ME 495R Mechatronics Competition
August 12, 2013
Revised 8/6/13

Project Description

You have been tasked with designing and constructing a robot to compete in a tournament of champions. The game is played completely by the robot, with no input from the user once the game is underway. The objective of the game is to get ping pong balls through colored hoops that correspond to the color of the ball. There are points awarded for each successful goal and penalties for mismatched colors. The best of three rounds will determine the winner, with each round lasting up to 60 seconds.

Before each round the robot will be preloaded with 6 ping pong balls. There will be two of each color (orange, white, and green) loaded in random order. The robot must start with a press of a button and then continue autonomously from that time forward. The robot must start with a size no greater than 6”x6”x6”. Safety should be an important part of the design so that spectators (including families) can watch without fear of injury.

The course (See attached schematic) is made from ½ inch particle board and has a base that is 47” x 47”. The sides of the course will be 24” from the base. Each hoop will be 5” square and be centered 19” from the base. In addition to being colored, each hoop will have an IR beacon directly below it (6” from the base). Each beacon will emit at a different frequency: Purple - 250 Hz, Pink - 3000 Hz, White - 11,000 Hz. There will be a forth hoop included for future expandability, but it will play no part in this competition.

Points may be scored by getting a ball through the hoop that matches its color (for more details see the Point Scoring section). There is a bonus for shooting a ball from behind the 18” mark on the course. This will be indicated by black tape on the base of the course. There will also be an optional challenge available to capture a golden colored ball and get it through any hoop.

Point Scoring

The following point scheme will be used to determine the champion:

- +5 points for a ball through a correct colored hoop
- -3 points for a ball through an incorrect colored hoop
- +5 points (additional) for a long distance shot (entire robot 18’’+ away) (correct color)
- -1 points for “Wild Shot” out of bounds (ball will not be returned to play)
- +50 points for capturing and launching the golden ball through any hoop

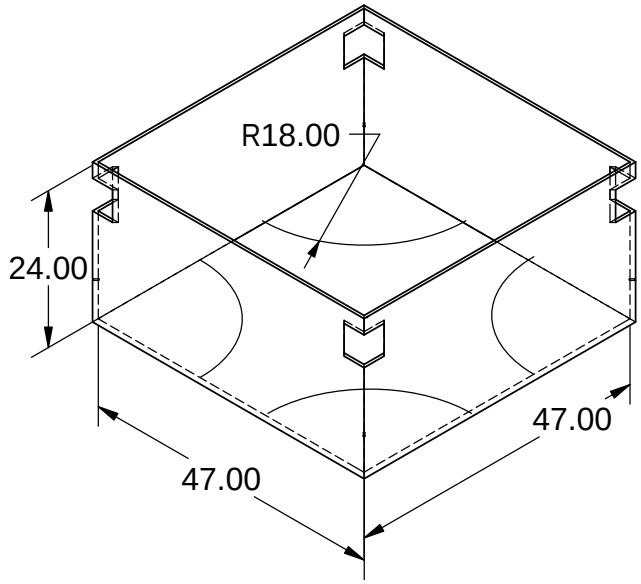
Additional Rules

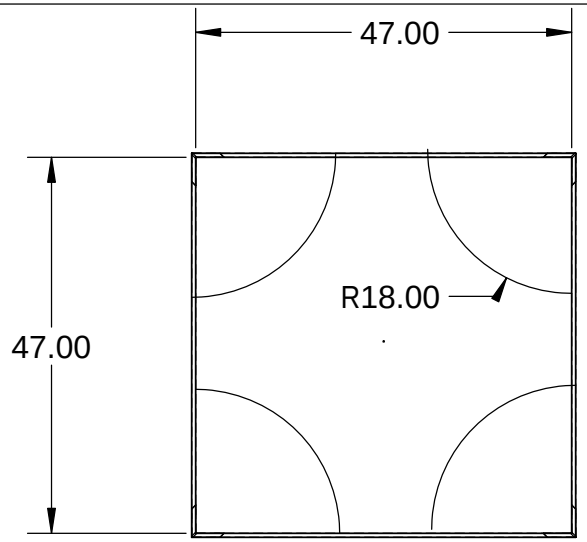
- Irreparable damage to another robot or spectator will result in a disqualification
- There shall be no broadcasting interference while another robot competes

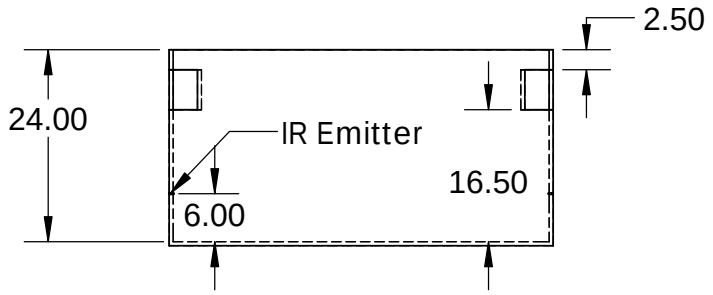
- Must have a “kill” button/switch that stops all motion of any motors
- Must be controlled using PIC microcontrollers (Exceptions may be granted on a case by case basis)
- No prebuilt robots (contact teaching staff if you think this might be an issue)
- At the start of the round, the robot must fit fully within a 6” cube
- The robot must be fully autonomous
- Max money limit: $100 (not including supplies available in the lab or your kits)
- 60 second time limit
- Must be self powered (no wall power)

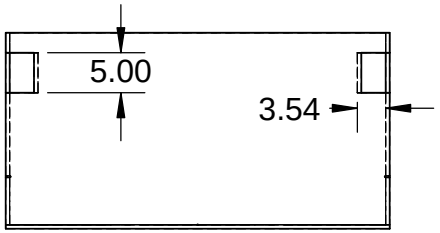
Expected Report Deliverables (more details to follow)

- Bill of materials
- Source Code
- Any CAD drawings
- Complete description of the design decisions, system operations
- Write up should be written such that a fellow engineer should be able to recreate the robot
- Photos, web resources, links to datasheets
- The report will be delivered in the form of a website









		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ± ANGULAR: MACH ± BEND ± TWO PLACE DECIMAL ± THREE PLACE DECIMAL ±	DRAWN		
			CHECKED		
			ENG APPR.		
			MFG APPR.		
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.		
		MATERIAL	COMMENTS:		
NEXT ASSY	USED ON	FINISH			
APPLICATION		DO NOT SCALE DRAWING			

TITLE:

SIZE	DWG. NO.	REV
A	Project_Course	
SCALE: 1:24	WEIGHT:	SHEET 1 OF 1

5 4 3 2 1