

# single-player challenges

These starter challenges will give you some fun, yet demanding goals to work toward as you build your first robots. Pick either a single- or multi-player challenge and get ready to build!

For additional (and more advanced) challenges, visit the official Vex Robotics Design System website at <http://www.vexrobotics.com!>

### Challenge 1

**Name:** Solo Soccer

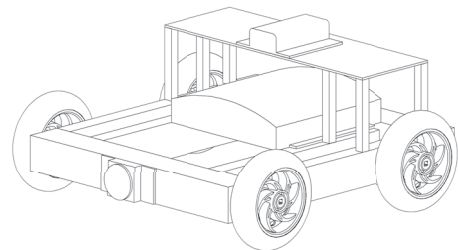
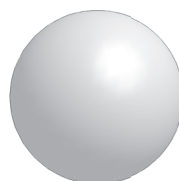
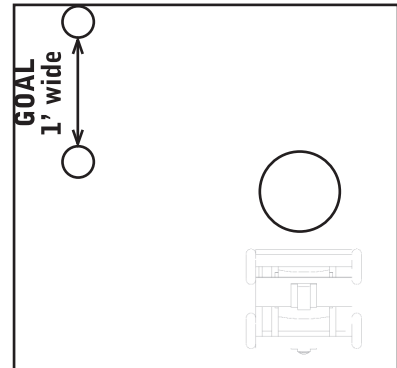
**Difficulty:** Novice to Intermediate

**Course:** Flat carpeted (easy) or smooth (harder) surface, two static objects as goal markers, a baseball/tennis ball or similar-sized round object placed in the middle of the field.

**Engineering Objective:** Verify robot functionality and familiarize the robot operator with controls.

**Instructions:** Maneuver your robot to push the ball into the "goal" (i.e. between the two markers). More advanced teams should attempt to engineer a better solution to ball handling than just pushing the ball around with the front chassis bumper. Hint: Make sure the ball does not hit the bumper sensor on the front of the Squarebot, or the operator will temporarily lose control!

**Other Rules:** Your robot must include the bumper sensor (plugged into ports 9 and 10) on both the front and the back in the same approximate location as the Squarebot.



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## Challenge 2

**Name:** Orchard

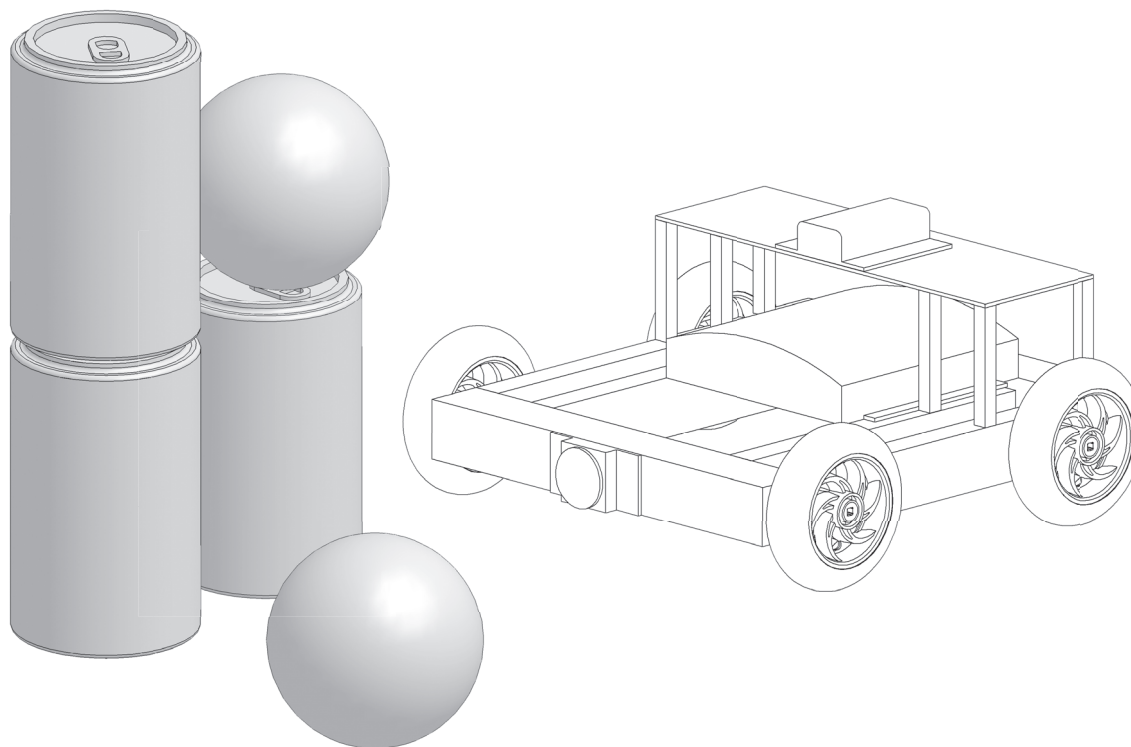
**Difficulty:** Intermediate

**Course:** Flat surface, two "stacks" of different heights, two baseballs or tennis balls (one on each stack)

**Engineering Objective:** Design a robust mechanical solution to a physical-space problem

**Instructions:** The robot must knock the balls off each of the two stacks without knocking over the cans.

**Hint:** A static structure may not be the best solution, a servomotor-guided solution would work better.



For more solo challenges, check out the Vex website at <http://www.vexrobotics.com!>

# multi-player challenges

## Challenge 3

**Name:** Team Soccer

**Difficulty:** Novice to Intermediate

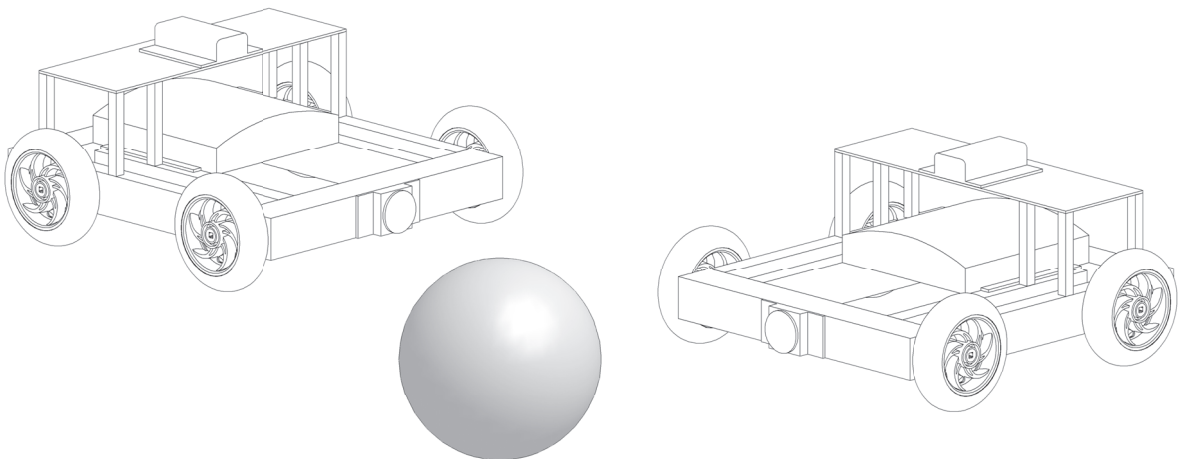
**Course:** Flat carpeted (easy) or smooth (harder) surface, 2x (two static objects) as goal markers, a baseball/tennis ball or similar-sized round object placed in the middle of the field

**Engineering Objective:** Verify robot functionality and familiarize the robot operator with controls. Build inter-team cooperation skills when there are enough robots to put more than one on a team.

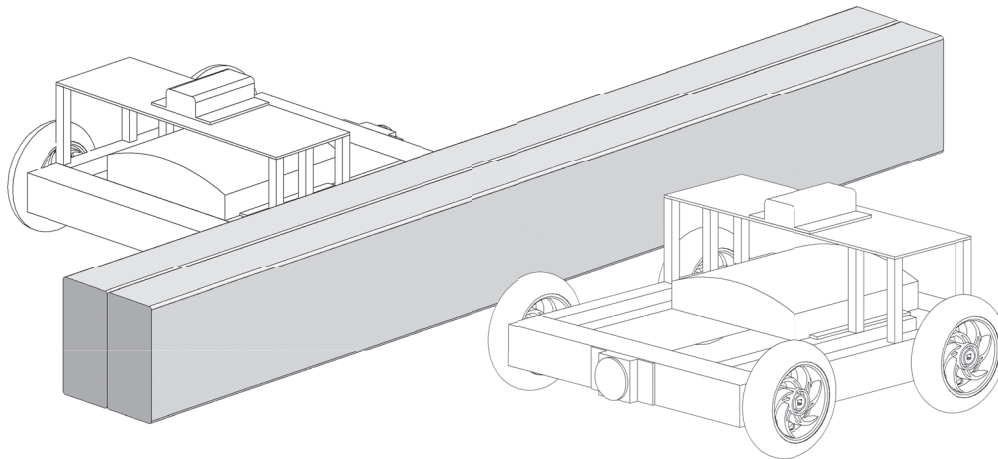
**Instructions:** Maneuver your robot to push the baseball into your opponent's "goal" (i.e. between the two markers). Defend your own goal! Robots are not allowed to sit in their goal areas in order to defend, they must stay at least 1' away from their goals at all times.

More advanced teams should attempt to engineer a better solution to ball handling than just pushing the ball around with the front chassis bumper. You may not remove or cover the robot's bumper sensors, in an attempt to make it harder for other teams to hit them.

**Hint:** Make sure the ball does not hit the bumper sensor on the front of the Squarebot, or the operator will temporarily lose control! Try to hit your opponent's sensors to disable them!



# multi-player challenges

**Challenge 4:****Name:** Demolition Derby**Difficulty:** Intermediate**Course:** Two pieces of 2x4 lumber marking the center "island" of an oval race track.**Engineering Objective:** Engineer a robust robot design for good performance characteristics**Instructions:** Be the first to complete ten laps around the center island. Bumper sensors must be mounted in the "Squarebot" positions and accessible. Collisions are frequent in this event, so be SURE your robot is built to withstand impact from all angles!**Note:** Robots built with protrusions or other elements which could be considered dangerous to people or intended to damage other robots are automatically disqualified. Safety first!

For more multi-robot challenges and information on competitions or leagues in your area, check out the Vex website at <http://www.vexrobotics.com!>