2005 ASEE Model Design Competition

Frequently Asked Questions (OK, maybe asked just once!)

Question 1: What is the correct size of a ping-pong ball? According to the ITTF (International Table Tennis Federation) 2.03.01 The ball shall be spherical, with a diameter of 40mm. 7/15/2003 see http://www.ittf.com/ Apparently it use to be 38mm until Oct of 2000.
Answer 1: This important question led to Revision A of the official rules (added 9-22-04). The section added to the rules is shown below:

> **Ping-Pong Ball Size:**
> There is some variation in ping-pong ball sizes. The official diameter of a ping-pong ball changed from 38mm to 40 mm in October 2000. Additionally, even nominal 38mm diameter ping-pong may vary somewhat. **For this competition, the size of a ping-pong ball must be at least 37.25 mm.** The judges may use a measuring device, such as a metal plate with a 37.25mm hole through which approved ping-pong balls should not be able to pass. Teams should be ready to present their ping-pong balls for inspection if requested to do so by the judges. Also note that a good source for purchasing ping-pong balls online ($0.95/dozen or $27.90 for 21 dozen with shipping) is:
> http://store.rebeccas.com/store/merchant.mvc?Screen=PROD&Product_Code=BLS575&Category_Code=

Question 2: Our Robot team was wondering if it would be legal to deposit a bag of balls in each corner rather than individual balls. I told them, I don't think so but I would ask you. The rule states that the ball cannot be in contact with the robot. What would a bag be considered? It is obviously not a ball so then it would have to be part of the robot and many of the balls in the bag would have to be in contact with the bag and therefore would not count. What is your thoughts?
Answer 2: This important question led to Revision B of the official rules (added 10-04-04). The section added to the Scoring and Test Procedures section of the rules is shown below:

> 3A) The ping-pong balls may not be taped, packaged, or bound together in any fashion when they are inside the pockets on the track (i.e., the balls must be loose after being placed in the pockets). Additionally, no materials other than the ping pong balls may be left in the pockets by the robot or the balls in that pocket will not be counted for scoring purposes.

Question 3: What if all corners have the same number of balls? How would you rank the most and least numbers?
Answer 3: If all corners had the same number of balls then you could rank them any way you want. Also note that this would yield the maximum score.
For example,
- if you deposited 100 balls in 1 corner, you earn 100*1 = 100 points
- if you deposited 100 balls evenly in 2 corners (50 in each), you earn 50*1 + 50*2 = 150 points
- if you deposited 100 balls evenly in 4 corners (25 in each), you earn 25*1 + 25*2 + 25*3 + 25*4 = 250 points

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Question 4: I have a question regarding the fabrication rules for the design competition. Are milling machines and lathes considered tools that are commonly available to the general public? In other words, can we use milling machines and lathes in fabricating our models?
Answer 4: The use of milling machines and lathes is definitely OK. Most teams probably won't use them, but we have had some teams that have done a great job in fabricating their parts.

Question 5: We have a club that does a lot of designing and building with the LEGO Mindstorms machines. I see that some use of LEGO's is prohibited, but I am not clear on how much. I also noticed that one of last year's competitors used a LEGO Mindstorms machine. Is it okay to build a LEGO machine with the yellow programmable brick? I want to make sure that the team is sure on what they are allowed to use.
Answer 5: We have wrestled with the issue of Legos and other kits and it particularly became an issue last year with the Lego vehicle that you noted. We finally decided that we wanted the teams to do at least some fabrication that was not straight from a Lego kit. The rules state "Use of commercially available vehicles, robots, or kits such as RC cars, Legos, ... may not be used for the chassis or major subassemblies of the robot." So my interpretation would be that your students should build their own chassis, but that using Lego programmable bricks, sensors, motors, gearboxes, etc., would be fine. Even the cars that are not Lego-based typically use off-the-shelf motors, gearboxes, sensors arrays, microprocessor boards, etc.
I hope that this answer helps.

Question 6: Can a vehicle climb on top of the barriers along the edge of the track?
Answer 6: There is no restriction to climbing on top of the barriers, but keep in mind that there are also no guarantees what will be on the outside of the track. The track could be up against a wall, on top of some tables, or be on a carpeted surface with heavy curtains just outside the barriers (just to name a few of the scenarios from previous competitions).

Question 7: Are the students allowed to position the robot at a preferred position over the center joint? Or should we assume that the position will be a randomly assigned position over the center joint?
Answer 7: The students are allowed to select their starting position as long as some portion of the robot is over the center joint.

Question 8: When the team member pushes the start button - could the button also mechanically release a spring loaded mechanism that causes the robot to expand beyond the original starting size? The team members finger is not adding energy to the system - (the springs already contain the energy needed to expand and lift) but is being used to activate a mechanical release.
Answer 8: No problem. The robot can expand beyond the original 12” x 12” x 6” after the start button is pressed and can use spring loaded devices to do so. However, as you correctly stated, the team member’s finger should not add any energy to the robot.

Question 9: We have a question about the scoring rules. I think the major question is what is meant by "second most", "third most" and "fourth most". If all pockets contain the same number of balls, (let’s stay 4 balls) what would be the score? Suppose two pockets each have 4 balls, and two pockets each have 5 balls. Would there be two pockets with the most balls, and two pockets with the second most?
Answer 9: If two pockets have 5 balls and two pockets have 4 balls then the pocket with the "most" balls would have 5 balls, "second most" would have 5 balls, "third most" would have 4 balls, and "fourth most" would have 4 balls. The score would then be 5*4 + 5*3 + 4*2 + 4*1 = 47.
