



A Collaborative Robotics Program

## 2020 FastBot Challenge

**Goal:** Design, build, and program a line following robot that can follow a black line on a white background around a closed loop Race track a set number of laps per your teams divisional requirements. Middle School and higher divisions may include intersections.

**Divisions:** Teams in this challenge compete in separate divisions

- |                     |    |                           |
|---------------------|----|---------------------------|
| • Elementary School | 11 | • High School             |
| • Middle School     | 12 | • University/Professional |

**Requirements:** Autonomous robot, any platform, costing \$1,500 USD or less, and meets the following design constraints, which will be verified during Check-In.

- Robot can demonstrate it is running a line following program on a test track.
- Volume of the robot must **not** exceed  $65030 \text{ cm}^3$ .

### General Rules of Play:

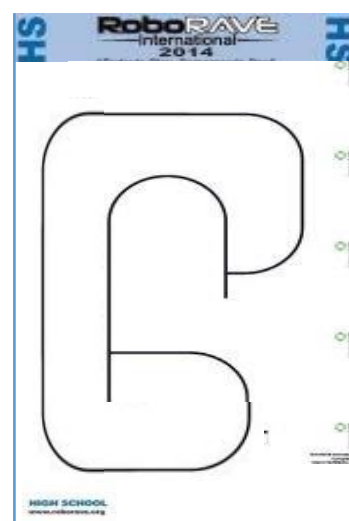
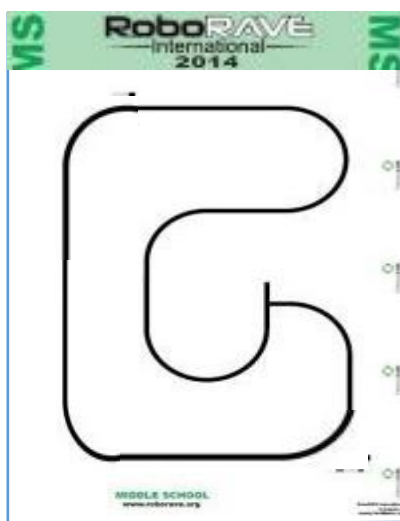
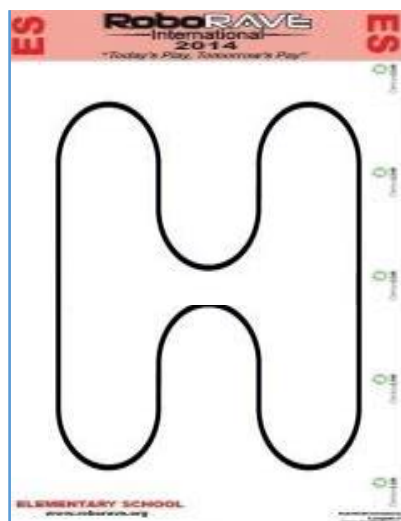
- The Event Director will establish the number of official races allowed, and the number of those official races that will be counted for the aggregate score used to determine the Top 8 teams that will compete in the Tournament.
- Divisions may compete on the same track with increasing number of laps to complete; or they may compete on different tracks with increasing levels of difficulty with regards to the track design i.e. width of line, and number of intersections etc.
- Score for each race is the elapsed time in seconds and hundredths of seconds
- The robot has 3 minutes to complete the Race. Any robot exceeding three minutes will Maximum Time Score of 180.00 for that race.
- A line following program must control your robot's motion at all times.
- Only players can operate and manipulate the robot during the heat. Remember, "Players Play, Coaches Coach, Parents Cheer".
- Touching the robot at any time ends the race and requires the entry of a Maximum Time Score (180 seconds).

## Challenge Equipment Specifications:

### The Track:

- Tracks are typically printed on durable paper, or PVC Vinyl Background
- Elementary Division - No intersections, 1.25 cm black line
- Middle School Division – May have up to one intersection, 1.25 cm black line
- High School Division – May have up to two intersections, 0.75 cm black line
- University/Professional Division
  - Use the HS track with increased lap requirement, or
  - Create a UP track with higher difficulty elements like including dashed lines, round-about turns, varying line widths, varying line ink saturation (only black and grays are allowed, no color changes are allowed).
- A new design is created each year.
- The line will be no closer than 10 cm from the edge of the track or any other line
- Advertisement, or printed instructions can be placed anywhere on the track surface, but must be a minimum of 10cm from any line
- Curves can have different/changing radiuses, but no part of the curve can have a radius less than 15cm for ES & MS, and 10cm for HS & UP divisions.

### Track Examples:



Tracks shown are an **example**. The design changes every year **and** are revealed on the first day of an event.

### Other Significant Items:

- The challenge may be held in areas with natural light present which may change the lighting conditions of the track. Teams should be prepared to engineer around this natural condition.

**Scoring:**

The score for each race is determined by measuring the time from start to finish in seconds and hundredths of seconds (000.00).

- A Max score of 180.00 will be entered for any Race not finished at the three-minute limit
- A Max score will also be entered if the robot is touched by any team member during the race

**Tournament Scoring**

- The top eight teams from each division will compete in the final tournament.
- Advancing teams will be seeded into the tournament bracket according to their aggregate score (see bracket below).



- Runner Up is used to determine 3rd place based on outcome of semi-finals.