ORBIT

Okaloosa RoBotics Invitational Tournament

2016 Rulebook

Because everything revolves around STEM

What is O.R.B.I.T?

O.R.B.I.T stands for the Okaloosa RoBotics Invitational Tournament. The second annual O.R.B.I.T competition tests competitors' progression of programming skills and understanding of engineering concepts over the course of 5 events.

Scoring

Scoring for each event will be a points-based system. Places will be based on the scoring specifications for each event.

1st place- 5 points
2nd place- 4 points
3rd place- 3 points

Any team after third place that successfully completes the event will be awarded 1 point.

The team with the highest overall score will be the Overall O.R.B.I.T Competition winner.

Awards

ORBIT Trophy given to team that receives the highest aggregate score across all five events

Awards will be also be given to best performing robot for each event

Radioactive Roach Award given to team makes the best use of sensor(s) in programming logic

Events

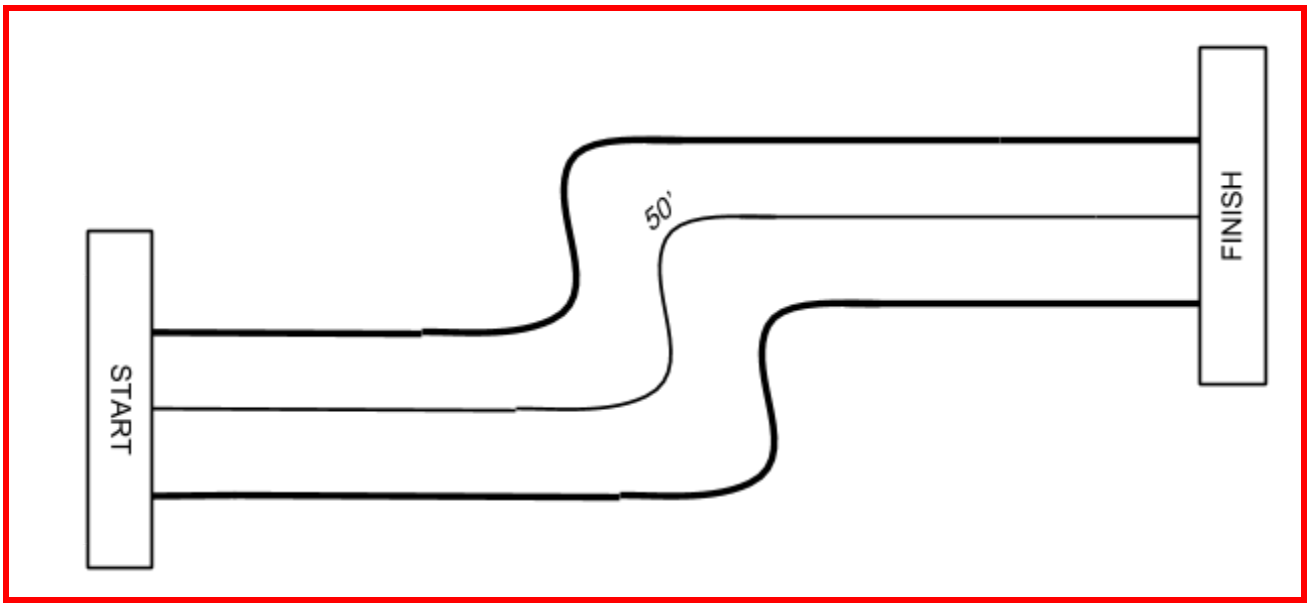
Drag Race

The Drag Race tests your ability to build a fast robot that can follow a line. The path for the Drag race is 50’ long following a black line arranged in an “S” curve.

There will be no bumpers or walls on this track. Robots will be disqualified for that run if centerline is crossed. Crossed is defined as outside plane of tire is over the centerline. The total width of the the lane is 24”.

Only standard EV3 kit wheels (from base kit) will be permitted and gears must be used to increase driven speed.

Scoring will be based on fastest times.



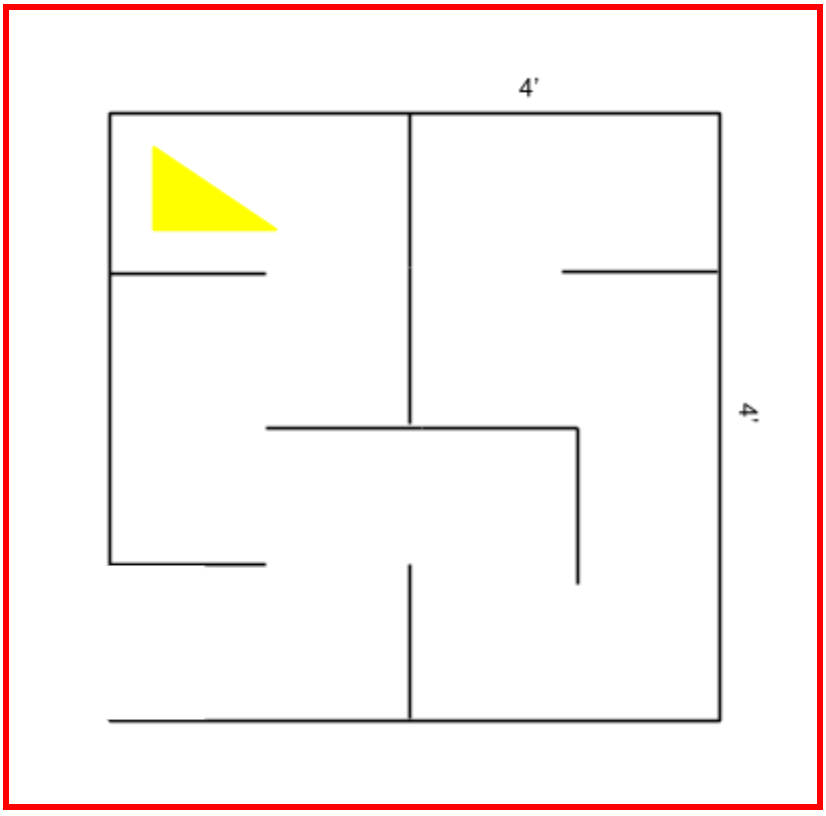
*The 50’ length of the track is measured along the centerline from the start to the finish, not from one side to the other.

Maze

The Maze tests your robot's ability to make and store decisions. The maze board is 4' x 4' and the paths inside the maze are 1' wide.

During the navigation of the maze there will be a decision point where the robot must choose to turn either left or right. The goal of the maze is to find the piece of "cheese" that will be placed on one side or the other side of the maze. The "cheese" will be denoted by yellow wall at dead end wall. Once the robot locates the cheese it must make an audible signal and then successfully exit the maze by retracing its steps via shortest path. After finding the cheese, if the robot misses the turn out of the maze, the robot will be disqualified for that run. Each of the three runs will be performed in a different maze that will not be disclosed until robot is placed at entry point.

Scoring will be based on the teams who get the "cheese" and exit the maze with the best times.



*There are 3 possible configurations for the maze. This is just an example.

Ball Shooter

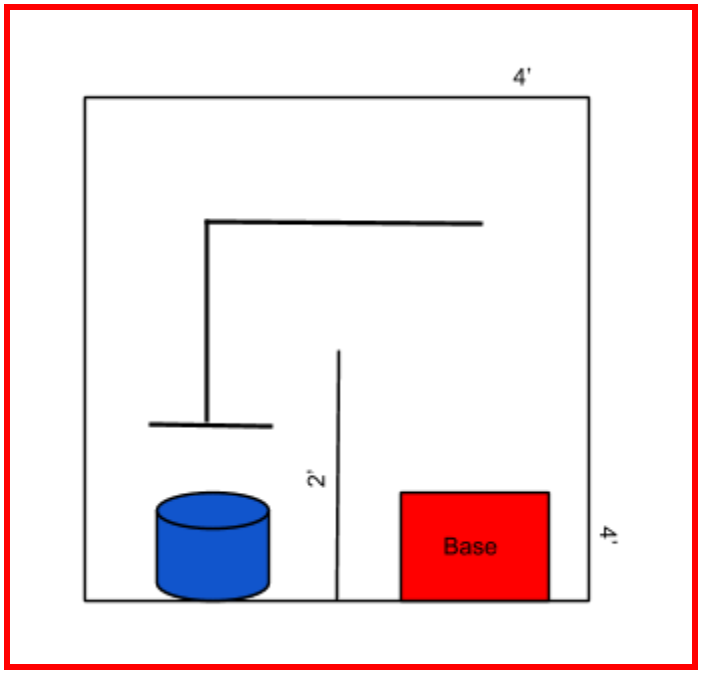
The Ball Shooter tests your robot's ability to traverse around a blind, locate goal, and place balls in goal. The Ball Shooter event is played on a 4' x 4' board. There will be a 2' long wall in the center of the board. The basket will be 6.25' tall and will have a 5.75' wide opening on the top.

The robot will start on one side of the wall inside the base. The objective is to maneuver the robot around the wall and place a lego plastic ball into the basket located on the other side of the wall. Balls are scored by shooting or dropping them into goal. Balls cannot be bounced in for score.

There is a black line with a termination provided that the robot can follow. The termination will be 6 inches away from the basket. The robot CANNOT throw the ball over the wall. Teams that attempt to make a basket over the wall will be disqualified for that run.

Scoring will be based on the teams that get the most number of balls into the basket in a 2.5 minute time period. If the team must interact with the robot outside the base, a "touch" penalty which will reduce score by 2 balls. If the team "touches" their robot a third time, the run will be terminated.

The starting dimensions of the robot must not exceed 12" x 12" x 12"

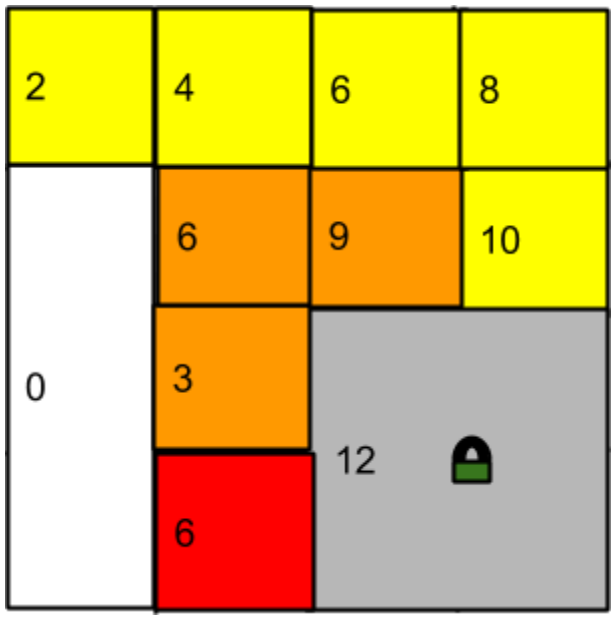


Step Climber

The Step Climber tests your robot's ability to maneuver over rough terrain. The Step Climber is played on a 4' x 4' board. There is a base on the ground that is 1' x 3' . There will be a series of steps, where each step is a 1' square. There is a path with 6 steps, each increasing by a height of 2". There is a second path with 4 steps that each increase by a height of 3". The third option is a path of 2 steps, increasing by 6" each step. The highest point of the board will be 1' tall, in a square in the corner that is 2' x 2' On the 2' x 2' block there will be a loop in its center. Teams may choose orientation of loop prior to beginning attempt. Only judges may touch game pieces. Robot may be placed anywhere on the base.

Teams have the option to climb to the top using one of three options: the 2" steps, 3" steps, or 6" steps. The objective is to climb the series of steps to the top block, collect the loop, and climb back down to the base.

Scoring will be based on teams that successfully climb to the top level, collect the loop, and return the loop back to the base with the fastest times. At the conclusion of the event, the robot must be right side up and in full control of the retrieved loop. Control may be defined as having the object fully captive including supporting its weight. The size of the robot may never exceed 12"x12"x12".



*red - 6” path
orange - 3” path
yellow- 2” path

Programming Challenge

Team will be presented with preconfigured robot (including one or more sensors) and given a task for the robot to perform. The configuration of the robot cannot be modified. Team will be given a predetermined amount of time to program and test the robot prior to attempting the task. Robot will be required to complete the task 2 consecutive times.

Teams are expected to use logic and sensor input to provide solution. Scoring will be based on average of two runs. Final layout of task may differ slightly from test layout to ensure flexibility of coding.

To qualify for overall ORBIT trophy, team must attempt this task. After introduction of problem, team must employ engineering design process (problem solving paradigm) to derive solution prior to attempting task. After solution is submitted to judges, team will be provided pre-configured robot and laptop to program robot to run task.