Project

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Project 1 (Units 1 – 4)

Protobot Ball

The Protobot Ball project is the collection of concepts learned and activities completed in Units 1 through 4. In this project, you play a game in which you attempt to score as many tennis balls as possible in a designated goal. There are three variations to this project challenge based on how many robots are available.

Objectives

After completing this project, you will be able to:

- Demonstrate the concepts presented in Units 1 through 4.
- Score as many tennis balls as possible to win the game.

Prerequisites

Before starting this project, you must have completed:

- Unit 1: Introduction to VEX and Robotics.
- Unit 2: Introduction to Autodesk® Inventor®.
- Unit 3: Building a Protobot.
- Unit 4: Microcontroller and Transmitter Overview.

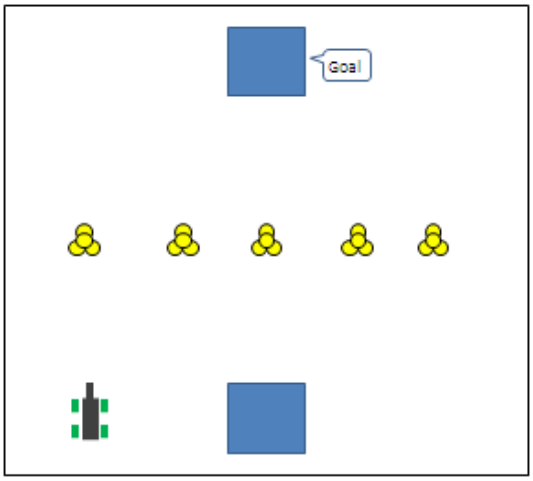
Required Supplies

The following supplies are used in this project:

Supplies
VEX Classroom Lab Kit
Notebook and pen
Work surface
Twenty tennis balls
Two containers to act as a goal, approximately 8" wide x 8" long x 8" high
12' x 12' of open floor space
Five textbooks
Measuring tape
One stopwatch
Masking or painter's tape
One to two assembled Protobots (second Protobot is optional)
Two assembled Tumblers (optional)

Protobot Ball Project

In this project, you play a game in which you attempt to score as many tennis balls as possible in a designated goal. There are three variations to this project challenge based on how many robots are available.

Single Robot Instructions	Figure 1
1. Choose two containers to act as goals. Something as simple as a cardboard box will suffice. 2. Place the goals approximately 8 feet apart, on opposite sides of your open space. 3. In between the goals, place 5 pyramids of 4 tennis balls across the floor, as shown in Figure 1. 4. Place your Protobot on the ground beside one of the goals. 5. Using your Protobot, see how many tennis balls you can place in goals within a 2-minute period. 6. Repeat the task to see if you can top your high score.	

Multiple Robot Instructions	Figure 2
Instructions for two Protobots with multiple crystal frequencies: Turn this game into a one vs.one challenge. Assign each robot a goal, and see who can score the most balls in a head to head battle with both Protobots playing at the same time. **Instructions for two Protobots and two Tumblers**: Try this variation of the game. 1. Make a line with tape across the center of the field. 2. Place 5 textbooks on the field in the locations of the ball pyramids. Make sure your textbooks are large enough so that the arm of the Protobot cannot reach the center. 3. Place a ball pyramid on each textbook. 4. In this variation, each ball scored in a goal is worth 3 points. 5. Each ball remaining on the floor is worth 1 point for red or blue if it is on the same side of the center line as their goal. 6. Robots on top of a textbook and not touching the floor at the end of the 2 minutes will also be worth 3 points each. 7. On either side of the goal, start with one Protobot and one Tumbler. See Figure 2. 8. This game is played with partners, two vs. two, with the goal of scoring as many balls on the goal opposite from your starting position. 9. Notice that the Protobot and Tumbler have to work together to make sure the Protobot has tennis balls available and to maximize the score of their alliance. 10. Also, the Tumbler can play defense on his opponent's Protobot. 11. The team that scores the most points in 2 minutes wins!