lit-up LED, but could contain other electronics, weights or magnets.
救援包最好含有一個點亮的LED，但可以包含其他的電子器件，砝碼或磁鐵。

1.6.3 Each rescue kit must have a minimum volume of 1 cubic cm.
每個救援包的體積必須最小有1立方厘米。

1.6.4 Each team can only carry up to a maximum number of 12 of those kits.
每隊伍僅可攜帶最多12個救援包。

1.6.5 Some sample instructions for creating the rescue lit-up kit can be found the end of this document, and may be found at the International RCJ Community Forum (http://www.rcjcommunity.org/). Each team is encouraged to design

their own versions.
製作救援點燃包的一些示例說明可於文件的末尾找到，及可能於國際RCJ社區論壇(http://www.rcjcommunity.org/)找到。鼓勵每隊設計他們自己的版本。

1.6.6 Each team is responsible for the whole rescue kits system (the maximum of 12 kits), including bringing the rescue kits to the competition. Team captain is responsible for loading their own Rescue Kits on their robots and cleaning the field with the referee's/judges' authorization after the game is called to end.
每個隊伍負責整個救援包系統(共最多12個)，包括帶同救援包往比賽。隊長負責加載他們自己的救援包至他們的機械人上，及比賽結束後在裁判的授權下清潔場地(拾回救援包)。

1.7 Environmental Conditions 環境條件
1.7.1 Teams should expect the environmental conditions at a tournament to be different from the conditions of at their home practice field.
隊伍應預期比賽的環境條件，有別於他們作自家練習場地的條件。

1.7.2 Teams must come prepared to adjust their robots to the lighting conditions at the venue.
隊伍必須有備而來，在會場的照明條件下調整他們的機械人。

1.7.3 Lighting and magnetic conditions may vary along the course in the rescue arena.
在拯救賽場上，照明及磁場情況可隨比賽過程有所變化。

1.7.4 The arena may be affected by magnetic fields (e.g. generated by under floor wiring and metallic objects).
場地可能受磁場影響(如：由地板下的電線和金屬物體產生的)

1.7.5 Teams should prepare their robots to handle unexpected lightning interference. While the organizers and referees will try their best to minimize external lighting interference, it is not possible for them to foresee all unexpected interferences such as camera flash from spectators.
隊伍所準備的機械人應能應付不可預期的照明干擾。雖然大會和裁判將竭盡所能減少外在光線的干擾，但他們不可能預知所有意外的事，如來自觀眾相機的閃光燈。

1.7.6 The Organizing Committee (OC) will try their best to fasten the walls onto the field floor so that the impact from regular robot's contact should not affect it. (Refer to 6.1)
組織委員會(OC)將會盡力以固定的牆在地板，所以正常的機械人接觸不應構成影響。(參見 6.1)

1.7.7. All measurements in the rules have a tolerance of 5%.
規則中所有測量的誤差可以有5%。

1.7.8. Objects to be detected by the robot will be distinguishable from the environment by their color or heat signature.
被機械人所檢測的對象將是可以通過跟環境中顏色或熱信號來區分。

2. Robot 機械人
2.1 Control 控制
2.1.1 Robots must be controlled autonomously. The use of a remote control or manual control, or passing information (by sensors, cables, wirelessly, etc.) to the robot is not allowed.
機械人必須是自主控制。使用遙控或人為控制，或傳輸資料(透過傳感器、電纜、無線方式等)至機械人是不允許。

2.1.2 Robots must be started manually by the team captain.
機械人必須由隊長以人手啟動。

2.1.3 Robots may utilize various maze navigation algorithm. Pre-mapped type of dead-reckoning (movements predefined based on known locations before game play) is prohibited.
機械人可以利用各種迷宮導航算法，但預先繪製地圖類型的航位推測法(預設移動基於賽前所知的位置)是禁止的。

2.1.4 The robot must not damage any part of the arena in any way.
機械人不能以任何方式損壞賽場任何部分。

2.1.5 Robots should include a stop/pause button so they may be easily stopped/ paused by humans to avert any potentially damaging or illegal robot actions
機械人應包括停止/暫停按鈕，使人們可以很容易地把它們停止/暫停下來，以避免任何潛在的破壞或違規的機械人行為。

2.2 Construction 構造
2.2.1 The height of a robot must not exceed 30 cm.
機械人高度不能超出30cm。

2.2.2 Robots may not have any sensor or other device that enables it to 'see' over the walls.
機械人不可有任何傳感器或其他裝置容許它的視野高於牆壁。

2.2.3 Any robot kit or building blocks, either available on the market or built from raw hardware and materials, may be used, as long as the design and construction are primarily and substantially the original work of the students (see section 2.5. below).
任何機械人套件或積木，無論是在市場上或從原始硬件和材料製造，也可以使用，只要在設計和搭建上主要地和本質上地為學生的原創作品(見以下章節第2.5）。

2.2.4 Any commercially produced robot kits or sensors components that are specifically marketed to complete any single major task of RoboCupJunior Rescue will be disqualified. If there is any doubt, teams should consult the Technical committee (TC) at the International RCJ Community Forum (*http://rcjcommunity.org)*.
使用專門銷售給完成RoboCupJunior拯救的任何一個重大任務的任何商業生產的機械人套件或傳感器部件將被取消資格。如有任何疑問，隊伍應在國際RCJ社區論壇（http://rcjcommunity.org）向技術委員會(TC) 諮詢。

2.2.5 For the safety of participants and spectators, only lasers of class 1 and 2 are allowed. This will be checked during inspection.
為保參加者及觀眾安全，只允許使用級別1及2的雷射。安檢時將被檢討。

2.2.6 Bluetooth Class 2,3 and ZigBee communications are the only wireless type allowed in RoboCupJunior. Robots that have other types of wireless communication on board have to be either removed or disabled for possible interference with other leagues competing in RoboCup. If a robot has equipment for other forms of wireless communication, the team must prove that they have been disabled them. Robots that do not comply may face immediate disqualification from the tournament.
RoboCupJunior只允許的無線通訊類型是藍芽組別2，3和ZigBee通訊。機械人板上有其他類型的無線通訊時，需要將其移除或關掉。因其他類型的無線通訊可能干擾到RoboCup其他聯盟的賽事。如機械人已裝設了其他形式的無線通訊，隊伍必須證明它們已關掉。機械人沒有遵從，可能遭到立即取消比賽資格。

2.3 Team 隊伍
2.3.1 Each team must have only one robot in the field. (This rule can be modified in a Super Team Competition such robots from different teams are deployed together and have to cooperate in completing given tasks.)
每隊必須只有唯一的機械人在賽場內。(於超級聯隊比賽中這規則可被修改，如機械人是由不同的隊伍一起研製和需要合作以完成給予的任務。)

2.3.2 Each team must have a minimum of 2 members.
每隊最少有兩名成員。

2.3.3 Students will participate in ONLY ONE (1) of the three (3) divisions: Primary Rescue Line, Secondary Rescue Line or Rescue Maze.
學生只能參加小學組拯救、中學組拯救或拯救迷宮任選其中一個。

2.3.4 Eligibility for international event is: 國際賽參加資格：

- Rescue Line Primary: Open to students between 11 and 14 years old. Age is calculated as of July 1 for the international RCJ event each year.

小學組拯救：舉辦給年齡由11至14歲之間的學生。年齡計算截至每年國際RCJ比賽日的7月1日。

- Rescue Line Secondary: Open to students from 11 up to and including 19 years of age. Team members may compete in Secondary Rescue at most, twice (2 international events). After competing twice they must move to Rescue Maze.

中學組拯救：舉辦給年齡由11至19歲的學生。隊伍成員最多可以參加中學組拯救兩次(凡指兩次國際賽)。兩次後，他們必須轉到拯救迷宮比賽。

-Rescue Maze: Open to students from age of 11 up to and including 19 years of age.

拯救迷宮：舉辦給年齡由11至19歲的學生。

2.3.5 The number of team members per a team is limited to 6 members maximum but team should choose their team size in a way that the learning experience of each member is maximized. Mentors/parents are not allowed to be with the students during the competition. The students will have to self-govern themselves (without mentor's supervision) during the long stretch of hours at the competition.
每隊隊員人數限制在最多6名，但隊伍應該選擇他們的隊伍規模，達至每個成員的學習經驗最大化。比賽期間不允許教練/父母和學生在一起。在悠長的比賽期間學生必須自主管理自己(沒有教練的監督)。

2.3.6 Every team member can be registered in only one team, and every team can compete in only one RoboCupJunior league and division.
每名隊員都只可註冊在一支隊，以及每支球隊只能在一個RoboCupJunior聯盟和分組比賽。

2.4 Inspection 檢查

2.4.1 The robots will be examined by a panel of referees before the start of the tournament and at other times during the competition to ensure that they meet the constraints described above.
比賽開始前和比賽過程中的其他時間，機械人將被一組裁判檢查，以確保機械人符合上述要求。

2.4.2 It is highly unlikely that a team will be able to legally use a robot identical to another team's robot from previous or the current years, or use a robot that is identical to another team's robot.
隊伍不得與其他隊伍使用相同的機械人，也不能使用過往年度或本年度其他隊伍使用的機械人。

2.4.3 It is the responsibility of teams to have their robots re-inspected, if their robots are modified at any time during the tournament.
比賽期間任何時間機械人若有修改，參賽隊伍有負責讓機械人重新接受檢查。

2.4.4 Students will be asked to explain the operation of their robot in order to verify that the construction and programming of the robot are their own work.
學生將會被要求講解其機械人的操作，以證實機械人的構建和編程是由他們自己完成的。

2.4.5 Students will be asked questions about their preparation efforts, and may be requested to answer surveys and participate in video-taped interviews for research purposes.
學生將會被問及準備工作事宜，可能會被要求回答調查問卷及參與錄影訪問，作為研究目的。

2.4.6 All teams must fill a web form that will be provided once the team is officially registered, and should be submitted at least one week prior to the competition. The purpose of this document is to allow judges to be more prepared for the interviews. For samples documentation, please refer to the "Description of Materials Sample" at the official RCJ website under Rescue rules. Information about how to submit your document will be announced prior to the competition to the teams.
所有隊伍在正式注冊後必須必須填寫網上表格，而且需要在比賽前至少一星期前前交。這文件目的是允許評審有較多時間準備面試。文件範例，請參考RCJ官方網站拯救規則下的"Description of Materials Sample"。如何提交你的文件，資

料將於比賽前向隊伍宣佈。

2.4.7 All teams have to submit their source codes prior to the competition. The source code is never shred with other teams without the team's permission.
比賽前所有隊伍需要提交他們的源程式碼。沒有隊伍的允許，源程式碼不得與其他隊伍分享。

2.5 Violations 違規
2.5.1. Any violations of the inspection rules will prevent the offending robot from competing until modifications are applied.
任何違反檢查規則的機械人不得參賽，直至修改妥當。

2.5.2. However, modifications must be made within the time schedule of the tournament and teams must not delay tournament play while making modifications.
然而，修改必須在比賽規定的時間內完成，進行修改的同時，隊伍不得耽誤比賽。

2.5.3. If a robot fails to meet all specifications (even with modification), it will be disqualified from that round (but not from the tournament).
若機械人不能符合所有的規定(即使已作修正)，將被取消其該輪比賽資格(但非整個比賽)。

2.5.4. No mentor assistance during the competition is allowed. See 6. Code of Conduct.
比賽期間禁止導師的協助。見章節6 行為守則。

3. Play 比賽
3.1 Pre-round Practice 賽前練習
3.1.1. Where possible, competitors will have access to practice arenas for calibration, testing and tuning throughout the competition.
如果可以，整個比賽中，參賽者將進入練習場區進行校準、測試和調優。

3.1.2.Whenever there are dedicated independent arenas for .competition and practice, it is the organizers' discretion if testing is allowed on the competition arena.
賽場和練習場是各自獨立的區域，而大會有決定權是否允許在賽場區域內測試。

3.2 Humans 隊員
3.2.1 Teams should designate one of its own team members as 'captain' and another one as 'co-captain'. Only these two team members will be allowed an access to the practice/competition arenas, unless otherwise directed by the referee. Only the 'captain' will be allowed to interact with the robot during a scoring run.
隊伍應委派自己隊伍的其中一名成員為'隊長'和另一成員為副'隊長'。 除非裁判另有指示，否則只允許這兩名成員進入練習/比賽賽場。得分回合期間只允許隊長可與機械人互動。

3.2.2 The captain can move the robot only when s/he is told to do so by the referee.
只有當她/他得到裁判指示時，隊長才可移動機械人。

3.2.3 Other team members (and any spectators) within the vicinity of the rescue arena are to stand at least 150 cm away from the arena while their robot is active, unless otherwise directed by the referee.
在機械人運動期間，除非裁判另有指示，否則所有其他隊伍成員(和任何觀眾)需要與拯救賽場範圍保持距離最少150cm。

3.2.4 No one is allowed to touch the arenas intentionally during a scoring run.
得分回合期間不允許任何人故意觸碰賽場。

3.3 Start of play 開始比賽
3.3.1 A run begins at the scheduled starting time whether or not the team is present/ready. Start times will be posted prominently around the venue.
比賽會按照預定時間開始，不管參賽隊伍是否已出席/準備。開始時間將張貼在賽場周圍的當眼位置。

3.3.2 Once the scoring run has begun, the robot playing is not permitted to leave the competition area for any reason. Each run lasts a maximum of 8 minutes.
得分賽一旦開始，不論任何理由機械人不得離開比賽場區。每輪比賽最多為8分鐘。

3.3.3 Calibration is defined as the taking of sensor readings and modifying a robot's programming to accommodate such sensor readings. Once the clock has started, a team may calibrate their robot in as many locations as desired on the arena, but the clock will continue to count down. A robot is not permitted to move using its own power while calibrating.
校準的定義是取得傳感器讀數和修改機械人程式以容納這些傳感器的讀數。計時一旦開始，隊伍可能於賽場內多個位置校準他們的機械人，但計時繼續倒數。當校準時不允許啟動機械人移動。

3.3.4 Calibration time is not for pre-mapping the arena and/or victim location. Pre-mapping activities will result in immediate robot disqualification for the round.
校準時間不是用作預先繪製賽場地圖或遇難者位置。進行繪製賽場地圖，機械人將立即失去該輪比賽資格。

3.3.5 Before a scoring run begins, a dice will be rolled to determine the location of the black and silver tiles. The position of the black tiles will NOT be revealed to the team until when they are ready to start a scoring run (see 3.3.6). Referees will ensure the combination of black tile placement result in a maze is 'solvable' before a robot begins a scoring run.
得分賽開始前，將擲骰子決定黑色和銀色階磚塊位置。黑色階磚塊位置將不會被透露，直至隊伍準備開始得分賽(見3.3.6)。機械人於分賽開始前，裁判確保迷宮中的黑色階磚塊位置組合'是可解的'。

3.3.6 Once the robot is started, the referee will place the black tiles and tiles (determined by roll of dice as per 3.3.5).
機械人一旦開始，裁判將放置黑色階磚塊(根據3.3.5，由擲骰子決定)。

3.3.7 Once a scoring run has begun, no more calibration is permitted (this includes changing of code/code selection).

得分賽一旦開始，不容許再有校準(包括轉換程式或程式選項)。

3.4 Game play 比賽過程

3.4.1 Modifying a robot during a run is prohibited; which includes remounting parts that has fallen off.
比賽回合期禁止修改機械人，其中包括將已經脫落的部件重新掛載。

3.4.2 All parts that the robot is losing intentionally or unintentionally are left in the arena until the run is over. Neither the team nor the judge is allowed to remove parts from the arena during a run or Lack of Progress.
機械人之所有部件，不論有意或無意地留在賽場均保持原狀，直至回合結束。比賽和進展中斷期間，都不允許隊伍和裁判將部件從賽場中移走。

3.4.3 The teams are not allowed to give a robot any advance information about the field. The robot is supposed to recognize the field by itself.
不允許隊伍預先將有關賽場的資料給予機械人。機械人應該是自行識別賽場。

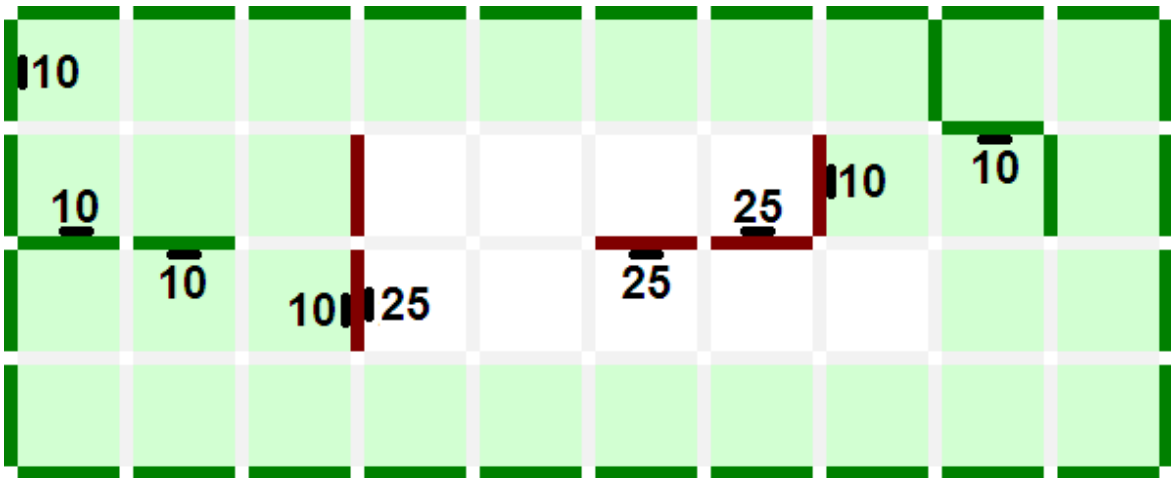
3.4.4 A 'visited tile' means that more than half of the robot is inside the tile when looking down from above.
「已到訪階磚」意指機械人有一半以上的機身已進入階磚當從上向下看的時候。

3.5 Scoring 得分

3.5.1 Successful Victim Identification. Robots are rewarded points for each Successful Victim Identification in the arena:
成功確定遇難者。機械人於賽場內成功確定每個遇難者可獲得分。

a)10 points per "victim" located at a tile adjacent to a linear wall (even diagonally), i.e. all victims at the 6 tiles around a linear wall.
每個遇難者10分，當被放置在鄰近線性牆的階磚塊時(即使牆是傾斜)。如位於6道線性牆的所有遇難者。

b) 25 points per "victim" at other walls.
每個遇難者25分，當在其他的牆時。



In the above diagram, red lines mean floating walls while the green ones represent linear walls.
於上圖，紅色線為流動牆而綠色代表線性牆

Note that some of the victims on the floating walls are worth 10p, this is because the 10p victims are located in a tile near a linear wall. The colors on the diagram are just for illustrative purposes.

注意：部分在流動牆的遇難者只有10分，原因是該10分的遇難者身處的階磚塊與線性牆相鄰。

To identify a victim, a robot must stop within 15 cm of the victim while flashing a lamp on and off for five seconds, and/or release a Rescue Kit before moving on. When a robot completes both, it counts as one victim identification and one rescue kit deployment (see below).
確認遇難者時，機械人必須停在遇難者的15cm範圍內，接著閃燈5秒，和/或放下救援包後才繼續。當機械人完成這兩項，算是確定一個遇難者和配置一個救援包。

3.5.2 Successful rescue kit deployment. Robot should drop a rescue kit on the tile where the victim is, and the deployment point needs to be within 15 cm proximity of the victim. The robot is awarded 10 points per successful rescue kit deployment. No extra points for multiple kit deployments per victim.
成功配置拯救包。機械人應該把拯救包放在遇難者所在的階磚上，配置點需要在遇難者的15厘米範圍內。機械人每次成功配置拯救包可獲10點。對每個遇難者重複配置拯救包不會獲額外分數。

3.5.3 Reliability Bonus. Reliability bonus = the number of 'successful victim' identification" x 10 + the number of 'successful rescue deployment' x 10, minus the number of 'Lack of Progress' x 10. However, Reliability Bonus score can only be reduced down to the minimum of 0 points.
可靠性分。可靠性分 = (「分功確認遇難者」數目 x 10 + 「成功配置拯救包」數目 x 10) 減 「進展中斷」數目 x 10。然而可靠性分最多只會被扣至 0 分

3.5.4 Successful Speed Bump Crossing. For each passed tile with speed bumps, a robot is awarded 5 points.
成功跨越減速坡。每通過有減速坡的階磚，機械人可獲5分。

3.5.5 Successful Up Ramp Negotiation. A robot is awarded 20 points for a successful climb of the ramp. To successfully climb up the ramp, a robot needs to move from the flat tile before the ramp to the flat tile after the ramp.
成功攀上斜坡。機械人成功攀上斜坡可獲20分。成功地攀上斜坡，機械人需要由斜坡底部平坦的階磚駛至斜坡頂部平坦的階磚。

3.5.6 Successful Down Ramp Negotiation. A robot is awarded 10 points for successfully landing at the bottom of the ramp. A robot needs to move from the top horizontal tile of the ramp to the bottom horizontal tile of the ramp. A successful landing means that the robot can leave the tile without assistance.
成功駛落斜坡。機械人成功著陸於斜坡的底部可獲10分。機械人需要由斜坡頂部水平階磚駛至斜坡底部水平的階磚塊。成功著陸意思是機械人在無需要協助下完成

3.5.7 Successful Checkpoint Negotiation. A robot is awarded10 points for each visited checkpoint. Refer to 3.4.4 for definition of visited tile.
成功通過檢查點。每到訪檢查點機械人可獲10分。參考3.4.4已到訪階磚的定義。

3.5.8 Successful Exit Bonus. A successful exit bonus is awarded when a robot successfully finishes a round on the start tile. It needs to stay there at least 10 seconds (this is to simulate the retrieval of a robot from the disaster zone.) The points awarded will be 10 points per victim successfully identified.
成功離開得分。當機械人成功完成回合並回到起始階磚可以獲得成功離開得分。機械人需要停留在此直至裁判認定機械人已靜止。(這模擬機械人從災難場回收。) 獲得的分數為每有一個成功確認遇難者獲10分。

3.5.9 Ties at the end. Ties in scoring will be resolved on the basis of the time each robot took to complete the run.
最終出現平分時。會以機械人比賽的完成時間來分勝負。

3.5.10 No duplicate rewards. For example, if a robot successfully crosses a tile with speed bumps multiple times, only one Successful Speed Bump Crossing will be rewarded per tile. Same applies to all rewarding entries specified here.
沒有重複計分。例如，如果一個機械人成功地跨越有減速坡的階磚多次，只會對每個階磚給予一次成功跨越減速坡的分數。這同樣適用在所有可得獲分數的項目。

3.5.11 A score sheet template is provided on the official RoboCupJunior website.

評分表模板於RoboCupJunior網站上提供。

3.6 Lack of Progress 進展中斷

3.6.1 A Lack of Progress occurs when 發生進展中斷當

A) The team captain declares a Lack of Progress. 隊長宣佈進展中斷。

B) A robot fails to retreat from a 'visited' black tile, For a successful retreat it needs to back up without turning inside the black tile (it has to move straight backwards inside of a black tile). See definition of visited, 3.4.4.
機械人無法從已到訪的黑色階磚撤退，成功撤退是機械人需要後退而在黑色階磚內沒有轉向(這需要在黑色階磚內垂直倒車離開)。已到訪的定義見3.4.4。

C) The robot or a team member damages the arena.
機械人或隊伍成員損壞了賽場。

D) A team member touches the arena or their robot without permission from a referee.
隊伍未得到裁判同意下，接觸賽場或機械人。

3.6.2 If a Lack of Progress occurs, the robot must be returned to the last visited checkpoint. The robot can be placed in any direction. Refer to 3.4.4 for definition of visited tile.
如發生進展中斷，機械人必須返回到上一個到訪的檢查點。機械人的放置可朝任何方向。(已到訪階磚的定義參見3.4.4)。

3.6.3 After a Lack of Progress the team captain may reset (turn on and off) the power supply and program. He is not allowed to change the program or give any information about the maze to the robot.
進展中斷後，隊伍可以重新啟動電源及程式，但不允許改變機械人程式或給予機械人有關迷宮的資料。

3.7 End of Play 比賽結束

3.7.1 The team captain may declare an "end of round" if the team wants to stop the round early. The team will be awarded all points achieved up to the call for end of round.
隊長可以宣佈"回合結束"，如隊伍需要提前結束回合。隊伍將獲得於回合結束前，已獲得的分數。

3.7.2 The round ends when: 當回合結束時：

A) The time expires. 時間耗盡

B) The team captain calls end of round. 隊長要求回合結束

C) The robot returns to the start tile and gets the exit bonus. 機械人截返起點階磚塊及獲得離開得分

4. Open Technical Evaluation 公開技術評估

4.1 Description 描述

4.1.1 Your technical innovation will be evaluated during a dedicated time frame. All teams need to prepare for an open display during this time frame.
於特定時間環節，你們的技術革新將被評估。在評估時段內所有隊伍需要準備為這個公開的展示作好準備。

4.1.2 Judges will go around interacting with teams. It will be set up as more like a casual conversation or "questions and answers" atmosphere.
評審將巡察並與隊伍互動。這將會是一般的交談或"問與答"的形式。

4.1.3 The main objective of the Open Technical Evaluation is to emphasize the ingenuity of innovation. Being innovative may mean technical advance as compared to the existing knowledge, or an out-of-the-ordinary simple but

clever solution to existing tasks.
公開技術評估的主要目的是強調創作力的革新。存在革新意指技術領先相對於現存知識，或不凡的簡單但能聰明的解決現存工作。

4.2 Evaluation Aspects 評估方向
4.2.1 A standardized rubric system is used focusing on: 採用標準的專欄系統將重點放在：
a)creativity 創造性
b)cleverness 靈功性
c)simplicity 簡潔性
d)functionality 功能性

4.2.2 "Your work" can include (but is not limited to) one of the following aspects:
你的工作可以包括(但不是限制於)以下其中一方面。

a) creation of your own sensor instead of a pre-built sensor
創建你自己的傳感器而不是一個預先建立傳感器

b) creation of a "sensor module" which comprises of various electronics to provide a self-contained module to provide a certain special functionality
創建一個“傳感器模塊”，它包括各種電子設備提供獨用的模塊以作一定的特殊功能。

c) creation of a mechanic module which is functional, but out of the ordinary
創建一個機械師模塊，實用的但與眾不同

d) creation of a new software algorithm to a solution
創建一個新的軟件運算法則來解決

4.2.3 Teams must provide documents that explain their work. Each invention must be supported by concise but clear documentation. The documents must show concise inventive steps.
隊伍必須提供文件解釋他們的工作。每個發明必須有簡潔而清晰的記錄支持。該文件必須顯示簡潔發明步驟。

4.2.4 Documents must include one poster and one engineering journal (see the Engineering Journal document for more details). Teams are expected to be readily prepared to explain about their work.
文件必須包括一張海報和一張工程日誌(詳情見工程日誌文件)。預期隊伍樂意地準備解釋有關他們的工作。

4.2.5 Engineering Journal should demonstrate your best practice in your development process.
工程日誌應說明你最好練習於你的研發進程。

4.2.6 The poster should include name of team, country, league, robot description, robot capabilities, controller and programming language used, sensors included, method of construction, time used for developing, cost of materials and awards won by the team in its country, etc.
海報應包括隊伍的隊名、國家、組別、機械人描述、機械人描述、控制器及所使用的程式語言，包含的傳感器、建構方法，開發所需時間、材料成本及隊伍在他們國家贏得的獎項等。

4.2.7 Guidelines may be provided at the official RCJ website under Rescue rules (Engineering Journal document).
指引可在RCJ官方網站救援規則下(工程日誌文件)提供。

4.3 Awards 獎項
4.3.1 Awards may be divided into several categories. 獎項可能劃分成幾個類別。
a) Innovation: 革新
- Mechanical innovation 機械革新
- Electronic innovation 電子革新

- Algorithm innovation　運算法則革新
b) Robust Design:　健全的設計
- Mechanical design　機械設計
- Electronic design　電子設計
- Algorithm design　運算法則設計

c) Team work – demonstration of great collaborations within the team. 隊伍分工 – 展現隊伍內的通力大合作。
d) Best Practice (in development) – demonstration of the best development practice from brainstorming, designing, prototyping, development, test plan, quality assurance plan, etc.
最佳實踐(於開發中) – 展現最佳開發實踐由腦震盪、設計、原型設計、開發、測試計劃、以至質量保證計劃等。

4.3.2 Awards will be given in the form of a certification.
獎項將以證書形式頒發。

4.4 Sharing　分享
4.4.1 Teams are encouraged to review other's posters and presentations.
鼓勵隊伍評閱其他隊伍的海報和報告

4.4.2 The awarded teams are required to post their documents and presentation at the International RCJ Community Forum (http://www.rcjcommunity.org/)
獲獎隊伍會被要求刊登他們的文件及報告到國際RCJ社區論壇(http://www.rcjcommunity.org/)。

5. Conflict Resolution　衝突的解決
5.1 Referee and Referee Assistant　裁判和助理裁判
5.1.1 All decisions during game play are made by the referee or the referee assistant who are in charge of the arena, persons and objects surrounding them.
比賽進行期間，由裁判裁決所有決定，助理裁判負責場地、周圍的人和物品。

5.1.2 During game play, the decisions made by the referee and/or the referee assistant are final.
比賽進行期間，裁判和助理裁判的決定為最終決定。

5.1.3 At conclusion of game play, the referee will ask the captain to sign the score sheet. Captain should be given maximum 1 minute to review the score sheet and sign it. By signing it, the captain accepts the final score on behalf of the entire team; in case of further clarification, the team captain should write their comments in the score sheet and sign it.
比賽結束時，裁判會要求隊長在計分紙上簽名，隊長有最多一分鐘的時間檢閱計分紙及簽名。簽名表示隊長是代表整支隊伍接受了最終分數；如需要進一步澄清，隊長應在計分紙上寫上註釋及簽名。

5.2 Rule Clarification　規則澄清
5.2.1 If any rule clarification is needed, please contact the International RoboCupJunior Rescue technical Committee through the International RCJ Community Forum (*http://www.rcjcommunity.org/*)
如任何規則需要澄清，請透過國際RCJ社區論壇聯絡國際RoboCupJunior救援技術委員會

5.2.2 If necessary even during a tournament, a rule clarification may be made by members of the RoboCupJunior Rescue Technical Committee and Organizing Committee.
如有必要，即使比賽期間，規則的澄清可以由RoboCupJunior救援技術委員會和組織委員會的成員執行。

5.3 Special Circumstances　特殊情況
5.3.1 If special circumstances, such as unforeseen problems or capabilities of a robot occur, rules may be modified by the RoboCupJunior Rescue Organizing Committee Chair in conjunction with available Technical Committee and Organizing Committee members, if necessary even during a tournament.

如有特殊情況，例如不可預見的問題或機械人的能力問題，需要時即使比賽期間，RoboCupJunior拯救組委員會主席會與技術委員會和大會委員會成員協助修改規則。

5.3.2 If any of team captains/mentors do not show up to the teams meeting to discuss the problems and the resulting rule modification described at 5.3.1, it is considered as an agreement.
如任何隊伍或教練沒有提出隊伍會議所討論的問題或規則的修改見5.3.1，這被視為同意

6. Code of Conduct 行為守則

6.1 Spirit 比賽精神

6.1.1 It is expected that all participants (students and mentors alike) will respect the aims and ideals of RoboCup Junior as set out in our mission statement.
所有參加者(學生和教練)都應尊重RoboCup Junior的目標和理念並作為我們的使命。

6.1.2 The volunteers, referees and officials will act within the spirit of the event to ensure the competition is competitive, fair and most importantly fun.
義工、裁判和工作人員將尊從活動的比賽精神以確保比賽具競爭性、公平和充滿歡樂。

6.1.3 ***It is not whether you win or lose, but how much you learn that counts!***
比賽意義不在輸贏，重在學習！

6.2 Fair Play 公平比賽

6.2.1. Robots that cause deliberate or repeated damage to the arena will be disqualified.
機械人故意或重複損壞比賽場地的，取消其比賽資格。

6.2.2. Humans that cause deliberate interference with robots or damage to the arena will be disqualified.
人為地故意干擾其他機械人或是故意損壞比賽場地的，取消肇事者比賽資格。

6.2.3. It is expected that the aim of all teams is to participate fairly.
期望所有參賽隊伍的目標皆為公平的比賽。

6.3 Behavior 行為

6.3.1 Participants should be mindful of other people and their robots when moving around the tournament venue.
在比賽場館行走時，參加者應留意其他人和他們的機械人。

6.3.2 Participants are not allowed to enter setup areas of other leagues or other teams, unless explicitly invited to do so by team members.
參加者不得進入其他聯盟或其他隊伍的設置區域，除非明顯地獲得隊員的邀請。

6.3.3 Teams will be responsible for checking update information (schedules, meetings, announcements, etc.) during the event. Update information will be provided on notice boards in the venue and (if possible) on the local competition website and/or the RoboCup or RoboCupJunior websites.
比賽期間隊伍有責任留意比賽最新消息(如賽程表、會議、宣佈等)，最新消息將會在場內的舌示板上公布，以及(如可能)在地區比賽的網頁及/或RoboCup或RoboCupJunior的網頁公布。

6.3.4 Participants who misbehave may be asked to leave the building and risk being disqualified from the tournament.
任何行為不端的參加者可能被要求離開會場或被取消參賽資格。

6.3.5 These rules will be enforced at the discretion of the referees, officials, tournament organizers and local law enforcement authorities.
這些規則的會由授權的裁判、工作人員、賽事舉辦者執行。

6.4 Mentors 教練

6.4.1 Adults (mentors, teachers, parents, chaperons, translators and other adult team members) are not allowed in the student work area.
成人(教練、教師、父母、同伴、翻譯員和其他的成人成員)不允許駐足於學生工作區域。

6.4.2 Sufficient seating will be supplied for mentors to remain in a supervisory capacity close to the student work area.
於學生工作區附近，大會將嘗試提供足夠座位給教練，以起監護作用。

6.4.3 Mentors are not permitted to repair robots or be involved in programming of their team's robots.
不允許教練修復機械人或是參與編寫程式。

6.4.4 Mentor interference with robots or referee decisions will result in a warning in the first instance. If this recurs, the team will risk being disqualified.
教練干擾機械人或裁判的決定，首犯給予警告處分，再犯則可取消該隊比賽資格。

6.4.5 Robots have to be mainly students' own work. Any robot that appears to be identical to another robot may be prompted for re-inspection.
機械人主要是學生自己製作。任何機械人與另一機械人似乎是相同，可能會被要求重新檢查。

6.5 Ethics and Integrity 道德和誠懇

6.5.1 Fraud and misconduct are not condoned. Fraudulent acts may include the following:
不會縱容欺詐和不當行為。欺詐行為可能包括以下內容：

a) Mentors working on the software or hardware of students' robot(s) during the competition.
比賽期間教練對學生的機械人軟件或硬件參與其中。

b) "Higher league group" and/or more advanced group of students may provide advice, but should not do the work for "Lower league group". For example, a secondary group helped to fix its peer primary group's work, software or hardware prior to and/or during the competition. This may risk the secondary group to be disqualified as well. See "Code of Conduct, 6.4.3 & 6.4.5". This applies not just to mentors, but also to higher league (advanced) group of students as well.
"較高級聯盟組別"和/或較高級隊伍的學生可提供意見，但不應為較低級聯盟隊伍提供協助。例如，比賽之前或期間，中級組幫助解決同輩初級組的工作，軟件或硬件。這可能會導致中級組同被取消資格。見 行為守則的 6.4.3 及 6.4.5。這不僅適用於教練，於較高級聯盟(高級)組別的學生一樣適用。

6.5.2 RoboCupJunior reserves the right to revoke an award if fraudulent behavior can be proven after the awarding ceremony took place.
頒獎典禮舉行後，如有欺詐行為被證實，RoboCupJunior拯救有權撤銷獎項。

6.5.3 If it is clear that a mentor intentionally violates the code of conduct, and repeatedly modifies and works on the students' robot(s) during the competition, the mentor will be banned from future participation in RoboCupJunior competitions.
比賽期間，如教練顯然故意違反行為守則，並重復修改和參與學生機械人有關工作，該教練將被禁止參與未來舉辦的RoboCupJunior比賽。

6.5.4 Teams that violate the code of conduct can be disqualified from the tournament. It is also possible to disqualify only a single team member from further participation in the tournament.
隊伍違反行為守則可被取消比賽資格。也可能是取消隊伍中某一成員參與接下來的比賽資格。

6.5.5 In less severe cases of violations of the code of conduct, a team will be given a warning. In severe or repeated cases of violations of the code of conduct, a team can be disqualified immediately without a warning.
在違反行為守則不太嚴重的情況下，隊伍會被給予警告。在嚴重或反復違反行為守則的情況下，隊伍會立即被取消資格

而無須警告。

6.6 Sharing 分享

6.6.1 The spirit of world RoboCup competitions is that any teological and curricular developments should be shared with other participants after the tournament.
世界RoboCup比賽的精神是當比賽後，任何技術和課程發展都應與其他參加者分享。

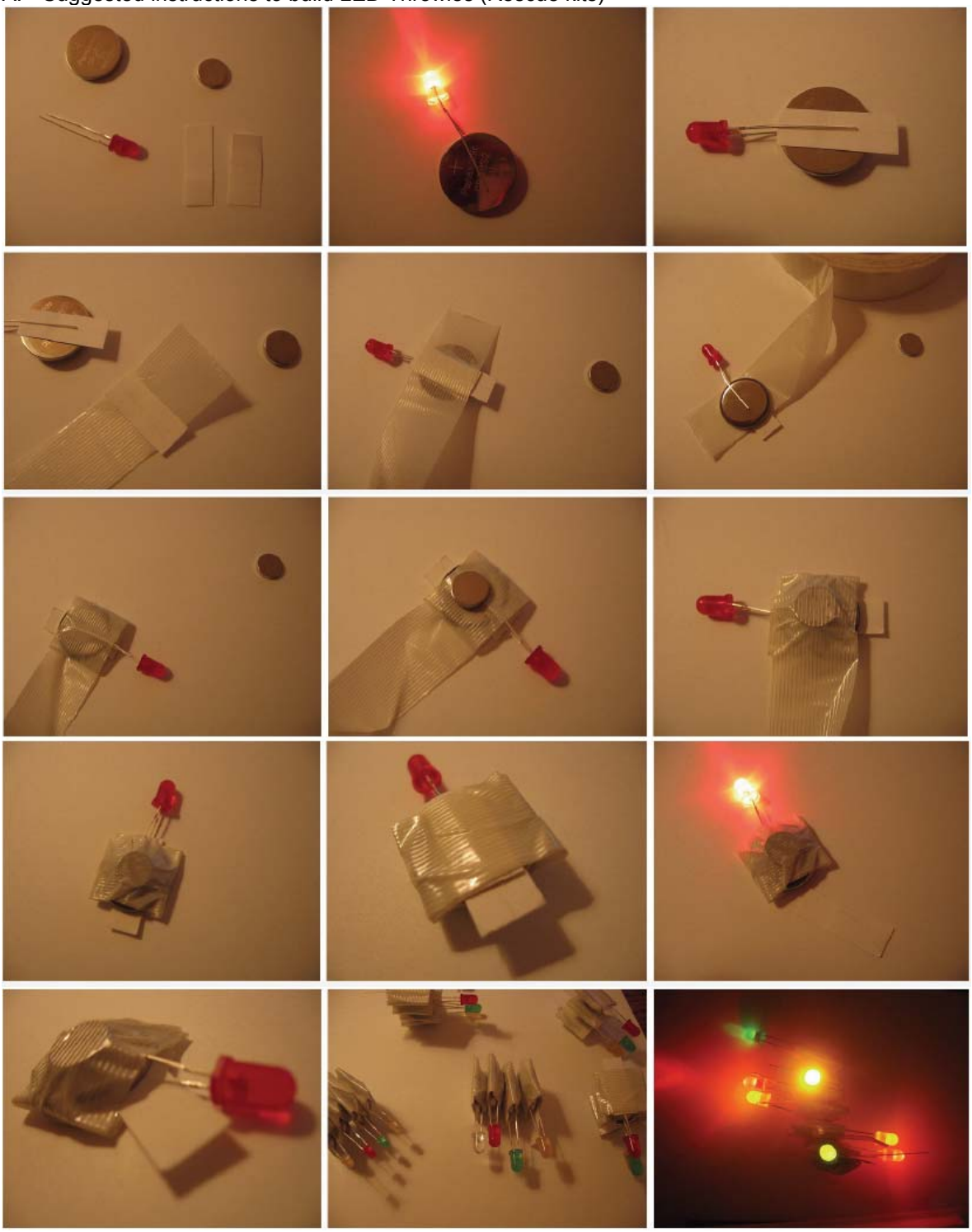
6.6.2 Any developments may be published on the RoboCupJunior website after the event.
所有的進展情況賽後均可公佈於 RoboCupJunior 的網站上。

6.6.3 Participants are strongly encouraged to ask questions to their fellow competitors to foster a culture of curiosity and exploration in the fields of science and technology.
強烈鼓勵參加者互相發問以促進彼此對科技的好奇心和探索文化。

6.6.4 This furthers the mission of RoboCupJunior as an educational initiative.
提倡分享的做法進一步加強了 RoboCup Junior 作為一項具有教育意義的公開化活動。

Note: The English version of these rules shall prevail wherever there is a discrepancy between the English and the Chinese versions.
注意：本賽規的中英文本如有歧義，概以英文本為準。

A. Suggested instructions to build LED Throwies (Rescue kits)



References

Joyce, A. (n.d.). *LED Throwies with On/Off Tab How--To.* Retrieved October 2013, from Flickr: http://www.flickr.com/photos/everythingdigital/sets/72057594069888500/