THE CRC ROBOTICS
SENIOR COMPETITION

RULEBOOK

TAK TIK 2025

A program of

AEST EAST

0. Changelog

0.1.0 Version 1.0

Released on 2024/10/28

0.1.1 Version 1.1

Released on 2024/10/30

- Added Collège Montmorency as Team #29.
- [1.4, 1.8.4] Changed the layout of the dispensers.
- [1.12.7] Added the penalty for carrying too many GPs.
- [1.8.4] Added a rule preventing robots from entering the Curling Area.
- [2.1.a] Clarified that only the connectors for the battery can be changed on the CRCvolt.
- [2.1.e] Clarified that the controller used must be unmodified and similar to the one provided with the CRCconnect.

Participating Schools

Team Number	School/Organization Name	Division	Prog. Division	Returning / Rookie
1	École secondaire Antoine de Saint-Exupéry	2	2	
2	Lower Canada College	1	2	
3	West Island College	2	2	
4	LaurenHill Academy	1	1	
5	Vanier College	1	1	
6	St. George's School of Montreal	2	2	
7	Cégep André Laurendeau	1	2	
8	Vanguard High School	2	2	
9	Marianopolis College	1	1	
10	Royal West Academy	1	1	
11	Bishop's College School	2	2	Returning
12	École secondaire Curé Antoine Labelle	2	2	
13	Cégep de Victoriaville	1	2	
14	École secondaire Monseigneur-Richard	2	1	
15	École secondaire Jules-Verne	2	2	
16	Rosemount Technology Centre	1	1	Returning
17	Collège André-Grasset	1	2	
18	John Abbott College	2	2	
19	Collège Sainte-Marcelline	1	2	
20	Collège de Bois-de-Boulogne	1	1	
21	Cégep Limoilou	2	1	
22	Lake of Two Mountains H. S.	2	2	
23	John F Kennedy High School	2	2	Rookie
24	Collège Sainte-Anne de Lachine	2	1	
25	Collège Citoyen	2	2	
26	Collège Saint-Sacrement	1	1	
27	Dawson College	1	1	
28	WIBCA	2	2	Rookie
29	Collège Montmorency	1	1	Returning

Table of Contents

1. Game

The game component requires robots to score the greatest number of points while working in teams. It is the main component of the CRC Robotics Competition, giving each school an equal opportunity to demonstrate their robot design, robot construction and strategic playing skills.

CRC Robotics reserves the right to modify any and all values outlined in the following subsections at any time throughout the season. All teams will be promptly notified if a modification is made. All the visual renderings in this document are not to scale. Please refer to the technical drawings for the field dimensions.

1.1. Definitions

The following terms are frequently used to keep this section of the rulebook as concise as possible. Bold characters are used when referencing them.

- **Robot part**: A part or assembly that gets separated from the robot and does not touch it.
- **Carrying a game piece**: A game piece is considered carried when it is lifted off the playing field floor and in contact with a robot, mechanism, or another carried GP.

1.2. Game Officials

Game Officials on or around the playing field, have full authority to judge all aspects of the heat. Game officials reserve the right to:

- Remove robots that are inactive or broken;
- Prevent robots, robot extensions and dropped robot parts from negatively blocking other robots;
- Prevent robots from damaging the playing field and GPs;
- Prevent robots from violating the air space on the edges of the playing field;
- Determine the final scores and penalties for each robot.

## 1.3. Teams

Two teams, blue and yellow, composed of two robots each, play against each other during each heat. For this section of the rulebook, "team" will be exclusively used to refer to teams of partnering robots.

Robots will change partners between heats based on the schedule provided by the CRC; partners are assigned at random and will not be changed once the schedule is released.

1.4. Playing Field

- The playing field is a square made of <u>6</u> tiles long per <u>6</u> tiles wide, with <u>2</u> tiles at each end for each team's starting zones.
- The image below shows a visual rendering of the playing field.
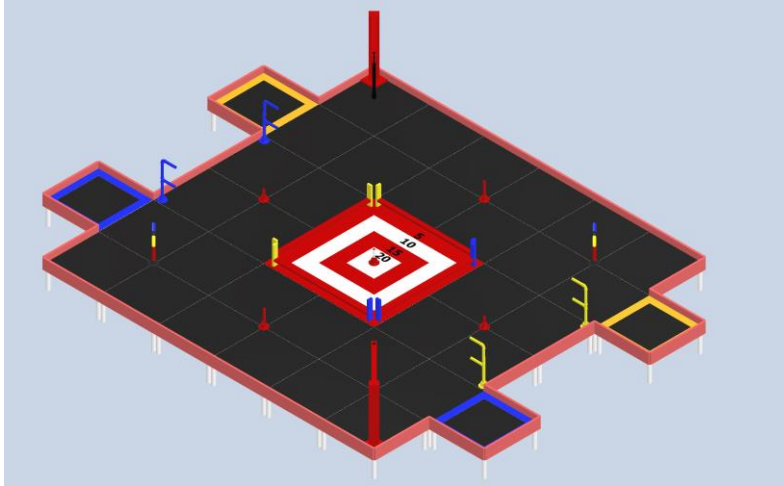
- There is a border on the perimeter of the playing field.

1.5. Game Pieces (GPs)

- All GPs are torus-shaped and 3D printed.
- A total of <u>60</u> yellow GPs and <u>60</u> blue GPs will be available at the start of each heat.
- The following images show a visual rendering of the blue and yellow GPs.
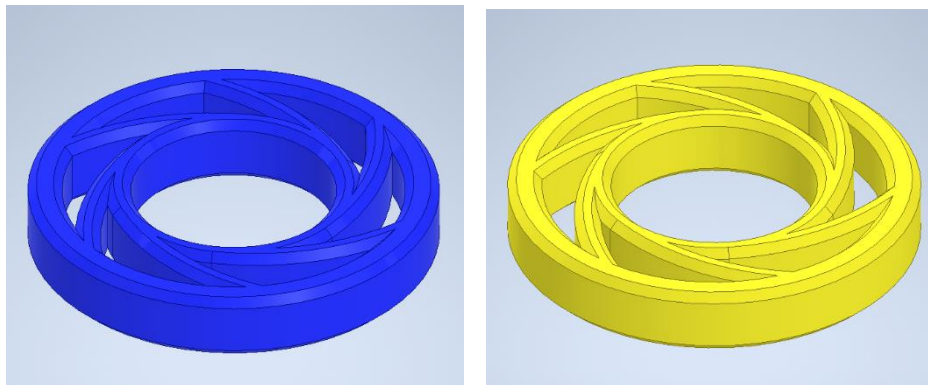
- A robot may only **carry** GPs of its team's color.
- A robot may only **carry** a maximum of <u>3</u> GPs.
- GPs are subject to wear, which may alter some of their physical properties. Each robot's design should account for this variability in order to progress in the competition.
- Should GPs be considered intentionally damaged by a robot, that robot will face a penalty.

1.6. Putting Game Pieces into Play

- All the GPs start in dispensers that correspond to their colour.

- Robots may not start the heat with any GPs preloaded.

- It is not permitted to intentionally remove GPs from the playing field.

- GPs that leave the field, regardless of reason, will be considered out of play and can no longer be retrieved or used by a robot.

1.7. Dispensers

- Each team has access to two different kinds of dispensers of their colour.
- A robot may only interact with their team's dispensers.
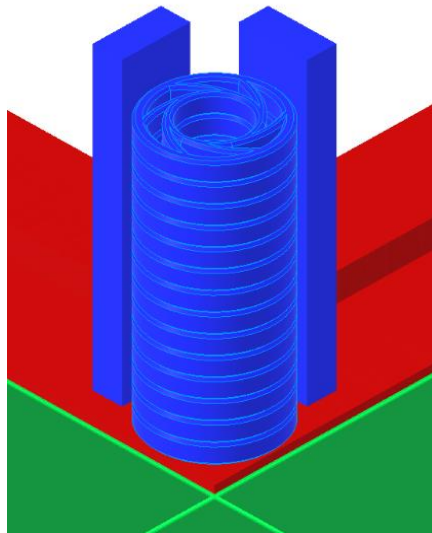
1.7.1. Stack Dispensers

- The **Stack Dispensers** are vertical containers located in the corners of the **Curling Area** from which GPs can be grabbed or pushed from the bottom.

- Each **Stack Dispenser** starts the heat with 14 GPs.

- The following image shows a visual rendering of the **Stack Dispensers**.
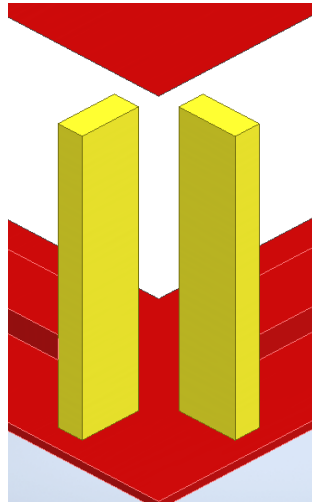
1.7.2. Horizontal Dispenser

- The **Horizontal Dispenser** starts the heat holding GPs on two horizontal cylinders.

- Each **Horizontal Dispenser** Starts the heat with 16 GPs.

- The following image shows a visual rendering of the **Horizontal Dispensers.**
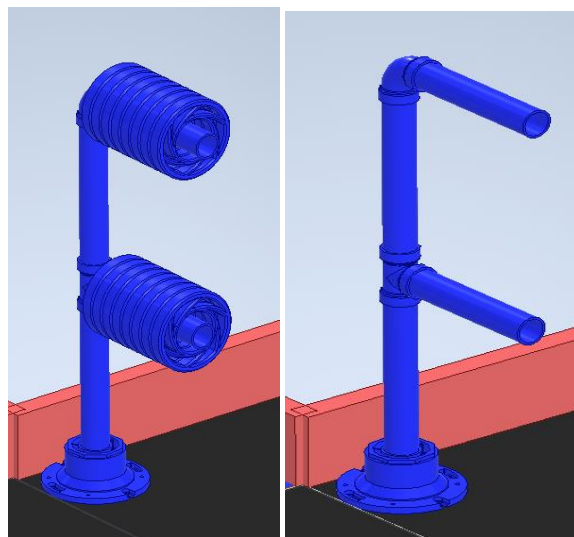
1.8. Stations

There are four types of **Stations** on the playing field, arranged in a 3 x 3 grid. Each **Station** can be controlled by one **team** at a time. Each **Station** has a GP capacity. GPs placed in a **Station** beyond the capacity will not be considered in the scoring.

1.8.1. The Post

- A **Post** is a vertical tube attached at its base to the playing field floor.

- The height and GP capacity of each **Post** may vary between rounds. This change will be announced before the start of the affected round. The dimensions supplied in this rulebook are in effect for the **Preliminary Heats**.

- In the preliminary heats, posts 1 and 2 will be 300 mm (12 in) and posts 3 and 4 will be 150 mm (6 in). The capacity of each **Post** is limited to the last GP held by the **Post**.

- A **Post** is controlled by the last GP placed on it.

- The following image shows a visual rendering of the **Post**.

1.8.2. Inverted Post

- An **Inverted Post** is a vertical tube, attached at its topmost point to the support. The tube retains **GPs** through the use of a retaining mechanism at its base.

- Each **Inverted Post** has a capacity of 12 GPs for the **Preliminary Heats**.

- An **Inverted Post** is controlled by the first GP placed on it.

- The following image shows a visual rendering of the **Inverted Post**.

1.8.3. Horizontal Post

- The **Horizontal Post** is a horizontal tube fixed in its center, with a yellow and blue side of equal lengths.

- Robots may only place GPs on the section of the Horizontal Post corresponding to their team colour.

- Each section of the **Horizontal Post** has a capacity of <u>8</u> GPs. This capacity does not vary between rounds.

- The **Horizontal Post** is controlled by having the most GPs placed on it. A tie nullifies the control of the **Horizontal Post** until another GP is placed.

- The following image shows a visual rendering of the **Horizontal Post**.

1.8.4. Curling Area

- The **Curling Area** is a series of concentric square **zones** with a **Central Post**. The **Central Post** is classified as its own scoring **Zone** within the **Curling Area**.

- Any robot deemed by a game official as leaning on the floor or borders of the **Curling Area** will be subject to a penalty of 10%, and any GP placed by the offending robot will be removed from play.

- **Zones** increase in scoring value as they near the center of the **Curling Area**.

- The **Central Post** has a capacity of 5 GPs. Other **Zones** do not have a limited capacity.

- Control of the **Curling Area** is determined by the team which has the largest quantity of their GPs resting within the centermost occupied scoring **Zone**.

- The following image shows a visual rendering of the **Curling Area**.
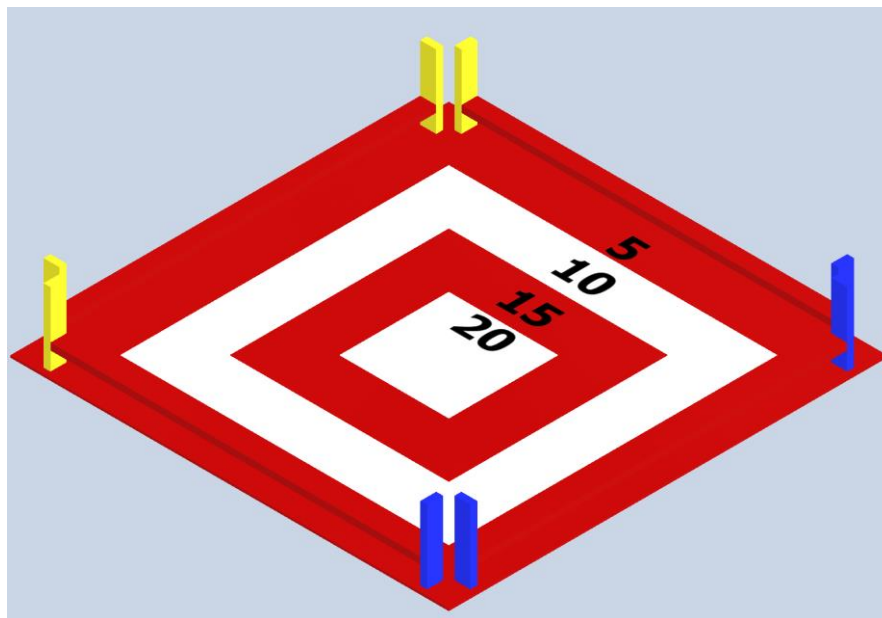
1.9. TakTik Toe Multiplier

- A **TakTik Toe Multiplier** consists of controlling three stations in the same horizontal, vertical or diagonal line.

- If a station is a part of a single **TakTik Toe Multiplier**, the team controlling it has their GPs score multiplied by a factor of 1.5 for that station.

- If a station is a part of two or more **TakTik Toe Multipliers**, the controlling team has their GPs score multiplied by 2 instead.

- GPs of the team not affected by a **TakTik Toe Multiplier** will remain at the base score for that station.

1.10. Scoring Points

- Each GP placed in a station gives points to the team of its corresponding color.

- The **Post** has a variable capacity. Refer to announcements prior to the round for details regarding capacity. Each GP placed on a Post is worth 20 points.

- The **Inverse Post** has a variable capacity. Refer to announcements prior to the round for details regarding capacity. Each GP placed on an inverse post is worth 40 points.

- The **Horizontal Post** has a Capacity of 8 GPs per team (16 total). Each GP placed on a **Horizontal Post** is worth 30 points.

- The **Center Post** has a capacity of 5 GPs:

  - The first GP placed is worth 500 points;
  - The second GP is worth 400 points;
  - The third GP is worth 300 points;
  - The fourth GP is worth 200 points;
  - The fifth GP is worth 100 points;
  - All subsequent GPs thrown on the **Center Post** are not considered for scoring.

- GPs thrown on the **Curling Area** are worth points according to the **Zone** on the floor their center is in. See the **Curling Area** diagram above for the point values of each **Zone**.

1.11. Heat Progress

- All heats are 5 minutes in duration. Estimated time and scores might appear on the screens near the playing field. The remaining time until the end of a heat is controlled by a Game Official.

- When the heat time is over, all robots and robot parts must stop moving. GPs will be considered only when they stop moving, even if that occurs after the heat time is over.

- All the points generated by a team due to the motion of their robots after the heat ends will be canceled.

- Following the end of the heat signal, team members are not allowed to enter the field, touch any robot, or touch the GPs before they are cleared to do so by a Game Official. It is essential that the configuration of the GPs, at the end of the heat, remains intact for scoring purposes. Teams must give back the GPs on board of their robot before leaving the playing field.

1.12. Requirements and Penalties

The minimum score that can be awarded for any given heat is 0 points. If a penalty brings a robot's total score to below 0, the final score awarded to the robot for the heat will be 0.

1.12.1. Identification

All robots must be identified using the CRCsignal to indicate that robot's team colour for the heat. Team names must be prominently displayed in a font of at least 38 mm x 38 mm per character. The assigned team number must be displayed in a font of at least 60 mm x 60 mm per character. All required identification elements must be wholly visible to the crowd, and game officials. Adding the robot's name (if any) is optional and does not substitute the required identification elements.

1.12.2. Robot Activity

A robot is activated by leaving its starting zone **and** actively contributing to its team's score. Only activated robots will benefit from their team's score.

A robot that is not activated or is absent from the heat will be considered inactive, and will receive a score of 0 for the heat; the teammate of an inactive robot will have its score multiplied by 1.5 to compensate for the disadvantage of playing alone.

1.12.3. Broken Robot

If an activated robot stops moving or participating after leaving its starting zone and contributing to the score, it will be considered a broken robot. A Game Official can determine a robot to be broken. Broken robots will be removed from the playing field after 30 seconds if they are blocking play. A broken robot gets a 10% penalty to its score for each 30 seconds (rounded upwards) elapsed.

1.12.4. Requesting a Game Official's Intervention

During a heat, if a robot is considered broken or if a pilot judges that its robot needs assistance on the playing field, they may ask a Game Official to assist their robot. The assisted robot will be liable to an assistance penalty of 20% of its total score for the heat. The Game Officials reserve the right not to assist the robot even if asked to do so by the pilot.

1.12.5. Robot Safety

Game officials retain all rights to decide that a robot's components or behaviour presents a risk of injury or damage. The team in question will be met with a warning at first, or if the action is deemed of a severe enough risk, be disqualified from the heat, or the tournament.

If a robot or robot part poses a safety concern during the heat or at any time during the tournament, that robot will be decertified and will no longer be permitted to play until the highlighted issues are fixed and the robot is recertified.

If liquid leaks from a robot during a heat, the robot that is leaking will be immediately removed and given a score of 0 for the heat. The offending team is responsible for the cleanup and containment required.

1.12.6. Unsportsmanlike Conduct

We trust that all participants will provide clear intentions and respect the rules, the Game Officials, and other competitors. However, certain actions may occur that require penalties. These have a series of escalating consequences, depending on the severity of the issue. The number of points deducted from the offending school's overall score will be proportional to the severity of the action. Penalties can range from point deductions to disqualification and barring from the tournament.

Some examples of unsportsmanlike behaviour include:

- A deliberate attempt to disable or damage another robot;
- A deliberate attempt to hit another robot in any way;
- Inappropriate behaviour directed at a Game Official, a volunteer, another participant, or the public.

1.12.7. GP Handling

Any instance of a robot throwing a GP out of the playing field will result in a 40% penalty of the robot's total score for the heat for each GP affected.

Robots **carrying** more than 3 GPs will be subject to a 20% assistance penalty. Additional GPs shall be removed by a Game Official.

1.12.8. Junk

Any discarded robot parts left on the field after a heat will be collected following the robots leaving the field. These parts will be transferred to the CRC Hub between heat blocks where they may be collected. Participants may only collect Junk pieces from the CRC hub; any attempt to collect junk prior to its release will result in a penalty.

If the robot part blocks another robot or their access to a GP, station or dispensers, or poses a safety concern, it will be immediately removed by a game official. It is the responsibility of the team to pick up their dropped robot parts before exiting the playing field area.

1.12.9. Playing Field Access

Game officials control access to the playing field at all times. At no point during a heat do participants have permission to access the playing field.

Game officials will grant access to participants at the beginning and the end of each heat to allow the loading and unloading of the robot.

Accessing the playing field without permission may result in a penalty to the offending team.

1.12.10. Practice Area(s)

Teams are only permitted to practice driving their robot in designated practice area(s).

The practice area shall contain a minimum of one example of each field component that robots may interact with. Teams are responsible for bringing their own GP(s) to the practice area.

For the purposes of practice, game officials may grant access to the playing field during periods in which there are no heats. There is no guarantee of playing field access during the competition.

1.13. Pilot and Co-Pilot

Each pilot and robot must be in the designated area before the end of the heat preceding their own in order to be permitted to play. It is the team's responsibility to ensure they are on time, even if the schedule is delayed. If a team's robot or pilot is not ready to start, the heat will start regardless.

Pilots and co-pilots must remain seated in their provided seats for the entirety of the heat. Pilot's or co-pilot's wishing to move their provided seat are permitted to do so, within the designated area before the heat begins.

Team members may not interfere with or touch any element of the playing field, robots or GPs during the heat.

Observers may not interact or guide the pilot, or co-pilot in any way once a heat has begun. Offenders shall be met with an initial warning before being banned from the playing field area.

1.14. Challenges

If a team wishes to challenge a ruling, their pilot must bring video evidence to the Team Resources CRC official within 15 minutes of the end of the concerned heat. Approaching the CRC scoring table or a game official directly will result in dismissal of any related challenge.

A team judged by CRC officials to be abusing its ability to challenge playing field rulings may lose its privilege to do so.

1.15. Tournament Progress

The tournament consists of 5 rounds. The teams with the best cumulative scores for a round progress in the tournament. Starting with the knock-out round, robots play in pools formed by the tournament bracket and their cumulative round score is compared with other robots of their pool to determine if they progress further in the bracket.

a. **Preliminary Round**: These heats are played by all robots. The cumulative score for that round consists of all but the two lowest scores obtained by a robot. Heats affected by an unsportsmanlike or safety penalty cannot be removed. The robots with the highest cumulative score advance directly to the semi-finals or quarter finals. A robot's cumulative score for the preliminary round determines initial seeding in the bracket.

b. **Knock-Out Round:** Played by all the robots not advancing to the semi-finals or quarter finals. The best cumulative scores of each pool advance to the quarterfinals.

c. **Quarterfinals:** Played only by robots that haven't been eliminated in the knock-out round. The best cumulative scores of each pool advance to the semi-finals.

d. **Semi-Finals:** Played only by robots that haven't been eliminated in previous rounds. The best cumulative scores of each pool advance to the finals.

e. **Finals:** Played only by the best scoring robots from the semi-finals. The cumulative scores determine the ranking for this round.

The schedule for the various rounds will be published at the beginning of the Competition. Some exceptional circumstances could prompt the CRC to create a Wildcard round in order to give a fair chance to every robot.

2. Robot

This section outlines the robot design and construction constraints on which robots will be evaluated at the Competition. Non-compliance with the following rules will cause robots to fail certification. Uncertified robots are not allowed to compete. Refer to the Wiki for tips and suggestions. The evaluation rubrics used by the judges to evaluate the robot design and robot construction as well as the Robot Certification Form may be found at the end of this section.

2.1. Minimum required equipment

All robots must have their school's name and number prominently displayed on their robot at all times. All characters must be a minimum of 50 mm in height and 25 mm in width. The team number must be at least 100 mm in height and 100 mm in width. In case of doubt, reach out to the CRC to confirm your signage is appropriate.

All robots are required to use the following in an unmodified fashion.

a. **CRCvolt**: A battery case that must be securely attached to your robot's frame. Integrating the 30 Amp self-reset fuse, the robot's 12V, 7.5 Ah lead-acid or Nickel-Cadmium sealed battery must be secured into the CRCvolt during all robot operations. Solely the terminals connecting to the battery may be modified, provided all modifications are adequate to the wiring (10 AWG) and current (30 A) requirements.

b. **CRCstop:** Emergency stop button in a case. The CRCstop must be placed to be easily accessible by the game officials in case of a problem on the playing field. Contains a PTC fuse to protect the CRCduino and the CRCsignal. The slots on both sides must be easily accessible to add and remove the certification plates.

c. **CRCsignal:** A stack light that must be placed on your robot in a spot that is visible by the crowd and the game officials. It must correctly display which team you are on.

d. **CRCduino:** CRC's Arduino-based microcontroller that must be used to control each output and actuation made by the robot.

e. **CRCconnect:** The CRCconnect communicates remotely with the CRCduino to drive the robot. No other remote communications are permitted with any robot component. The CRCconnect can only be used with the integrated gaming controller or with a USB similar unmodified gaming controller plugged in the CRCconnect.

2.2. Transmission and Controls

2.2.1. Other Transmitters

It is forbidden to use any transmission methods or any method disrupting other robots in any way.

2.2.2. Other Microcontrollers

Onboard control systems other than the CRCduino are only permitted if a motor, a servo, any actuator type or a motor controller is not connected to them. Sensors can be connected to an onboard control system other than the CRCduino.

2.2.3. Onboard Cameras

Cameras may be attached to robots, but the live transmission of images is prohibited during the heats. If the camera is transmitting information to the robot, it must be powered by the robot's 12V battery. A camera can have its own battery only if it feeds no signal to the robot.

2.2.4. Low-Voltage Sensors

Usage of any onboard sensors to give feedback to the CRCduino or other microcontrollers is allowed

2.2.5. Low-Voltage Servos

All servo motors rated for 6 VDC or less are allowed, whether they have continuous rotation or partial rotation.

Examples of legal continuous rotation servos: VEX EDR 3-wire motors, VEX EDR 2-wire 393 motors, VEX EDR 2-wire 269 motors, POWER HD 1501MG, FEETECH FS0403 and HITEC HSR-1425CR.

Examples of legal partial-rotation servos: VEX EDR 3-wire servo, POWER HD DSP33, FEETECH FT5313M and HITEC HS-625MG.

Thousands of different models are available on the market. When in doubt, contact CRC Robotics.

2.2.6. External Motor Controllers

External motor controllers are permitted when they are used to control low-voltage servo motors that are not equipped with an internal motor controller. For reference, the following are some examples of legal servos: VEX EDR 2-wire 393 motors and VEX EDR 2-wire 269 motors. Low-voltage servo controllers must be powered through a 5V robot controller port.

2.3. Dimensions

2.3.1.   Initial Size Limits

Robot dimensions are limited to an initial dimension limit of 762 mm x 610 mm x 1220 mm (length x width x height) at the beginning of each heat.

2.3.2.   Extension Constraints

After the heat begins, robots can extend their dimensions up to 1067 mm x 762 mm x 1220 mm (length x width x height).

2.3.3.   Moving Parts

Moving parts and mechanisms are only allowed if they cannot extend beyond the allowed dimensions. A physical limit must be present in the event that a mechanism could extend beyond the allowed dimensions.

2.4. Power Circuit and Motorization

2.4.1. Power Motors

Only the following power motors can be used as part of the power circuit, with any or no gearbox attached:

Motor Type	Part Number
Banebot Motor	RS-5XX* with any gearbox
goBilda Motor	Modern Robotics/MATRIX 12VDC Motor**
Car Power Seat Motor	Princess Auto SKU: 9102179

*   *"XX" can be any number*
**   *Legal replacement: RobotZone 12VDC Motor for heavy-duty planetary gearbox*

2.4.2. Power Motor Count

The maximum number of power motors allowed on the robot is 8.

2.4.3. Power Motor Modifications

Any modification to the electrical components of the power motors is prohibited. Modifications may only be made to the mechanical components of the power motors, if desired. Therefore, the gearbox can be changed or removed completely.

2.4.4. Power Servos

Servos powered by the 12V power circuit are prohibited.

2.4.5. Power Motor Controller

Power motors may be controlled with relays, interrupts, switches and/or any motor controllers, such as the Victor SPX, as long as they are rated for the appropriate current.

2.4.6. Capacitors

The use of capacitors is not permitted.

2.4.7. Voltage Converters

The use of voltage converters is not permitted.

2.4.8. Power Distribution

The **power distribution** is connected to the CRCstop module and allows multiple connections to the power circuit. Each team is responsible for selecting their style and capacity of **power distribution** elements. These elements must be minimally rated for the current passing through them.

2.4.9. Wiring Schematic

The power circuit must adhere to the following schematic:
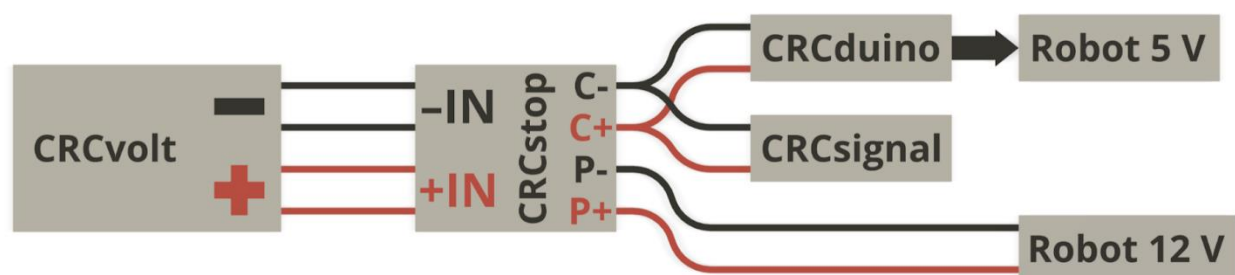
2.4.10. Wiring

The use of an adequate wire gauge is mandatory in the power section of the robot in order to pass the technical certification. We provide this table of minimum requirements.

Robot circuit component	Required wire
CRCvolt to CRCstop	10 AWG (6 mm^2)
CRCstop to power distribution	10 AWG (6 mm^2)
Power distribution to motors	14 AWG (2,5 mm^2)
CRCstop to CRCduino	18 AWG (0,75 mm^2)
CRCstop to CRCflash	18 AWG (0,75 mm^2)

2.5. Pneumatics

The use of pneumatic systems is not permitted.

2.6. Alternative Power and Energy Systems

2.6.1. Gravitational Energy

There is no restriction with regard to using gravity.

2.6.2. Single Decompression Springs

A spring that, after having started the heat in a compressed or stretched state, releases its energy during the heat, but cannot return to its original state without human intervention, will be deemed illegal.

2.6.3. Proper Spring Usage

If spring systems are used, they must either be in relaxed states at the beginning of the heat, or any force exerted onto the spring must originate from a robot component connected to the robots' batteries. Springs can only be energized on the playing field or designated practice areas to avoid injuries. Spring systems that function through oscillation are also allowed, given they conform to the above rules.

Spring-loaded mechanisms that release their energy all at once, like a catapult, must not present any pinch points or crushing hazards in the trajectory of the released moving robot part or parts.

2.6.4. Fans

Fans may only be used to cool down motors or electrical components that can potentially overheat.

2.6.5. Lights

The use of lights is permitted; however, they must draw their energy from the 12V power circuit. Lighting that is considered a nuisance by game officials will be permanently disconnected without warning.

2.6.6. Lasers

The use of lasers of any type is prohibited.

2.7. Certifications

2.7.1. Initial Certification

Robots will be required to pass a safety inspection (on-site, at the Competition) in order to be judged and have access to the playing field. During the certification, the electrical power circuit will be inspected for its integrity. If parts are protected inside boxes, the boxes will need to be opened during certification. Should any part of the circuit be inaccessible, the robot will not be certified. Refer to the certification criteria at the end of this section.

2.7.2. Recertification

Teams may modify their robot between heats at their discretion. However, each electrical modification and each modification made to enlarge the robot's dimensions must be subsequently certified. Failure to recertify the robot will result in all points gained in subsequent heats to be void. When in doubt, recertifying a robot is best practice.

All robots advancing to the final round of the game, will undergo recertification before the first heat of the round.

2.8. Evaluations for all components

2.8.1. The Evaluation Process

All evaluations shall comprise two stages: the Preliminaries and the Finals.

The Preliminaries:

- All registered teams are divided into pools. The number of teams per pool is dependent on the number of registered teams.
- The judges of each pool evaluate and rank the teams' robots. Judges are participating mentors or qualified CRC volunteers. Judges are never assigned to pools containing their current or past teams.
- Each pool is evaluated by different judges. Judges of all pools follow the same judging criteria for each category.
- The top teams in each pool will qualify for the Finals. The number of qualifiers per pool is dependent on the number of registered teams.

The Finals:

- Finalists are the top teams from each pool in the Preliminaries.
- There are no pools in the Finals. All finalists are evaluated by the same judges.
- Judges evaluate and rank the finalists' work. Judges are field experts and did not judge in the Preliminaries. Judges in the Finals follow the same judging criteria used in the Preliminaries.
- Based on the ranking provided by the judges, the top three teams in each division will receive awards.

2.8.2. The Evaluation Criteria

Evaluations are divided into three criteria. Each criterion is scored 1-5. Refer to the rubrics below for the criteria relevant to each evaluation.

2.8.3. Schedule

The timeframes for the preliminary evaluations will be provided to the teams on the first day of the Competition. The teams that advance to the final round will be provided with their time frame after the preliminary round.

2.8.4. Presentations

The preliminary presentations will take place at the Kiosk of each team. Final presentations will take place in a closed room at the host school, with the exception of Kiosk.

2.8.5. Language

The presentation can be done in French and/or English.

2.8.6. Visual Support

Visual support is permitted. CRC Robotics does not guarantee the presence of electrical outlets for the presentation.

2.8.7. Structure

The presentations must abide by the following structure:

Length	Action
5 min	The team presents the robot (without the judges interrupting).
5 min	The judges ask their questions to the evaluated team.
5 min	The judges give feedback, rank teams, discuss and move toward the next team.

2.9. Evaluation Form for Robot Design

Robot Design (Robots are not permitted in the presentation area)					
	Beginning (1)	Developing (2)	Accomplished (3)	Exemplary (4-5)	Score /5
Design Intent	The design has some link to the intended purpose but lacks clarity or completeness.	The design aligns with the purpose, but some elements could be refined.	The design is well thought out, with a clear intent and good functionality.	The design is exceptionally purposeful, with each element clearly serving its intended function.	
Efficiency	The design lacks efficiency, with excessive complexity or wasted resources in the structure and layout.	The design is moderately efficient, but some elements could be streamlined or optimized for better use of space or materials.	The design is efficient, with a thoughtful use of materials, components, and layout that minimizes waste.	The design is highly efficient, achieving maximum functionality with minimal complexity, resource use, and waste.	
Originality	The design shows minor attempts at creativity, but remains largely conventional.	The design incorporates some creative elements, though it's still somewhat conventional.	The design has creative elements that distinguish it from more common designs.	The design is highly innovative and unique, offering a fresh and original concept.	

Robot Design Presentation					
	Beginning (1)	**Developing (2)**	**Accomplished (3)**	**Exemplary (4-5)**	**Score /5**
Clarity	The presentation is unclear, with key concepts difficult to understand and explanations vague or confusing.	The presentation communicates the basic ideas, but some parts are unclear or lack sufficient detail.	The presentation is clear and understandable, with minor areas that could be better explained.	The presentation is exceptionally clear, with all concepts well-articulated and easy to understand.	
Organization	The presentation is poorly organized, making it difficult to follow the flow of ideas.	The presentation has a general structure, but the flow of ideas is sometimes disjointed or lacks a smooth progression.	The presentation is well-organized, with a logical progression of ideas, though some transitions could be smoother	The presentation is extremely well-organized, with a logical and engaging flow of ideas that enhances understanding.	
Response to questions	Struggles to answer questions effectively, with responses lacking depth or relevance to the questions asked.	Answers questions with basic understanding, though responses may be incomplete or somewhat unclear.	Responds to questions with clear, thoughtful answers that demonstrate good understanding of the topic.	Provides detailed, insightful answers to questions, demonstrating a deep understanding and ability to think on the spot.	

2.10. Evaluation Form for Robot Construction

Robot Construction					
	Beginning (1)	**Developing (2)**	**Accomplished (3)**	**Exemplary (4-5)**	**Score /5**
Structural Integrity	The robot is unstable and parts are poorly attached. It frequently falls apart or breaks.	The robot is somewhat stable, but some parts are loosely attached or fragile.	The robot is stable, with securely attached parts. It withstands normal use without issues.	The robot is highly durable, extremely stable, and can withstand rough use or stress without damage.	
Component Integration	Components (e.g., motors, sensors) are poorly placed or connected, leading to malfunction or misalignment.	Some components are connected, but they may not be well-integrated, causing occasional malfunctions or misalignment.	Components are well-placed, connected, and integrated, with only minor issues.	Components are flawlessly integrated, well-placed, and function perfectly together.	
Maintenance & Repair	The robot is difficult to maintain and repair. Parts are hard to access.	Some components are accessible, but maintenance is time-consuming or requires special tools.	Most parts are easy to access and maintain with standard tools. Repairs are straightforward.	The robot is designed for easy maintenance, with all parts accessible, and repairs are simple with common tools.	

Robot Construction Presentation					
	Beginning (1)	**Developing (2)**	**Accomplished (3)**	**Exemplary (4-5)**	**Score /5**
Clarity	The presentation is unclear, with key concepts difficult to understand and explanations vague or confusing.	The presentation communicates the basic ideas, but some parts are unclear or lack sufficient detail.	The presentation is clear and understandable, with minor areas that could be better explained.	The presentation is exceptionally clear, with all concepts well-articulated and easy to understand.	
Organization	The presentation is poorly organized, making it difficult to follow the flow of ideas.	The presentation has a general structure, but the flow of ideas is sometimes disjointed or lacks a smooth progression.	The presentation is well-organized, with a logical progression of ideas, though some transitions could be smoother	The presentation is extremely well-organized, with a logical and engaging flow of ideas that enhances understanding.	
Response to questions	Struggles to answer questions effectively, with responses lacking depth or relevance to the questions asked.	Answers questions with basic understanding, though responses may be incomplete or somewhat unclear.	Responds to questions with clear, thoughtful answers that demonstrate good understanding of the topic.	Provides detailed, insightful answers to questions, demonstrating a deep understanding and ability to think on the spot.	

2.11. Robot Certification Form

Team: _____

Component	Item	Certification		
		Pass	**Fail**	**N/A**
Electricity	Accessible Circuit			
	CRCvolt			
	CRCstop			
	Wiring gauge			
Motor Count	Banebot Motors			
	GoBilda Motors			
	5V Servos			
	Integrity of the Motors			
Electronics	Speed Controller			
	Other Electronic Devices			
	CRCduino			
Robot	Dimensions of the Robot			
	Visibility and size of CRCflash, School Name and Team Number			
	Robot Safety (electric circuit, exposed screw, sharp edge, dangerous mechanism, etc.)			

Notes:

_____

_____

_____   _____
CRC Robotics Signature   Team Signature

3. Kiosk

The Kiosk component requires the creation of a themed kiosk and presentation to visitors and judges. This component gives each school an equal opportunity to showcase their school, their team and their robot.

3.1. Installation and dismantling

3.1.1. Setup Safety

If CRC Robotics deems that there is a risk of accident either with the Kiosk or with the construction methodology (e.g. unsafe ladder, tools, etc.), CRC Robotics will stop the building process until a safe approach can be agreed upon.

3.1.2. Space Usage

All teams must ensure that the assembly and disassembly of their Kiosks does not negatively impact other teams in any way.

3.1.3. Competition Readiness

In an effort to have the best experience possible for all teams, Kiosk must arrive at the competition in a completed but disassembled state. Only minor tweaks will be permitted. Major construction or modification will result in a penalty.

3.1.4. Paint Touch-ups

Paint touch-ups must be done outside of the host school. Any paint spills will result in a $200 fine. Any cleaning costs incurred by the host school will be invoiced to the offending team. Repeat offenders may be subject to further penalties.

3.1.5. Assembly Time Limit

Scheduled arrival times, sent by email to all teams, indicate the assigned arrival time. The kiosk must be fully assembled and ready for judging within 6 hours of the team's scheduled arrival time.

3.1.6. Dismantling Time

Kiosks may not be dismantled until instructed to do so by CRC Robotics.

3.1.7. Dismantling

A team's kiosk area must be cleared and cleaned by the designated time. on the takedown night of the Competition. No damage can be done to the area. Any team leaving debris behind 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.

3.2. Constraints for certification

Each kiosk will be required to pass a safety inspection at the end of their setup time in order to be judged. Refer to the certification form at the end of this section and the following points for details.

3.2.1. General

a) **Identification:** A clear and obvious identification of the team number and full school name must be prominently displayed at the entrance of the kiosk. Font characters must be at least 150 mm high by 50 mm wide.
b) **Respect for Neighbors:** The surrounding kiosk areas must be respected; otherwise, the team at fault will be penalized for any behavior that has a negative impact on other kiosks (e.g. loud music, extending beyond the kiosk footprint).
c) **Space Provided:** A 12'4" (depth) by 12' (width) space is available to each team.

3.2.2. Electrical Work Conformity

All electrical work within the kiosk must adhere to Québec's building safety standards. Wires must not be exposed (protected), need to be grounded, and anchored to avoid tripping or accidental disconnection.

3.2.3. Structural Integrity

a) The walls and internal structures of the kiosk must be stable and adequately secured.
b) All structures should be able to withstand reasonable pressure or force without risk of falling or collapsing.
c) It is not permitted to have any livable space floor higher than a 300 mm distance from the ground.

3.2.4. Safety Equipment

Each Kiosk must be equipped with at least:

- One complete first aid kit (see First Aid Kit Requirements Certification Form);
- 3 pairs of safety glasses;
- 3 pairs of work or mechanic's gloves.

It is each teams' responsibility to ensure proper safety gear is worn when necessary.

3.2.5. Access

There must be clear access for the robot and team members within the kiosk. The space must be easily maneuverable without hitting things or risking injury.

3.3. Kiosk aesthetics and provisions

3.3.1. Material Provided

a) 1 electrical outlet will be provided with 2 plugs (120V, 15A total).
b) 1 folding table (Optional);
c) 2 school chairs (Optional);

3.3.2. Visual Appeal

The outside walls of Kiosks, except the facade, will not be judged.

3.3.3. Bilingualism

The information displayed and available in the interior or on the exterior of the kiosk must be bilingual.

3.3.4. Multiple Teams per School

Schools with multiple teams will have their Kiosk spaces adjacent to each other.

3.3.5. Language

The presentation for the evaluation can be conducted in the team's language of preference

3.3.6. Presentations

Preliminary and Final presentations will take place at the kiosk of the evaluated team.

3.3.7. Kiosk Evaluation Form

		Beginning (1)	Developing (2)	Accomplished (3)	Exemplary (4-5)	Score /5
Kiosk Construction						
Theme Alignment		The kiosk poorly reflects the chosen theme, with little to no visible connection.	The kiosk somewhat reflects the theme but lacks cohesion or clear design elements.	The kiosk reflects the theme well, with consistent design elements that align with the theme.	The kiosk strongly and creatively embodies the theme, with cohesive and immersive design elements that enhance the overall concept.	
Structural Design & Stability		The kiosk is unstable, with weak construction, and may not support the intended use.	The kiosk is somewhat stable but may have issues with durability or sturdiness under prolonged use.	The kiosk is stable and well-constructed, holding up under normal use.	The kiosk is highly durable, exceptionally well-constructed, and can withstand heavy use and environmental factors.	
User Accessibility & Functionality		The kiosk is difficult to use or navigate, with poor placement of interactive elements or restricted access.	The kiosk has some accessible elements, but the layout or functionality is confusing or inconvenient.	The kiosk is user-friendly, with well-placed interactive elements and clear, functional access points.	The kiosk is highly accessible and intuitive, with seamless functionality, clear user paths, and well-placed interactive features.	

Presentation					
	Beginning (1)	**Developing (2)**	**Accomplished (3)**	**Exemplary (4-5)**	**Score /5**
Clarity	The presentation is unclear, with key concepts difficult to understand and explanations vague or confusing.	The presentation communicates the basic ideas, but some parts are unclear or lack sufficient detail.	The presentation is clear and understandable, with minor areas that could be better explained.	The presentation is exceptionally clear, with all concepts well-articulated and easy to understand.	
Organization	The presentation is poorly organized, making it difficult to follow the flow of ideas.	The presentation has a general structure, but the flow of ideas is sometimes disjointed or lacks a smooth progression.	The presentation is well-organized, with a logical progression of ideas, though some transitions could be smoother	The presentation is extremely well-organized, with a logical and engaging flow of ideas that enhances understanding.	
Response to questions	Struggles to answer questions effectively, with responses lacking depth or relevance to the questions asked.	Answers questions with basic understanding, though responses may be incomplete or somewhat unclear.	Responds to questions with clear, thoughtful answers that demonstrate good understanding of the topic.	Provides detailed, insightful answers to questions, demonstrating a deep understanding and ability to think on the spot.	

3.4. Kiosk Certification Form

Team: _____   Time: _____

Component	Item	Certification	
		Pass	Fail
General	Team identification clarity and sizing		
	Respect neighboring kiosks (sound, paint, etc.)		
	Space does not exceed 12' x 12'4"		
Wiring	Protected		
	Grounded		
	Anchored		
Structural Integrity	Walls		
	Roof		
	Floor		
	Floor no higher than 300 mm		
	Proper fastening / anchoring (Accessories, equipment, shelves, objects, etc.)		
Safety	Required safety equipment		
	Safe tool storage		
	Maneuverability inside kiosk		
	Safe public access (for all ages)		

Notes:

_____

_____

_____   _____
CRC Robotics Signature   Team Signature

3.5. Safety Equipment Checklist

At the competition, the following items with their respective quantities are mandatory at the moment of kiosk construction.

Item	Quantity Necessary	Pass	Fail
Fire Extinguisher	1		
Safety Glasses (With peripheral protection)	3 minimum		
Safety Gloves	3 pairs		
Sterile Adhesive Bandages	25		
Sterile Gauze Pads 3''x3''	12		
Sterile Abdominal Pad 5''x9''	1		
Stretch Bandage 2''x 2 yards	1		
Sterile Compress Dressing with ties 4''x4''	2		
Triangular Bandage 40''x40''x56''	2		
Adhesive Tape	2.3m roll		
Antiseptic Wound Cleansing Towelettes	25		
Clean Examination Gloves (non-latex)	4 pairs		
Bandage scissors (blunt angled tip)	1 pair		
Splinter Tweezers (Fine tip)	1		
Hand Sanitizer OR Skin Cleansing Towelettes	6 uses		

Notes:

_____

_____

_____   _____
CRC Robotics Signature   Team Signature

4. Programming

As the game is generally played with remote-controlled robots and not automated ones, there is a separate competition dedicated to programming. This Programming component allows teams to develop and demonstrate their programming skills. Teams are evaluated on their performance in solving programming-related problems.

4.1. Scope

4.1.1. Goal

The Programming component is primarily a learning experience. Simply based on analysis and problem-solving through programming, it will allow participants to learn how to solve simple and complex situations using a computer. The objective is not to test the participants' knowledge of a programming language, but rather to test their knowledge of the principles and techniques required to design and implement a program in the best possible way.

4.1.2. Challenge

Participants will face several individual programming problems that will be solved separately from one another. However, participants will have to score as many points as possible in the overall challenge according to a certain arrangement of the problems solved. See sections 4.4 and 4.5 for more information.

4.2. Rules

4.2.1. Final Score

A team's score in the overall challenge determines the team's ranking in the Programming component of the Competition. The scores from the preliminary portion and the main challenge will be combined to determine the overall score. The points repartition for the preliminary problems is a percentage of the main challenge. See section **4.4.2** for more information.

4.2.2. Tie-breaker Logic

The submission time of the final completed problem will be used to determine placement during ties. The team with the earliest submission time will be placed higher.

4.2.3. Player Limit and Having Multiple Teams

Teams shall not be permitted to have more then 4 team members present at the in-person events. However, teams may register multiple sub teams should they have an abundance of willing participants. Sub-teams must work independently during the main challenge and only the best total score will count for the overall team.

4.2.4. Unsportsmanlike Conduct

Any team caught cheating or exhibiting unsportsmanlike conduct is subject to disqualification. Examples of cheating or unsportsmanlike conduct include, but are not limited to, any attempt to:

* Use artificial intelligence tools to write code segments;
* Misleading another team;
* Copying the solutions of another team;
* Having more than 4 active participants in a sub-team;
* Using a solution belonging to someone who is not an official participant of the Competition.

4.3. Evaluations

4.3.1. Languages

The competition will be held exclusively in Python. It is permitted to use the math, matplotlib, NumPy, random and panda libraries. Unless clearly stated otherwise in the problem description, it is prohibited to import any other library for problem solving.

4.3.2. Evaluation

A judge will perform the evaluation. Template files will be provided for every problem, allowing teams to test their solutions directly by writing in a predetermined function.

For preliminary problems (see Section **4.4**), the solution shall be evaluated, with test cases of increasing difficulty, so that the reliability of the code can be verified by a Judge. On request, judges provide the teams feedback, to help them better prepare for the main challenge.

For the main challenge problems (see Section **4.5**), the evaluation will be done automatically based on a set of predetermined test cases unknown by the participants.

4.3.3. Execution Limit

There will be a time limit of 60 seconds for the execution of the code for any given challenge. Any code taking longer than the time limit will receive a score of 0 for that problem.

4.3.4. Partial Points

Should solely the output format of a team's solution not match the requirements in the problems description, a team may receive half of the points associated with a problem. In addition, the answers must be clearly defined in the solutions output. However, any bonuses (see Section **4.5**) resulting from the completion of the problem will not be valid. The decision to award partial points is entirely at the discretion of the judges.

4.4. Preliminary Problems

4.4.1. Schedule

Four preliminary problems of increasing difficulty will be given leading up to the Competition. A two week's delay will be allowed for the completion of each one of the problems. However, participants will be allowed three weeks to complete the final preliminary problem. The schedule for the preliminary problems is as follows:

Date the problem will be provided	Submission Deadline
November 3rd 2024	November 17th 2024
November 17th 2024	December 1st 2024
December 1st 2024	December 15th 2024
January 5th 2025	January 26th 2025

4.4.2. Relating to the Main Challenge

Preliminary problems serve primarily as a learning experience and stepping stone towards the main challenge. Feedback will therefore be provided to all participating teams on request. Every preliminary problem shall be 2% of the total value of the main challenge's problems (outside of any multipliers), with the exception of the final problem, which is worth double (4%). These points are not a part of the specified format in Section 4.5, but could difference in the total programming score.

4.5. Main Challenge

4.5.1. Schedule

The programming challenge shall be divided into two 3-hour programming blocks where participants are tasked with solving different problems from one block to another. These blocks shall henceforth be referred to as Block A and Block B. The detailed schedule of the programming challenge shall be provided at the beginning of the Competition.

4.5.2. Problems

The content of a problem is related to the category that encompasses it. Problems can be of varying difficulty, with more difficult problems awarding more points. However, problems given in Block A, are likely to be easier than those given in Block B.

4.5.3. Categories and Points Multipliers

Problems shall be separated into several categories, **granting a bonus multiplier upon completion of the category.** Categories group problems with a similar theme, requiring a similar solution, or use of similar concepts.

Completion of at least one problem in each category **shall multiply the points of the hardest problem completed** for the multiplier **in each category**. The same is true for at least two successful problems in each category, which will multiply the points of the two most difficult problems successfully completed in each category.

All multipliers are 1.5x/150% and are completely independent from one another. Thus, the overall multiplier and the category multiplier can **both apply** to the same problem, giving it a **2.25x/225% multiplier.** See rule **4.5.5** for a scoring example.

4.5.4. Blocks A and B

Certain categories and their related problems shall be provided in Block A while the rest shall be provided in Block B. During Block B, it will not be possible to go back and complete problems from Block A.

For Block B, no information about the number of categories or the number of problems shall be provided until the problems are received at the beginning of the block. It is possible, however, that some of the problems in Block A will be useful in solving problems in Block B.

However, for Block A, the categories shall always contain 2 to 5 problems and shall be as follows:

- Two-dimensional problems
- Data sorting
- Scientific calculations
- Text processing

4.5.5. Scoring Example

Below is an example of how a team could perform in the main challenge. The categories in Block B have been named E, F and G for now. It is important to mention that the number of categories in Block B, the number of problems for each category presented, the points assigned to each problem and the difficulty of each problem are for illustrative purposes only and are in no way an accurate representation of what will be presented at the Competition.

Example:

BLOCK A

Categories	Data Structures (SD)			Scientific Calculations (CS)				Two-Dimensional Problems (2D)			Text Processing (TT)			
#Problem (pts)	SD.1 (10)	SD.2 (30)	SD.3 (15)	CS.1 (25)	CS.2 (35)	CS.3 (20)	CS.4 (25)	2D.1 (20)	2D.2 (15)	2D.3 (20)	TT.1 (10)	TT.2 (15)	TT.3 (15)	
Raw Points	0	30	15	25	35	20	25	10	15	20	0	15	0	
Boni => Category	NO			YES				NO			NO			
=> Global	YES			YES				YES			YES			
Multiplier	1	1.5	1	1.5	2.25	1.5	1.5	1	1	1.5	1	1.5	1	Points in A
Final Points	0	45	15	37.5	78.75	30	37.5	10	15	30	0	22.5	0	321.25

BLOCK B

Categories	E				F					G			
#Problem (pts)	E.1 (40)	E.2 (25)	E.3 (55)	E.4 (60)	F.1 (70)	F.2 (55)	F.3 (50)	F.4 (45)	F.5 (50)	G.1 (60)	G.2 (30)	G.3 (55)	
Raw Points	20	25	0	0	70	55	50	45	50	60	0	0	
Boni => Category	NO				YES					YES			
=> Global	YES									YES			
Multiplier	1	1.5	1	1	2.25	1.5	1.5	1.5	1.5	1.5	1	1	Points in B
Final Points	20	37.5	0	0	157.5	82.5	75	67.5	75	90	0	0	605

LEGEND	
Full points given	
Half-points given	
No points given	

Total Rounded Team Score	
	926

Explanation:

The category bonus in (2D) is not obtained because the problem **2D.1** was attributed partial points per **4.3.4**. Since one problem in each category has been completed, a bonus is applied to the highest tiered problem in each relevant category. A multiplier of **2.25** attributed when both the overall bonus and the category bonus are applied on the same problem (1.5 x 1.5 = 2.25).

5. Video

The following section outlines the rules specific to the video component. The evaluation rubric used by the judges to evaluate the video may be found at the end of this section.

5.1. Format

5.1.1. Run-time

The submitted video must be no more than 5 minutes long, not including end credits.

5.1.2. Stylization/Style

The video submitted must have a fictional narrative or journalistic/documentary style.

5.2. Required Content

5.2.1. CRC Robotics Competition Description

The video must reference or describe the CRC Robotics Competition or an aspect of this year's game.

5.2.2. Bilingualism

Both the English and French languages must be equally represented in the video, either through dialogue and/or subtitles. YouTube's closed-captioning tool is not permitted.

5.2.3. Video Description Content

The video description on YouTube must mention the date and location of this year's CRC Robotics Competition and show a hyperlink to the following URL: www.robo-crc.ca

5.2.4. Copyright Law Adhesion

If the video is themed around an existing work, it must be clearly mentioned and credited. It is the responsibility of each team to ensure that the video does not violate YouTube's Copyrighted Content policy.

5.2.5. Forbidden Content

No vulgar, offensive, violent or inappropriate content is permitted. When in doubt, contact CRC Robotics.

5.2.6.   Asset Reuse

The reuse of content or assets from a previous submission is prohibited. Any attempt to submit a video containing the same content or assets from a previous submission may be subject to a penalty determined by CRC Robotics.

5.3. Submission

5.3.1.   Deadline and Submission Platform

The video must be uploaded to YouTube in order to be judged. Refer to the Season Calendar in the admin packet for the date on which to submit the video. The specific URL pointing to the video's YouTube page must be provided at the time of submission. Video upload must be done by the deadline. A team that does not submit a video will receive a score of zero in the video component. A team that submits a video up to 24 hours following the deadline will be evaluated; however, this team will not be able to rank within the "Top 3" for the video component in their division. Submissions received more than 24 hours after the deadline may not be judged.

5.3.2.   Privacy Settings

The video's privacy setting must be either "Unlisted" or "Public" when submitted. The video's privacy setting must be switched to "Public" no later than the first day of the Competition. Refer to the Season Calendar in the admin packet for the exact time and date.

5.4. Video Evaluation Form

Video Narrative					
	Beginning (1)	**Developing (2)**	**Accomplished (3)**	**Exemplary (4-5)**	**Score /5**
Narrative Flow	The video lacks a clear structure or story. Transitions between ideas are abrupt or confusing, making it hard to follow.	The narrative is somewhat clear but may have disjointed parts, causing occasional confusion or loss of interest.	The narrative is clear and well-organized, with smooth transitions and a logical progression of ideas.	The narrative is highly engaging, cohesive, and flows smoothly from beginning to end, with seamless transitions and a strong sense of direction.	
Originality	The video lacks creativity and presents ideas that are common or predictable, with minimal original content.	The video shows some creativity but relies on common ideas or techniques without pushing boundaries.	The video is creative, incorporating original ideas or perspectives that make it stand out.	The video is exceptionally creative and original, showcasing unique ideas, innovative techniques, or a fresh approach to the subject.	
Clarity	The video is difficult to understand, with unclear visuals, poor audio quality, or a confusing presentation of ideas.	The video is somewhat clear, but occasional issues with visuals, audio, or explanations make parts hard to understand.	The video is clear, with good visuals, clear audio, and an easy-to-follow presentation of ideas.	The video is exceptionally clear, with high-quality visuals and audio, and a presentation that is easy to understand and follow throughout.	

Video Technical					
	Beginning (1)	**Developing (2)**	**Accomplished (3)**	**Exemplary (4-5)**	**Score /5**
Cinematography	The shots are poorly composed, shaky, or out of focus, making it difficult to view the video properly. Lighting is inadequate.	The shots are somewhat composed but lack consistency or creativity. Lighting is uneven or distracting in some scenes.	The shots are well-composed with good focus, and lighting is appropriate. There's an attempt to use creative camera angles.	The cinematography is excellent, with creative and well-composed shots, steady camera work, and effective use of lighting that enhances the mood and narrative.	
Editing	The video is poorly edited, with choppy cuts, inconsistent pacing, and visible mistakes that detract from the story.	Editing is functional but inconsistent, with some awkward transitions or pacing issues that disrupt the flow.	Editing is smooth, with good pacing and clean transitions that support the narrative. There are few noticeable errors.	The editing is seamless and highly polished, with perfect pacing and transitions that enhance the flow and storytelling of the film.	
Sound Quality	The sound is unclear, with poor volume balance, background noise, or distorted audio that makes it hard to understand.	The sound is mostly clear but may have occasional issues with volume, background noise, or inconsistency in audio levels.	The sound is clear and well-balanced, with minimal background noise or volume issues. Dialogue and effects are easy to hear.	The sound quality is exceptional, with clear, balanced audio, no background noise, and perfectly synchronized sound effects and dialogue.	

6. Tutorial

To promote the sharing of knowledge and to encourage a spirit of cooperation between the CRC Robotics Competition teams, the CRC Robotics Organizing Committee selects the team with the best tutorial each year. The evaluation rubric used by the judges to evaluate the tutorial may be found at the end of this section.

6.1. Requirements

The Tutorial must demonstrate knowledge directly related to any component of the Competition. Although it is strongly encouraged to cover new subjects, it is acceptable to cover a tutorial topic previously explored.

6.1.1. Format

Tutorials must be in video format and cannot be longer than 3 minutes, excluding end credits.

6.1.2. Structure

The Tutorial can be structured in one or more of the following ways:

- A theoretical and simplified explanation of a common system (e.g. internal functioning of CRCduino);
- A step-by-step explanation to achieve a specific task;
- A practical demonstration of a complex system to perform a specific task.

6.1.3. Asset Reuse

The reuse of content or assets from a previous submission is prohibited. Any attempt to submit a tutorial containing the same content or assets from a previous submission may be subject to a penalty determined by CRC Robotics.

6.1.4. Bilingualism

Both the English and French languages must be equally represented in the tutorial. The dialogue must be accessible in both languages. YouTube's closed-captioning tool is not permitted.

6.2. Submission

6.2.1. Deadline and Submission Platform

The Tutorial must be uploaded to YouTube in order to be judged. Refer to the Season Calendar in the admin packet for the date on which to submit the video. The specific URL pointing to the tutorial's YouTube page must be provided at the time of submission. Upload must be done by the deadline. A team that submits a tutorial up to 24 hours following the deadline will be evaluated; however, this team will not be able to rank within the "Top 3" for the tutorial component in their division. Submissions received more than 24 hours after the deadline will not be judged.

6.2.2. Privacy Settings

The Tutorial's privacy setting must be either "Unlisted" or "Public" when submitted. The tutorial's privacy setting must be switched to "Public" no later than the first day of the Competition. Refer to the Season Calendar in the admin packet for the exact time and date.

6.2.3. Multiple Submissions

A team can submit multiple Tutorials. If a team submits multiple tutorials, one will be chosen at random to be evaluated.

6.3. Tutorial Evaluation Form

Tutorial Technical					
	Beginning (1)	**Developing (2)**	**Accomplished (3)**	**Exemplary (4-5)**	**Score /5**
Content Accuracy & Depth	Information is mostly inaccurate, incomplete, or lacks technical detail. Critical concepts are missing or poorly explained.	Some accurate information is presented, but there are gaps in technical detail or important concepts.	Information is accurate and complete, covering most key technical details effectively.	The content is highly accurate, comprehensive, and provides in-depth technical detail, covering all relevant concepts thoroughly.	
Clarity of Explanation	Instructions are confusing, vague, or disorganized, making it difficult to follow the tutorial.	Instructions are somewhat clear, but parts of the tutorial are difficult to understand or follow.	Instructions are clear and well-organized, with only minor areas of confusion.	Instructions are exceptionally clear, well-organized, and easy to follow, guiding the user smoothly through complex tasks.	
Engagement & Practical Application	The tutorial is unengaging, with little to no interactive elements or practical examples. Users struggle to apply what they learn.	The tutorial includes some examples or exercises but lacks consistent practical application or engagement.	The tutorial engages users with relevant examples and exercises that encourage practical application of the material.	The tutorial is highly engaging, with hands-on examples, interactive elements, and strong focus on real-world application of the concepts.	

7. Website

The following section outlines the rules and regulations of the website content and design components. The evaluation rubrics used by the judges to evaluate the website design and the website content may be found at the end of this section.

7.1. Technical Requirements

7.1.1. Compatibility

The website must be functional in the mobile and desktop version of Google Chrome, Firefox and Safari.

7.1.2. Quality Assurance

The website should be **tested prior to submission**. Any bugs found during evaluation will negatively affect the team's score in the website design component. Bugs include, but are not limited to, malformed links, missing images or actions that cause an error.

7.1.3. HTML Standards Adhesion

The website should validate against HTML5 Standards (http://www.w3.org/TR/html5/) with little to no errors.

7.1.4. CSS Standards Adhesion

The website should validate against CSS 3.0 (https://www.w3.org/standards/techs/css#stds & https://jigsaw.w3.org/css-validator/) or better with little to no errors.

7.2. Website Content

7.2.1. Bilingualism

The website content must be fully bilingual. When the locale is changed to French, no English content should be displayed. When the locale is changed to English, no French content should be displayed.

7.2.2.   Team Roster

The website must minimally contain a browsable roster of every student, teacher and mentor on the team, which includes each member's:

- Name
- Picture (optional)
- Contribution
- Descriptive content (optional)

7.2.3.   CRC Robotics Competition Description

The website must contain a page referencing or describing the CRC Robotics Competition.

7.2.4.   Game Description

The website must explain the game rules in enough detail such that the game can be understood from an outsider's perspective.

7.2.5.   Progress in Each Component

The website should include details relating to:

- The design and construction of the robot;
- Prototype plans and drawings;
- The latest version of the robot at time of submission;
- Photos of the robot, at various stages of construction;
- Progress in each component of the CRC Robotics Competition;
- Roadblocks encountered and the process of overcoming them;
- The team's video and tutorial.

7.2.6.   Copyright Law Adhesion

If the website is themed around an existing work, it must be clearly mentioned and credited.

7.2.7.   Asset Reuse

The reuse of content or assets from a previous submission is prohibited. Any attempt to submit a website containing the same content or assets from a previous submission may be subject to a penalty determined by CRC Robotics.

7.2.8. Forbidden Content

No vulgar, offensive, violent or inappropriate content is tolerated. When in doubt, contact CRC Robotics.

7.3. Submission

7.3.1. Online Accessibility

The website must be publicly accessible and hosted on the server provided by CRC Robotics, using the account credentials provided in the Competition Pamphlet available in your Participant Kit. If you have misplaced your credentials or they do not function, please email info.crc@sciencetech.ca.

7.3.2. Post-Submission Changes

Once submitted, changes cannot be made to the website. Should changes be discovered past the submission date, the website will be considered as not submitted.

7.3.3. Deadline and Submission Platform

Refer to the Season Calendar in the admin packet for the exact date on which to submit the website. The specific URL pointing to the website must be provided at the time of submission. A team that does not submit a website will receive a score of zero in the website design and website content components. A team that submits a website up to 24 hours following the deadline will be evaluated; however, this team will not be able to rank within the "Top 3" for the website design or website content components in their division. Submissions received more than 24 hours after the deadline may not be judged.

7.3.4. Website Visibility

The entirety of the website must be made visible to the general public and, preferably, discoverable by search engines no later than the first day of the Competition. Refer to the Season Calendar in the admin packet for the exact time and date. No points will be deducted if the website is not discoverable by search engines.

7.4. Website Design Evaluation Form

	Beginning (1)	Developing (2)	Accomplished (3)	Exemplary (4-5)	Score /5
Visual Appeal	The design is unattractive, cluttered, or inconsistent, with poor use of color, typography, or images. It detracts from the user experience.	The design is somewhat appealing but lacks consistency in color, fonts, or imagery. It may look unprofessional or outdated.	The design is visually appealing, with good use of color, typography, and images. The layout is clean and professional.	The design is highly polished, visually striking, and cohesive, with excellent use of colors, fonts, and images that create a strong, professional aesthetic.	
Navigation & Usability	The website is difficult to navigate, with unclear menus, broken links, or a confusing structure that frustrates users.	The website has basic navigation but may have usability issues, such as unclear labels or a non-intuitive structure.	The website is easy to navigate, with clear menus and a logical structure that users can follow with minimal effort.	The website offers seamless navigation, with intuitive menus, clear labels, and a highly user-friendly structure that enhances the overall experience.	
Responsiveness & Compatibility	The website is not responsive and does not display well on different devices or browsers. It is hard to use on mobile devices or tablets.	The website is somewhat responsive but may have layout issues or slower performance on certain devices or browsers.	The website is responsive, with smooth performance and appropriate layout adjustments on different devices and browsers.	The website is fully responsive and performs exceptionally well on all devices and browsers, with perfect layout adjustments and fast loading times across platforms.	

7.5. Website Content Evaluation Form

	Beginning (1)	Developing (2)	Accomplished (3)	Exemplary (4-5)	Score /5
Relevance & Accuracy	The content is irrelevant or inaccurate, with outdated or incorrect information that does not meet the needs of the audience.	The content is somewhat relevant but may contain minor inaccuracies or outdated information. It only partially meets the audience's needs.	The content is accurate and relevant, meeting the needs of the audience with up-to-date information.	The content is highly accurate, thoroughly researched, and perfectly aligned with the audience's needs, offering valuable, up-to-date insights.	
Organization & Structure	The content is poorly organized, with no clear structure. It is difficult for users to navigate or find information.	The content is somewhat organized but lacks a logical flow, making it hard to follow in some places.	The content is well-organized, with a clear structure that helps users easily navigate and find information.	The content is exceptionally well-structured, with a logical, intuitive flow that enhances user navigation and makes finding information effortless.	
Engagement & Readability	The content is unengaging and difficult to read due to complex language, jargon, or poor formatting.	The content is somewhat engaging but may have readability issues, such as long paragraphs or difficult language.	The content is engaging and easy to read, with clear language, proper formatting, and appropriate tone for the audience.	The content is highly engaging and reader-friendly, with concise, clear language, excellent formatting, and a tone that captivates the audience.	