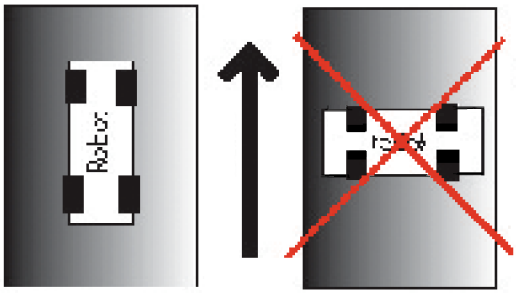
Indy 5.00 Rules

Robots

- Must be limited to a size no larger than 6" x 10". To accommodate multiple robots on the track at the same time, the robots must be designed so that they move long ways down the track (see diagram A). The robot may not at any time exceed the 6” x 10” size limit.

- Limited to original LEGO™ parts and electronics. No custom/homebrew sensors or electronics. There is no restriction on quantity or weight except as allowed by the size limit.

- All robots must have bumpers on the front and back. The bumper height is defined as the height of a Technic beam connected to the axle of a LEGO™ Mag wheel, included in all Robotic Invention System kits (see diagram B). It is not required that the Mag wheels be used in the robot, only that the bumper is at this height (the red beams in the diagram). The bumpers must be perpendicular to the robot’s direction of motion, not “angled”. Bumpers must extend the entire width of the robot



<- Diagram A

<- Diagram B

- All robots must be fully autonomous, that is to say they may not receive any prompts or cues from the operator. See later rules about when you can and cannot touch your robot.

Qualification

- All robots are required to pass an initial qualification round to be admitted into the final competition. Qualification is required to ensure all the competetors can successfully negotiate the track and to determine starting positions. During qualification, each robot will be given one minute to complete as many un-aided laps as possible, with un-aided meaning that the operator may not touch the robot while it is running. The best successful un-aided lap that the robot completes will be timed and this time trial will be used to determine starting positions.

The Track

- The racetrack will be composed of a 4' x 8' gradient in the shape of an oval race track. There will be a surrounding boundary constructed of 2" by 4" plywood, as well as a 4 foot long 2" by 4" board in the center (see diagram C). The linear gradient is black on the inside, fading outward to white. The surface of the track is bond paper with the printed gradient. The center board, as well as all physical boundaries, will be secured to the plywood so as not to be knocked over by the robots. The race will be counter-clockwise on the track. The starting line will be a small black line off to the outside part of the track so as not to interfere with the sensors. A template may be used while the competitors are placing their robots so as to have a physical boundary designating the starting line.

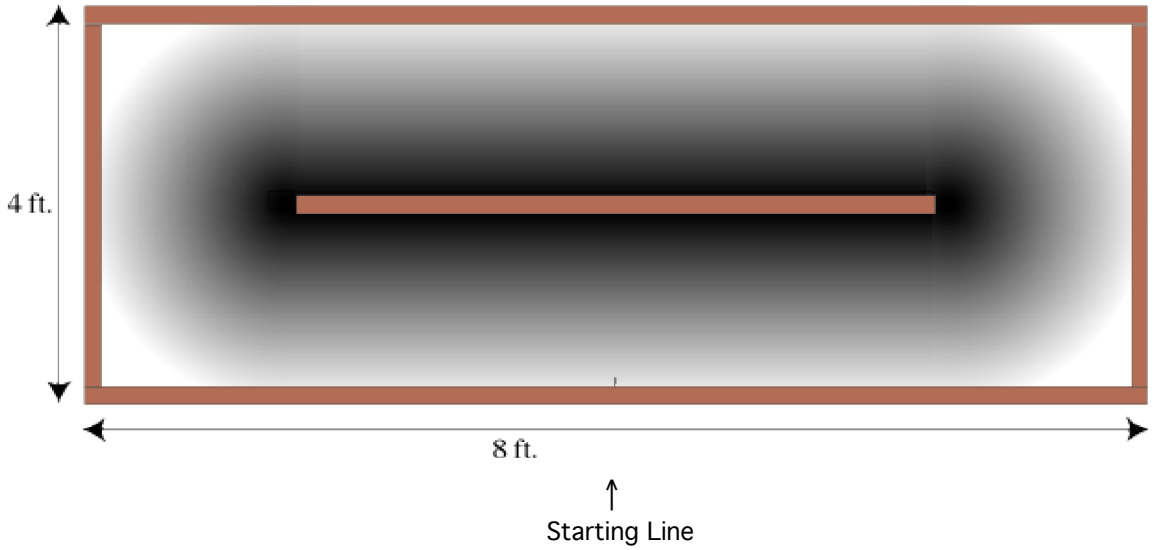


Diagram C

-There may be a practice track for competitors to use for robot calibration; however, this practice track may be smaller and may not have any physical boundaries. Qualification rounds will occur on the actual race track, not the practice track.

The Race

- Each race will be a match between two robots and will last for the duration of five laps/circuits. The competition will be conducted in double-elimination style or round-robin style, depending on the number of particpants, so as to ensure that every robot competes in at least two races.

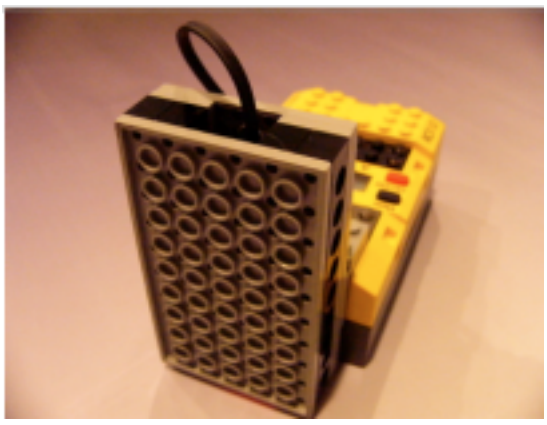
- After the two robots that are to race are selected, then the robot with the better time trial during qualification will have the better choice of starting position, either on the inside or outside of the track as the operator wishes. The other robot will then be placed. The race will proceed for five laps, with the robot that completes five laps first being the winner of that race.

Complications During the Race

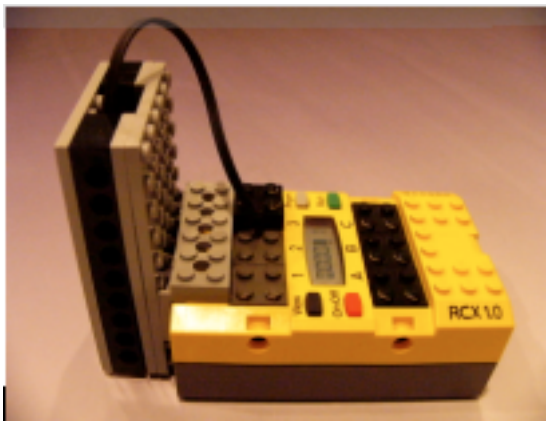
- Should a robot at anytime during the race become unable to continue racing, then that robot is stopped and removed from the track. If the other competing robot is not disabled also, then that robot is allowed to complete the lap that it is currently on. Once it has crossed the finish line, the robots are reset. Each robot then has the number of laps that it has completed credited to it. Only laps where the robot has made a complete circuit will be counted. The race will then begin again, with the robot that first completes a cumulative five laps being the winner.

Light Sensor Values

- The conditions of the room on the day and the event, as well as the light sensor that is used, will effect the outcome of light sensor values. The following chart shows the values that were taken under cam/flood lights using a Lego light sensor surrounded by a small assembly (see pictures below). The pictures are only for reference, as the actual readings were taken with the assembly closed (first two pictures below).

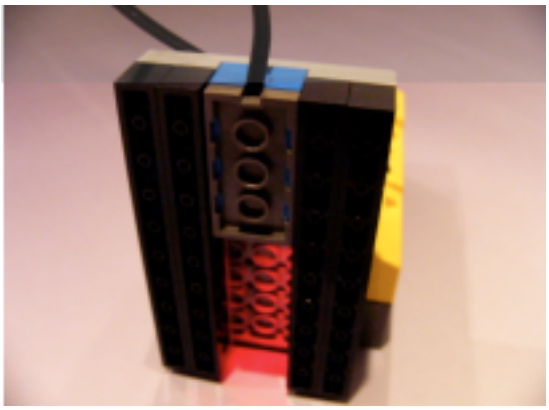


Front view with enclosed sensor.



Side View

Open assembly with sensor in First (1) stud position.



Open assembly with sensor in Highest (7) stud position.

	Stud Position:	1	2	3	4	5	6	7
Mat Position								
outside (white)								
1		**55**	**50**	**45**	**41**	**38**	**36**	**34**
2		**51**	**46**	**42**	**39**	**36**	**34**	**33**
middle (gray)								
3		**49**	**44**	**39**	**36**	**34**	**32**	**31**
4		**44**	**40**	**36**	**33**	**32**	**31**	**30**
5		**41**	**38**	**34**	**32**	**31**	**30**	**29**
inside (black)								

Each stud position increment was the upward movement of the light sensor one Lego stud length, starting from the bottom (upper left photo) and stopping at the top of the assembly (upper right photo).