

RC -- Push Shooting

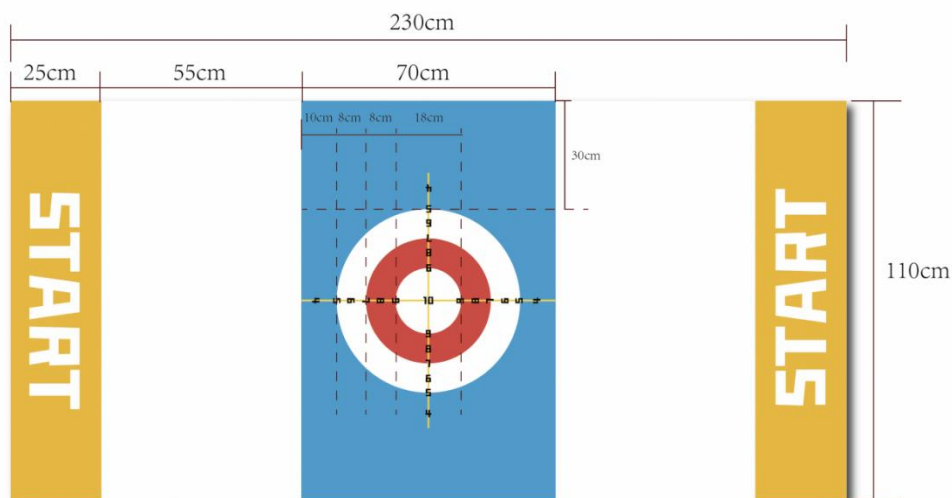
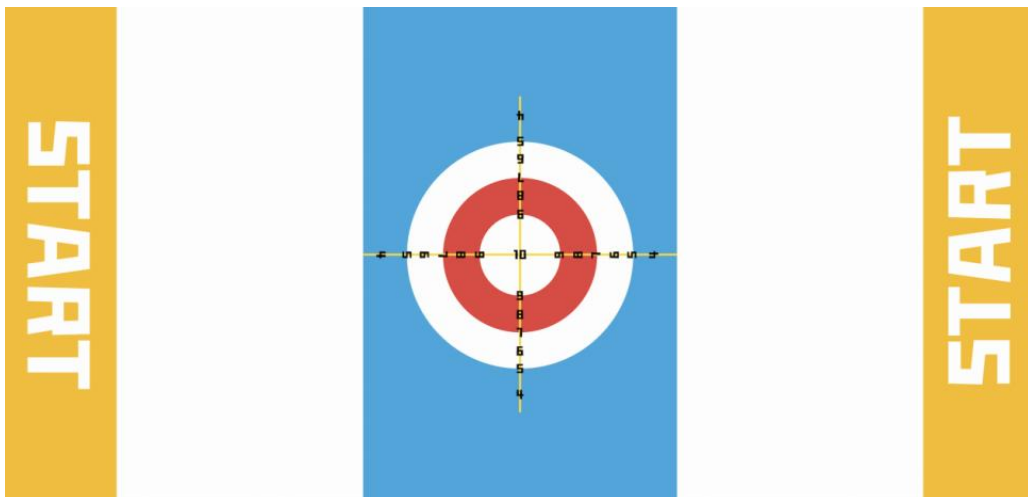
Rules Revised on 2024.10.14

Introduction: Competing teams determine their positions within the starting area. The robot starts within the starting area and shoots after reaching the push shot area. Teams take turns shooting, completing all shots within the specified time.

- A. Junior Category
- B. Senior Category

1. Field Setup

- A. The field surface material is knife-coated fabric. Yellow is the starting area, white is the push shot area, and blue is the scoring area.
- B. Field Example, Field Dimensions, Scoring Point Example ($\pm 2\text{cm}$)



- C. The discs used in the competition are 3D printed. Diameter: 70mm ($\pm 3\text{mm}$), Height: 20mm ($\pm 3\text{mm}$), Weight: 28g ($\pm 3\text{g}$). 6 red discs, 6 blue discs.



2. Robot Requirements

- A. This project only supports robots using the micro:bit as the control core for participation. Sensors, motors, servos, and structural parts are not restricted.
- B. The robot's control core and structural parts are not restricted. The robot must not damage the field. The robot is limited to one controller; remote control is not allowed. The main controller's power supply voltage is 7.4V-DC (lithium polymer battery), battery capacity must not exceed 1000mAh. The total number of external sensors used by the robot is not limited, but the total must not exceed 4. The total number of actuators used by the robot is not limited, but the total must not exceed 4.
- C. Robot dimensions: 25cm × 25cm. Height and weight are not limited. It is allowed to expand after startup, but the expanded dimensions must not exceed 25cm. During the check-in for disc pushing, the robot must push the discs according to the rules. Discs must not reach the opponent's starting area. During operation, the robot must not drop any parts. If a team drops a part, their score for that match becomes 0.
- D. Teams complete the design and construction of the robot outside the field. Once the robot passes inspection and enters the field, no further modifications are allowed. If a robot fails inspection, one modification opportunity is given, with a time limit of ten minutes timed by the referee. If the robot still fails inspection after the time ends, the team is disqualified.

3. Competition Rules

- A. The competition adopts a format combining group stage round-robin and final knockout stages based on the number of participants. Each match's grouping is randomly done by the competition organizing committee before the competition. The top two teams from each group advance to the knockout stage.
- B. In the group stage, for every two-team match, the winning team receives 3 points, a draw gives each team 1 point, and the losing team receives 0 points.
- C. If there is a tie in points for teams competing for advancement within a group, the ranking is determined by the head-to-head result between the tied teams; the winner of that head-to-head match ranks higher. If 3 or more teams are tied, making it impossible to determine the head-to-head result, and this tie affects qualification for the knockout stage, these tied teams will have a play-off match.
- D. In the knockout stage, the winning team of each match advances to the next round. If there is a tie, a tie-break match is held until a winner is determined.
- E. In both the group stage and knockout stage, competing pairs play two rounds



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per match. In the first round, the red discs are shot first; in the second round, the blue discs are shot first. Each team shoots 6 times per round. Teams take turns shooting alternately. The red team shoots first, then the blue team shoots, and so on. Teams may complete robot placement early. The referee gives a 10-second countdown. The robot must start within 10 seconds, otherwise, this attempt is disqualified.

- F. Teams freely choose their position within the starting area. The robot's orientation can be placed arbitrarily. The vertical projection of the robot and the disc must not exceed the starting area. After the referee's 10-second countdown begins, the team places and starts the robot. The robot autonomously moves to the push shot area. After completing the push shot, the robot returns to the starting area. When any part of the robot's vertical projection contacts the starting area, this round is considered ended, and the team can manually reposition the robot.
- G. When the robot pushes the disc, the vertical projection of both the robot and the disc must be completely within the push shot area, and must not touch the lines. The vertical projection of the entire robot, including expanded parts, is also subject to this restriction. The robot is allowed to touch the field borders during operation. The robot must not touch any disc that has been pushed, and must not touch the scoring area. Touching either results in forfeiting this attempt.
- H. The robot has a total of 6 push shot attempts. Each disc has only 1 push attempt. If a push attempt fails, the disc cannot be pushed again. A failed disc cannot be moved manually, but the robot is allowed to hit its own team's discs during subsequent pushes.
- I. The robot pushing a disc is allowed to hit its own team's discs or the opponent's discs.
- J. Observe competition etiquette. Treat all participating teams amicably and respect the referees' decisions. Serious arguments, fights, or other misconduct may result in disqualification. The final score is subject to the referee's decision, and the referee holds the right of final interpretation.

4. Scoring Criteria

- A. The team's score is the sole criterion. The score for each disc is determined by its final resting position. If the disc is outside the scoring area, the score is 0. If the disc is between the scoring area and the push shot area, the score is 0.
- B. Within the scoring area, from the inner ring outwards, the points are 10, 9, 8, 7, 6, 5, 4.



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- C. The sum of the scores from the two rounds (one where the team shoots first, one where they shoot second) in a head-to-head match constitutes the match result, determining the winner. If the match scores are tied, the team with the higher single-round score wins. If the single-round scores are also tied, the team with the higher score for a single disc within that round wins. If a winner still cannot be determined, it is considered a draw in the group stage. In the knockout stage, a tie-break match is held, where each team uses 3 red and 3 blue discs, competing in two rounds according to the rules.

5. Statement of Objections

- A. No objections shall be raised against the referee's decision.
- B. In the event of any misunderstanding during the execution of these rules, the team captain may raise an objection with the referee.

6. Flexibility of Rules

- A. These rules shall be sufficiently flexible to accommodate changes in the number of participants and the competition content, provided that the concepts and fundamentals of these rules are adhered to.

7. Liability

- A. Participating teams are always responsible for the safety of their robots and for any accidents caused by their team members or machines.
- B. RobotChallenge Organization and organizing personnel shall not be held responsible for any accidents caused by participating teams or their equipment.