EA 3.3
Robot Design and Build Project 1

You're going to design and build a robot to collect scoring objects (foam balls) and place them in your scoring area in the arena. Game rules provide for both autonomous and operator control.

Robot Requirements
- Size must be no larger than 18"x18"x18" to begin a match, but it can extend/expand during a match.
- Must be able to move by operator control.
- Must be able to collect and hold one or more scoring objects from the surface. Can also accommodate scoring objects to be placed on/in it ('driver control loads' – see below).
- Must have a scoring process that meets the following:
  - Gets activated by a single trigger (button pushed, switch pressed, etc.).
  - Only runs if a scoring object is in place within the robot.
  - Once activated, requires no additional human intervention.

Restrictions and Recommendations
- May only use Vex robot components that we have, except you may use tape to secure wires.
- Only use wheels for traction (size is up to you).
- May use up to 8 motors.
- Use only one controller and one battery on the robot.
- Must only hold a maximum of 4 scoring objects at once.
- Use a Competition-Joystick project in EasyC.

Game Rules
- Game will be played in the arena. Two teams will compete at once. Matches will last 2 minutes.
- Tournament will be round-robin format with final head-to-head matches between the top 2 ranked teams for the championship and the 3rd and 4th ranked teams for 3rd place. Any ties in standings will be broken by: 1–head to head; 2–total points, 3–coin flip.
- Scoring objects in arena will be placed according to 'Nothing but Net' configuration.
- Robots must start completely within in their assigned color square (red or blue).
- Points are scored by placing scoring objects in the team's designated scoring area. Low goal: 1 point regular/2 points bonus. High goal: 5 points regular/10 points bonus.
- Teams will also be given 10 'driver control loads' which may be manually added during the match. These must be placed either within the team's starting square or on a robot fully within the starting square.
- Scoring objects must not be removed from the scoring area during a match.
- Scoring objects that leave the arena will stay out of the arena for the duration of the match.
- The following are prohibited and will result in penalties and/or disqualification as well as grade penalties:
  - Any intentional malicious or potentially damaging actions against the other team's robot, including (but not limited to) collisions, pinning, grabbing, etc.
  - Driving your robot into the other team's starting square during the match.
  - Interfering in any way with the successful operation of a match.

Notebook Requirements
You must maintain a notebook throughout the project. It must be updated as you complete the robot work, not thrown together at the end. It should be made up of 3 sections, and each section will be checked as we reach that point in the project.
- Part 1 – Research and Design. Thoroughly explain and document your designs. You should focus on robot motion, accumulating scoring objects, and the scoring process. You should also include why you chose your designs, where you got your information and ideas, drawings of your designs, materials needed, relevant constraints, and other pertinent information related to the design of your robot.
- Part 2 – Build and Test. Document the steps required to build your robot. Describe any changes you make from the original design and why you made them. Create a test plan and use it to document expected and actual results of your testing.
- Part 3 – Compete and Adjust. Document the results of each match in which you compete, including the score, at least one thing that went well, and at least one thing that could've been better. Describe any adjustments you make between matches, including why you make them. Keep in mind that "didn't make any" is not an acceptable answer because you will always make some kind of adjustment.
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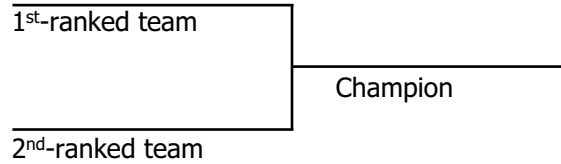## Participation Requirements

You must participate at all times – no exceptions. Team members should work together and include everyone as much as possible. You should let me know if either of the following occurs:

- You have a teammate who is choosing not to participate.
- You are not able to participate because other teammates are not allowing it.
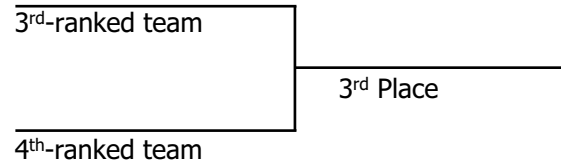
Tournament Format

Round-Robin	
Match#	Teams
1	1 vs 2
2	3 vs 5
3	1 vs 3
4	5 vs 2
5	3 vs 4
6	4 vs 1
7	2 vs 3
8	2 vs 4
9	5 vs 1
10	4 vs 5

Championship

1st-ranked team

Champion

2nd-ranked team

Consolation

3rd-ranked team

3rd Place

4th-ranked team

Grading

You will receive six grades for this project – 3 formative, 3 summative

Formative grades

Notebook progress check 1 – all required part 1 documentation in notebook	100
Notebook progress check 2 – all required part 2 documentation in notebook	100
Notebook progress check 3 – all required part 3 documentation in notebook	100

Summative grades

Robot – meets all criteria	100
Notebook final check – everything documented as required	100
Participation – contributed to all parts of project as required	100