BAE Systems Mini-Bot Challenge #1
Mondrian Madness

Mondrian Madness is easy: just move from the green circle to the red square, without crossing any black lines, in the shortest amount of time. Of course, the shortest path may not be the path with the shortest time, so plan wisely!

This is a timed challenge. Registered FRC teams can submit one autonomous and one teleoperated entry. Teams must submit their code with their times. Teams must record their runs during the designated period and then submit their times, code and link to their video to the form located at https://bit.ly/3rhuIFM

Teams may only submit one set of runs per challenge. The designated recording period for Challenge #1 Mondrian madness is between 12:01 AM Feb. 26 and 11:59 PM Feb 27. No submissions will be accepted before or after this time window.

Challenge rules.
1. Robot
    a. Teams must use only the "stock" kit provided by NEFIRST, or purchased as a kit to match the kit of parts in the "stock" kit.
    b. No additional attachments or sensors may be used.
    c. Teams must use WPILib to program the robot.
2. Playing field (see figure 1)
    a. Teams should print out the supplied Field mat from PDF.
    b. Teams can print as a single sheet on a wide-format printer or tile sheets together.
    c. Instructions for tiling in Adobe Reader and Acrobat are found here.
    d. When printed, the Playing Field should measure 36" x 36" square.
        i. All solid black lines are 2 cm thick.
        ii. There is a black border around the entire field.
        iii. There are two chutes that positioned on opposite sides of the field.
        iv. The chutes are rotationally symmetrically positioned on the field, around the center of the field.
        v. There is a blue cross at the center of the field.
        vi. There is a Starting Circle with a green fill.
        vii. There is a Target Zone with a red fill.
3. Game
    a. There is no time limit for a run
    b. At the start of their run, robots must completely cover the Starting Circle.
        i. No portion of the Starting Circle can be visible when viewed from above the robot at the start of the run.
    c. Robots must move from the Starting Circle to the Target Zone.
    d. Robots may not cross any black line in the course of their run.

      i. Crossing a line is defined as the wheels or roller balls moving from one white area to another white area while traversing a line.

      ii. Robots are allowed to touch a line in the course of their movement, so long as they do not cross the line.

      iii. Components of the robot that normally do not touch the ground are allowed to cover black lines.

e. At the end of their run, robots must be completely within the Target Zone.

      i. Completely within the target zone means that it is possible to see the target zone around the entire robot.

f. Autonomous runs

      i. Autonomous runs must be controlled solely by robot code that is run in simulation mode on a computer.

      ii. All code must be started in simulation mode, and a connection established to the Romi MiniBot before commencing a run.

      iii. Code can be started from the computer connected to the MiniBot by activating the "Autonomous" mode on the driver station or simulation GUI, but no other human input is permitted.

      iv. Robots can only use the built-in internal sensors to control their robot (wheel encoders and IMU).

g. Teleoperated runs

      i. Teleoperated runs abide by the rules of the Autonomous run, with the following additions:

        1. Robots must receive input from the Drivers' Station during the run to qualify as a Teleoperated run.

        2. The robot can use any amount of automation to assist the driver.

        3. Teams are free to design a Drivers' Station to suit the challenge.

h. Run time starts when the robot begins to move from rest in the Starting Circle.

i. Run time ends when the robot is completely within the Target Zone.

      i. A robot is considered within the Target Zone when it is completely surrounded by red mat when viewed from above.

      ii. A robot which comes to rest in the Target Zone but which overlaps the black border or the white chute will accrue a penalty (see below).

j. Penalties

      i. One wheel crossing a line will accrue a 3 second penalty.

      ii. Two wheels crossing a line will disqualify a run.

      iii. Ending the run in the Target Zone but overlapping the black border or the white chute will accrue a 3 second penalty.

      iv. Ending the run completely outside of the Target Zone will disqualify a run.

      v. A robot that completely leaves the mat during the run will disqualify a run.

      vi. Touching the robot during a run will disqualify the run.

4. Recording a run

a. Each run must be recorded on video from above.

      i. The entire mat must be visible at all times during the run.

  ii. The mat is small enough for a person to hold a mobile device above the mat during each run.

  iii. Try not to record the run from an oblique angle. The referees need a clear view of the run to validate timing.

b. Each submission must include:

  i. The FRC team number

  ii. The total time for Autonomous run (not including penalties)

  iii. The total number of penalties for the Autonomous run

  iv. The total time for Teleoperated run (not including penalties)

  v. The total number of penalties for the Teleoperated run

  vi. Link to the robot code

    1. Code should be saved to a publicly available repository such as GitHub

  vii. Links to the two videos

    1. Videos should be saved to a publicly available service such as Vimeo or YouTube

    2. Use a private link to the videos

    3. Use 1080p or higher quality when submitting each run