11th Annual CRC Robotics Competition

ProFuga 2012

Full Rulebook

Welcome to the CRC Robotics Competition

On behalf of the Educational Alliance for Science and Technology and the CRC Robotics Organizing Committee, welcome and congratulations to all the participants on joining your school robotics team and embarking on the CRC Robotics journey! Twenty-two schools will be participating this year!

Take it from some of the current leaders of the CRC Robotics Organizing Committee who were former student participants in the CRC: you will remember this unparalleled experience for many years. In fact, many of the five-thousand CRC Robotics Competition alumni will tell you that participating in the CRC was the most memorable, useful, important and fun part of their high school and Cégep lives.

We are very proud to announce that the torch has been officially passed on within the CRC. After 10 exceptional years, André Barette and Brad Moffat have stepped down from the CRC Organizing Committee. These two men were instrumental in the founding of the competition and have put countless hours into this cause that they believe in. We would once again like to thank them and their families, especially their wives Claudine Martel and Barbra Moffat, who have all supported the CRC since its founding.
Mike and Tom Downey have also stepped back and become mentors for the new CRC Organizers. They continue to help organize the competition and on behalf of everyone, we would like to thank them and their families for their support.

After an incredible 10 first years, the CRC is continuing to evolve and improve, and is ready to take on the next 10 years! We are now pleased to officially announce that Peter, Bjorn, Jean-Philippe, and Simon have stepped in as the lead organizers of the CRC Robotics Competition. The CRC Organizing Committee is filled with renewed energy, enthusiasm and lots of new ideas.

We wish to welcome and thank the many teachers, parents, mentors and volunteers for embarking on this journey, and for all the hard work you will put into enriching your students' lives with this activity.

We also wish to thank Stephen Newbigging and his team, as well as the administration at Cégep Vanier College for hosting all of us for the 11th Annual CRC Robotics Competition.

We also wish to acknowledge all the volunteers and partners, without whom the CRC could not exist.

Good luck to all, and see you at Profuga 2012 from February 16th to 18th 2012 at Vanier College!

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Goals, Objectives and Roles
within the CRC and EAST Organization

Our non-profit organization has set up this competition with the following goals in mind:

i) To set up a student-oriented and student-directed activity.

ii) To create a project where science, math, multimedia, language arts and computers are all used.

iii) To develop a hands on and practical application to help our students understand the link between the classroom and the workplace.

iv) To help to encourage girls to head into fields in science and technology.

v) To put into practice the education reform and its cross curricular competencies.

vi) To provide a positive and rewarding experience to help reduce the dropout rate among young men.

vii) To foster and build team skills and communication skills.

viii) To promote working together to accomplish a common goal.

ix) To teach that achieving team goals is more important than winning.

In this competition there are three different types of people; students, teachers and mentors. We have laid out the following roles for each:

i) **Students are to do all of the planning and building.** They should be creating the strategies, designing the critical paths, and controlling all aspects of the team. Any work done on the robot, video, website and kiosk must be done entirely by the students.

ii) **Teachers are there to provide the support that the students might need.** They should not be directing the students, but instead acting as an advisor. If a student has a question, the teacher may point the student towards the answer, or show the student how to find the answer. If a student is unsure how to accomplish a specific task, the teacher may demonstrate, but any pieces attached to the robot are to be touched only by students. We do realize that there may be times when an educator must step in for academic reasons. We believe that every teacher is a professional that can differentiate between teaching and doing.

iii) **Mentors are outside professionals who may be consulted. Their job is to help with questions that are on a level that exceeds the students and the teachers' knowledge.** An engineer would have more practical experience. However, the engineer may not direct the students; he/she is acting only as an advisor.

We are very excited about your school's participation in this project, but always remember that it is a project for the students. Give them the opportunity to show you what they can do.

Profuga 2012 Participating Schools:

Welcome and good luck to all!

Cégep Vanier College
Cégep de Lévis-Lauzon
Centennial Academy
Collège de Bois-de-Boulogne
Collège Laval
Collège Montmorency
Dawson College
Lake of Two Mountains High School
LaurenHill Academy
Laurier Senior High School
Laval Liberty High School
Lester B. Pearson High School
Lower Canada College (LCC)
Macdonald High School
Marianopolis College
Pierrefonds Comprehensive High School
Rosemount Technology Centre
Selwyn House School
St. George's School of Montreal
The Sacred Heart School of Montreal
The Study
West Island College

CRC Robotics Partners

The entire CRC Robotics team would like to offer a hearty thank-you to our partners!

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‘Profuga 2012’

Game Rules

Have fun with this, and good luck!

Goal:

1. The robots will capture cubes from one side of the playing field and bring them back to their designated base on the other side of the playing field in order to score points. There are also two flags in play. If a team captures both flags and places them on the pedestals in their base, the heat ends immediately.

Teams:

2. Robots are grouped into two teams of two robots for each heat. Two schools will be the “yellow” team and they will play against two other schools who will be the “blue” team. Each robot will have a different partner from heat to heat. **Each pair of robots will attempt to score as many points for their team as possible.**

Playing Pieces:

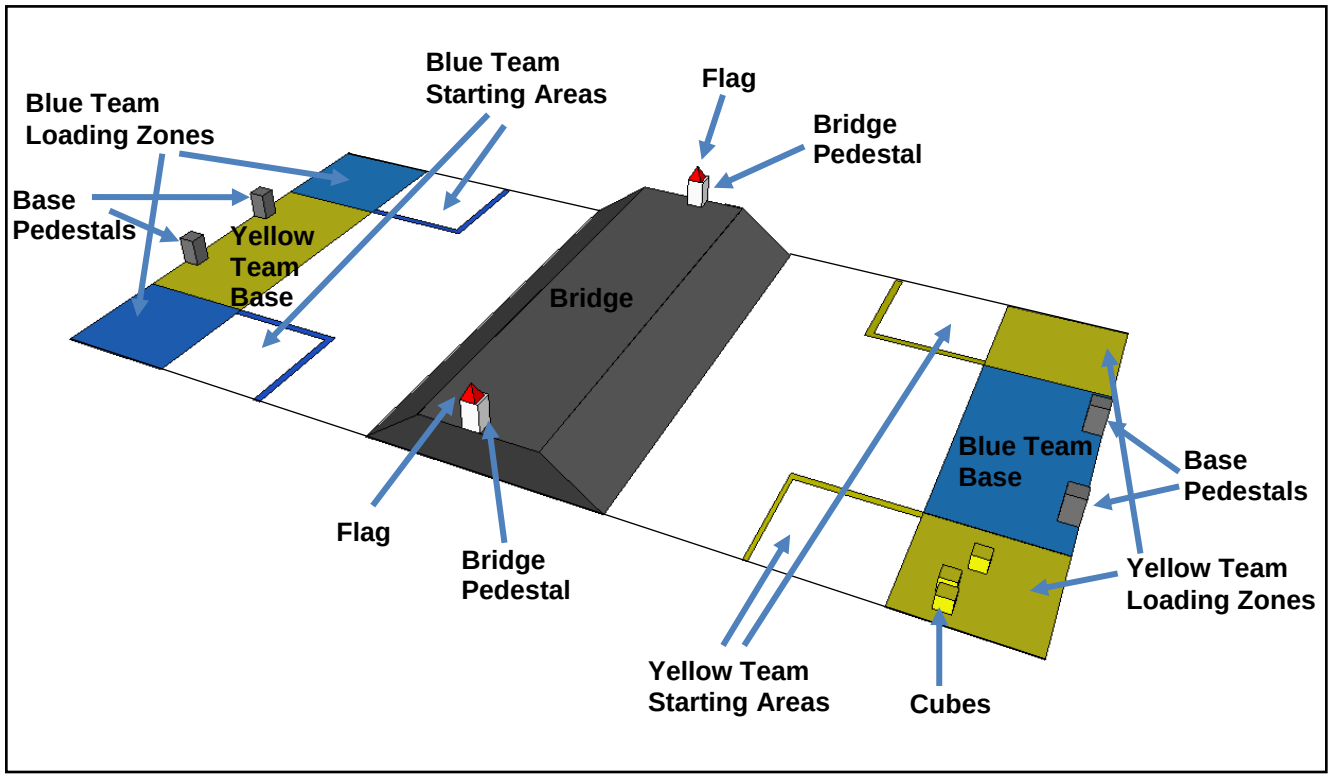
3. Cubes: There will be 24 cubes in both teams’ loading zones at each end of the playing field at the beginning of each heat. The yellow team will pick up their yellow cubes from their loading zones, while the blue team will pick up their blue cubes from their loading zone. Teams will be able to pick up their designated cubes on the same side of the field as their designated starting area, and must bring the cubes to their base on the opposite side of the playing field to score points. Robots will also be able to pick up any cubes (regardless of their colour) that have left either of the loading zones.

4. Flags: The two flags are located on the bridge pedestals at the center of the playing field at the beginning of each heat. Teams can pick up or steal these flags from their opponents’ base at any time. For a flag to count for a team, the flag must be placed on one of the pedestals in that team’s base.

Playing Field:

5. The whole playing field is a large rectangle.
6. The two robots forming the Yellow Team must start in the Yellow Team Starting Area, and the two robots forming the Blue Team must start in the Blue Team Starting Area.
7. There are two loading zones per team at either end of the playing field.
8. The Blue Team's base is at one end, and the Yellow Team's base is at the opposite end.
9. There is a bridge (ramp) at the center of the floor.
10. There are two red flags located at the center of the field on top of the pedestals at each extremity of the bridge.
11. There are two base pedestals in each base.

Diagram of the Playing Field:



3D VIEW
(Diagram not to scale)

Play:

12. On deck:

12.1. School spotter, driver and robot must be in the "On Deck Circle" when the buzzer sounds to end the previous heat. Failure to do so will result in a 30-point penalty assessed to the offending school.
If a school's spotter, driver or robot is not ready to start, the heat will begin without that school.

12.2. All robots must be labelled with its school name and number, which must be clearly visible to the crowd and referees at all times during a heat.

12.3. All schools must prepare four signs for their robot: **Yellow Circle, Yellow Square, Blue Star and Blue Triangle.** The schedule will announce which sign is to be displayed on your school's robot during each heat. These signs must be clearly visible to the crowd and referees at all times during a heat.

13. Starting Play:

13.1. The drivers and spotters must remain seated in the designated areas on each side of the playing field. They may not interfere in any way with any items on the field. This includes having any contact with the robots or any of the playing pieces (cubes, flags, *etc*…) once the heat has started. They must take all necessary safety precautions.

13.2. The robots are then brought to their robot starting areas. Robots arriving after a heat begins will not be permitted to play.

13.3. Robots must start within their designated starting area. All components of the robot must remain within the outside edge of the paint outlining the starting area.

13.4. Each heat will begin with 48 cubes. Each team will have 24 cubes of their designated colour in their designated loading zones. Of these cubes, each robot will have 4 cubes with a pattern matching the sign on their robot. Please see section 16 for more information.

13.5. Each heat will begin with two pyramid-shaped flags placed on the top of the bridge pedestals.

14. In Play:

14.1. Time is called in by the head referee.

14.2. If a cube leaves the field, it is considered to be out of play.

14.3. If a flag leaves the field, a referee will replace it on the last pedestal it occupied.

14.4. Flags **may**, however, be picked up off of the pedestal in the other team's base and stolen.

14.5. Robots may NOT damage the playing field, the cubes or the flags in anyway.

14.6. Robots may pick up and use any playing piece that matches their colour.

14.7. Robots may use any of the other team's playing pieces that have left the other team's loading zone, **however they may not enter the other team's loading zones at any time**.

14.8. Teams may not have a cube of the opposing team's colour or a flag in their loading zone. If a cube of the opposing team's colour or a flag enters a team's loading zone, a referee will place the cube or flag outside of the loading zone.

14.9. A robot is considered to be in violation of rule 14.7 at the moment when a robot encroaches the airspace of the other team's loading zone, described by the outside edge of the paint outlining the loading zone. A robot that violates this rule may be given an unsportsmanlike conduct penalty at the discretion of the referee (see rule 23).

14.10. Robots may remove cubes and flags from their opponents' base but they **may not push or throw them out of the playing field.**

14.11. A robot may only enter their opponent's base (scoring zone) once this robot has met the criteria for a robot to share points (see rule 16.1 about sharing points).

14.12. A robot may not transport or move both flags at the same time.

15. End of play:

15.1. The heat will be 5:00 minutes long unless both flags are placed on the pedestals in the same base, in which case, the heat will end immediately. When the heat ends, a buzzer will sound and all must robots must stop moving. Any playing piece that has already left a robot will remain in play until it stops moving.

15.2. The heat will end immediately if both flags have been placed on the pedestals in the same base.

15.3. At the end of the heat, the driver and the spotter are not permitted to enter the playing field until the head referee indicates that they may.

16. Scoring:

16.1. In order to share points with their paired robot for that heat, a robot must either lift a cube fully off of the ground, or move a cube across the bridge.

16.2. A cube is deemed to be lifted off the ground at the moment when the cube is no longer in contact with any part of the playing field, and is being held in the air using only the robot.

16.3. A cube is deemed to be moved across the bridge at the moment when the cube begins to encroach on the airspace above the lower floor on the other side of the ramp, or at the moment the cube makes contact with the lower floor on the other side of the ramp.

16.4. Teams will score based on how many cubes are in their base at the end of the heat.

16.5. A cube is deemed to be in a base if at that moment it is completely within the airspace of the base, which includes the outer edge of the paint outlining the base.

16.6. A team will receive **15 points per cube** in their base at the end of the heat for cubes that are the same colour as **that team's designated colour** for that heat.

16.7. A team will receive **10 points per cube** in their base at the end of the heat for cubes that are the same colour as **the opposing team's colour** for that heat.

16.8. A robot will receive an **additional** **15 points for each cube** in their base at the end of the heat **that matches the pattern** on their indicator sign on their robot. These additional points will **NOT** be affected by the multiplier flags.

16.9. A team will **double their points** if they have **one flag** on one of the pedestals in their base at the end of the heat.

16.10. A team will **triple their points** if they have **both flags** on their pedestals in their base at the end of the heat.

16.11. A flag is deemed to be on a base pedestal at the moment when the robot or robots are no longer in contact with that flag **and** the flag remains on top of the pedestal.

17. Scoring Example:

Robots A and B form the Yellow Team for this heat. Robot A was assigned the **Yellow Circle** sign and Robot B was assigned the **Yellow Square** sign for this heat.

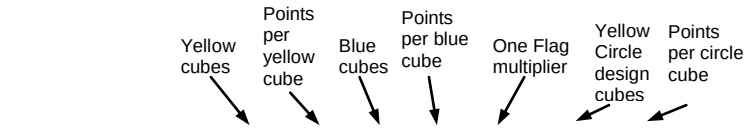
Robots A and B have placed a combined total of 16 yellow cubes from their loading zones into their base.

Robots A and B have also stolen 6 cubes from the Blue Team (from outside the Blue Team's loading zones).

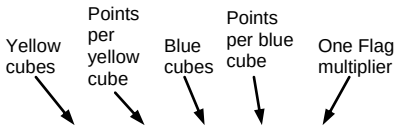
Also, one flag was on one of the base pedestals in the Yellow Team base at the end of the heat.

Lastly, 3 of the yellow cubes inside the Yellow Team's base at the end of the heat have a Yellow Circle design matching Robot A's sign design for this heat.

None of the yellow cubes inside the Yellow Team's base have a Yellow Square design that would match Robot B's sign design for this heat.



Robot A scores: ((16 x 15 + 6 x 10) x 2) + (3 x 15) = 645 points



Robot B scores: ((16 x 15 + 6 x 10) x 2) = 600 points

18. Preliminary Round Final score:

18.1. After all the preliminary heats are done, individual robots will cast out their two lowest scoring heats. The total of all other heats will be added to determine their final score for the preliminary rounds.

19. The schedule of playoff and Repechage Rounds will be published at a later date.

20. Contact:

20.1. Bumping and blocking may occur as robots attempt to acquire, transport and protect their blocks, base and flag pedestals in their base. However, you are not allowed to intentionally hit other robots. Should the referee decide you have intentionally hit another robot, you will receive a penalty.

20.2. Our referees are experts in calling and assessing penalties and have **the final word** at all times on the playing field.

20.3. Blocking is permitted, but like in basketball, once a position has been established, the robot may not move again to block their opponent.

Penalties:

21. Good penalties vs. bad penalties

21.1. Sometimes it may be advantageous to take a penalty to improve your score. This strategy is acceptable as long as the penalty isn't taken at the expense of others. See unsportsmanlike conduct penalty.

22. Junk penalty:

22.1. Various devices may be placed about the playing field by any robot only if they are removed from the playing field by the robot before the heat ends. If devices are left anywhere that are no longer in contact with the robot at the end of the heat, the robot that dispensed them will be liable to receive a 10 point individual penalty for each item left. The item(s) must be lifted and held entirely off the floor by a robot in order to avoid

this penalty. (If you can't clean them up, don't use them. Don't drop nuts, bolts, wheels or tie raps by accident. Liquids count as many items of junk-- don't leak!)

23. Unsportsmanlike conduct penalties:

23.1. While we trust that all participants will have the best of intentions, it may happen that, in the heat of battle, certain conduct may occur that requires sanctions. (To avoid such penalties, remain courteous.)

23.2. These penalties have a series of escalating consequences depending on the seriousness of the penalty. Some examples of the types of behaviour that signal a lapse of sportsmanship are:

23.2.1. A deliberate attempt to disable another robot.

23.2.2. A deliberate attempt to ram another robot.

23.2.3. Inappropriate behaviour directed at either an official, another competitor or a spectator.

23.3. An unsportsmanlike conduct penalty is taken from the individual school's final total and cannot be 'tossed out' with 2 lowest heat scores.

Robot Safety, Power, Motors and Control Rules

*** WARNING: When designing and building your robot, you must make sure that your robot is able to climb over the ramp at the center of the playing field. If your robot cannot get over the ramp, you will not be able to score points!**

24. Size:

24.1. Robots are limited to a 1m x 1m footprint Length x Width). There is no height restriction.
Robots will be placed within a frame whose inner dimensions measure 1m x 1m. If they do not fit within the frame, they will not be allowed to compete.

25. Certification:

25.1. All robots must be certified before the first heat to ensure that the motor, control, power and safety rules have been respected.

25.2. Schools may make as many modifications as they would like between heats, but each modification requires that the robot be re-certified. Any robot that has not been re-certified after a modification will have all of its heats since the last certification annulled.

25.3. Any robot that is deemed dangerous runs the risk of being disqualified.

26. Safety:

26.1. Your robot must have an easily identifiable and easily visible ON/OFF kill switch, **clearly showing the OFF position.**

26.2. Your robot must have a fuse between the Makita batteries and the robot.

26.3. Your robot must have a fuse to limit the total output of all batteries to 30 A.

26.4. If your robot uses any pneumatics, your robot must also have an easily identifiable and easily visible ON/OFF pneumatic kill switch.

27. Power:

27.1. All energy used by the robots must come from the exact same model of batteries provided in your kit or from gravity. There is no restriction with regards to gravity. Any battery may be used to power the transmitter.

27.2. This means that if spring systems are used, they must begin the heats in relaxed states, or they must be compressed or stretched somehow by the batteries and motors used in the heat before the heat begins.

27.3. This implies that if springs are used as a way to store energy and then release energy, and then store energy again and release energy again in an oscillating manner, this is permitted. The only time that springs are not allowed is when the heat begins with them in a non-relaxed state and which are then released during the heat with the robot unable to recoil them.

27.3.1. A legal example: your motor is unable to lift an arm by itself. Schools may add a pre-stretched spring to help it. When the motor moves it adds energy to the spring system and then releases it. This is permitted; it's like using a counter-weight.

27.3.2. An illegal example: A loaded spring system is used to shoot an arm out at the beginning of the heat but is unable to draw it back in. This is not permitted.

27.3.3. Spring suspension systems and springs that are built into switches and relays are permitted.

Note: 27.1, 27.2 and 27.3 do not apply to the pneumatics.

27.4. If other systems are to be powered, like flashlights, they must be modified to draw their energy from the batteries provided as well. LASERS **are not permitted**.

27.5. Teams should be aware that great energy drains from the batteries of your robot system might leave you powerless. Learn how to handle your batteries properly. You may have to play several heats in each round.

27.6. Teams may purchase more batteries, as long as they are identical models to the ones in the kit provided. It is important to note that the robot may not be touched or modified in any way during a heat. Teams may not change batteries during the heat.

28. Motors:

28.1. Drive motors and auxiliary motors must be chosen from the motors supplied in your kit. You may purchase a new motor if something goes wrong with the ones you have, but you may never use more than the number of each supplied in your kit. (e.g. You may only use 2 drill motors on your robot.)

28.2. There is no limit to the number of servo motors that you may use. Caution: There is a limit to how much current the VEX CPU can handle safely. You do not have to use all of the motors in the kit.

28.3. No major modifications may be made to the motors.

28.4. Solenoids and muscle wires are not permitted as they are considered linear motors unless they are not used for propulsion, such as to activate a switch, then they are permitted.

28.5. The pneumatics kit may be used as long as all safety requirements are met. For example, your robot must have an ON/OFF kill switch between the reservoirs and the rest of the system.

29. Control:

29.1. You will be receiving a RC unit in your kit. This frequency is allowed for practicing and working on your robot.

You may **not** use this frequency at the competition. You must use the tether option to practice at the competition.

In order to use the tether feature, you will need to purchase a cable. Any telephone handset extension cable will work (the coiled cable that goes from the handset to the base of a corded phone, not the cable that goes from the phone to the wall).

29.2. Only RF transmissions from the VEX transmitter are allowed to control the robot. The VEX CPU must mediate all control signals and is limited to the 6 channels of the VEX transmitter.

29.3. You are allowed to use the VEX CPU to then control any other controller board or relay switches to turn motors on and off, or use proportional control systems. You may use any sensors and/or microprocessors to help with this control. We encourage you to take advantage of the programming capabilities already available in the VEX CPU.

29.4. You may not use any other RF transmitters that will allow the use of more channels or block other robots from using theirs.

29.5. You may wirelessly send data back to the driver and spotter. You may not send data or program information to the robot during a heat in any way. If your program hangs during a heat, you may not reboot wirelessly, the reboot would have to be initiated onboard.

For more info:

http://www.vexrobotics.com/docs/inventors-guide/main-2008/06-control-06272008.pdf
and
http://www.vexrobotics.com/docs/inventors-guide/main-2008/13-e-transmitter-menus-06272008.pdf

Programming Competition

With the goal of encouraging competitors to program on their robots, there will be a programming competition this year, which will be independent of the main game.

Here are the rules for the Programming Competition:

P-1. This competition will take place between heats during the Main Competition.
The schedule for the Programming Competition will be published at a later date.

P-2. Each robot plays only one heat.

P-3. Each Programming Competition heat will be 2 minutes long.

P-4. A buzzer will sound at the end of the heat.

P-5. Only tasks completed before the buzzer sounds will count towards that robot's final score for the programming competition.

P-6. Two robots will play on the playing field at a time, but will play independent of each other.

P-7. Each robot will receive points for completing any of the following tasks:

P-7.1. Picking up a cube.
A cube is deemed to be "picked up" at the moment when the cube is no longer in contact with the floor or any other part of the playing field, and is being held in the air using only the robot.

P-7.2. Picking up a flag.
A flag is deemed to be "picked up" at the moment that the flag is no longer in contact with the floor, a pedestal or any other part of the playing field, and is being held in the air using only the robot.

P-7.3. Driving across the ramp and then stop.
A robot is deemed to have driven across the ramp at the moment when it has completely cleared the airspace of the ramp.

P-7.4. Placing a cube.
A cube is deemed to be "placed" if a robot releases a cube that begins in the air without making contact with anything except the robot, AND ends when the cube is no longer in contact with the robot.

P-7.5. Placing a flag.
A flag is deemed to be "placed" if a robot releases a flag that begins in the air without making contact with anything except the robot, AND ends when the cube is no longer in contact with the robot.

- Bonus points will be awarded if any of these tasks are accomplished in series without the aid of additional driver input.

P-8. <u>Scoring:</u>

P-8.1. A school will receive one (1) point for each of the tasks completed, listed in P-5, remembering that a robot may only repeat the same task twice.

P-8.2. A school will receive one (1) bonus point if two (2) actions are completed in series without additional driver input.

P-8.3. A school will receive two (2) bonus points if three (3) actions are completed in series without additional driver input.

P-8.4. A school will receive four (4) bonus points if four (4) or more actions are completed in series without additional driver input

P-9. Each school will have two judges watching their controls.

P-10. To score points, the drivers must explain to the judges exactly what actions the robot will be performing and how this series of actions will be triggered BEFORE the driver completes the last driver input that triggers the robot's subsequent actions.

Ex1. School A is would like to complete the "pick up a cube" function to score points. They tell the judge: "we are about to pick up a cube. By pressing the right joystick to the left, our robot will close its claw to the proper size to grip the cube and it will lift it off of the ground." School A can then press the right joystick to the left. If the operation is successfully completed as described and the judges have seen that only the right joystick was touched for this series of actions to take place, the robot has completed the task, and will receive one (1) point for this completed task.

Ex2. School A would like to complete a consecutive sequence of actions consisting of "picking up a cube, and then driving across the ramp and then stop". They tell the judge: "we are about to pick up a cube and then drive across the ramp and then stop. By pressing the right joystick to the right, our robot will close its claw to the proper size to grip the cube and it will lift it off of the ground, the robot will then drive over the ramp and then will stop." School A can then press the right joystick to the right. If the operation is successfully completed as described and the judges have seen that only the right joystick was touched one time for this entire series of actions to take place, the robot has completed the two tasks in sequence, and will receive three (3) points: One (1) point per completed tasks and one (1) bonus point for completing two actions in series.

P-11. A robot may only repeat the same task twice.
Any additional uses of that function will not count towards that robot's final score for the Programming Competition.

P-12. Schools must displace their robot to the location where they would like to complete their next programming task or next series of consecutive tasks, so they don't use their Remote Control for anything other than for activating a programming sequence.

P-13. Schools will be ranked by their final scores, and Programming Awards will be given based on these scores.

P-14. The Programming Competition **does not** count towards the overall points for the main Profuga 2012 Game or the CRC Robotics Competition Overall Trophy.

P-15. Participation in the Programming Competition is optional.

P-16. In order to participate in the Programming Competition, you must answer that your school will be participating in this event by submitting the online submission form **on or before Thursday, February 8th, 2012** here: http://robo-crc.ca/submit

P-17. For your school to participate in the Programming Competition, your request to participate in this event must be received before the indicated deadline.

P-18. *** Rules 1 to 29 from the Game Rules and Robot Safety, Power, Motors and Control Rules set-forth in this rulebook that are not specifically addressed in this section (Programming Competition Rules) will also apply in the Programming Competition.**

P-19. The Programming Competition Rules override the rules in the other sections of the Rulebook during the Programming Competition in the case of any conflicting rules.

P-20. You may use any programming software that works with the VEX microcontroller. You will be provided with easyC and RobotC licences so you can download and use these two programs.

RobotC can be downloaded for free for 30 days here:
http://www.robotc.net/download/cortex/

easyC can be downloaded here:
http://intelitekdownloads.com/easyCV2/

EasyC is very, wait for it, easy to use.
EasyC is a graphical programming interface similar to the one included with LEGO Mindstorms.

You can follow the tutorials and examples included with the software.
There are many tutorials online which are easy to follow, such as:
http://www.youtube.com/watch?v=ZC_IzM9frGo
http://www.youtube.com/watch?v=yg6g7RvlaPM
http://www.youtube.com/watch?v=1YejKhFV_s8&feature=related

There are even more PDF presentations as to how to use easyC such as:
http://www.engr.sjsu.edu/E10/E10pdf/EasyC_environment.pdf

If you have any experience with any of RobotC, C, C++, C# or Basic, or if you want to learn any of these, you may prefer using RobotC.

Requirements and Judging Criteria for the Video, Website and Kiosk Components of the Competition

In accordance with the CRC's goal to create a project where science, math, multimedia, language, arts and computers are integrated, the robot is only one of the four main components of the competition.

As the world requires people to be more diversified rather than singularly specialized, the CRC wishes to give students with varied interests not only in science an opportunity to develop and discover their skills through the creation of a video, a website and a kiosk.

The following are the rules and requirements as well as the judging criteria for the video, website, journal and kiosk components.

Note: Any components not arriving by the due date will be assessed a late penalty of 20% deducted from the total score of each component received within 24 hours of the deadline for that component. **A component received more than 24 hours after the deadline will not be judged.**

VIDEO
Rules and Requirements

The Video component requires the creation of a video documentary that presents the competitor's school, the team's robot-building process and the game to be played, presented in an entertaining way to a general audience.

V-1. Format:
- V-1.1. Your video must be no less than 4 minutes and no more than 5 minutes.
- V-1.2. Your video must play on YouTube and it is your responsibility to make sure that YouTube does not mute your soundtrack due to copyright infringement of the songs that you use.
- V-1.3. Your video may have a fictional storyline, or be of a journalistic or documentary style. (If a fictional storyline is chosen, make sure to relate the story to the building of the robot, school description *etc*…)

V-2. Required Content:
- V-2.1. An explanation of the game.
- V-2.2. A description of your school including the school location and type of school.
- V-2.3. Explanations of the different steps involved in the building of your robot.
- V-2.4. Bilingual narration, acting, commentary or subtitles.

V-3. Important Remarks and Suggestions:
- V-3.1. Develop a theme or a storyline that is consistent throughout the entire video.
- V-3.2. Try to make it as entertaining as possible to a general audience not familiar with robotics and the CRC.
- V-3.3. A 5-minute video usually requires lots of raw footage and planning. Start **planning** and **filming now**!
- V-3.4. Work closely with all of the other groups (Robot, Web and Kiosk) since all components are related.
- V-3.5. How you put the video together is completely up to you. In order to obtain the highest score possible, make sure to follow the judging form.
- V-3.6. Do not use profanity, violence or inappropriate material in your videos. Be mindful of sensitive material. If a video is deemed to have inappropriate content it will not be shown at the competition, even if it scored well otherwise.

V-4. Due Date:
- V-4.1. Your video must be uploaded to YouTube **on or before February 8th, 2012**.
- V-4.2. The URL must be submitted using the following submission form online **before 11:59 p.m. on Wednesday, February 8th, 2012** http://robo-crc.ca/submit
- V-4.3. You may select the option on YouTube to make your video private (non-searchable) and submit that private URL in the form at the link above, but your video must be made public by February 16th, 2012 so that other teams may see your video once the competition has begun.
- V-4.4. You must also submit a physical DVD copy of your video **or** a .mov file of your video on a USB key at the competition on Thursday, February 16th, 2012.
- V-4.5. If your school does not allow you to upload your video onto YouTube or if you cannot upload to YouTube for any reason you must send an explanation to bjorn@robo-crc.ca before Monday, February 6th, 2012 at 11:59 p.m., and we will do our best to accommodate your team based on your explanation.
- V-4.6. If your video is not uploaded to YouTube before the deadline, and we do not receive an explanation before February 6th, then your video may not be judged.

Video Judging Form

School: _____ Total mark = _____

Section A : Required Format

A video that does not adhere to the required format of length and bilingualism will obtain the following penalties:

Length (must be between 4 & 5 minutes, not including optional rolling end credits on a black screen)

Up to a maximum of a 15% penalty off total video mark for a video of less than 4 minutes or over 5 minutes.

Bilingualism

Both English and French must be equally represented in the video using narration, acting, commentaries or subtitles, but do not have direct translation of all words.
Use sub-titles if you find it helpful.

The use of automated translation will be subject to the same penalties for inadequate representation of both languages.

Penalty of 10% off total video mark if the ratio of the two languages represented in the video is 70/30, and a penalty of 20% off total video mark if one language is represented in less than $\frac{1}{3}$ of the video.

Judges comments: _____
_____
_____
_____

Section B : Required Content (23%)

Although technical aspects and creativity are important, the following required content is crucial to the video.

Description of your school **(worth 5% overall)** 1 2 3 4 5 6 7 8 9 10

Explanation of the game **(worth 8 % overall)** 1 2 3 4 5 6 7 8 9 10
(Explain the rules of this year's game to an audience that has never heard or seen robotics or the CRC before.)

Explanation and steps in the building of the robot **(worth 10 % overall)** 1 2 3 4 5 6 7 8 9 10

Judges comments: _____
_____
_____
_____

Scoring Scale:
1 = Poor / Criteria not met
10 = Exceptional

(Video Judging Form Continued)

Section C : Technical Aspects (26%)

Technical aspects relate to the quality of sound, picture, filming, editing… This section is not related to creativity, theme or story.

Picture quality **(worth 8 % overall)** 1 2 3 4 5 6 7 8 9 10
(e.g. lighting, framing, stability of shots, proper zooming, etc…)
High quality HD video which does not meet the lighting, framing, stability of shots and proper zooming criteria in this category WILL NOT get a high score.

Sound (quality of voices and music) **(worth 8 % overall)** 1 2 3 4 5 6 7 8 9 10
(e.g. is voice clearly audible, is music volume too high compared to voice, etc…)

Quality of editing, overall flow of video **(worth 10 % overall)** 1 2 3 4 5 6 7 8 9 10
(Strictly in terms of technical aspects, not creativity)

Judges comments: _____
_____
_____
_____

Section D : Presentation (51%)

The presentation section relates to the creative aspect of the video.

Creative use of camera and creative editing **(worth 6 % overall)** 1 2 3 4 5 6 7 8 9 10
(Variety of camera shots and angles, as well as variety and uniqueness of transitions and editing)

Creative choice of music and theme **(worth 7 % overall)** 1 2 3 4 5 6 7 8 9 10
(Proper choice of music for selected theme of video)

Presence of a strong central idea that 1 2 3 4 5 6 7 8 9 10
ties the different parts of the video together **(worth 10 % overall)**

Entertainment value (attempts to make 1 2 3 4 5 6 7 8 9 10
video interesting and understandable to a large audience) **(worth 10 % overall)**

The quality of the on camera narrators or actors 1 2 3 4 5 6 7 8 9 10
(well spoken and/or well acted) **(worth 8 % overall)**

The ability to creatively link the information and 1 2 3 4 5 6 7 8 9 10
entertainment parts of the video in an easy to
follow and logical manner. **(worth 10 % overall)**

Judges comments: _____
_____
_____
_____

WEBSITE
Rules and Requirements

Websites are an essential tool for communication in all fields. The website component of the competition requires designing of a fully bilingual website that showcases your team, its members, mentors and teachers, including your experiences, your team's school, your robot, your video and a description of the competition.

As with any website, your aim should be to clearly communicate your goals and relevant information in a simple and professional format.

W-1. Length:
- W-1.1. There is no limit to the size of the site.

W-2. Required Content:
- W-2.1. Each team member's:
  - i. name
  - ii. picture (if they want),
  - iii. sub-team.
- W-2.2. Each teacher and mentor's:
  - i. name
  - ii. picture (if they want),
  - iii. area(s) in which they provided help.
- W-2.3. An explanation of the game in your own words.
- W-2.4. A description of:
  - i. your school,
  - ii. your school's location, and
  - iii. your school's type (e.g., high-school, CÉGEP, vocational training institute, *etc.*).
- W-2.5. Description of the robot including:
  - i. the steps in the conception and building of the robot,
  - ii. the problems that were encountered along the way,
  - iii. the solutions to those problems.
  - iv. conception and prototype plans/drawings,
  - v. final design plans/drawings, and
  - vi. photos of your robot.
- W-2.6. Student experiences, especially:
  - i. what your team learned,
  - ii. what they enjoyed,
  - iii. what they struggled with,
  - iv. sacrifices made for the team, *etc.*
- W-2.7. Social interaction (such as a survey/poll, Facebook Page, Twitter page, YouTube/Vimeo video page that shows more than just your required video, *etc*…).

W-3. Technical Requirements:
- W-3.1. The web site must be fully bilingual.
- W-3.2. The web site must validate against the following design standards:
  - i. XHTML 1.0 Transitional (or better) with 20 errors or less and any number of warnings (http://www.w3.org/TR/xhtml1/),
  - ii. CSS 1.0 or better with 10 errors or less (http://www.w3.org/TR/REC-CSS1/),

iii. WCAG 2 Priority A or better with 20 errors or less and any number of warnings (http://www.w3.org/TR/2006/WD-WCAG20-20060427/appendixB.html)

W-3.3. The web site must look and function as similar a manner as possible in Mozilla Firefox, Internet Explorer 7 and above, Apple Safari and Google Chrome.

W-3.4. The web site must be equally accessible in Windows- and Macintosh-based computers.

W-4. Legal Considerations:

W-4.1. May not contain copyrighted materials unless permission was obtained from the copyright holder and was documented.

W-4.2. To avoid copyright problems, look for work available either (i) in the Public Domain, or (ii) under the Creative Commons license (http://creativecommons.org/).

W-4.3. If any team member has any special privacy concerns putting their name or photograph on their web site, please discretely leave them out *without any penalty.*

W-5. Due Date:

W-5.1. The site must be up and running by **Wednesday, February 8, 2012 before 11:59 p.m.**

W-5.2. The URL must be submitted using the following submission form online by this deadline, ready for judging http://robo-crc.ca/submit

W-5.3. You must also submit your website as a zip file to bjorn@robo-crc.ca by this deadline. The Site on the submitted zip file will be compared to the hosted website if a team has been suspected of changing their website after the deadline.
Age changes may also be verified after the deadline.

W-5.4. Judging will commence immediately after the submission deadline.

W-6. Suggestions and Remarks:

W-6.1. If no member of your Web sub-team has experience designing web pages, try a design tool like RapidWeaver, Apple iWeb, Microsoft Expression Web, Macromedia Dreamweaver or an existing blogging platform.

W-6.2. Try to make it as easy to use as possible.

W-6.3. Use **<DIV>** tags instead of <TABLE> tags for laying out your site.

W-6.4. The website should be as **widely-accessible** as possible. Be sure to present alternatives to features like DHTML and Flash.

W-6.5. Each school should host their own website if possible.

W-6.6. The site must balance design appeal, content and functionality.

W-6.7. Components which foster user interactivity are great. (e.g., Surveys where they can vote, some trivia questions, graphics that pop-up within the website when as the user interacts, Facebook pages, *etc*.)

W-6.8. Why test your web site against standards at all if your website looks okay in your browser? Here are our top five reasons:

i. **Number One: Accessibility.** Just because *you* can use your website doesn't mean that someone with a disability can. For many countries this is not only a moral, but also a legal requirement. So you should ensure your site conforms to the W3C Web Accessibility Guidelines, if you want your site to be accessible to all. Conforming to these standards also means strictly validated HTML.

ii. **Number Two: Search engines.** These can be very fussy and will not search or index some or all of a site if they come across invalid web pages. So if you want people to find your site you need to be sure your pages are validated.

iii. **Number Three: Happy visitors.** Who wants to come to a site that looks bad in their browser, has broken links, and is full of spelling mistakes. IE's dominance is fading and each browser has its own quirks, but all are striving to conform to the standards. So make your site standards based and it will work better in all

browsers and for more people. Check for broken links regularly and for spelling mistakes too. Annoy or upset your visitors and they are less likely to return.

iv. **Number Four: Maintenance.** You've probably heard the term "Internet Time". On the Internet things move fast, and a validated site will be easier to maintain, easier to improve and so easier to keep up with the latest trends.

v. **Number Five: Tools and CMS.** Authoring tools may make it easy to write and maintain pages, and content management systems that generate pages on the fly seem cool. But almost all will produce invalid pages without you knowing and so you may already be failing to meet many of the reasons above.

W-7. Free Tools That Will Help:

W-7.1. The judges will use the **Total Validator** tool, free and available for Windows, Mac and Linux, to check if your web site conforms to all of the technical requirements. Download it from http://www.totalvalidator.com/

W-7.2. The **YSlow** developer tool that will help you improve the efficiency of your web site's design http://developer.yahoo.com/yslow/

W-7.3. If you're using Firefox, the **Firebug** extension series is an extremely powerful developer suite that will help you find every last design flaw in your web site http://getfirebug.com/

Web Site Judging Form

School: _____ Total mark = _____

Section A : Required Format

A website that does not adhere to the required format of being fully bilingual will obtain the following penalties:

Bilingualism

For each of the required content components listed in Section B below, the school's score for any component that only appears in one language on the website will be halved for that component.

The use of automated translation will be subject to the same penalties for each section.

(e.g. A judge marks the "Explanation of the game" component of a school's website to be 10/10, however that section appears only in English on the website, therefore the score for the "explanation of the game" obtains a 50% penalty and becomes 5/10, and so on…)

Judges comments: _____
_____
_____
_____

Section B : Required Content (33%)

The website must contain the following required content components in both English and French. (See Section A penalties for lack of bilingualism).

Identification and breakdown of different sub-teams (worth 5 % overall) 1 2 3 4 5 6 7 8 9 10
(e.g. Robot design, robot building, video, website and kiosk sub-teams…)

Description of your school and team (worth 5 % overall) 1 2 3 4 5 6 7 8 9 10

Student experiences (What you learned) **(worth 5 % overall)** 1 2 3 4 5 6 7 8 9 10

Explanation of the game (worth 5 % overall) 1 2 3 4 5 6 7 8 9 10
(Explain the rules of this year's game to an audience that has never heard or seen robotics or the CRC before.)

Explanation and steps in the building of the robot including solutions to problems (worth 7 % overall) 1 2 3 4 5 6 7 8 9 10

Drawings, plans, photos and designs of the robot (worth 6 % overall) 1 2 3 4 5 6 7 8 9 10
(Must include robot building process and conception/prototype drawings and photos as well as final design drawings)

Judges comments: _____
_____
_____
_____

Scoring Scale:
1 = Poor / Criteria not met
10 = Exceptional

(Website Judging Form continued)

Section C : Technical Aspects (33%)

Technical aspects of the website relate to the quality of coding, site navigation, appropriate use of features or redirection for unsupported features' alternatives (e.g., NOFRAMES or non-Flash alternatives to Flash pages.). This section does not relate to presentation or aesthetics.

Navigation structure **(worth 5 % overall)** 1 2 3 4 5 6 7 8 9 10
(Consistency, menus, site map, search, clarity of location)

Technical Innovation/Merit **(worth 6 % overall)** 1 2 3 4 5 6 7 8 9 10
(Complexity of the design, use of 3D graphics,
videos incorporated in the website, live streaming, etc…)

Level of interactivity **(worth 6 % overall)** 1 2 3 4 5 6 7 8 9 10
(Use of surveys, forums, social media, dynamic elements…)

Browser compatibility **(worth 3 % overall)** 1 2 3 4 5 6 7 8 9 10
(Equal function and appearance in IE, Firefox, Safari, and Google Chrome)

Conforms to X/HTML **(worth 5% overall)** 1 2 3 4 5 6 7 8 9 10
(Validates XHTML 1.0 Transitional with < 20 errors; ∞ warnings)

Conforms to CSS 1.0 **(worth 4% overall)** 1 2 3 4 5 6 7 8 9 10
(Validates CSS 1.0 < 10 errors; ∞ warnings)

Conforms to WCAG 2.0 A **(worth 4% overall)** 1 2 3 4 5 6 7 8 9 10
(Validates WCAG 2.0 Priority A with < 20 errors; ∞ warnings)

Judges comments: _____
_____
_____
_____

Section D : Presentation (34%)

The presentation section relates to the creative, aesthetic, flow and practicality aspects of the website.

Quality of language editing **(worth 8 % overall)** 1 2 3 4 5 6 7 8 9 10
(Proper spelling, grammar and punctuation in English and French)

Creativity/originality of design & layout and visual appeal **(worth 6 % overall)** 1 2 3 4 5 6 7 8 9 10

Consistency of design **(worth 5 % overall)** 1 2 3 4 5 6 7 8 9 10

Clarity of visual Organization of Information **(worth 6 % overall)** 1 2 3 4 5 6 7 8 9 10

Creative and appropriate use of images and graphics **(worth 5 % overall)** 1 2 3 4 5 6 7 8 9 10

Content and information flow (Do the pages flow together in an easy to follow and logical manner.) **(worth 4 % overall)** 1 2 3 4 5 6 7 8 9 10

Judges comments: _____
_____
_____
_____

KIOSK
Rules and Requirements

The kiosk component requires the organization of an information kiosk and presentation of accomplishments to visitors and judges. This is each school's chance to show everyone what their school, their team and their robot is all about, and to develop presentation and arts skills.

Remember that the kiosk is also the school's only functional pit area for repairs, maintenance and modifications to the robot during the competition. The kiosk is not intended as a central lounge for team members. One part of the kiosk must be organized as a functional pit area to work on the robot, and store materials and tools, and the rest of the kiosk is a showcase for other schools and the public to visit. We recommend that you plan for a restricted area of your kiosk for pit only.

K-1. Format:
- K-1.1. Space given: 12 foot by 12 foot square, 4 foot high separators to the left and right of the square.
- K-1.2. Objects provided by the CRC: 1 2x5 foot table, 1 electrical outlet with 2 plugs, 120V, 15Amp.

K-2. Required Content:
- K-2.1. Distinct and delineated pit area for robot maintenance, modifications and repairs
- K-2.2. School and Robot demonstration and presentation area (description of the robot: including the steps in the construction, the problems that were encountered along with the solutions to those problems, the workings of the final version of the robot)
- K-2.3. Fully bilingual reception and interaction with the public.

K-3. Rules and Requirements:
- K-3.1. Only students are permitted to be in the pits and working on the robot. **Teachers and mentors may only provide advice and guidance from the sidelines; they may not be in the pits touching/working on the robots.** There will be referees present in the pits. Repeat offenders run the risk of being disqualified from the kiosk competition.
- K-3.2. You are not permitted to have any liveable space on a second level due to safety concerns.
- K-3.3. **Your kiosk will be required to pass a safety inspection in order to be judged. There is a safety checklist attached to the end of the rules.**
- K-3.4. Please respect the surrounding kiosk areas as you run the risk of being penalized for any behaviour that has a negative impact on other kiosks. (Ex. Loud music, extending beyond your kiosk footprint, the kiosk should be visually appealing all around (inside and outside), not only in its façade if the outside walls can be seen from neighbouring kiosks. You may be required to **paint or cover the outer sides and back of your kiosk** during certification if it is not already done so, so plan accordingly!)

K-4. Suggestions:
- K-4.1. Plan adequate space for tools, maintenance and repair materials and adequate work space for the robot.

K-4.2. Remember that because the kiosk is also the pit area for the robot, there must be clear access for the robot and a few selected student team members from the school who will be coming in and out of the pit area, sometimes in a hurry and on short notice.

K-4.3. Make sure to have at least 1 bilingual student speaker for the school giving presentations and answering the public and judges questions at all times in the kiosk.

K-4.4. Make sure you bring lighting equipment to ensure adequate lighting in the pit area for safety and for aesthetics.

K-4.5. Create an attractive, aesthetic environment that entices and encourages the public to inquire about the school, team and the robot.

K-4.6. You may bring a television, DVD/Blu-ray, PC, laptop or other audio-visual equipment remembering that the CRC only supplies each school with 2 power connections (bring adapters, and extensions as necessary), but make sure to be respectful for other kiosks in terms of noise, visual pollution and proper behaviour.

K-5. Due Date:

K-5.1. **The kiosk must be fully mounted and ready for judging by 5:00 p.m. on Thursday February 16th, 2012.**

K-5.2. Dismantle and clean kiosk area and ensure that no damage was done to area or property by 6:00 p.m. Saturday, February 18th, 2012. Any team leaving any debris will be subject to a $200 fine, as well as any cleaning costs incurred by the host school. Repeat offenders may be subject to further penalties.

Kiosk Judging Form

School: _____ Total mark = _____

Section A : Required Content (31%)

The Kiosk must fulfill the following required content:

Inviting the public **(worth 6 % overall)** 1 2 3 4 5 6 7 8 9 10
(Approachable, welcoming…)

Level of bilingualism **(worth 6 % overall)** 1 2 3 4 5 6 7 8 9 10
(Use & quality of French and English…)

Interaction with the public **(worth 8 % overall)** 1 2 3 4 5 6 7 8 9 10
(Friendly, Polite, Cooperative…)

Respect for others **(worth 6 % overall)** 1 2 3 4 5 6 7 8 9 10
(Respect for other kiosks, noise & visual pollution)

Showcase/Description of your school and team (worth 5 % overall) 1 2 3 4 5 6 7 8 9 10

Judges comments: _____
_____
_____

Section B : Technical Aspects (31%)

Technical aspects relate to organization, functionality, safety measures, neatness… This section is not related to creativity, presentation or aesthetics.

Kiosk design, layout and practicality **(worth 9 % overall)** 1 2 3 4 5 6 7 8 9 10
(Organization, plan, functionality…)

Engineering and Construction of Kiosk **(worth 7 % overall)** 1 2 3 4 5 6 7 8 9 10
(How well is the kiosk designed and physically built, how structurally sound is it)

Safety measures **(worth 5 % overall)** 1 2 3 4 5 6 7 8 9 10
(Proper and safe layout of tools and materials)

Security measures **(worth 5 % overall)** 1 2 3 4 5 6 7 8 9 10
(Public safety, number of people inside the school's Pit area…)

Respect for the surroundings **(worth 5 % overall)** 1 2 3 4 5 6 7 8 9 10
(Cleanliness and damage to area or property…)
If any damage is done to the property or area, added penalties may be deducted from the kiosk component's total mark.

Judges comments: _____
_____
_____

Scoring Scale:
1 = Poor / Criteria not met
10 = Exceptional

(Kiosk Judging Form continued)

Section C : Presentation (38%)

The presentation section relates to the creative, aesthetic and logical flow of the kiosk.

Creativity of presentation	**(worth 10 % overall)**	1 2 3 4 5 6 7 8 9 10
Visually attractive to the public	**(worth 10 % overall)**	1 2 3 4 5 6 7 8 9 10
Use of light and sound	**(worth 10 % overall)**	1 2 3 4 5 6 7 8 9 10
Organization of content and information (Does the information flow together in an easy to follow and logical manner.)	**(worth 8 % overall)**	1 2 3 4 5 6 7 8 9 10

Judges comments: _____
_____
_____
_____

Kiosk #: _____

School: _____

Kiosk Certification Form
Robotique CRC Robotics 2012

1. Electrical

Wiring & Outlets	Acceptable	Not acceptable	Not applicable
Gauge			
Layout			
Protected			
Grounded			
Anchored			

2. Structural Integrity

	Acceptable	Not acceptable	Not applicable
Walls			
Roof			
Floor			

3. Safety

	Acceptable	Not acceptable	Not applicable
Tools properly stored			
Proper Fastening / Anchoring (Accessories, equipment, shelves, objects …)			
Public access			
Manoeuvrability inside kiosk (Ability to move around without hitting things)			
Safety equipment (**First Aid Kit**, Goggles, gloves...)			

4. Aesthetics

Respects Neighbouring kiosks (sound, paint /cover back and outer sides)

Acceptable	Not acceptable

_____ CRC Signature

_____ Team Signature

Robot Engineering Evaluation Guidelines

1. **Design Objective:**
   i. Adaptation of concept to meet Game objectives
   ii. Appropriate efficiency and functionality
   iii. Innovation / Ingenuity

2. **Design Flexibility:**
   i. Flexibility of design to varying Game strategies
   ii. Flexibility of design to component failures

3. **General Concept:**
   i. Originality of concept
   ii. Creativity in the use of VEX components
   iii. Simplicity of concept
   iv. Functionality / Feasibility