Formula S Race Challenge

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Disclaimer

It is your responsibility to read and understand this document on a regular basis because we may update it from time to time.

Formula S Race Challenge

The Formula S Race Challenge is a challenge in which vehicles maneuver along a curved track as quickly as they can, to be the first to cross a finish line. It is a true engineering challenge to balance speed, control, accuracy, and precision.

The track itself will be 6.2 meters long from the starting line to the finish line. Robots must stop within a 30 cm by 30 cm red box after the finish line to avoid losing points. There is at least 26 cm between the centre line of the track and the closest wall.

Challenge Rules

1. All robots must be built and programmed to the specifications outlined in our Lego Competition Rules. Unless exceptions are listed in the rules below, any robots not adhering to these specifications will be disqualified for the match and can rejoin once the robot meets the specified requirements.

2. Your competition day rank will be worth 70% of your final score. Judges will also interview your team (30% of the final score).

3. Each race will be started by a coin toss to choose either the left or right track when facing the Start line. Winner of the coin toss gets choice.

4. When placing the robot in the starting position, only the very front tip of the robot must be above or behind the start line. The rest of the robot must be behind the start line. You will have 1 minute from when both racing teams arrive to the race track to put your robots into starting position. After this 1 minute, judges can start the race, even if your team is not ready.

5. Once both robots are in position at the start line, a judge will give a countdown and place a wall 20 - 35 cm from the start line. The race will begin once the judge moves the wall beyond 35 cm from the start line; the wall will swiftly move away from the start line then up off the track. The robot must start on its own (i.e. no touching, waving, etc.).

6. Infrared and/or ultrasonic sensors must be placed less than 20 cm from the ground.

7. Racers will race side-by-side.

8. Your robot must stop with **all** wheels inside the box at the finish line without reversing into the box. This means that all wheels must be in contact with the red stop box at the end of the race. 'Reversing' is defined as using the motor(s) to move toward(s) the start line after the robot has passed the finish line.

9. The winner of the race will be the robot with the highest number of points. Generally speaking, this will be the first robot to cross the finish line and stop in the red box of their respective lane without reversing into it.

Judging and Scoring

1. Judges will time and score your race.

2. The race begins when the wall is removed, and it ends when all robots in the race fulfill one of the following two requirements listed below.

    - The robot has rolled off the track with no foreseeable return to the track.
    - The robot has come to a complete stop.

3. Teams will receive the following points for a race. Please note that penalties (negative points) can occur once per infraction per race, even if a team commits several instances of the same infraction.

    - **+4 points** for completing a race* and reaching the finish line first
    - **+3 points** for completing a race* and reaching the finish line second
    - **+2 points** for stopping in the red box corresponding to your starting lane without reversing into it
    - **0 points** for failing to complete a race
    - **-1 point** for leaving your lane (all wheels to one side of the outer lines of your lane)
    - **-1 point** for leaving the track (all wheels off of the white coroplast sheet)
    - **-1 point** for a false start (leaving before wall is removed) **
    - **-1 point** if a team member must manually start the robot (i.e. wave, touch, etc.) after starting the program for the race
    - **-3 points** for interfering with another robot***

    * Completing the race means any part of the robot passes the finish line.

    ** The team that did not leave prior to the removal of the wall will race again without an opponent. If they complete the race, it will be assumed as though they completed the race first.

*** ‘Interference’ means one robot touches or collides into the other robot any time after the race is started, and only applies when there are offending and affected robots. The offending/interfering robot is the one that leaves its lane and will receive -3 points. The affected robot is the one that stays in its lane and will race again without an opponent. If the affected robot completes the race, it will count as though they finished first.

4. The competition will consist of a round-robin style tournament in the morning, followed by elimination playoffs in the afternoon.

5. For the elimination playoffs portion of the competition: If there is a tie, another race will occur and the winner continues. If there is still a tie, the first robot to cross the finish line wins. If neither robot crossed the finish line, the robot closest to the finish line without leaving the track wins.

6. Decisions of judges are final.

Stopping in The Red Box

Red – box. Blue – wheels. Black – robot.

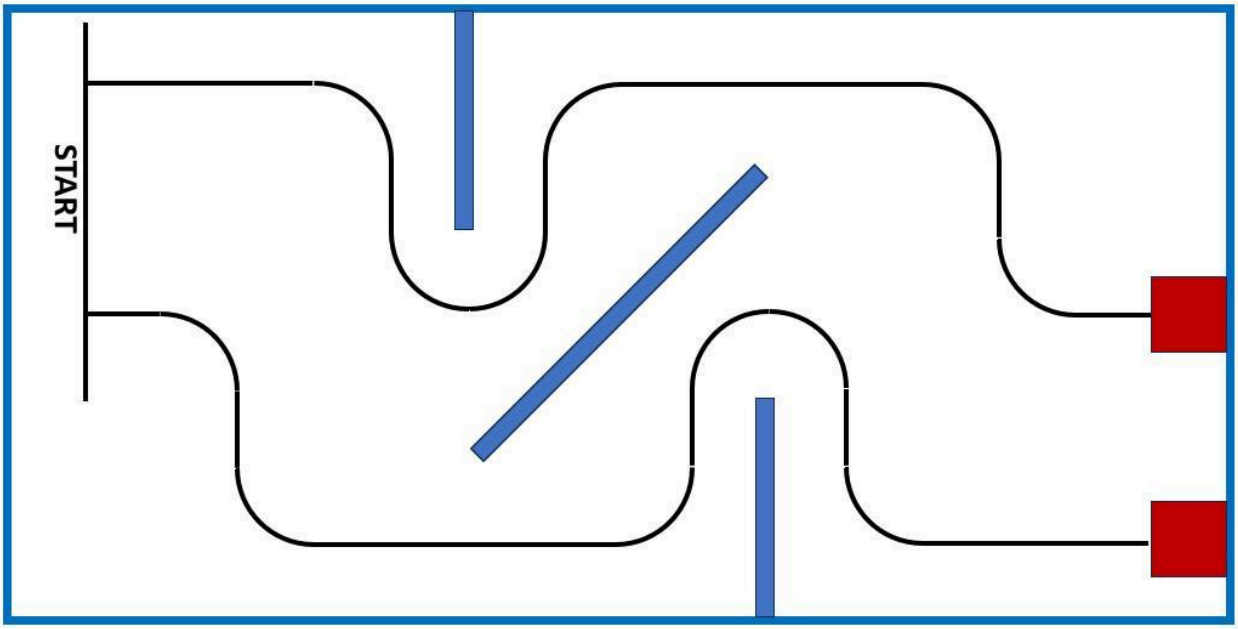
	Good because all four wheels are in the red box.		Good because all wheels are partly or fully in contact with the red box.
	Good because all four wheels are still in contact with the red box even though the tip is just a bit past the red box. Robot is still smaller than dimension limits.		Banned because even though the wheels could all in the box, the robot is bigger than 1 foot by 1 foot. **Do NOT build a robot of this size.**

Formula S Race Arena Diagram

The track itself will have a thick, black line that runs 6.2 m between the start lines and finish line. Both Tracks are the same length with equal number of curves and straight runs. The tracks are inverted copies of themselves.

The starting line will be black and the finish line will be red to help the robot identify that it has reached the end of the track. There will be a red box that measures 30 cm by 30 cm immediately after the finish line. The robot must stop with all wheels within the red finish box to avoid losing points without reversing into the box.

You can build your own Formula S race track using 4 – 4*8 Coroplast sheets (corrugated plastic) with electrical tape (all lines and boxes on the official track are made using tape). The colours may not necessarily match up to the official track, but they will help with practicing and testing. The Board measures 8'*16' or 244cm*488 cm. Black lines are Black electric Tape. The Radius of the curves are 30cm +/- width of the tape.



Please avoid stepping on the track to help keep the track clean and to prevent damage!