Section

3

FIRST Robotics Competition

THE GAME

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3 THE GAME

3.1   GAMEPLAY RULES

3.1.1   Periods

<G01> A MATCH is 2 minutes and 15 seconds long. The AUTONOMOUS PERIOD is the first 15 seconds of the match. The TELEOPERATED PERIOD is the remaining 2-minute period.

<G02> The AUTONOMOUS PERIOD ends when the ARENA timer displays zero seconds. The MATCH ends if all TOWERS are TRIGGERED or when the ARENA timer displays zero seconds, whichever comes first.

> During the AUTONOMOUS PERIOD, the BASES will be illuminated in yellow. During the TELEOPERATED PERIOD, BASES will be illuminated with their ALLiANCE color. At 15 seconds before the end of the MATCH, BASES will flash yellow, while TARGET lights will flash green. At 10 seconds before the end of the MATCH, when HOSTBOTS may DEPLOY their MINIBOT without penalty, BASES will illuminate with the appropriate ALLIANCE color, while TARGET lights will show a green 'chase' sequence. This chase sequence will continue until a MINIBOT TRIGGERS the TARGET, or time expires, whichever comes first. If a MINIBOT TRIGGERS the TARGET within the set time period, the TARGET light will illuminate to indicate in which place the MINIBOT finished. 1st place will illuminate all four lights to indicate the maximum number of points have been scored. MINIBOTS finishing in subsequent positions will illuminate fewer lights, with the 4th place MINIBOT illuminating one light, to indicate the fewest points scored

3.1.2   Pre-MATCH

<G03> Each ROBOT must be in its STARTING CONFIGURATION. The Head Referee may call for an inspector's recertification of the ROBOT size and weight prior to the start of any MATCH.
Violation: Prohibition from participating in the MATCH

<G04> Each ROBOT must be positioned on the FIELD so that the BUMPER closest to it's ALLIANCE'S PLAYER STATION breaks the plane formed by the POSTS of the opposing ALLIANCE'S TOWERS.
Violation: The MATCH will not start until all ROBOTS are in legal positions. A YELLOW CARD may be assigned for repeated violations.

<G05> Alignment devices (templates, tape measures, laser pointers, etc.) that are not part of the ROBOT and fully contained within the volume defined by the STARTING CONFIGURATION may not be used to assist with positioning the ROBOT.
Violation: TEAMS that use external alignment devices to position their ROBOT will have their ROBOT arbitrarily repositioned by a referee before the start of the MATCH.

<G06> Each ROBOT must be in contact with one UBERTUBE. No more than one ROBOT may be contacting an UBERTUBE.

<G07> Items other than the ROBOTS and the GAME PIECES shall not be placed on the FIELD prior to or during the MATCH.
Violation: PENALTY and YELLOW CARD

<G08> Each TEAM provides a COACH, two DRIVERS and a HUMAN PLAYER. (Each ALLIANCE will have three HUMAN PLAYERS: two FEEDERS and one ANALYST.)

<G09> All DRIVERS, COACHES and ANALYSTS must be standing in the ALLIANCE STATION and behind their STARTING LINE. FEEDERS must be in the FEEDER STATIONS.
Violation: PENALTY

<G10> Each FEEDER STATION must contain 3 sets of LOGO PIECES.

3.1.3   AUTONOMOUS PERIOD

<G11> ROBOTS may not break the plane of the CENTER LINE.
Violation: PENALTY

<G12> TEAM members must remain within their assigned starting areas (COACH, DRIVERS, and ANALYSTS must be in the ALLIANCE STATIONS and behind the STARTING LINE; FEEDERS must be in the FEEDER STATIONS).
Violation: PENALTY

<G13> TEAM members may not touch GAME PIECES.
Violation: PENALTY

<G14> Any control devices worn or held by the DRIVERS must be disconnected from the OPERATOR CONSOLE, and not connected until after the AUTONOMOUS PERIOD.
Violation: PENALTY

<G15> If a ROBOT should touch anything outside of the FIELD boundary during the AUTONOMOUS PERIOD, it will have a 10 second "grace period" to return to the FIELD at the beginning of the TELEOPERATED PERIOD.
Violation: If the ROBOT is unable to correct the situation within the grace period, it will be disabled for the remainder of the MATCH. If at any time the Head Referee should determine that the attempts to recover from the situation constitute unsafe operations, Rule <G26> will take precedence.

3.1.4   TELEOPERATED PERIOD

<G16> UBERTUBES may not be HUNG.
Violation: PENALTY

> <G16> disallows an unplaced UBERTUBE to be hung, a knocked-off UBERTUBE to be rehung, or movement of an UBERTUBE to a different PEG.

<G17>
HOSTBOTS may not DEPLOY a MINIBOT.
Violation: TOWER is disabled.

3.1.5   END GAME

<G18> All TELEOPERATED PERIOD rules apply, except as modified in this section.

<G19> MINIBOTS must remain completely autonomous and move up the POST solely through electric energy provided after the start of DEPLOYMENT by the permitted, unaltered battery and converted to mechanical energy by the permitted unaltered motors (and associated, appropriate circuitry).

Violation: The TOWER on which the MINIBOT is DEPLOYED is disabled. If the MINIBOT is DEPLOYED on something other than a TOWER, then the ALLIANCE'S TOWER upon which the highest RACE SCORE was earned will be discounted.

> <G19> means that HOSTBOTS are not allowed to launch the MINIBOT up the pole at the TARGET, or otherwise contribute to the vertical movement of the MINIBOT. Energy for vertical movement may not be stored in the MINIBOT before DEPLOYMENT (except that which is contained within the battery and excluding incidental kinetic energy stored in the motors or wheels, but NOT, for example, in a flywheel).

<G20> ROBOTS/HOSTBOTS may not contact their own TOWERS above the DEPLOYMENT LINE.
Violation: PENALTY for contact. TOWER is disabled if MINIBOT is DEPLOYED above the DEPLOYMENT LINE.

<G21> HOSTBOTS may DEPLOY MINIBOTS only onto their ALLIANCE'S TOWERS and entirely below the DEPLOYMENT LINE.
Violation: RED CARD

<G22> HOSTBOTS may not contact their ALLIANCE'S MINIBOT while any part of it is above the DEPLOYMENT LINE.
Violation: TOWER is disabled

<G23> Contact (via ROBOT or GAME PIECE) with the opposing ALLIANCE'S TOWERS is prohibited.
Violation: RED CARD

<G24> The opposing ALLIANCE may not interfere with the DEPLOYMENT or climbing of a MINIBOT.
Violation: RED CARD

> Interference by an ALLIANCE refers to any action taken by that ALLIANCE that results in disruption of the MINIBOT's progress. This may include, but is not limited to,
> > a) throwing a GAME PIECE at the MINIBOT/TOWER,
> > b) driving a ROBOT or GAME PIECE into the TOWER, or
> > c) directly contacting the MINIBOT or TOWER.

<G25> During the END GAME, ROBOTS/HOSTBOTS in contact with their ALLIANCE'S TOWER are protected and may not be contacted by an opponent.
Violation: PENALTY for inadvertent contact; plus a RED CARD for obviously intentional contact.

3.1.6 Safety

\<G26\> If at any time a ROBOT'S operation or design is deemed unsafe, the ROBOT will be disabled for the remainder of the MATCH. If the safety violation is due to the ROBOT design, the Head Referee has the option to not allow the ROBOT back onto the FIELD until the design has been corrected. *Violation: PENALTY and Disablement*

> An example of unsafe operation would be uncontrolled motion that cannot be stopped by the DRIVERS.

\<G27\> TEAM members may not contact any ROBOT at any time during the MATCH.
Violation: PENALTY and Disablement

\<G28\> TEAM members may not extend any part of their body into the FIELD during the MATCH.
Violation: PENALTY

\<G29\> If a ROBOT becomes unsafe (e.g. the ROBOT begins to smoke, the battery falls out, etc.) it may be disabled by pressing the E-Stop button. This will cause the TEAM'S ROBOT to be disabled for the remainder of the MATCH. The E-Stop buttons are intended for remote shut down during a MATCH in the event of safety hazards and will not otherwise affect MATCH score or duration. Any TEAM member may press the E-Stop button.
Violation: Inappropriate use of the E-Stop button (i.e. not for safety reasons) will result in a RED CARD.

\<G30\> Any ROBOT used during a MATCH must be in compliance with all ROBOT Rules (as defined in *Section 4 – The Robot*).
Violation: RED CARD

3.1.7 General

\<G31\> ROBOTS, HOSTBOTS, nor MINIBOTS may not touch anything outside the FIELD boundary.
Violation: Disablement

> \<G31\> is in place primarily for safety. It also includes touching a FEEDER or FIELD structure through the FEEDING SLOT.

\<G32\> Neither ROBOTS, HOSTBOTS, nor MINIBOTS may break the planes of the vertically projected borders of the opponent's ZONES, including a GAME PIECE in their POSSESSION. Momentary incursions by a POSSESSED GAME PIECE will not be penalized if they do not make contact with anything in the ZONE.
Violation: PENALTY. G61 does not apply to this rule, however strategies aimed at taking advantage of this exception will result in a YELLOW CARD. If a ROBOT enters the opponent's ZONE and does not make immediate effort to leave OR if it contacts another ROBOT (or GAME PIECE in its POSSESSION) also in the ZONE, then the intruding TEAM will receive a RED CARD.

> \<G32\> allows ROBOTS to complete HANGING a GAME PIECE, as designed, without being hindered.

\<G33\> Neither ROBOTS, HOSTBOTS, nor MINIBOTS may break the planes of the vertically projected borders of the opponent's LANES.

Violation: PENALTY. G61 does not apply to this rule, however strategies aimed at taking advantage of this exception will result in a YELLOW CARD. If a ROBOT enters the opponent's LANE and does not make immediate effort to leave OR if it contacts another ROBOT (or GAME PIECE in its POSSESSION) also in the LANE, then the intruding TEAM will receive a RED CARD.

> <G33>allows ROBOTS to retrieve LOGO PIECES from the FEEDER without being hindered.

<G34> ROBOTS or HOSTBOTS may only POSSESS or HERD one GAME PIECE at a time.
Violation: PENALTY

> It is important to design your ROBOT so that it is impossible to inadvertently or intentionally control more than one GAME PIECE at a time. Inadvertent contact will be not be considered HERDING and will not be penalized.

<G35> GAME PIECES that exit the FIELD will be placed back on the FIELD approximately at the point of exit, at the earliest safe opportunity, by FIELD staff.

<G36> GAME PIECES may not be intentionally placed out of bounds.
Violation: PENALTY and YELLOW CARD

<G37> GAME PIECES that deflate during a MATCH will be considered identical to inflated GAME PIECES.

<G38> ROBOTS and HOSTBOTS may not intentionally deflate GAME PIECES. No violation will be assigned for unintentional deflation.
Violation: RED CARD for intentional deflation. Repeated unintentional deflation may result in a YELLOW CARD.

<G39> ROBOTS and FEEDERS may not SCORE on their opponent's PEGS or descore their opponent's GAME PIECES, or interfere with their opponent's TOWERS.
Violation: RED CARD.

3.1.8   Robot actions

<G40> ROBOTS or HOSTBOTS may not exceed PLAYING CONFIGURATION at any time.
Violation: PENALTY

<G41> MINIBOTS may not exceed a 12" x 12" x 12" volume.
Violation: The TOWER on which the MINIBOT is DEPLOYED is disabled. If the MINIBOT is not deployed on a TOWER, then the ALLIANCE's TOWER upon which the highest RACE SCORE was earned will be discounted

<G42> ROBOTS, MINIBOTS, or HOSTBOTS may not intentionally detach parts or leave MECHANISMS on the FIELD (with the exception of appropriate DEPLOYMENT of the MINIBOT).
Violation: PENALTY for each incident and potential RED CARD if an intentionally detached COMPONENT or MECHANISM impedes MATCH play.

<G43> ROBOTS and MINIBOTS may push or react against any elements of the ARENA, provided there is no damage or disruption of the ARENA elements. With the exception of the TOWER during the END GAME and while DEPLOYING a MINIBOT, ROBOTS may not grab, grasp, grapple, or attach to any ARENA structure.

Violation: A warning will be issued when a ROBOT violates this rule. If the referee determines that the TEAM is disregarding the warning, their ROBOT will be disabled for the remainder of the MATCH.

<G44> ROBOTS, MINIBOTS, or HOSTBOTS that become entangled in the ARENA elements may be disabled and will not be freed until after the MATCH has finished. No PENALTY will be assigned.

<G45> ROBOTS, MINIBOTS, or HOSTBOTS may not damage any part of the ARENA.
Violation: Potential Disablement if the Head Referee determins that further damage is likely to occur. Corrective action (such as eliminating sharp edges, removing the damaging MECHANISM, and/or re-inspection) may be required before the ROBOT will be allowed to compete in subsequent MATCHES.

<G46> MINIBOTS may only be used to climb the TOWER.
Violation: YELLOW CARD

<G47> From the start of the MATCH until it is DEPLOYED, the MINIBOT must remain on the HOSTBOT.
Violation: YELLOW CARD

3.1.9 Robot-Robot Interaction

<G48> Strategies aimed at the destruction, attachment, damage, tipping or entanglement of ROBOTS, MINIBOTS, or HOSTBOTS are not in the spirit of the FRC and are not allowed. Contact with another ROBOT or HOSTBOT inside it's FRAME PERIMETER is not allowed.
Violation: PENALTY, plus potential disablement and YELLOW CARD

> High speed accidental collisions may occur during the MATCH and are an expected part of LOGO MOTION™. ROBOTS place mechanisms outside of the BUMPER PERIMETER at their own risk; no penalties will be assigned for incidental contact with such extended mechanisms. For example, use of wedge-like mechanisms to flip ROBOTS would be considered a violation.

<G49> ROBOTS may not attempt to POSSESS a GAME PIECE that is being POSSESSED by an opponent ROBOT.
Violation: PENALTY

<G50> An ALLIANCE may not pin an opponent ROBOT that is in contact with a field border or TOWER for more than 5 seconds. A ROBOT will be considered pinned until the ROBOTS have separated by at least 6 feet. The pinning ROBOT(S) must then wait for at least 3 seconds before attempting to pin the same ROBOT again.
Violation: 10 PENALTIES

> If the pinned ROBOT chases the pinning ROBOT upon retreat, the pinning ROBOT will not be penalized per Rule <G61>, and the pin will be considered complete.

<G51> Fallen (i.e. tipped over) ROBOTS attempting to right themselves (either by themselves or with assistance from an ALLIANCE partner) have one 10-second grace period per fallen ROBOT in which they may not be contacted by an opposing ROBOT. This protection continues for either 10 seconds or when the protected ROBOTS have completed the righting operation, whichever comes first.

Violation: PENALTY for inadvertent contact; plus a RED CARD for obviously intentional contact.

<G52> Intentionally falling down or tipping over to block the field is not allowed.
Violation: YELLOW CARD

<G53> Once the 10-second grace period for righting a fallen ROBOT has expired, opposing ROBOTS may interact with a fallen ROBOT with no PENALTY assessed as long as <G48> is not violated.

3.1.10 Human actions

<G54> Each ALLIANCE shall have no more than the four designated members of each of the three participating TEAMS in the ARENA during a MATCH. Any ALLIANCE with additional personnel in the ARENA must have the additional personnel leave the area before the MATCH may proceed.
Violation: YELLOW CARD for repeated offenses.

<G55> During the MATCH, TEAM members must stay within their assigned stations.The DRIVERS, COACH and ANALYST may travel anywhere within the ALLIANCE STATION. Exceptions will be allowed in cases involving TEAM member safety.
Violation: PENALTY

<G56> During a MATCH, the OPERATOR CONSOLE shall be operated solely by the DRIVERS of that TEAM.
Violation: Disablement and RED CARD

<G57> During the TELEOPERATED PERIOD, FEEDERS may enter LOGO PIECES onto the FIELD by using the FEEDING SLOTS or by throwing the LOGO PIECE over the top of the FEEDER STATION wall. LOGO PIECES may not be thrown around the side of the FEEDER STATION wall.
Violation: PENALTY

<G58> COACHES, DRIVERS, and ANALYSTS may not touch GAME PIECES at any point during the MATCH.
Violation: PENALTY

<G59> MINIBOTS must be removed from the TOWER quickly and safely after each MATCH; this may be done by TEAMS while standing on the floor without special equipment, or by field crew using a retrieval hook. *Violation: The field crew will not be responsible for accidental MINIBOT damage. If the field crew cannot safely pull the MINIBOT down using their hook, a warning will be issued to the TEAM, after which repeated violations may result in a YELLOW CARD.*

<G60> While in the ARENA, including before and after a MATCH, TEAM members must be civil towards other TEAMS, competition personnel, and event attendees.
Violation: Potential RED CARD if during a MATCH. TEAMS will not receive MATCH PENALTIES for off-FIELD actions, however designated field personnel will hold them accountable for their off-FIELD actions.

3.2   PENALTIES

<G61>   The actions of an ALLIANCE shall not cause an opposing ALLIANCE to violate a rule and thus incur PENALTIES. Any rule violations committed by the affected ALLIANCE shall be excused, and no PENALTIES will be assigned.

Unless otherwise noted, all PENALTIES assigned by referees are applied to the entire ALLIANCE.

3.3   SCORING

<G62>   Each ALLIANCE receives a MATCH SCORE which is the sum of its AUTONOMOUS SCORE, PEG SCORE, LOGO BONUS and RACE SCORE, less any assigned PENALTIES. The AUTONOMOUS SCORE is tabulated at the conclusion of the AUTONOMOUS PERIOD; all other scores are tabulated at the conclusion of the MATCH.

<G63>   If two GAME PIECES are HANGING from a single SCORING PEG, the outermost GAME PIECE will be counted for scoring purposes.

<G64>   The AUTONOMOUS SCORE is the sum of points determined by the positions of the three ALLIANCE UBERTUBES at the conclusion of the AUTONOMOUS PERIOD. The AUTONOMOUS PERIOD ends when the ARENA timer reaches zero seconds.

Not HANGING	0 points
HANGING on bottom row	2 points
HANGING on middle row	4 points
HANGING on top row	6 points

<G65>   The PEG SCORE is the sum of points determined by the positions of the GAME PIECES on each SCORING GRID. A LOGO PIECE HANGING in front of an UBERTUBE doubles the points for that SCORING PEG. The table below gives the value for each LOGO PIECE HANGING on a SCORING PEG.

LOGO PIECE:	*Alone*	*Over UBERTUBE*
Not HANGING	0 points	0 points
HANGING on bottom ROW	1 point	2 points
HANGING on middle ROW	2 points	4 points
HANGING on top ROW	3 points	6 points

> Note that an UBERTUBE acts only as a modifier and carries no point value of its own after the AUTONOMOUS PERIOD.

<G66>   If three LOGO PIECES form a LOGO, the assigned points from the PEG SCORE in that row of that SCORING GRID are given as an additional LOGO BONUS, effectively doubling the score of the row.

<G67>   The RACE SCORE is assigned to each ALLIANCE based on the place of finish in the MINIBOT RACE (ties each receive the points for that place):

1st MINIBOT to TRIGGER the TARGET	30 points
2nd MINIBOT to TRIGGER the TARGET	20 points
3rd MINIBOT to TRIGGER the TARGET	15 points
4th MINIBOT to TRIGGER the TARGET	10 points

<G68>   Scores will be assessed when the MATCH ends and all objects in motion come to rest, or 10 seconds elapses, whichever comes first.

<G69> The minimum MATCH SCORE is zero points.

3.4 REVISION HISTORY

Revision	Release Date	Changes
-	1/5/11	Original release
A	1/11/11	Revised <G19> to clarify ways the MINIBOT may be propelled after DEPLOYMENT and added a Blue Box. Fixed capitalization of DEPLOYED and of the "S" in ALLIANCE'S in the Violation section of the rule.
		Revised <G41> to fix typo (diabled to disabled)
		Revised <G48>, Blue box, to change "LogoMotion" to "LOGO MOTION™"
		Revised <G65> to clarify the role and scoring of the UBERTUBE, fix a typo (PIECES to PIECE), and changed "GAME" to "LOGO" when referring to pieces on scoring pegs.
		Revised <G66> to clarify that it's the PEG SCORE that is doubled by a LOGO.
		Added *Section 3.4, Revision History*
B	1/14/11	Revised <G21> to clarify that the MINIBOT must be DEPLOYED entirely below the DEPLOYMENT LINE.
		Revised <G22> to clarify that the MINIBOT may not be touched after it has started to cross the DEPLOYEMENT LINE.
C	1/18/11	Revised <G07> to include all GAME PIECES.
D	1/21/11	Revised <G32> to allow momentary incursions of GAME PIECES in the opponent's HOME ZONE.
		Revised <G39> to prohibit ALLIANCES for scoring on opponent's PEGS.
		Revised <G49> to allow alliance partner ROBOTS to hand off GAME PIECES to each other.
		Revised <G67> to fix spelling error
E	1/25/11	Fixed footer to include correct Section #.
		Revised <G19> to clarify timing of MINIBOT movement
		Revised <G21> to fix a misplaced modifier.
F	1/28/11	Revised <G05> to constraing alignment devices mounted on the ROBOT to the STARTING CONFIGURATION of the ROBOT.
		Revised <G32> and <G33> to make them exceptions to <G61>.
		Revised <G50> to change ROBOT to ALLIANCE regarding pinning. Also added blue box to clarify outcome if pinned ROBOT pursues pinning ROBOT.
		Revised <G59> to clarify what "quickly and safely" means.
G	2/1/11	Revised <G22> to clarify restriction on contact with MINIBOT once it's climbing the TOWER.
		Revised <G39> to prohibit interference with opponent's TOWERS.
		Revised <G59> to clarify consequences if MINIBOTS do not descend on their own.
G+	2/2/11	Fixed accidental deletion of Rule <R60>.