

The Game

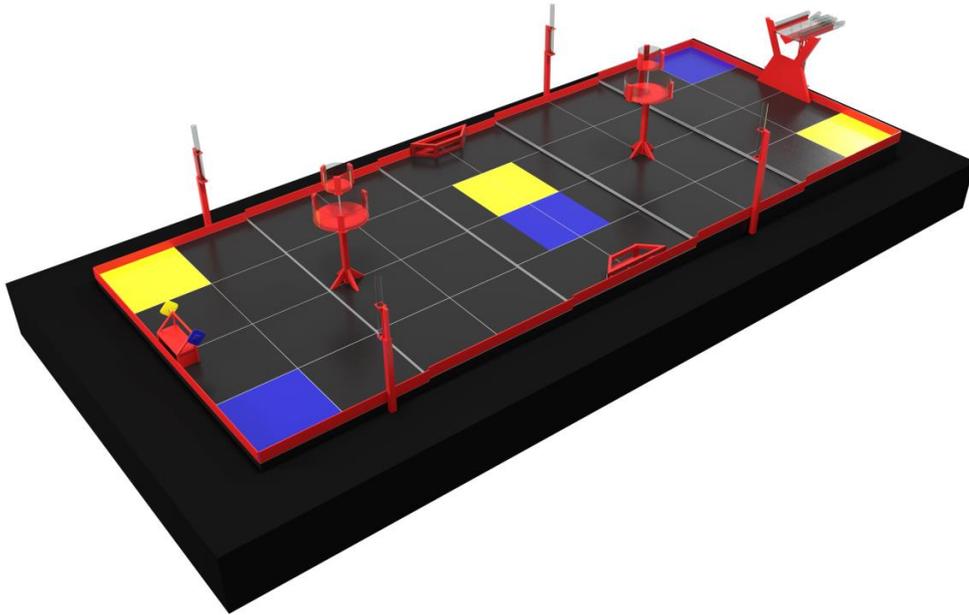
The game component requires robots to score the most amount of points while working in teams. It is the main component of the CRC Robotics Competition, giving each school an equal opportunity to demonstrate their robot design, robot construction, and strategic playing skills. Refer to the Survival Guide for tips and suggestions.

2.1 Teams

- 2.1.01 Two teams, blue and yellow, composed of two robots each, are playing against each other during each heat.
- 2.1.02 Robots will change partners from heat to heat.

2.2 Playing Field

- 2.2.01 This year, the playing field resembles a staircase. It is made up of five sections of the same size, but they are not positioned on the same horizontal level. Level 1 is the lowest level and Level 5 is the highest.
- 2.2.02 Available starting zones are located on Level 1, Level 3, and Level 5.
- 2.2.03 Game piece dispensers are located on Level 1, Level 4, and Level 5.
- 2.2.04 Targets are located on Level 2, Level 3, and Level 4.
- 2.2.05 The image below shows a view (not to scale) of the playing field. Unless otherwise communicated by the CRC Robotics Organizing Committee in the event of a modification, measurements of the playing field recorded at Kickoff will be considered accurate.



2.3 Game Pieces

- 2.3.01 This year's game pieces (GPs) are coloured tennis balls.
- 2.3.02 There is a total of 142 GPs that can be put into play: 70 blue, 70 yellow, and 2 red.
- 2.3.03 There is no limit to the number of GPs a robot can hold at any time during the game.
- 2.3.04 At the beginning of the heat, GPs are held in 5 dispensers across the playing field: 2 team-specific dispensers and one dispenser common to both teams. Each team-specific dispenser contains 15 GPs of the team's colour and the common dispenser contains 20 GPs of each colour and 2 red GPs.

2.4 Putting Game Pieces into Play

- 2.4.01 Each robot can be preloaded with a maximum of 10 GPs. If a robot is preloaded with less than 10 GPs, the remaining GPs are placed on the floor in the robot's starting zone.
- 2.4.02 When the game starts, robots may move across the field to remove the GPs from their dispensers and use them to score points.
- 2.4.03 To release GPs from the tube-shaped dispensers, robots must activate the corresponding mechanism located on Level 1.

- 2.4.04 To release GPs from the tilting dispenser, the rope must be pulled by either team.
- 2.4.05 A GP is considered removed from the dispenser when it is no longer in contact with the dispenser.
- 2.4.06 A GP on the field floor can be picked up by any team, regardless of which dispenser or robot it previously came from. For example, if a robot of the blue team removes a GP from a blue dispenser and that GP falls on the field floor, then that GP can be picked up by any robot from the yellow or blue team.
- 2.4.07 If a team picks up a GP of another team and the GP is processed by any mechanism to sort GPs, the opponent's coloured GP may not be stored in the robot to prevent the other team from using it.
- 2.4.08 GPs that leave the field will no longer be in play. It is not permitted to intentionally remove GPs from the playing field.

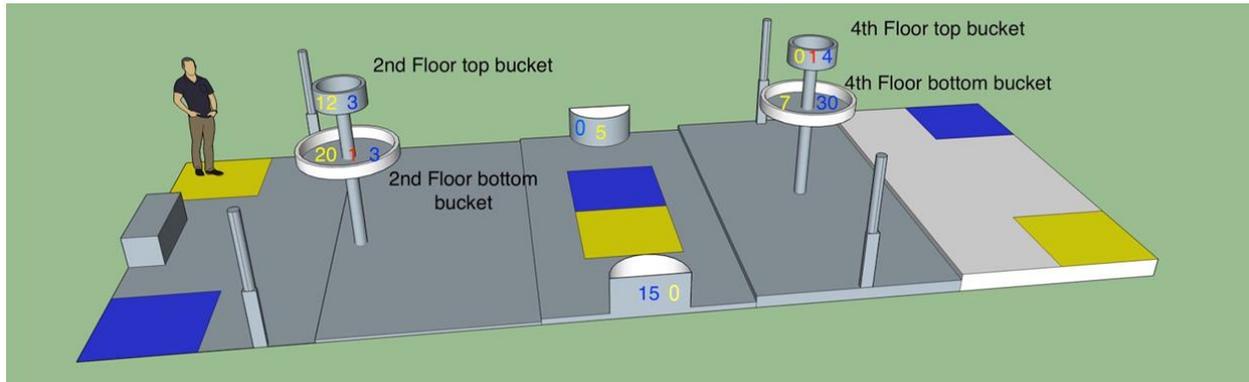
2.5 Scoring Points

- 2.5.01 A team scores points by placing GPs in the targets located on the playing field.
- 2.5.02 There are 3 target types in which teams can place GPs. The table below shows the location of the targets as well as the number of points awarded per GP found in that type of target.

Target Name	Points/GP	Location
Top Bucket	40	Level 2 and Level 4
Bottom Bucket	20	Level 2 and Level 4
Trapezoidal Prism	10	2 on Level 3

- 2.5.03 Yellow GPs found in targets award points to the Yellow team and blue GPs found in targets award points to the Blue team, regardless of which team placed the GP in the target.
- 2.5.04 Red GPs are worth 0 points, but act as a multiplier. If at least 1 red GP is located in a target at the end of the heat, then the value of all GPs inside that target is doubled. If both red GPs are located in the same target at the end of the heat, then the value of all GPs inside that target is still doubled.
- 2.5.05 No points are awarded for removing GPs from the dispensers.
- 2.5.06 No points are assigned to the GPs located in the dispensers, on the robots, or on the playing field at the end of the heat.

2.5.07 The following is a scoring example. It constitutes an integral part of the rules and acts as a reference for scoring disputes. Please note that this image does not represent the real playing field to scale, the various elements of the field, or the positioning of the starting zones. This image is simply to help understand the scoring system. The numbers represent the number of GPs of each color located in each target at the end of a heat.



Number of GPs in each target at the end of the heat						
	2nd level		3rd level		4th level	
	Bottom Bucket	Top Bucket	Trapezoidal prism #1	Trapezoidal prism #2	Bottom Bucket	Top Bucket
Blue GPs	3	3	0	15	30	4
Yellow GPs	20	12	5	0	7	0
Red GPs	1	0	0	0	0	1

Blue team's score				
Target	Number of GPs	Value of a GP	Multiplier	Score
2nd level, bottom bucket	3	20	Yes	120
2nd level, top bucket	3	40	No	120
3rd level, trapezoidal prisms	15	10	No	150
4th level, bottom bucket	30	20	No	600
4th level, top bucket	4	40	Yes	320
Total				1310

Yellow team's score				
Target	Number of GPs	Value of a GP	Multiplier	Score
2nd level, bottom bucket	20	20	Yes	800
2nd level, top bucket	12	40	No	480
3rd level, trapezoidal prisms	5	10	No	50
4th level, bottom bucket	7	20	No	140
4th level, top bucket	0	40	Yes	0
Total				1470

2.5.08 In order to share points with its teammate, a robot must contribute to the score by putting at least one GP in a target. The robot will then be defined as a sharing robot and will share the team's points.

2.5.09 The final score for each team is assessed at the end of the heat, although an estimated score might appear on the display as the heat is in progress.

2.6 Arbitration and Penalties

2.6.01 Our referees are experts in calling and assessing penalties and always have the final word on the playing field.

2.6.02 The referees on the playing field have full authority to judge all aspects of the game. In particular, the referees will:

- Prevent robots 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 field;
- Try their best to make sure the numbers displayed on the screens are accurate and updated as soon as possible; however, their ruling overrides whatever is displayed on the screens.

2.6.03 Any robot that is deemed dangerous by any of the referees runs the risk of being disqualified.

2.6.04 Various items may be placed, intentionally or not, on or around the playing field by a robot, on the condition that they are removed from the playing field by the robot before the end of the heat. If items are no longer in contact with the robot by the end of the heat, the robot that released these items will be liable to an individual junk penalty of 4% of its total score for the heat for each item left on or around the playing field.

2.6.05 If liquid seeps from a robot onto the playing field, the robot's total score for the heat will be reduced to 0.

2.6.06 While we trust that all participants will provide clear intentions, certain conducts may occur that require sanctions, especially during the heat of battle. To avoid such penalties, remain courteous. These penalties are considered as Unsportsmanlike Conduct and have a series of escalating consequences, depending on the severity of the issue. The number of points deducted from the robot's total score for that heat will be at the discretion of the head referee and will be proportional to the severity of the action. Some examples of the types of behaviour that signal a lapse of sportsmanlike behavior are:

- A deliberate attempt to disable or damage another robot;
 - A deliberate attempt to hit another robot;
 - Inappropriate behaviour directed at an official, another participant, or a spectator.
- 2.6.07 The minimum score that can be awarded for any given heat is 0 points; therefore, 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.
- 2.6.08 A robot can only release GPs from the dispensers corresponding to their team colour or from the common dispenser. For example, a robot from the yellow team cannot release GPs from a dispenser corresponding to the blue team. In case this happens, the yellow robot that released the GPs will obtain a 20% penalty applied to its total score for that heat.
- 2.6.09 If a team judges that its robot needs assistance on the playing field during a heat, its pilot may ask the referee to assist their robot. A penalty of 100 points will affect only the robot that was assisted by the referee. The referees reserve the right not to assist the robot even if asked to do so by the pilot.
- 2.6.10 GPs that are intentionally thrown out of the playing field by a robot will result in a penalty of 40 points for the robot and its teammate.

2.7 Heat Progress

- 2.7.01 Blue robots start the heat in two of the three blue starting zones on the playing field, while yellow robots start the heat in two of the three yellow starting zones on the playing field.
- 2.7.02 All heats are 5 minutes in duration. When the heat time is over, all parts of all robots 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.
- 2.7.03 Team members may not interfere with any items on the field during the heat, including contact with the robots or the GPs.
- 2.7.04 Robots may not damage the GPs or the setup on the playing field.
- 2.7.05 All robots must be labelled with the school's name (either full or shortened) and number as well as its corresponding team colour for the heat. These three elements must be clearly visible to the crowd and referees. If these elements are not all

visible, the robot will not be allowed to participate in the heat. Adding the robot's name (if any) is optional.

- 2.7.06 If a robot is not able to fully exit its starting zone during the heat for whatever reason and is not actively trying to score points from its starting zone, or if it is simply absent, it will be considered as an inactive robot. A robot teaming up with an inactive robot will see its score multiplied by 1.5 to compensate for the disadvantage of playing alone. Inactive robots will be removed from the playing field after 30 seconds of inactivity to prevent them from blocking play.
- 2.7.07 In the event that a robot puts at least one GP in a target without ever leaving the starting zone during the heat, this robot will not be considered an inactive robot and will share the team's points.
- 2.7.08 If a robot makes it out of its starting zone and stops moving for whatever reason, it will be considered a broken robot. If the robot breaks before it meets the sharing requirements, then it will not share the team's score, but the other robot's score (from the same team) will not be multiplied by 1.5, because, initially, the broken robot was an active robot. Broken robots will be removed from the playing field after 30 seconds of inactivity to prevent them from blocking play.
- 2.7.09 Following the buzzer signaling the end of play, team members are not allowed to enter the field, to touch any robot, or to touch the GPs before they are cleared to do so by the head referee. It is essential that the configuration of the GPs, at the end of the heat, remain intact for scoring purposes. The head referee will indicate when the team members are allowed to enter the playing field.

2.8 Pilot and Co-Pilot

- 2.8.01 Each team's pilot, co-pilot (spotter), and robot participating in the next heat must be in the "On Deck Area" when the buzzer sounds to end the previous heat. If not, a penalty is assessed to the offending robot. It is the team's responsibility to make sure the team is on time, even if the schedule is delayed.
- 2.8.02 If a robot, pilot, or co-pilot of a team is not ready to start, the heat will start without the team in question.
- 2.8.03 The pilot and co-pilot must remain seated during the entire game in their designated seats provided by CRC Robotics, which are placed within the designated areas surrounding the playing field.

2.8.04 Each person is responsible for taking all necessary precautions to ensure its own safety.

2.9 Tournament Progress

2.9.01 The tournament consists of 5 stages:

- a. **Preliminary round:** These heats are played on Thursday night and throughout the day on Friday by all teams. After all the preliminary heats have been completed, each robot will cast out their two lowest-scoring heats. Heats affected by an unsportsmanlike penalty cannot be cast out. The total of all other heats will be summed to determine each robot's final rank for the preliminary round. Depending on a team's rank, teams can advance directly to semi-finals or quarter-finals, or they will play in the knock-out rounds.
- b. **Knock-out rounds:** These heats are played on Saturday morning by teams that did not directly advance to quarter-finals or semi-finals. These rounds provide teams with an opportunity to advance further in the tournament.
- c. **Quarter-finals:** Top teams from the preliminary and knock-out rounds advance to this stage of the tournament.
- d. **Semi-finals:** Top teams from the preliminary rounds and quarter-finals advance to this stage of the tournament.
- e. **Finals:** Top teams from the semi-finals advance to this stage of the tournament.

2.9.02 The schedule for the various rounds will be published at the beginning of the Competition.