

Square - RCX

Overview

Challenge

Get an RCX car to follow a square path while driving.

Age Range

8 - 14

Topics

Rotation Sensors

Subjects

Math & Science

Programming Themes

Loops

Related Math & Science Concepts

Velocity / Speed
Angles and Geometry

Building and Programming

Materials

- RCX Car

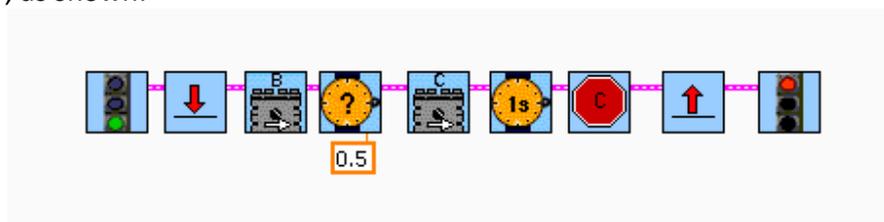
Building Instructions

1. Build an RCX car.

Programming Instructions

Using ROBOLAB, program the RCX to move forward for a certain distance, turn 90 degrees, and continue these motions until a square has been completed.

1. Start by placing a green light and a red light into a ROBOLAB patch.
2. Add a land just after the green light, and add a jump just before the red light.
3. After the land, wire in a “Motor B forward” block, followed by a “Wait for ?” with a value of 0.5 seconds wired in.
4. After the “Wait for ?” block, add a “Motor C Forward” block, followed by a “Wait for 1s” block.
5. After the “Wait for 1s” block, add a “Stop C” block. Wire everything together in order, as shown:



In Action

Place the RCX car on a flat surface, such as a table or the floor – just make sure there is enough room for the car to complete a square without crashing! Run the program, and look at the shape of the car's path, and how many times the car completes that path. The car should complete one full square using the included instructions and sample program, "ROBOLAB_Square.vi".

Resources/Help

Related Activities

- Proportional Control - RCX
- Rotation Sensor Challenge
- Going the Distance – RCX
- Poor Man's Rotation Sensor

Building & Programming References

- The RCX
- ROBOLAB_Square.vi

Knowledge Base

- I tried to use jumps and lands but nothing happened.

Classroom Management

Procedure

1. Set up a testing area for the cars, making sure there is as much open space as is practical so that the cars can complete their paths.
2. Begin the lesson with a description of how a square is formed geometrically, focusing especially on right angles. Other shapes' angles can be explored as well.
3. Each RCX brick should be programmed in ROBOLAB, either by the students if time permits or before the activity starts.
4. Each student or group of students should have an RCX car. They can build this themselves if time permits, or the cars can be built beforehand.
5. Have each student or group of students test their robot's ability to complete a square and end up where they started. If possible, allow them to make changes to the program's parameters – especially important items to change are the "Wait for time" values, in seconds. These levels may cause the car to respond differently on different surfaces such as wood, tile, or carpet, and may need to be adjusted to properly complete a square.
6. Collaborate as a class and compile a list of changes that might be helpful to the program, or what could be done to the robot itself to make it more able to complete a square and return to where it started.
7. Try out some ideas if the class is motivated and able to, or wrap up by talking about the activity and additional uses of robots returning to where they started, in manufacturing of cars or machines for example.