# 9th

# Annual

# Robotics Competition

# Golf Wars!!!

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# Mission Statement

This robotics competition is designed for students enrolled in Computer Engineering, and/or other technological disciplines, who are involved in building a line-following robot that functions autonomously.

The students that participate in this challenge will be drawing from several skill sets. The robot requires both mechanical and electrical design. As well, students will be required to program the robot to accept sensory information and respond appropriately so that it efficiently completes the challenges. Also, students must demonstrate good communication skills.

The competition has been designed so that competitors of all levels can participate and showcase their knowledge and understanding of robotics.

The 8th Annual CETA Robotics Competition will be held on Friday, May 22, 2015 at Rick Hansen Secondary School, 1150 Dream Crest Road, Mississauga, ON L5V 1N7. (905) 567-4260

Outlined below is the day's timetable.

| Time | Activity |
|---|---|
| 8:30 – 9:00 | Registration and Setup |
| 9:00 – 9:30 | Opening message and review of rules |
| 9:30 – 10:30 | Challenge 1: Running the Fairway |
| 10:30 – 12:00 | Challenge 2: Caddy Race |
| 12:00 – 12:30 | Lunch |
| 12:30 – 2:00 | Challenge 3: Bunker Botting |
| 2:00 – 2:30 | Awards Ceremony |

Lunch (food and a drink) will be provided for the participants and their coach.

Application Deadline: Friday, March 6, 2015
Miss it and you may not have a spot. ☹

**Note:** A school is allowed to enter two primary teams and one alternate team. If there are available spaces, a draw will be made for those schools that have submitted an alternate team.

This year we are expecting a large turnout and will have limited space. Therefore, schools are not allowed to take any extra students unless they have the approval of the Organizing Committee. Schools that do take extra students without permission will not be allowed to compete in the competition.

**Organizing Committee**

Paul Lewis, St. Francis Xavier S.S.
Bill Van Hout, St. Joseph S.S.
Brad North, Rick Hansen S.S.
Stephen Knox, Applewood Heights S.S.

# Awards

The following awards will be given to the winning robot teams.

- **Running the Fairway** – by competition
- **Caddy Race** – by competition
- **Bunker Botting** – by competition
- **Best in-character Robot** – by judge **(Golf Theme)**
- **Best Engineered Robot**– by judge
- **Team Sportsmanship Award** – by judge
- **Innovation Award -** by judge

# The Challenges

This year the robotic theme is around the sport of golf. The first challenge is a double elimination format. This means your bot will race until it has been beaten twice. Challenge Two is a timed event. The eight fastest robots will then go "head to head" in a double elimination format to determine the winner. Challenge Three is a timed event. At no time during any of the challenges can you touch the robot. Doing so will result in forfeiture of that match of the competition.

**Challenge One**

The first challenge is called "Running the Fairway". This is a simple line following challenge where the robot must start at one end of the track and race to the other end of the track, turn around and then race back. The robot must complete the course twice. The footprint of the robot must start just behind the "T". The winner will be the first robot's footprint to cross the starting "T" after the second run.

**Challenge Two**

The second challenge is called "Caddy Race". This challenge requires the robot to follow a similar track. However, at the end of the track they must pick up a golf ball, bring it back and place it in a cup. The robot must then turn around and repeat the process one more time. Once again, your robot will be competing against another robot in a double elimination forum.

**Challenge Three**

The third challenge is called "Bunker Botting". The robot will start in the home square. A team member will push a button to start the robot. There will be a 5 second delay. The robot will make its way to the other side of the board to pick up a golf ball from the "bunker". As robot enters the pathway leading to the bunker there will be a number of lines across the pathway. The number of lines represent which hole the golf ball must be dropped into. During that 5 second delay the judge will roll a die to determine the number of lines to put down.

| Die Rolled | Bunker 1 |
|---|---|
| 1 | 1 |
| 2 | 2 |
| 3 | 3 |
| 4 | 4 |
| 5 | ROLL AGAIN |
| 6 | ROLL AGAIN |

After the robot has delivered the golf ball to the correct hole, the robot must then make its way to the home square and stop inside it. Time starts when the button is pushed on the robot and ends when the robot has returned to the home box.

The robot will face the following penalties:

| Infraction | Penalty |
|---|---|
| Did not wait the full 5 seconds. | 10 seconds |
| Did not stay on top of the line being followed. | 15 seconds |
| Went to the right hole but failed to deliver it into the hole. | 20 seconds |
| Delivered the ball to the wrong hole. | 20 seconds |
| Drops the ball. | DNF designation |
| Goes off the line and does not return. | DNF designation |
| Did not go home. | DNF designation |

DNF – Did not finish.

The final time is determined by taking the time it takes to complete the task plus any penalties that the robot has accumulated. The winner of the competition is the robot that has the best time. Each robot has three tries.

**Reminder:** If a judge is required to make a determination, the judge's decision is final.

# Design Restraints and Equipment

In order for the competition to remain equitable and to foster an environment of ingenuity and creativity rather than a brawny solution, the following restrictions are in place.

1. The voltage source will consist only of four AA batteries. No other batteries, including 9V, can be used.

2. The wheels and drive train must be the Solarbotics GM8 or the GM9. These motors have a ratio of 143:1.
   http://www.solarbotics.com/products/gm8/
   http://www.solarbotics.com/product/gm9/
   No other motors will be accepted for the drivetrain. No modifications of these motors are allowed. However, any motor or servo may be used for the arm.

3. The footprint (base, wheels, motors, breadboard and line sensors) of the robot base may not exceed 6½" wide x 6½" long. However, the end effectors (e.g. arm to transport game piece) can extend beyond the 6½".

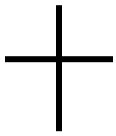
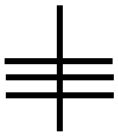
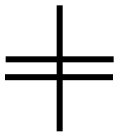
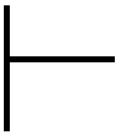
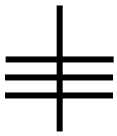
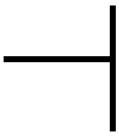
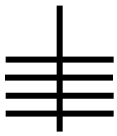
4. Only one robot can do all three challenges. Each team cannot have robots that are specific to each challenge. The complete robot must meet the above requirements and will be inspected as part of the registration process. After that, aspects of the robot, such as end effectors, etc., can be removed for specific challenges.

5. There are no weight restrictions.

6. There are no restrictions on the microcontroller that is used on your robot.

7. The choice of any additional motors will be left up to the robot team. However, the microcontroller must be mounted on the robot (not tethered by a cable or wireless).

8. The number and type of sensors used is up to the robotic team. The sensors should be able to read a black line. The following lines will be use for information on the track.

| Lines | Description | Lines | Description |
|---|---|---|---|
|  | Bunker one line - ball is to go into hole 1. |  | Inside track three lines- hole one and hole two will be on the right. |
|  | Bunker two lines – ball is to go into hole two. |  | Right turn – could be for going to a bunker or turning onto the inside track. |
|  | Bunker three Lines – ball is to go into hole three. |  | Left turn – could be for going to a bunker or turning onto the inside track. |
|  | Bunker four Lines – ball is to go into hole four. | | |
|  | Inside track two lines- hole one and hole two will be on the left. | | |

9. The black lines are generated by laying down black electrical tape. The white board is a ⅛" x 48" x 48" white hard board. It is made by Cutler Forest Products and can be purchased at the Home Depot under the product number 0621973. However, other methods may be used at the time of the competition.

10. To assist in ongoing innovation of future participants we ask everyone to provide an electronic copy of the following:
    - Schematic
    - Bill of materials
    - Programming code

11. Support material provided by robot team is:

    - Robot
    - Computer
    - Tools
    - Extension Cord
    - Power Bar

Support material provided by the organizers is:

- Table and Chairs
- Nearby Receptacle

10. Any unforeseen changes by the organizing committee will be emailed to the teams as they are made.

# Before the Competition

As you madly prepare for the competition there are a couple of items that you must do.

- Make sure that you have your registration form (page 17) in before the deadline (March 6, 2015). To miss this date may result in your team not being able to attend.

- Have all of the forms and money completed and returned to your teacher. They include:

  - ☐ Field trip form

  - ☐ Consent/Waiver form on page 18 (which the teacher must submit the day of the competition)

  - ☐ $15.00/student admittance fee (which the teacher must submit the day of the competition)

- On the day of the competition make sure you bring the extension cord, tools, extra parts and laptop so that you can maintain your robot.

# Day of the Competition

On the morning of the competition there are several things that you must do to help make things run smoothly. They are as follows:

1. Go up to the registration desk as a team and sign in.

2. Bring your robot so that the dimensions and specifications can be checked. Any robot that does not meet the requirements as outlined above will not be allowed to complete.

3. Make sure you take your survey for food. No survey – no food.

4. Put your name tag on. No one likes to be called “Hey you!”

5. Set up your table and prepare for the first challenge.

6. Assign someone to keep an ear out for your competition. You don’t want to miss out because you didn’t hear it.

7. Teams must be responsible for knowing when and where they compete. Teams that fail to show up to their match will lose that match by default.

8. The coach may not be involved in any aspect of the day’s competition.
    - Coaches are not permitted to assist students or interfere in the judging in any way during the competition.
    - The goal of this competition is to challenge students to think, adapt to changing environments, and be successful.
    - Students must learn to advocate for themselves.

9. Expect the unexpected:
    - The game boards will be provided and may be different from what you're used to. Your students will need to adjust their robots to accommodate these changes.
    - Expect inconsistent lighting; varied dark and light zones.

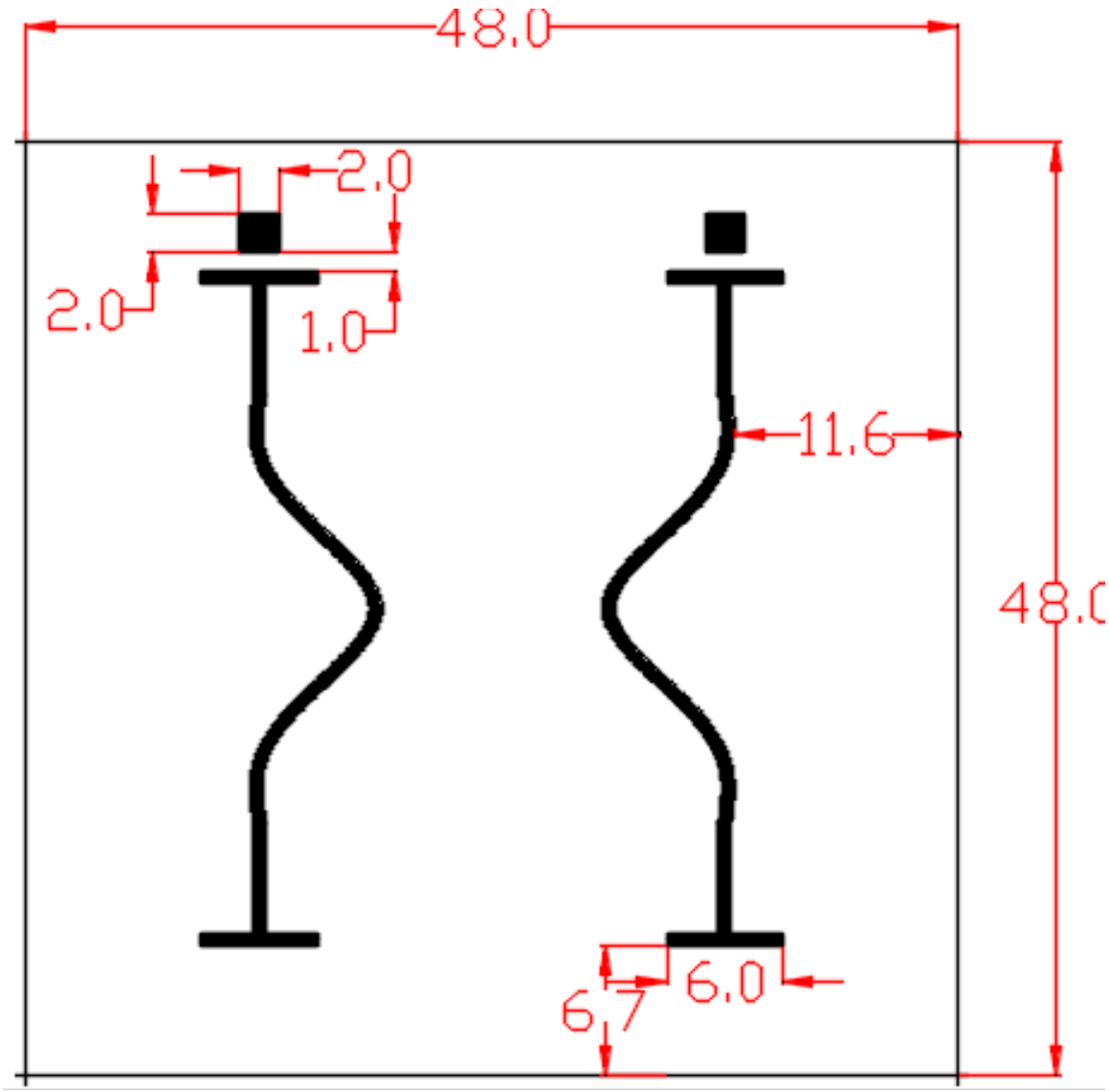
10. The judge has the last word.

11. Lastly, have fun!

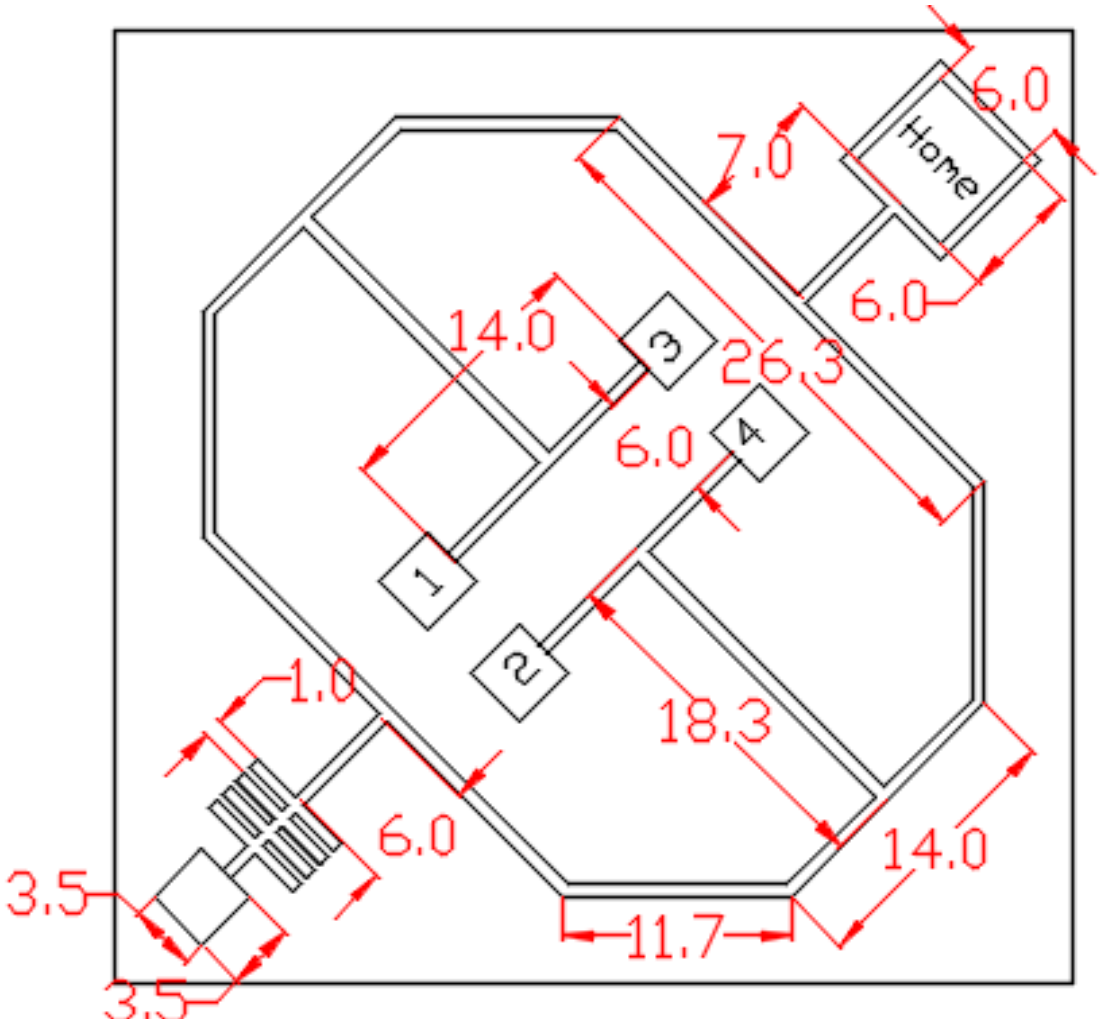
# Appendix

The following pages show the layout of all the boards used in this competition.

**Competition 1 and 2: • Running the Fairway & Caddy Race**

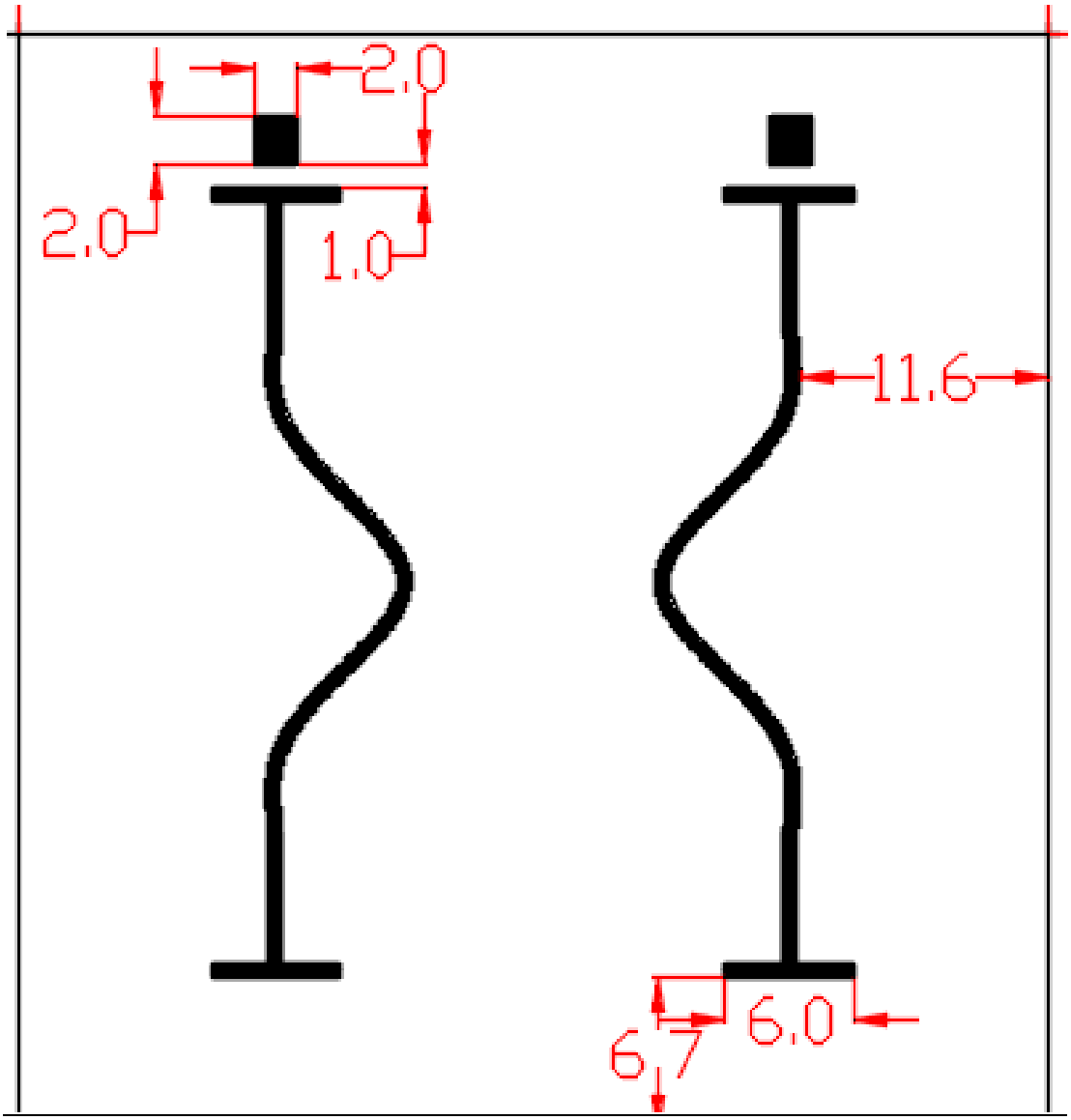


## Competition 3: • Bunker Botting



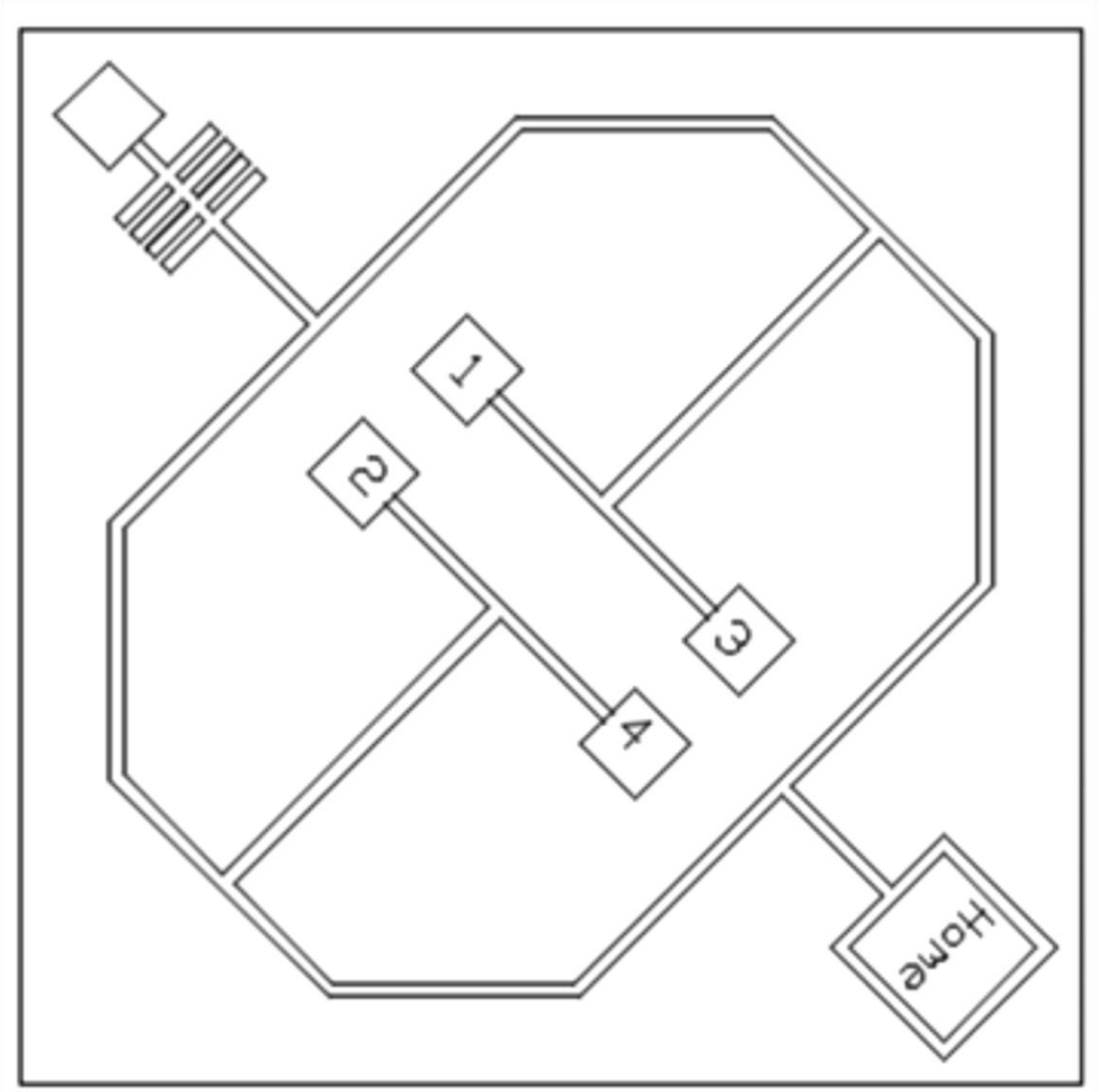
Layout Overheads

**Competition 1 and 2: •  Running the Fairway & Caddy Race**

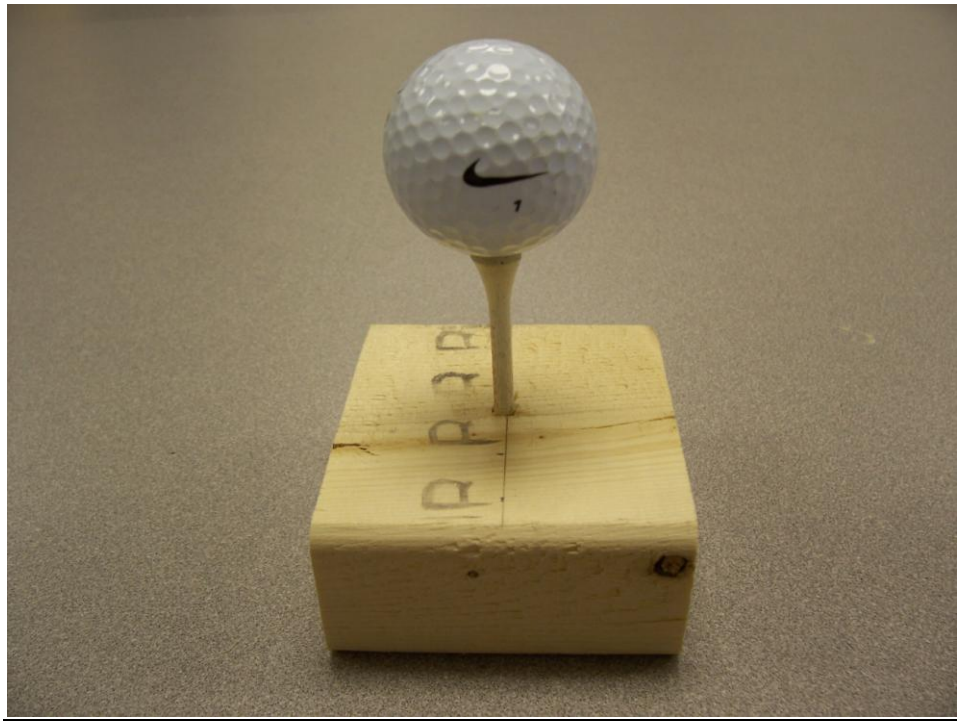


Layout Overheads

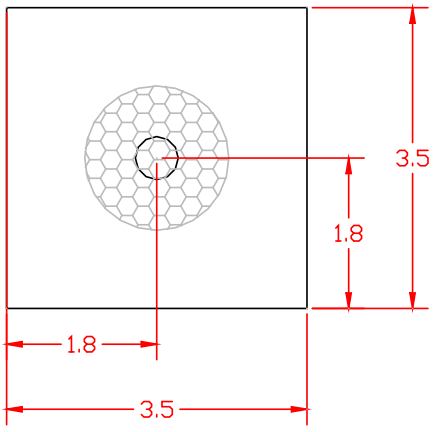
## Competition 3: •  Bunker Botting



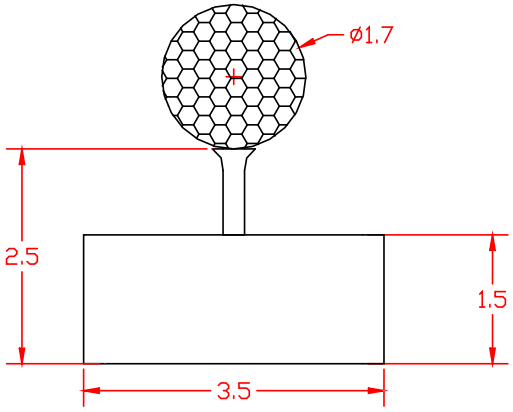
# Golf Ball Holder



Top View




Front View



# 7th Annual Dufferin-Peel/Peel Regional Robotics Competition
# Friday, May 22, 2015

Deadline for registration and this form: Friday, March 6, 2015
Miss it and you may not have a spot. ☹

Please note that there is a $15.00 entrance fee for each student that is attending and it is to be paid on the day of the competition.

**Fax to:** Paul Lewis, St. Francis Xavier S.S. 905-568-1026

☺PLEASE PRINT NEATLY☺

| | |
|---|---|
| **School:** | **Coach:** |
| **School Board: □ Peel □ Dufferin Peel** | **Coach's email:** |

**Team 1**

**Name(1):**_____ **Dietary Requests:**_____

**Name(1):**_____ **Dietary Requests:**_____

**Team 2**

**Name(1):**_____ **Dietary Requests:**_____

**Name(1):**_____ **Dietary Requests:**_____

**Alternate Team (Sorry Only One)**
(ENTRANCE DETERMINED BY DRAW)

**Name(1):**_____ **Dietary Requests:**_____

**Name(1):**_____ **Dietary Requests:**_____

**Observers**
**(MAX OF TWO)**

**Name(1):**_____ **Dietary Requests:**_____

**Name(1):**_____ **Dietary Requests:**_____

**Comments:**

# Consent/Waiver

Date: Wednesday, November 2, 2014

**Dear Parent/Guardian and Student**

Your son or daughter will be involved in an exciting event taking place at Rick Hansen S.S., and we would like to capture this exciting event on camera.

We require student and parent permission to use a person's photograph, voice, work and/or name for media videos to promote the competition.

**The following event will be held on** May 22, 2015:

Peel Board/Dufferin-Peel Board Regional Robotics Competitions at Rick Hansen S.S.

## Please review the consent form below and, if satisfactory, please complete and Return it to the robotics coach/teacher at your school before March 6th.

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## Authorization & Release

**I hereby consent to the activity/event, as described above. I understand that photographs, films, written work, video or audio recordings, may be used, edited and released to newspapers, radio, television and internet providers and may be used by newspapers, and on the radio, television and internet.**

**I hereby release the Peel District School Board and Dufferin-Peel Catholic District School Board and its employees and assignees from all claims resulting from the use, editing and release of any photographs, films, written work, videos or audio recordings with respect to this event/activity. This consent shall be continuing with no limitations or reservations, except those stated above.**

**Date: _____**

**Student Name: _____**

**(If student is 18 years of age or older)**
I am at least 18 years of age, and I consent to this authorization and release.

Signature: _____

Address: _____

**I am the parent or guardian of _____and I consent to this authorization and release.**

**Parent/Guardian signature: _____**