Robonz Robotics Competition 2007

"Robonz is New Zealand's personal robotics club"

Its finally the time you have all been waiting for. An all-new robotics competition. A challenge for engineers, hobbyists and students. All levels of competition from beginners to advanced. All competitors will be welcomed.

What challenge is best for me?

The courses have been specifically designed to allow for all levels of ability from beginners to the advanced. The simplest course is a easy as driving from one end of the track to the other in the quickest possible time. See the Quick trip course listed below. A more challenging course involves two robots competing against each other. They must dominate by controlling the lights on the course. See the Domination course listed below (based on the game Unreal Tournament). If you decide to take up the challenge, don't be surprised if you end up inventing something.

When? Where?

The competition will be set up and run on the first Saturday in August 2007. This is the 4th of August 2007 to be precise.

We have two venues in mind and will announce these closer to the competition date. The number of entrants will dictate which venue we decide on. See www.robonz.com for updates.

What is the challenge?

Listed in order from easiest to hardest. Remember robot means autonomous action (no remotes controls).

- **Quicktrip** - Up to the end and back, don't crash into the wall as it might waist time.
- **Path Finder** - Can your robot follow a line, even a squiggly one?.
- **Wall Following** - Can your robot follow the wall to make it right around the course?
- **Domination** - Is your robot smarter and faster than the opponents. This is going to be an entertaining challenge. We expect this course to be the highlight of the robotics competition, as two robots will be competing in the course at the same time.
- **Can Can** - Retrieving cans is a lot harder than it seems.

How do I start?

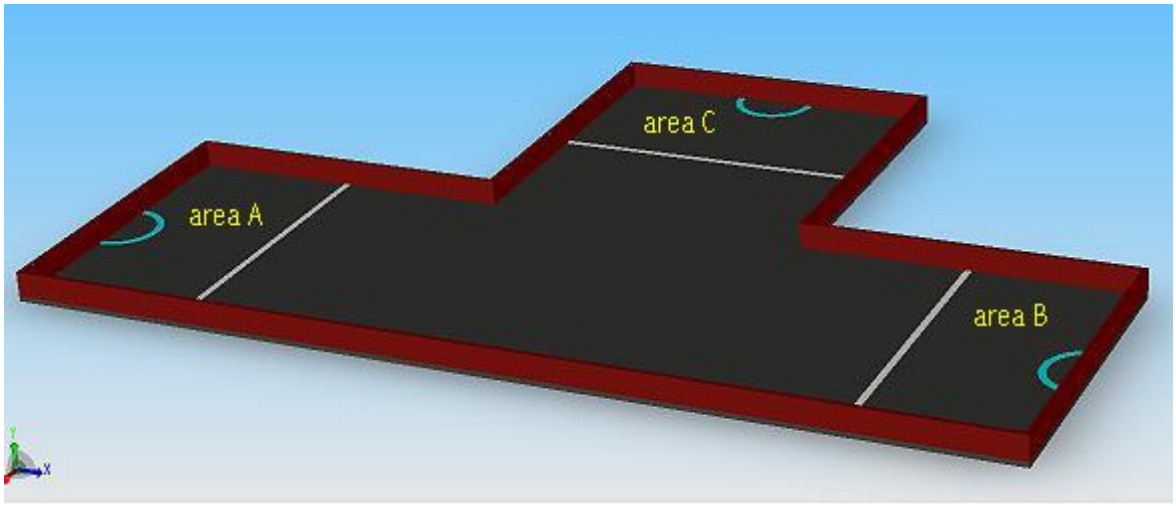
- Register to compete. Email your contact details to Next at pitstock.com (replace the "at" with the @ symbol) or join our mailing list from our main page and send an email to the mail list. There will be a $20 registration fee which will go towards prizes and costs.
- Get building! Talking and mucking around will make sure you are not ready on time. Build and build. This will leave you time to sort out your software bugs.
- www.robonz.com/mailist.html mailing list is a helpful and friendly resource. You can join the email news letter and communicate with competitors for ideas resources and rule clarifications. Ask a question and you will be sure to get many detailed answers.
- This competition is based on the Dallas Personal Robotics Group contests. Be sure to visit their site for construction and design ideas.
- Download a printer friendly version of these rules as a PDF

Your Robot's Specifications

- Every robot must fit into the area of a standard piece of A4 paper, including grippers and accessories. There is no height limit,
- Horizontally visible light sources cannot be used during domination, they could be confused for totem poles. Infrared LED's and any colour lasers are allowable.
- No use of weapons, including spikes, flamethrowers, emp weapons (Electro Magnetic Pulse). You know the drill. Unintentional collisions are un avoidable but will be noted by the referee. The referee can disqualify robots that intentionally appear to want to damage or destroy opponent robots or the robot arena.
- All robots must be autonomous. Robots cannot be remote controlled.
- All robots must be self-contained and untethered. Radio control by a laptop is ok so long as the laptop is not touched when the robot is running a course. The robot must be self-contained, in that it cannot slip in multiple robots or an item like string.

The Competition Arena

- Download the arena dimensions here as a PDF. The general Arena is 2.4 x 3.6 meters x 90 millimeters high (wall height).



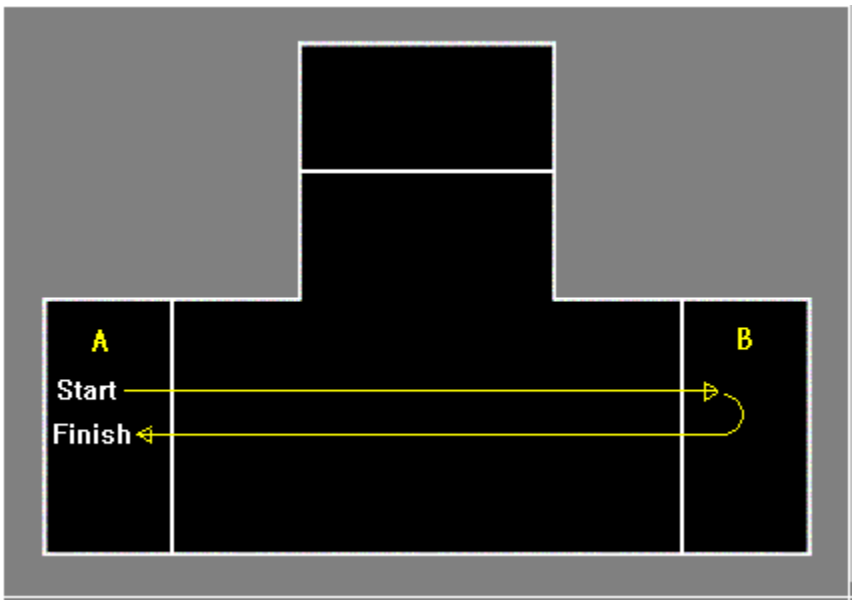
- The walls are painted white (shown brown for clarity in the above picture) on all sides and made of wood, approximately 18mm thick.
- The floor of the Arena is black paper. Note that the black paper is not actually black, it will be a dark grey simular to builders paper as this easier to purchase, so make sure your sensors can handle this. There will be plenty of contrast between the white insulation tape and this paper.
- Each area, A, B and C (see PDF or picture above) will be marked off with 20mm wide white insulation tape as shown.
- Additional totem poles will be fitted to the course during "Domination". The location of these totems is shown in light blue in the picture above.

Sponsors

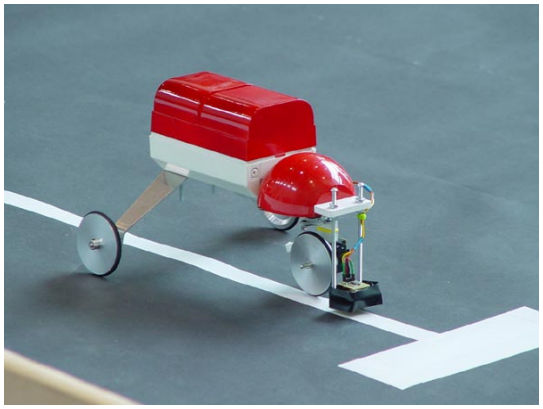
- Robonz is a community run non-profit club. If you would like to sponsor or donate prizes please contact Next at pitstock.com (replace the "at" with the @ symbol) or join our mailing list. We expect a large audience and possibly some TV coverage so this could be an advertising opportunity. The course has room on the outside for company logos.

Course1: "Quicktrip"

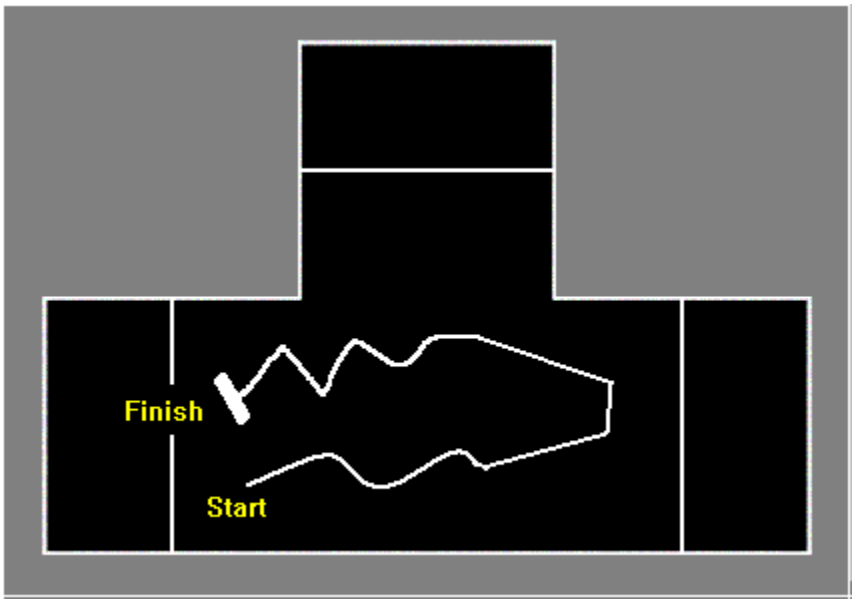
- This is the easiest course designed for entry level competitors. Experienced competitors will still be able to compete on this course as well.
- Your robot must move from area A to area B and back to Area A in the quickest time.
- When the robot enters area B, the whole of the robot must cross the white line to qualify as a run.
- The robot is timed when it begins to cross the first white line, leaving area A. The total time is completed when the robot returns back to this area.
- The robot can be started anywhere in area A.
- Robots that turn around before returning to area A will get a bonus of 5 seconds reduced from their total time.
- Each competitor will have 3 attempts to complete this course.



Course2: "Path Finder"

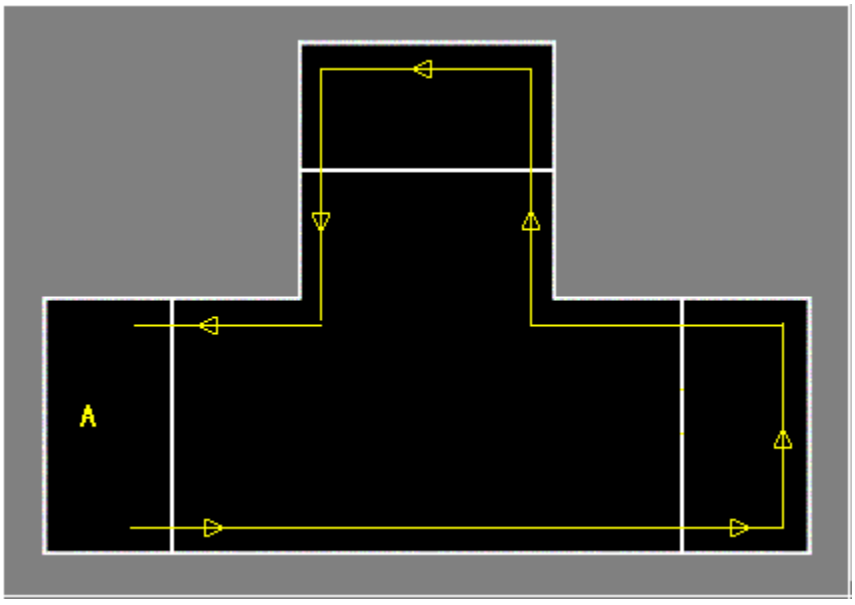


- This is a typical line following course. Your robot is required to navigate from one end of the line to the other in the shortest possible time.
- The floor of the Arena is black paper. Note that the black paper is not actually black, it will be a dark grey simular to builders paper as this easier to purchase. Make sure your sensors can handle this. There will be plenty of contrast between the white insulation tape and this paper.
- The line is standard white electrical insulation tape. This is about 20mm wide. This tape can vary from about 18 to 21mm in width. Make sure your robot can handle this.
- Robots must follow the line at all time. If a robot appears to have lost track of the line it may not qualify as a completed run.
- The line will have curves, right angles and be fairly random. No angle will be tighter than 90 degrees. The line will randomly made on competition day by a competition official. The drawing below is a general example of what it could look like.
- At the finish the robot will cross a finish white line as drawn below. Robots that stop on this white line will get a bonus of 5 seconds removed from their total time. The finish of the line will be 3 tape widths as shown in the picture (right).
- Each competitor will have 3 attempts to complete this course.

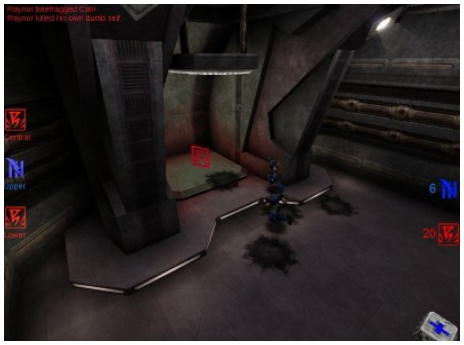


Course3: "Wall following"

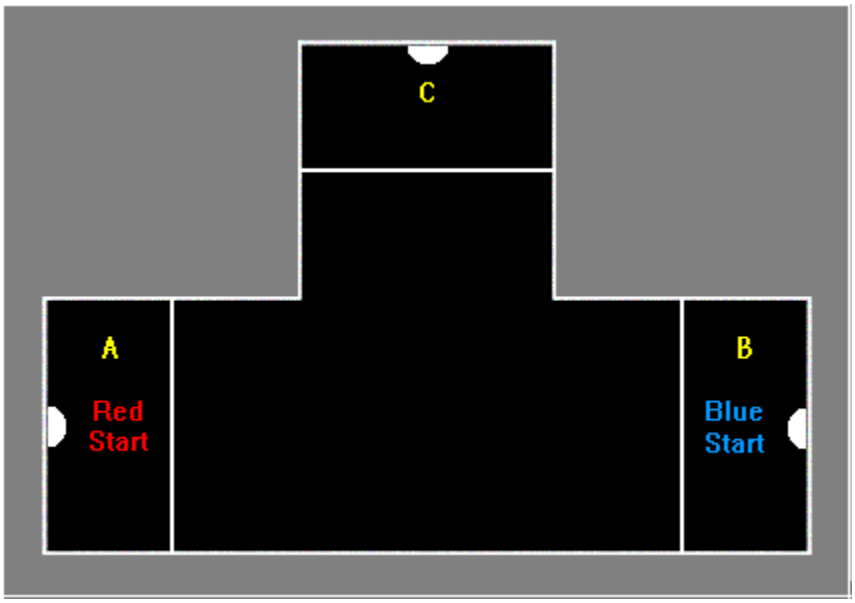
- Your robot must start from area A. The robot is required to follow the inside wall until it reaches area A again. The robots with the quickest times will be the winners.
- The robot is timed when it begins to cross the first white line, leaving area A. The total time is completed when the robot returns back to this area.
- The robot can be started anywhere in area A.
- The robot must never be further than 30 centimeters from the wall at any time.
- The diagram shows an example path of a robot going round the course anti-clockwise. Your robot can go clockwise or anti clockwise when traversing this course. There is no preference.
- Each competitor will have 3 attempts to complete this course.



Course4: "Domination"



- Domination is the only course that sees two robots competing against each other at the same time. In each area A, B and C there are "totem poles" which are described in detail below. It is based on the PC game Unreal Tournament.
- When this course commences the totem poles will be illuminated from within using bright blue and red LED's. Both red and blue LED's will be on at the start.
- The red team will start in area A and the blue team will start in area B.
- The goal of the robot is to keep as many totem poles illuminated with their team colour. Each team will get one point per second for every totem pole that is showing their colour. e.g. If two of the totem poles were red and one was showing blue the red team would get two points per second and the blue team would get one point per second.
- The red team should press the top switch on the totem pole. This will make the totem pole display red. Pressing the switch multiple times is of no consequence. The blue team should press the bottom switch on the totem pole. This will make the totem pole display blue.
- **All robots must be configurable to run as red team or blue team**. E.G. the bumper that is used to push the switch must be able to be moved to either height of 25mm or 50mm. See the totem pole dimensions here as a PDF. If your robot uses sensors to see the led colour you may need to change a colour filter so your robot behaves correctly.



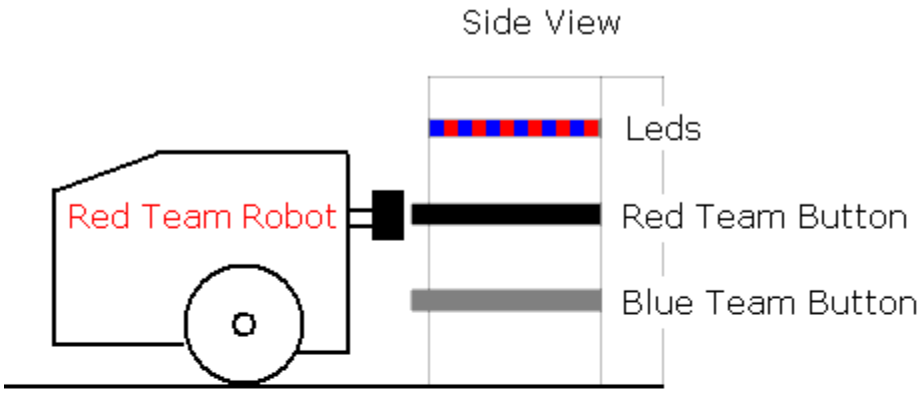
Course4: "Domination" continued

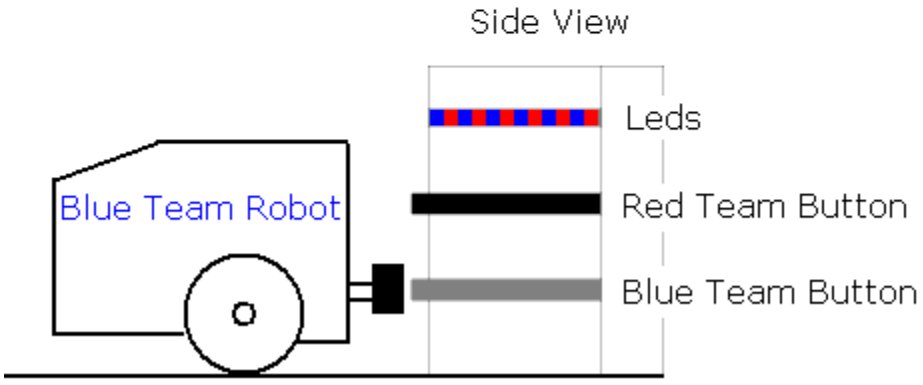
- The duration of this competition is two minutes. Which ever team has collected the most points will be declared the winner of that attempt.
- Robots should not be programmed to intentionally damage the competitor. Robots displaying this trait may be disqualified. Blocking robots from a totem pole is acceptable. Blocking robots into a corner is not acceptable.
- If the robots get jammed with each or the walls the judge can give them a nudge and will try not to re-orient their heading.
- Horizontally visible light sources cannot be used during domination, they could be confused for totem poles by competing robots. Infrared LED's and any colour lasers are allowable
- Teams will be played against each other in a knock out style competition.

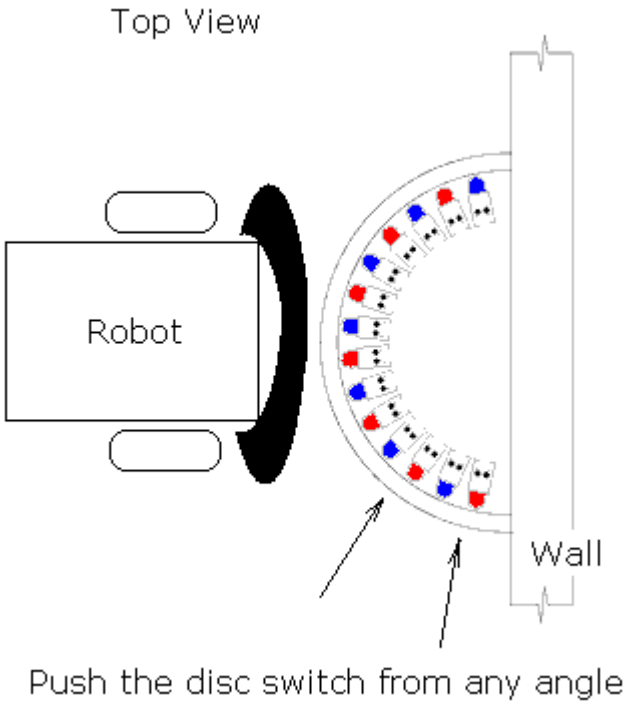
Totem Poles used in domination

- See domination rules listed below for the usage of these. These will only be fitted to the course during domination.
- The totem poles have a ring of red and blue LED's fitted near the top. These are bright light sources, which will make it easy for your robot to locate these totem poles.
- Each totem pole is fitted with two disc buttons that can be pressed from most angles. The disc buttons (or switches) are made of 6mm thick clear acrylic (Perspex).
- The totems are half-circle posts that are painted white and measuring 100mm in diameter or 50mm radius.
- Download the totem pole dimensions here as a PDF.

Totem Pole diagrams

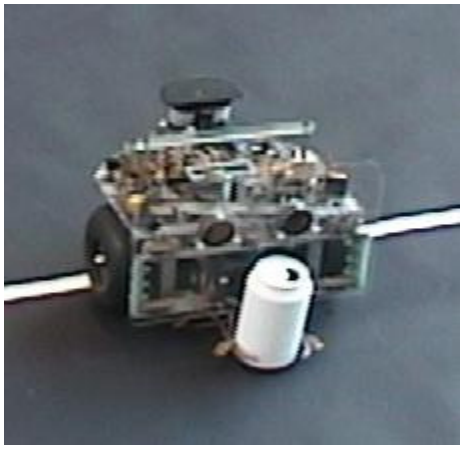




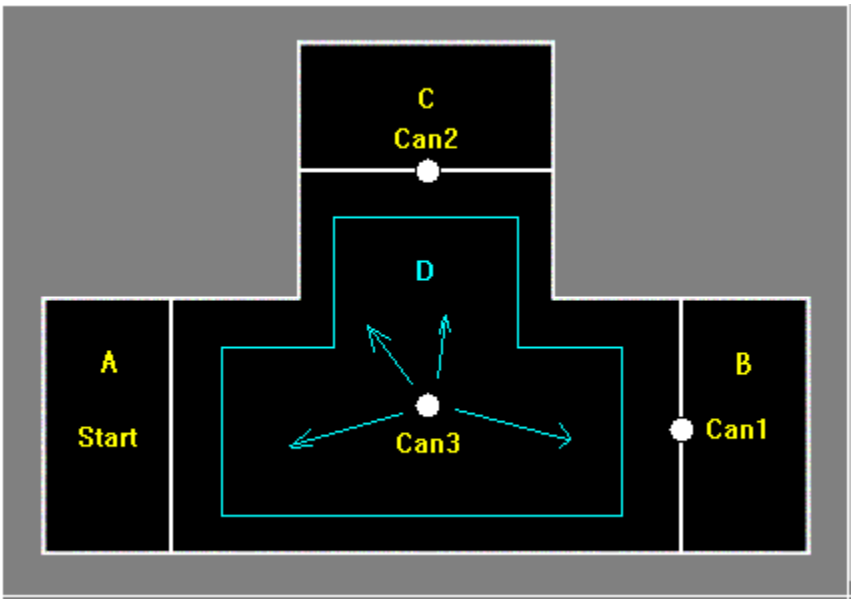


Download the totem pole dimensions here as a PDF.

Course5: "Can Can"



- We are not expecting a lot of competitors to attempt this course, as it is fairly hard. But remember getting a winning placing could be quite easy if you are one of three entrants.
- In this course your robot is required to retrieve 3 cans placed on the course. These cans need to be returned to area A. The robots goal is to collect all three cans in the fastest time. If no robot collects all three cans judging will be based on how much of the course was completed.
- The competing robot starts in area A behind the white line.
- 2 cans are placed in fixed positions as drawn and the third can will be randomly placed in area D. These will be ordinary aluminium soda cans 355mL that have been painted white. If you want to bring your own cans of a different colour that would be okay (e.g. 300 gram tin cans).
- Area D is always more than 15 centimetres from a wall or a line.
- All cans collected should be returned to area A. If the robot is holding all three cans and standing in area A, this would qualify as completion. Putting the cans down in area A is of no consequence.
- Each competitor will have 3 attempts to complete this course.



Prizes

- All entrants will get a certificate of participation, except placeholders.
- Certificates will be issued for 1st 2nd and 3rd placing's.
- There will be special certificates for "young achievers" or robots that have "wow factor".
- One person will get the title of "national robotics champion". This will be carefully decided.
- Prizes are being sourced. Winners will not go away empty handed.

Footnotes

- Only the person starting the competing robot can enter the course. There will be no shoes allowed on the course at anytime. This may sound silly, but the last competitor would get the grubbiest course to use. Bare feet or socks are ok.
- We would appreciate that children are kept a short distance away from the arena at all times.
- These are preliminary rules and we do expect some minor modifications, mainly to clarify or correct items.

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Contact information

- Visit www.robonz.com
- Call Keith Colson in 09-353-6687
- **Register now:** Email Next at Pitstock.com (remove the "at" and put in a @). Please include your contact details.
- Join the robonz mailing list here mailing list. - http://www.pitstock.com/robonz/maillist.html
- Download a printer friendly version of these rules as a PDF