# RoboRAVE ONLINE Line Following Rules

**Goal:** Robotics enthusiasts, of all ages, design, build, and program a line following robot that can follow a black line on a white background.  Some challenges will just be a race around a circuit track, others may have you going to a set point and back and accomplishing some task along the way I.e. deliver a single ping pong ball into a cup.  The fastest robot to accomplish these tasks in each division will be declared the Monthly Champion.

**Who can submit an entry into the monthly challenge:** Participants must register a team through the RoboRAVE website at **www.roboraveinternational.com** teams can be individuals, up to 4 players. Each paid entry allows for one entry into the monthly Challenge.

**How are entries submitted:** Entries will be uploaded via the RoboRAVE website's video submission link which will be ready by the end of the first challenge month videos should be submitted in the following formats: AVI, FLV, WMV, MOV, or MP4.

**Challenge divisions:** Based on the level of the school a student attends. The oldest student associated with a challenge submission determines the division for an entry into the challenge.

Elementary Division (K-5):  Students enrolled in an elementary

Middle School Division (6-8):  Students enrolled in a Middle School (includes 6th grade students attending an elementary school that is K-6th grade)

High School (9-12):  Students enrolled in a High School

University/Big Kids: Anyone who has graduated from High School

**Monthly Challenges:**

**April:**  Fastbot – The line will be a continuous circuit.  ES will do 2 laps, MS 3 laps, HS 4 laps, and UP 5 laps.

**May:**  Race to the tower (cup) – Your robot needs to get to the to cup, pause for 1 second, turn around and return to the Home bar.  ES  (0) intersections, MS (1) intersection, HS & UP (2) intersections.

**June:**  Delivery – Same as May's challenge but you must deliver one ping pong ball into the cup.

**Robot Platforms Allowed:**  RoboRAVE is an open platform robotics challenge.  Any robot platform that can be built to follow a line can be used.  Robot must be autonomous (not Remote Controlled) and must be coded by the participant(s).

**Official track for the monthly challenge:** Challenge track changes every month and is printed on standard 8.5 X 11 inch white paper medium (paper or card stock). <mark>International Students: I am working on track files in A-4 format.</mark> **US Students only:** If you do not have access to a printer you can add print service to your subscription for a small fee. Each track uses between 12 to 16 sheets of paper which gets taped together. It is recommended that you use card stock, and reinforce all the seams on the back of the track with tape (i.e. packaging tape). See the video on track printing. The paper cannot be reduced in size or altered in any way or your entry will be disqualified. The Challenge, or the track design gets successively more difficult as you move up in divisions.

**Finishing the track once taped together:** Once you tape your track together you will notice that there are gaps in the black lines at the margins. There are two methods to finish the tracks.

> **First Method:** The last page of the printer file is for printing a page of standard 1" x 2 5/8 address labels (Avery #5160) you can use these labels to tape the track together and bridge the line gaps (see the video on constructing the track)
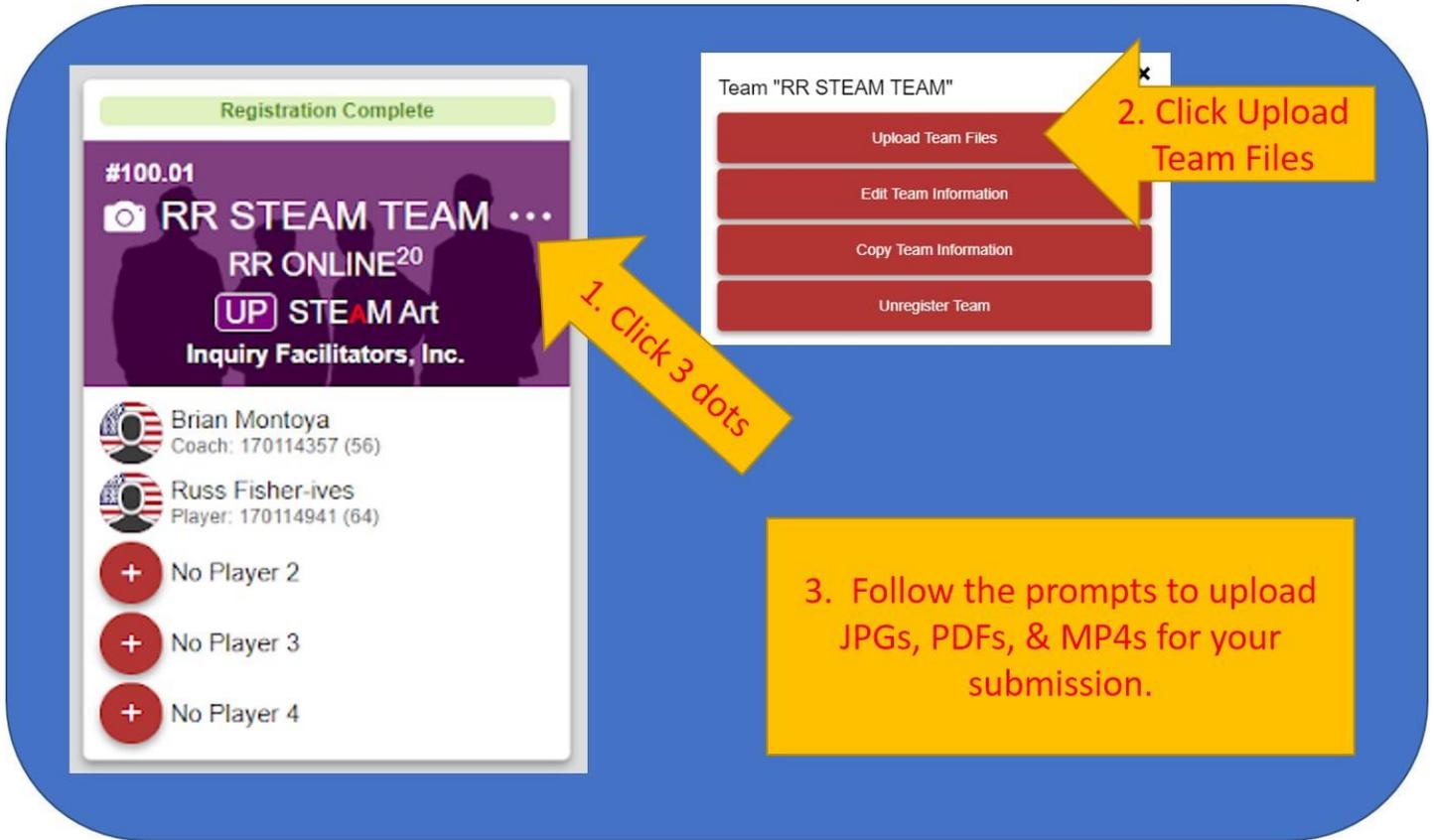
> **Second Method:** Simply use a sharpy or other dark black marker to connect the lines.

**Tower (Cup) guidelines:** Any cup can be used as your tower as long as it fits the following guidelines. The opening must fit inside the black circle on the track where the cup sits. The height of the cup must be at least 4 inches. If you use a lightweight cup like a solo cup, put some pennies or marbles or a few rocks in it to weigh it down so it doesn't move when touched by the robot.

**Timing Device:** Any timing device that can be easily viewed in the video is allowed. Times should be rounded to the nearest one hundredth of a second. The timing device must be placed where it can be viewed in the video when the robot crosses the start/finish line. Once started the timing device cannot be touched or the entry will be disqualified. The stop time is determined by the time displayed on the timing device when the front of the robot crosses the finish line.

**Submitting your Entry:** Each entry submission consists of a picture, a document, and a video. The picture is a selfie of your and your robot. To make the document, copy or take a screenshot of your code and save it as a pdf (you can use Microsoft Word to do this). The last item is a video of your robot completing the entire challenge. Make the video by placing your robot on the track behind the gray dashed Start line. Place the Timing device (stopwatch or cellphone running stopwatch app) where it will be easily viewed in the video at both the start and the finish of the run. The timing device must clearly show that it is running before any movement of the robot occurs. The robot must always be in the field of view from start to finish. The timing device must also be in the field of view for the entire video. As your robot moves down the line pan your video out so that you can see the entire track. Film the robot throughout its journey, capturing any tasks that the challenge requires. As the robot completes the challenge, try to zoom in to capture the finish time as clearly as possible. The photo finish should be filmed directly above the robot as it crosses the finish line.

See the Upload diagram below for instructions on uploading your files:

**Upload Diagram**