



RARC Competition III

February 25, 2012

Rules and Procedures

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RARC III Competition Overview

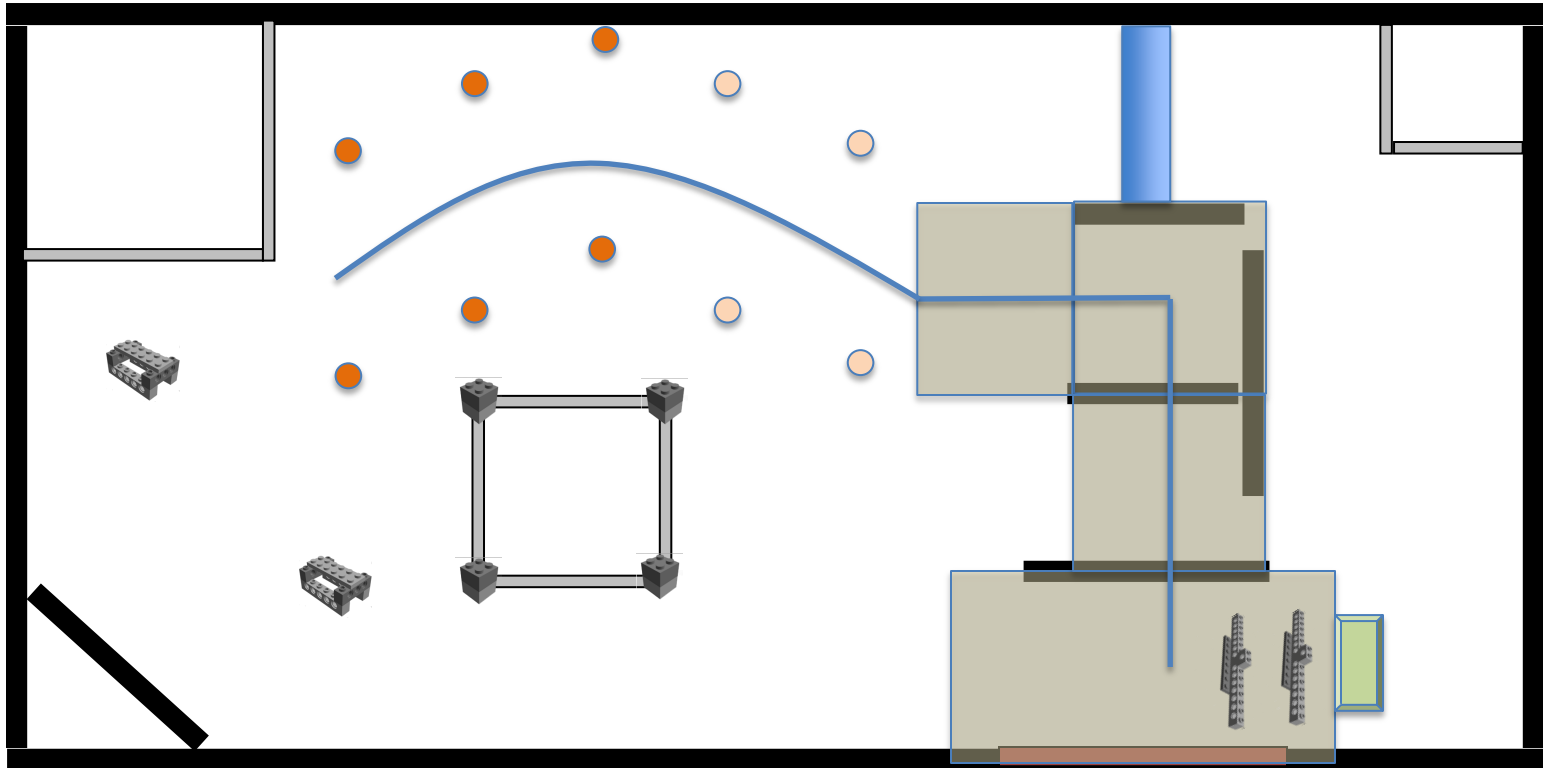
- 2 Divisions
 - Club (Elementary School) and Middle School
 - High School will compete in the ION Mini-Urban Challenge
 - Open Platform
 - NXT, Boe-Bot, or any other autonomous platform that meets size specifications. **Bots are not limited to a source or number of parts**
- Table Top
 - Standard 4'x8' competition **tables with a white floor and black walls**. (Page 14 lists sources for instructions on how to build competition tables)

RARC III COMPETITION



- The goal of the challenge is to accomplish as many missions as possible within the time allotted.
- All table elements will remain in play until the match is over and will not be moved by the judge(s). Team members are not allowed to move or reset the table elements.
- Unlike other competitions, your robot IS NOT limited to a particular source (kit numbers) or number of parts that it may contain as long as it fits within the home base. (NXT based bots must contain parts that have not been modified from their original shape and/or size)
- Your robot, including any attachments, must fit in the home base which is 15 inches by 15 inches. The starting orientation of your robot does not matter as long as your bot starts within the home base. No leeway will be given to bots that exceed this size requirement.
- Each match is a maximum of 3 minutes long. Your score is cumulative (both results are added together). Time will be the tie breaker if needed.
- If bot is touched while it is outside of the home base, the round is over (stop time) or a -5 point penalty is assessed (one traffic marker is removed) for a restart from Home Base. If the team chooses to take the -5 penalty, the bot must restart from within the base. The -5 point penalty will apply each time that the robot is touched if you choose to restart from base.
- The bot may be touched without a penalty if a part of the robot is inside of the volume of the base.
- Team captains must carry the score sheet to the judge's table once the round is complete. Failure to do so will result in a score of ZERO for that match.
- Please remember that although every effort is made to make all competition table set-ups the same, there might be slight variations between your school practice table and the official competition tables. You may practice on the official competition tables on the morning of the competition before the challenge begins.

CHALLENGE BOARD LAYOUT



There are 8 missions to accomplish plus 1 bonus mission which will be released on the day of the challenge. The missions may be attempted in any order and as many times as possible (penalty points will be deducted if bot touched outside of home base), but points for the mission will only be given once. The missions involve lifting and pushing structures and getting across obstacles. Go to page 8 for a detailed list of the missions.

RARC III COMPETITION RULES

BOTS

- Bot must fit in Home Base (attachments and/or sensors may NOT go over)
- Must navigate autonomously through the course
 - Cannot launch objects or reach into the table from base
- Cannot use remote controls
- Sensors
 - The use of at least one light sensor is required for one of the missions. Hint – the bonus mission will require the use of a different sensor(s).

RARC III COMPETITION RULES

CONDUCT OF ROUNDS

- Teams will go through 2 rounds of 3 minutes each.
- Bot starts from home base (No part of the bot may be outside of the Home Base area/volume).
- Time starts when the judge says “Go.”
- Any and all table elements will remain in play on the table even if the element is impeding the robot’s course. The team members will not be allowed to remove or reset the elements until the match ends.
- You may attempt to accomplish a mission as many times as possible, but the match ends after 3 minutes have elapsed. The mission points will only be awarded once per mission. Traffic marker points will not be assessed until the end of the match.
- If you touch a bot outside of the base, you must restart your bot from Home Base.
- Time ends when the team declares “stop time,” or at 3:00 minutes.

RARC III COMPETITION RULES

MISSIONS

- Mission 1
 - Place crate structures into the triangular area (Denoted by an “A” in the diagram)
 - A part of the structure must be touching the bottom surface (plywood). Ending orientation does not matter.
- Mission 2
 - Push the block structures to the storage area
 - A block structure is located at each corner of location “B”
 - Each block structure is worth 5 points
 - The storage area is located underneath the second diagonal ramp leading to the topmost level of the bridge.
- Mission 3
 - Get to the ramp without knocking down any of the traffic markers
 - Must use the light sensor to receive the points
 - Remember that you get points for every traffic marker that remains upright at the end of the match. You will not receive the traffic marker points if you knock down any traffic markers while attempting another mission(s) and/or if the marker is removed as a penalty by a judge.
- Mission 4
 - Get to the topmost level of the bridge platform (Denoted by a “C” in the diagram)
- Mission 5
 - Move the push structures into the basket
 - Each push structure in the basket is worth 5 points
- Mission 6
 - Move basket to the delivery area (Denoted by a “D” in the diagram)
- Mission 7
 - Get across speed bump from the side of the delivery area “D”
 - Your bot may move/knock down the 4 traffic markers closest to the ramp without penalty points being assessed after crossing the speed bump
- Mission 8
 - Robot ends match at location B or C
- Mission 9 – Bonus Points

– Mission will not be released until the day of the challenge

SCORING

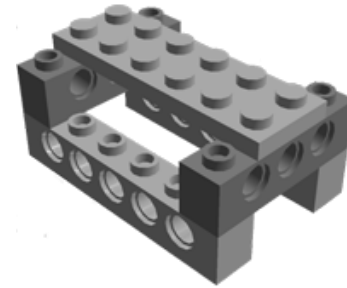
- Points per mission will only be awarded once (table will not be reset until the end of the match)
- Penalty points (One traffic marker will be removed) will be assessed each time that the robot is touched outside of Home Base
- If the robot is touched outside of home base, the robot must restart from home base. Remember that the table elements will not be reset until the end of the match.
- If the robot crosses the speed bump (made out of jumbo craft sticks), then the robot may move the 4 traffic markers closest to the ramp without penalty points being assessed.
- The team captain must carry the scoring sheet to the scoring table. (Failure to turn in a scoring sheet will result in a score of ZERO)
- Time will be the deciding factor in case of a tie

Action	Point Value
Place crate within the "A" area	20 each
Move block structures to the storage area	5 each
Get to the ramp without knocking down pedestals by using a light sensor	20
Reach top of bridge. ("C")	15
Move structures into basket	10 each
Move basket (with structures) to holding area	30
Basket without structures	15
Get across speed bump	20
End match at "B" location	10
End match at "C" location	25
Traffic Markers remaining upright on the table	5 each
Touch bot outside of home base	- One traffic marker
TOTAL Possible	250

STRUCTURES

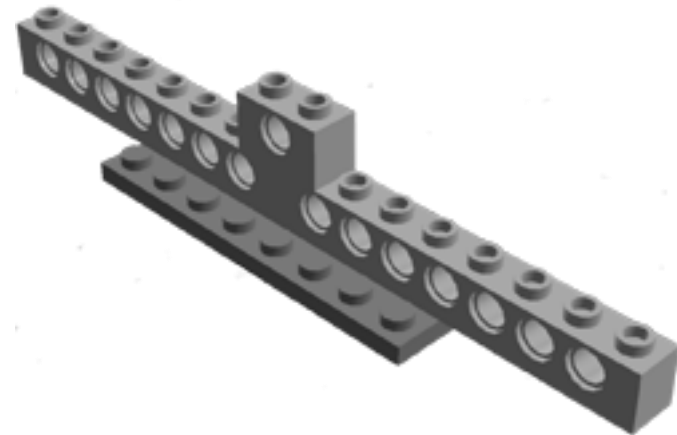
- Crate structures

- Parts needed for each
 - 2 Technic Bricks 1x6
 - 2 Technic Bricks 1x4
 - 1 Plate 2x6



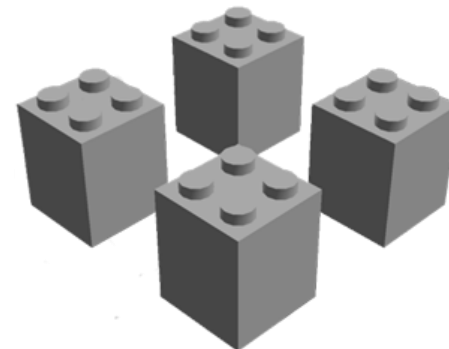
- Push structures

- Parts needed for each
 - 1 Plate 2x8
 - 2 Technic Bricks 1x8
 - 1 Technic Brick 1x2



- Block structures

- Parts needed for each
 - 1 Brick 2x2
 - 2 Bricks 1x2



STRUCTURES

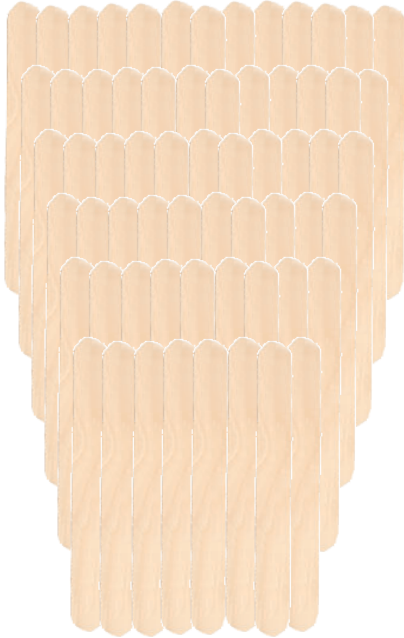
- Ramp

- Parts needed

- 63 Jumbo Craft Sticks

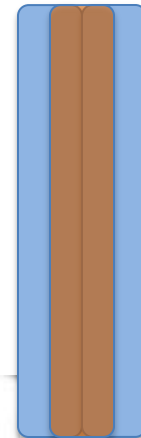
- 6 Layers

- » 13 Sticks on the bottom
 - » 12 Sticks on 2nd layer
 - » 11 Sticks on 3rd layer
 - » 10 Sticks on 4th layer
 - » 9 Sticks on 5th layer
 - » 8 Sticks 6th layer

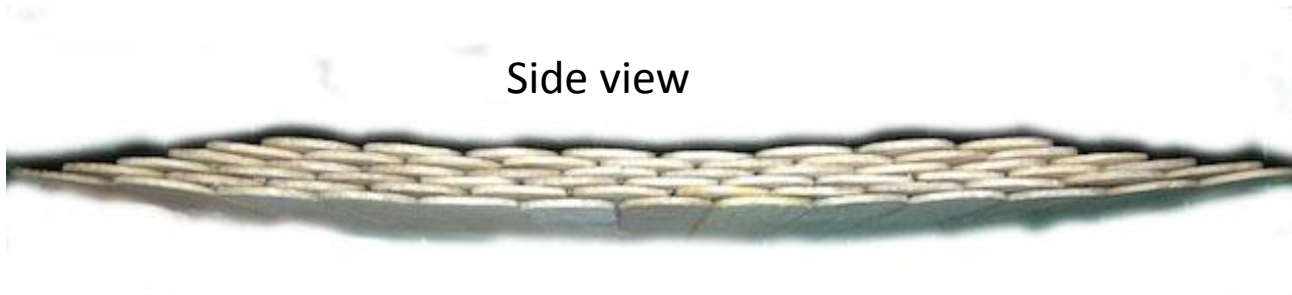


Top view

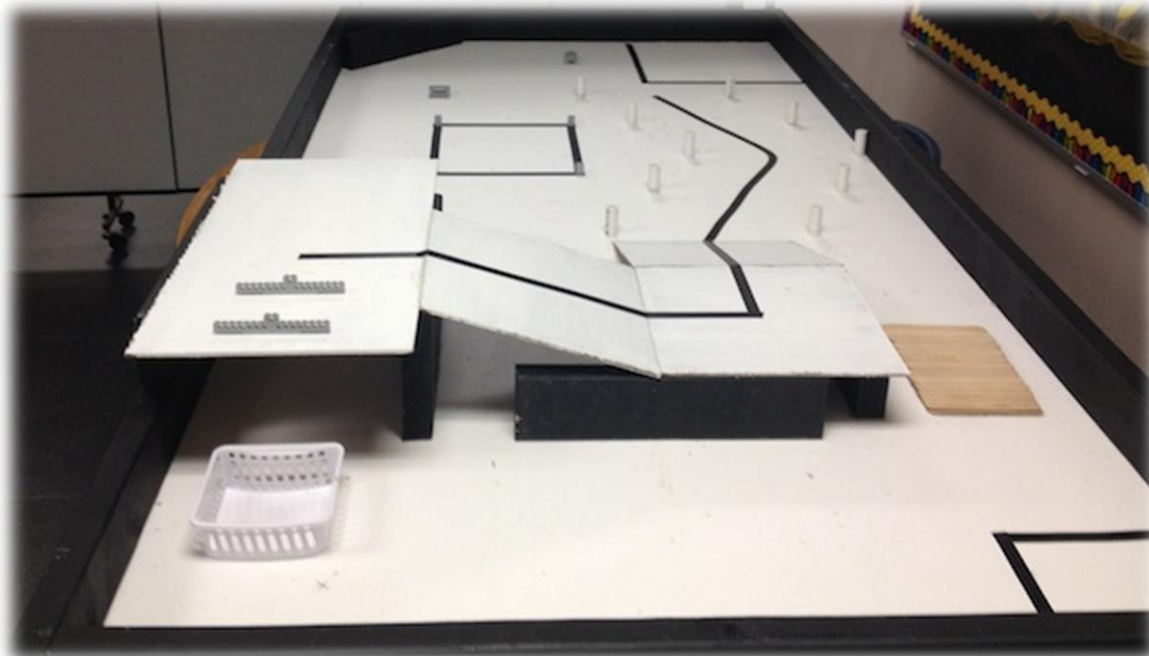
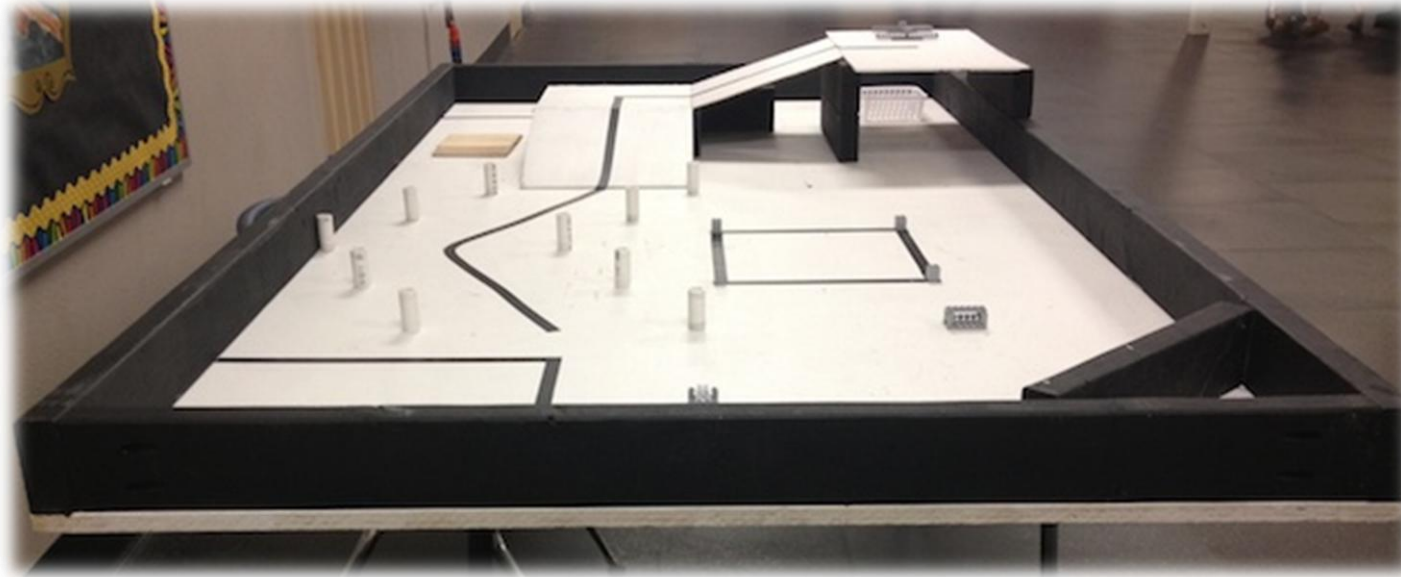
Each layer of the ramp is glued in such a way that the **craft stick on top** is half way between **two sticks on the bottom**.



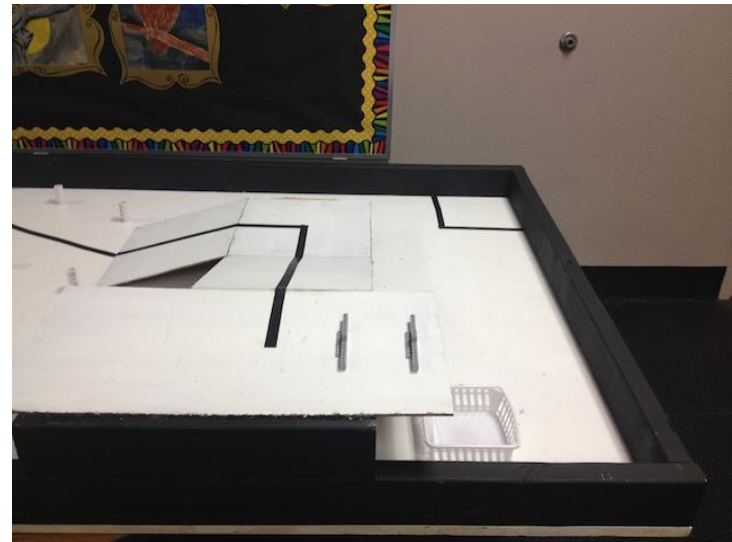
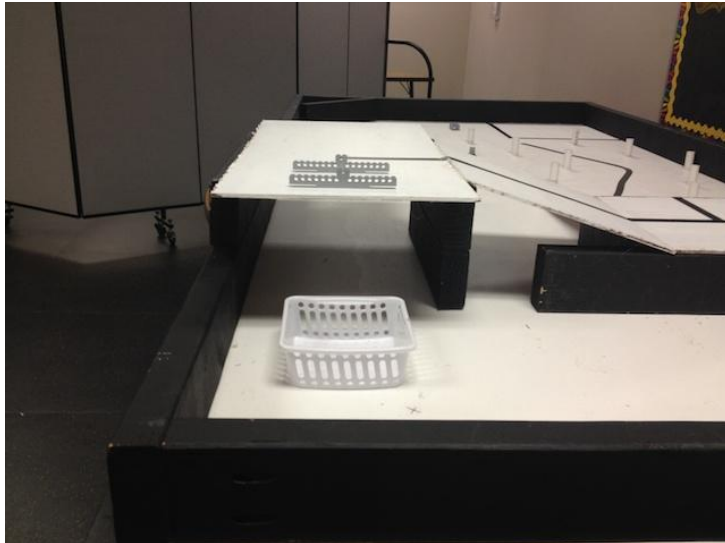
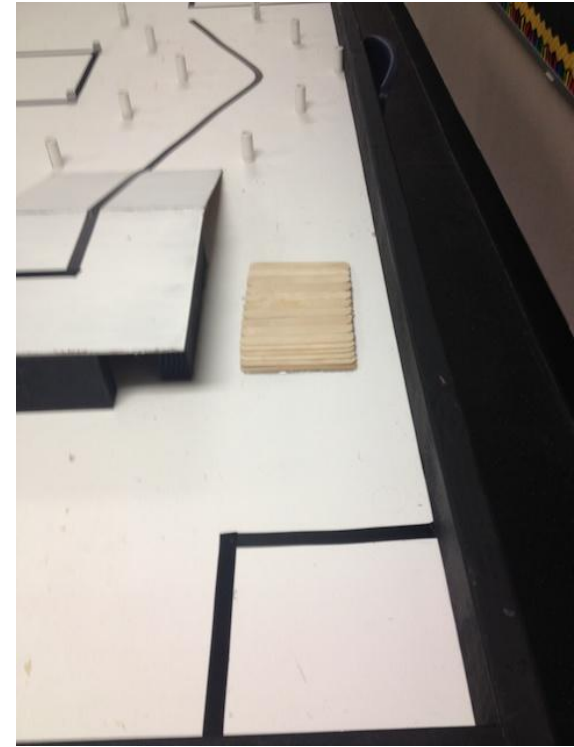
Side view



Completed Table views



Completed Table views



1/30/12

Club (Elementary School) & Middle School Registration

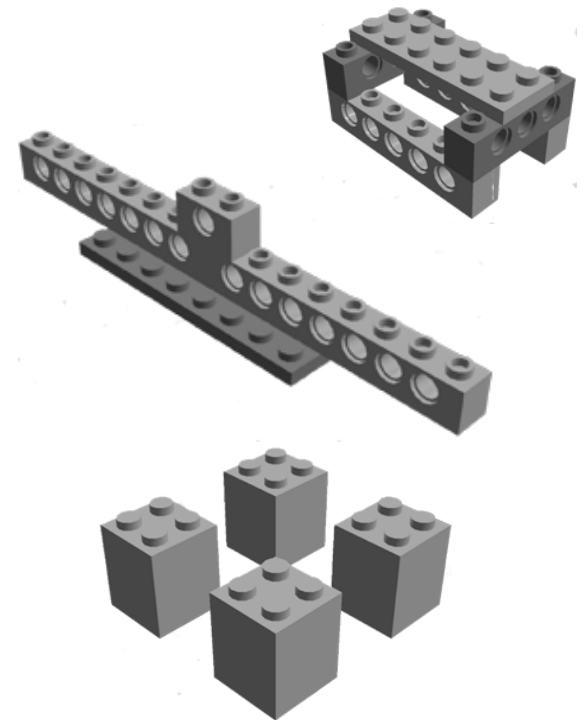
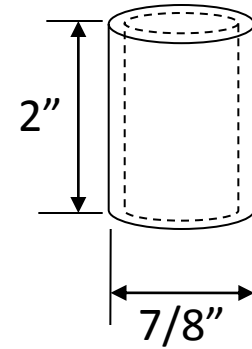
- The entry fee will be **\$25** per team. **The entry fee is non-refundable.**
- A team may not have more than 6 members.
- Please send completed registration forms by **January 27, 2012**, to JoAnn Marshall via fax (318-759-1622) or e-mail joann.marshall@cyberinnovationcenter.org
- Payment for the entry fee is required by **January 27, 2012**. **Checks should be made payable to Cyber Innovation Center and should be mailed to 6300 East Texas Street, Suite 100, Bossier City, Louisiana 71111.**
- Team rosters are due by **February 10, 2012**.
- An information packet will be e-mailed to all registered teams on February 13, 2012.
- You can easily build your own kit (multiple teams may use a single kit) based on the dimensions available in the PDF presentation.

High School ION Mini-Urban Challenge

- Registration Policies:
 - Team spots are limited.
Only high school teams may register.
All team members must be enrolled in Grades 9-12.
Each high school is allowed to register only ONE team.
Additional teams from registered schools will be wait-listed
Teams that participated in a prior year's competition MUST use the robot package provided previously.
- Registration Procedures:
 - The deadline to register a team is **Wednesday, November 18, 2011.**
 - To be considered for participation in the Regional Competition, teams must submit their high school name, a teacher name, and teacher phone number and e-mail address to joann.marshall@cyberinnovationcenter.org.
- For more information about the Mini-Urban challenge please visit:
 - <http://www.ion.org/outreach/muc/>

Item	Quantity
2x4 x 93" (table walls)	2
2x4 x 48" (table walls)	2
4x8 Sheet Plywood (floor)	1
2x4 x 10.5"	2
2x4 x 15"	4
2x4 x 18"	1
Basket	1
Jumbo Craft Sticks	63
PVC Pipe (Traffic Markers)	10
Technic Brick 1x2	2
Technic Brick 1x4	4
Technic Brick 1x6	4
Technic Brick 1x8	4
Plate 2x6	2
Plate 2x8	2
Brick 1x2	8
Brick 2x2	4
¾" Black Electrical Tape	1 roll
12" x 12" Board (Similar to pegboard but w/o holes)	3
12" x 24" Board (Similar to pegboard but w/o holes)	1

Materials



Competition Table Resources

Here are some websites that you can visit for information on how to build a competition table:

http://edoutreach.wpafb.af.mil/Robotics/media/table_construction.pdf

<http://www.techbrick.com/Lego/TechBrick/TeamTips/NewTeams/Documents/TechBrickTableBuild.pdf>

<http://ausfll.org/res/fllTable.pdf>

<https://landroids.netfirms.com/landroids.org/Landroids%20FLL%20Table%20100608.pdf>

<http://sketchup.google.com/3dwarehouse/details?mid=d1047fba877024b1e41db8d254f9844e>

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