2nd Baguio City Robotics Cup Open

Game Description, Rules and Mechanics

Kennon Road Challenge [Elementary to High School]

April 26, 2020
St. Vincent Gym, Naguillian Rd., Baguio City

Version 1.1   January 2020

1. Game Description

In the Kennon Road Challenge, inspired by RoboRAVE International, participants build robots that can navigate a maze, composed of straight ways and 45, 90 and 135-degree turns, in the fastest time.

Approximate Challenge Time: 3 hours (2 ½ hours build/program, 30 minutes competition)

2. Objective

To design, build, and program a robot that can follow a maze without falling off. The faster you can complete the maze increases your overall score.

3. Robot Specifications

a. The robot must be autonomous. Robot must be self contained, and not externally operated by wire or by remote radio control during the challenge.

b. The maximum dimensions of the robot are 25 x 25 x 25 cm.

c. Robot is **not allowed to use any external sensors** to assist it in following the maze but wheel encoders are allowed.

d. The robot must not damage the field or endanger the spectators in any way.

e. The robot must have a start and/or stop button.

f. Dimensional limits for the robots shall be strictly enforced. Robots must have passed inspection prior to competing.

4. Maze Track Specification

The maze should follow this format: straightway, turn, straightway, turn, etc. Some of the turns should be to the right and others to the left. The straightway lengths will vary based on the length of the boards. Turns should vary between 90 degrees, 45 degrees, and 135 degrees. See the example track diagram for help with setting up these angles. Maze length should vary based on division of participants:

• Elementary School - 5 straight ways and 4 turns

• High School - 6 straight ways and 5 turns

5. Build Instruction

Allow teams approximately 2 ½ hours to build a robot that can navigate the maze track. Teams can use any robot kit, i.e Lego EV3 Mindstorms, Makeblock, UBTech Robot, VeX, but no sensors are allowed for

this challenge. The goal is to get the students to learn to make precision turns without the use of external sensors.

The majority of time during the "build" will actually be used on programming. Participants should have free access to the maze track to test their program. If teams get through the maze early in the challenge, they should be encouraged to try to find ways to increase the speed with which they can navigate the maze, and should work on improving their accuracy.

The robot has **3 minutes** to complete the maze with the clock running backwards from 180 seconds.

6. During Competition

a. Have one team place their robot at the starting line on top of the maze track. The back of the robot should be lined up with the edge of the board.

b. Have the team start their maze-navigation program. At the same time start a timer. Teams get up to 3 minutes to complete the challenge.

c. If the team drives off the track in their 3-minute time frame, allow them to pick up the robot, reset it at the start line and run their program again. Keep the timer countdown running during this period. The team may reset their robot an unlimited number of times during the 3 minute time frame. They are not allowed to touch the robot while it is running on the track—only during initial set up and any resets.

d. During the 3-minute run, take note of the furthest distance the robot travels before falling off of the track, and award points accordingly on the scoresheet. For a straight section of track, the robots wheels should touch the point value line for those points to count. For a turn, the robot should completely clear the point value line for it to count. If the robot is able to make it to the end of the track without falling off, stop the timer and note the time remaining. To make it easier to determine when a robot has officially reached the end of the track, place an object like a water bottle at the far edge of the track. When the robot touches this object, stop the timer.

e. For all teams that reach the end of the maze in under 3 minutes, consult the table to determine bonus points. Teams get one extra point per second remaining on the clock when they completed the maze. Note the time and bonus points on the scoresheet.

f. Tally up points earned and bonus points to determine your winners.

7. Scoring

    a. Each completed straight-away is worth 50 points, once completed with back wheels passing over the scoring zone.

    b. Each completed angle is worth 100 points, once completed with back wheels passing over the scoring zone.

    c. If the robot falls off the maze before reaching the finish line, then the run is concluded, and the score received includes any portion of the maze that is completed in its entirety, **but** no **time bonus** points are awarded.

    d. **Time bonus** points are awarded, if and only if, the robot reaches the finish line before the 180 second ends. Any remaining time (integer in seconds) is then added to the maze score as a "time bonus" point value.

Scoring Matrix

	1st Straight Completed	1st Turn Completed	2nd Straight Completed	2nd Turn Completed	3rd Straight Completed	3rd Turn Completed
ES	50	100	50	100	50	100

	4th Straight Completed	4th Turn Completed	5th Straight Completed	5th Turn Completed	6th Straight Completed	Total Score
ES	50	N/A	N/A	N/A	N/A	500

Time Bonus: Finished required distance under 180 seconds? Remaining seconds (integer part Only) are added to score.

For example - a robot finishes the track: 500 points for finishing + 35.8 seconds remain.

Team score = 500 points + 35 seconds time bonus (integer value only) = 645 points.

8. Flexibility of Rules

As long as the concept and fundamentals of the rules are observed, these rules shall be flexible enough to encompass the changes in the number of players and of the contents of matches. Modifications or abolition of the rules can be made by the local event organizers as long as they are published prior to the event, and are consistently maintained throughout the event.

9. Power of Officials

 a. If a robot or a participant violates the rules, the referee may disqualify them from the competition.

 b. The organizers reserve the right to make changes to any of the above in the interest of fair play and sportsmanship, and to ensure that all competitors have an enjoyable competition.

 c. In the event of ambiguity, the organizers' interpretation of any clauses of the rules shall prevail.

 d. The organizers may change the rules without prior notice, e.g. based on number of participants, local conditions etc.

10. Awarding

1. All contestants are requested to be there to receive their awards.
2. The awards are as follows:

 a. Champion

 b. 1st Runner-Up

 c. 2nd Runner-Up

11. Declaring Objections

The coach of a team can present objections to the Marshall, before the attempts is over, if there are any doubts in the exercising of these rules.

12. Liability

 a. Participating teams are always responsible for the safety of their robots and are liable for any accident caused by their team members or their robot.

b. MGE Advance Computing Solutions and the organizing team members will never be held responsible or liable for any incidents and/or accidents caused by participating teams or their equipment.

c. MGE Advance Computing Solutions and its partners and sponsors shall not be responsible for any lost and stolen models during the competition.