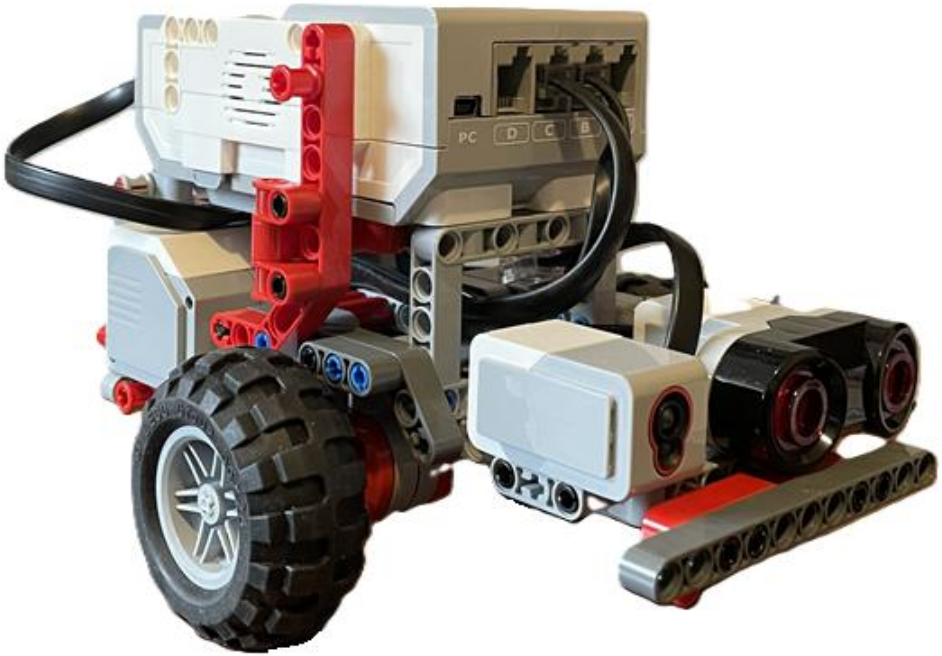
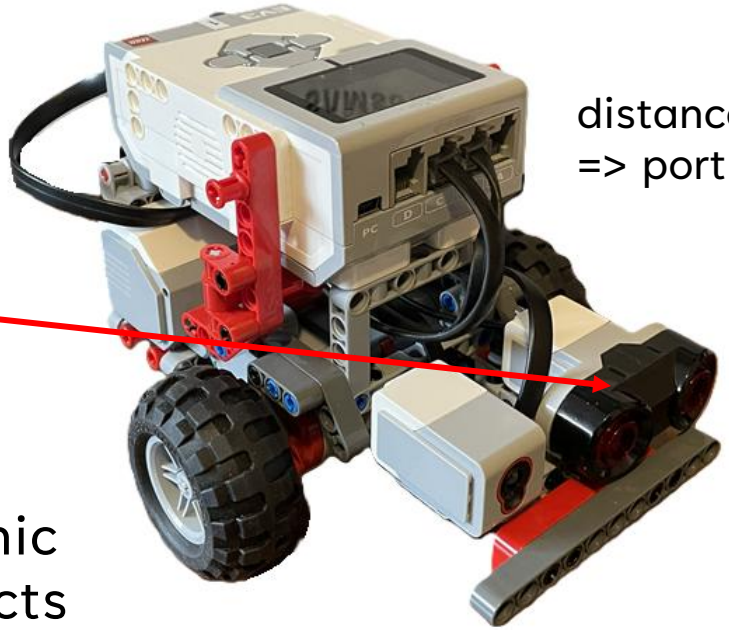
DISTANCE SENSOR



SD

DISTANCE SENSOR

This is the LEGO EV3 distance sensor.

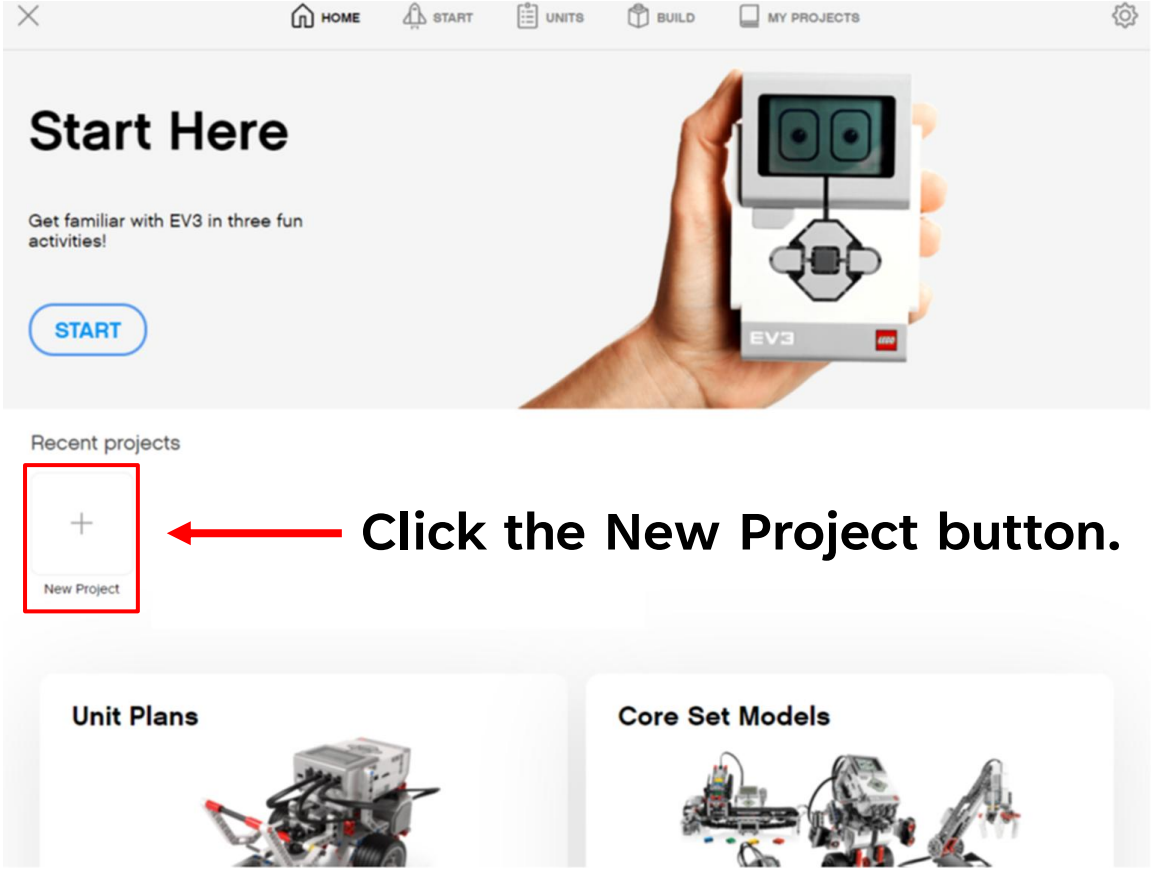


distance sensor
=> port 4

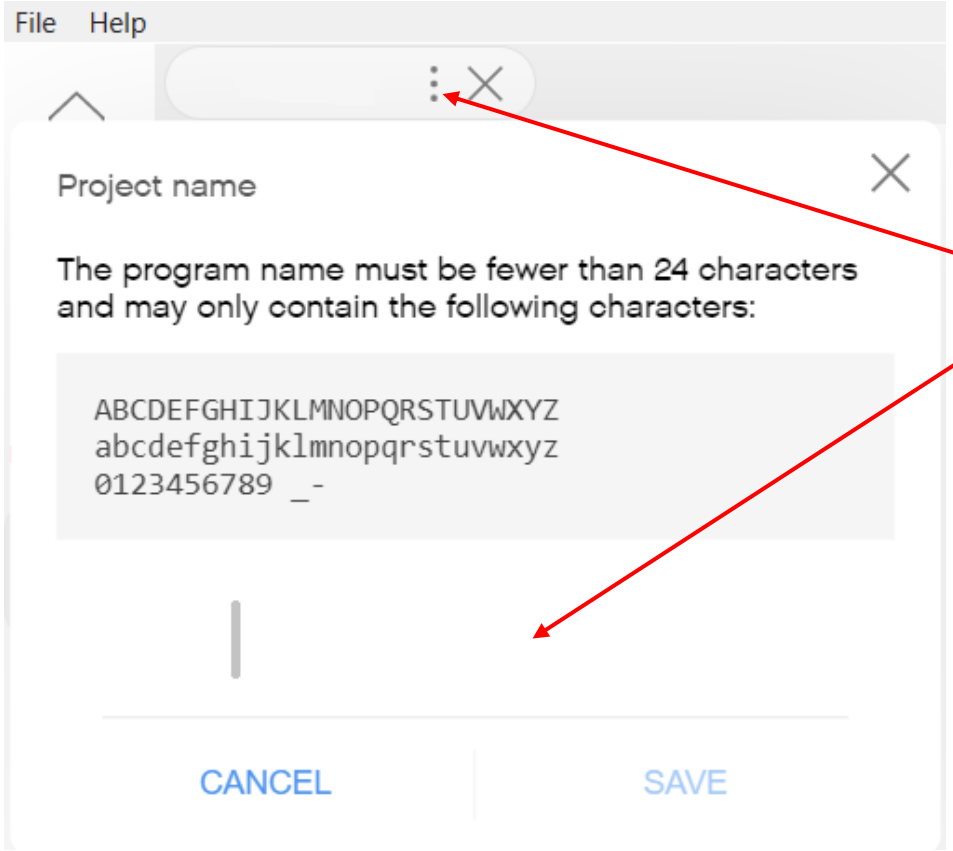
The distance sensor uses ultrasonic sound frequencies to detect objects and determine their distance in the same way that some animals use echo-location.

SD

DISTANCE SENSOR



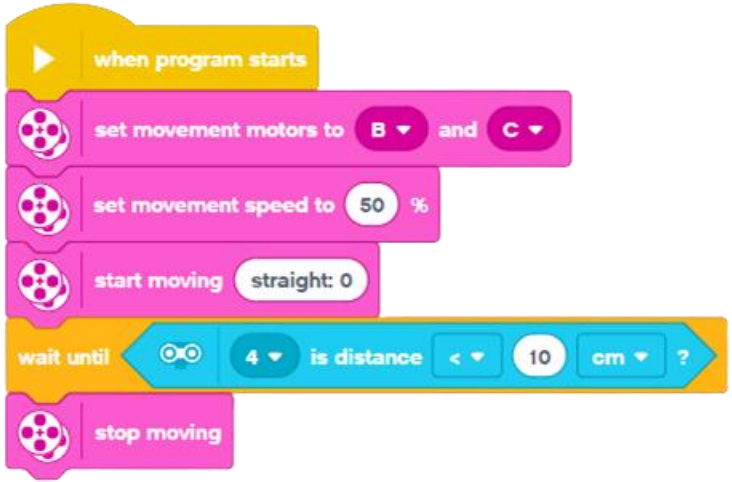
DISTANCE SENSOR



Name your program.
Click the three dots.
In the project name window type:
Distance-_____
(your names).

DISTANCE SENSOR – GO THERE

Create a code sequence to have the Robocar move toward a large wooden block and use the distance sensor to stop 10 cm from the block.



Download the program to the EV3.

Run the program from the EV3.

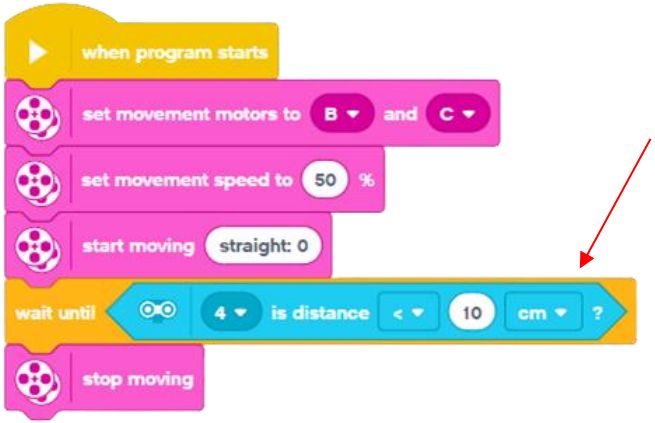
Observe how the Robocar moves.

SD

DISTANCE SENSOR – CODE EXPLAINED

The “wait until” command is a conditional statement that monitors what the distance sensor is doing. The “wait until” code block allows the commands prior to it to perform until the distance sensor senses an object a specified distance in front of it.
Only then will the coding sequence continue.

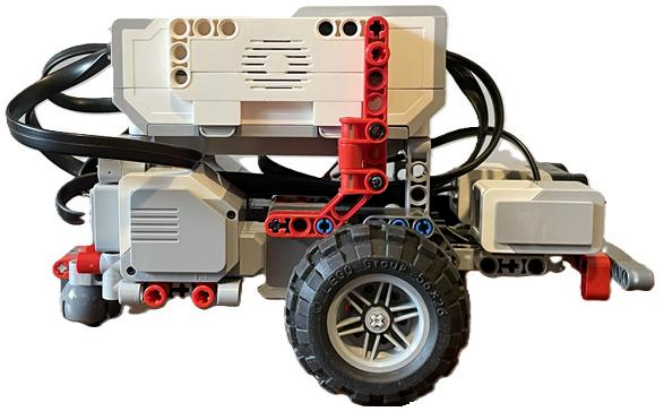
This means move – the duration is not defined. The duration is unlimited: it could be any value value above zero to infinity.



The “wait until” condition is equivalent to saying “always check to see if the distance sensor senses an object closer than 10 cm to it, if true then run the next command”.

DISTANCE SENSOR – SENSE AND TURN

Create a code sequence to have the Robocar move toward an object and use the distance sensor to stop 5 cm from the object. After it has stopped have the Robocar move backward a short distance and complete a 180º turn.



Download the program to the EV3.

Run the program from the EV3.

Observe how the Robocar moves.

SD

DISTANCE SENSOR – SENSE AND TURN

Think about it, discuss your ideas as a group, and then write down your answer on a sheet of paper.

1) How does the distance sensor function?

2) What is the purpose of backing up and why keep that distance short?

Show Mr. Desmond your coding and the Robocar in action using the distance sensor to stop the Robocar within a certain distance of an object.

Be prepared to explain what is happening with the Robocar and the distance sensor and why.

SD

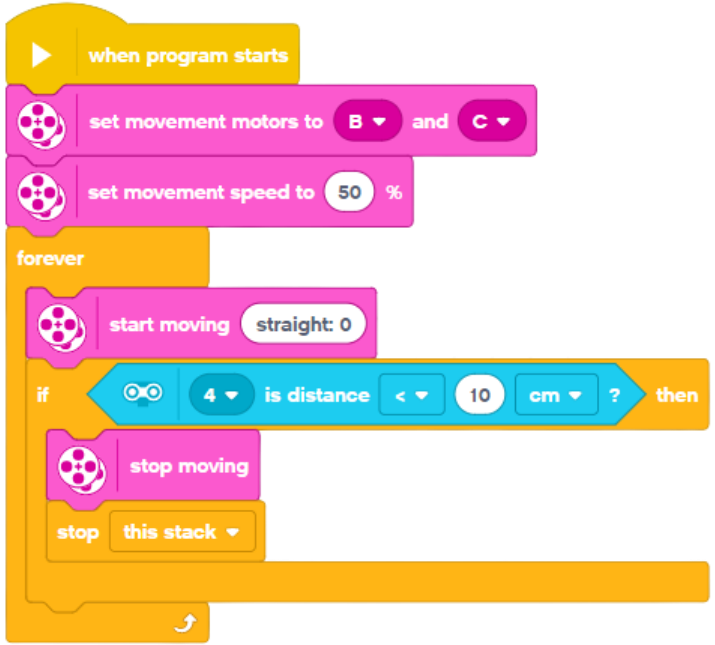
DISTANCE SENSOR – GO THERE AGAIN

Create a code sequence to have the Robocar move toward a large wood block and use the distance sensor to stop 10 cm from the object.

Download the program to the EV3.

Run the program from the EV3.

Observe how the Robocar moves.



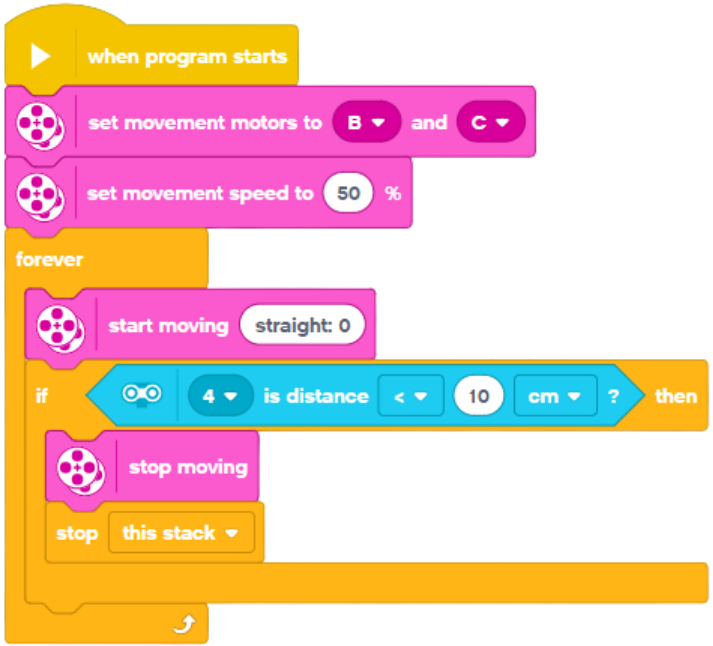
DISTANCE SENSOR – CODE EXPLAINED

"If then" is a conditional statement. Without thinking about it you use it all the time.

If my hands are dirty, then I will wash them.

If I am cold, then I will put on a coat.

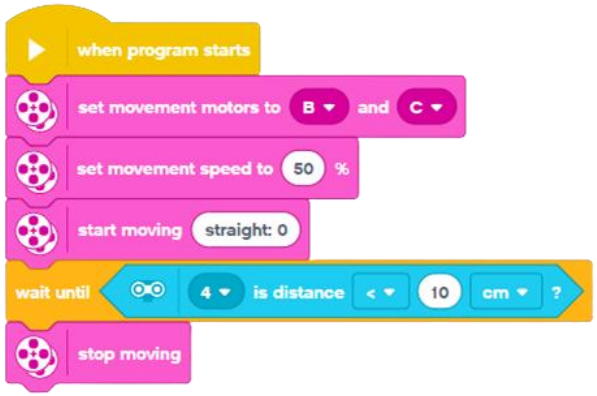
In this code sequence if the distance sensor senses an object closer than 10 cm then the motors will stop moving.

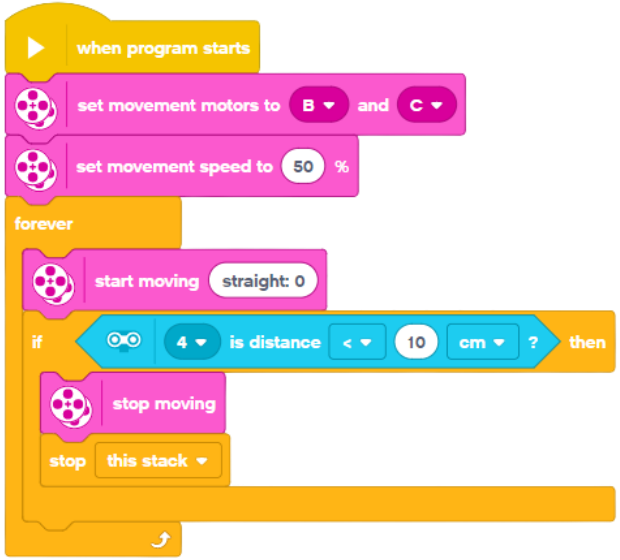


DISTANCE SENSOR – GO THERE AGAIN

Think about it, discuss your ideas as a group, and then write down your answers on a sheet of paper.

1) How are these two code sequences the same?
2) How are these two code sequences different?





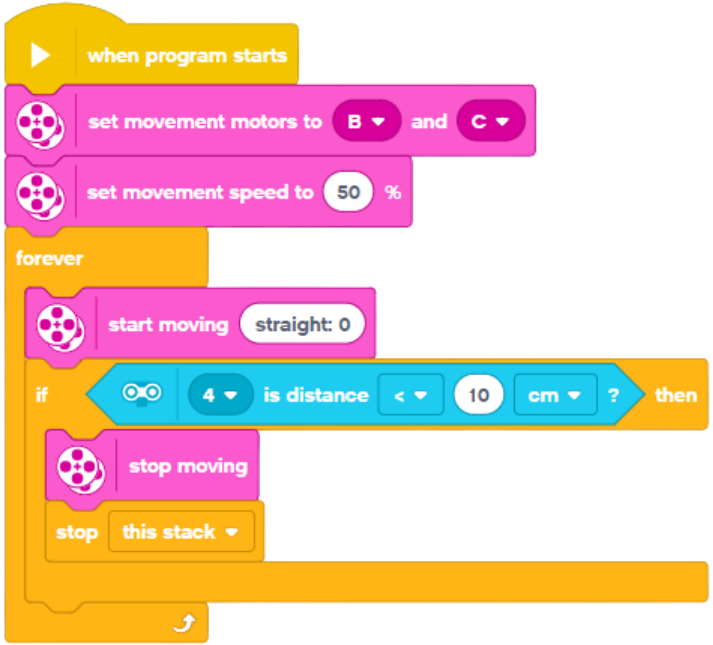
SD

DISTANCE SENSOR – GO THERE AGAIN

Think about it, discuss your ideas as a group, and then write down your answers on a sheet of paper.

3) What is the purpose of the “forever” block?

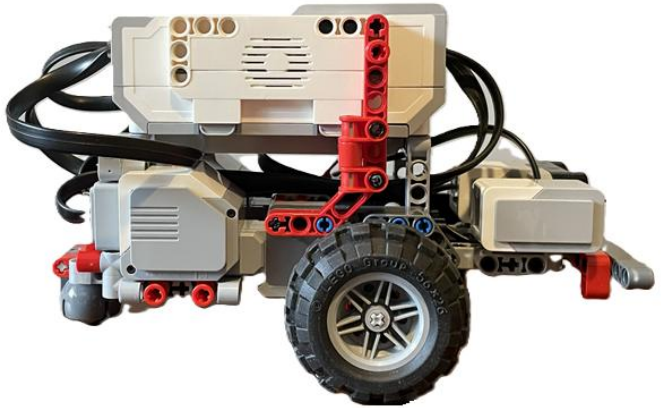
4) What is the purpose of the “stop this stack” block?



SD

DISTANCE SENSOR – GO THERE AND SPIN

Create a code sequence using the “if then” condition to have the Robocar move toward an object and use the distance sensor to stop 5 cm from the object. After the stop have the Robocar move backward and then complete a fun robot spin maneuver.



Download the program to the EV3.

Run the program from the EV3.

Observe how the Robocar moves.

SD

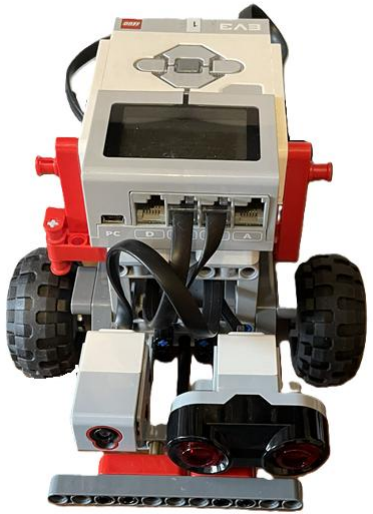
DISTANCE SENSOR – GO THERE AND SPIN

Think about it, discuss your ideas as a group, and then write down your answer on a sheet of paper.

1) Why are conditional statements like “wait until” and “if then” paired with sensors?

Show Mr. Desmond your Go There and Spin coding and the Robocar in action.

Be prepared to explain what is happening with the Robocar and why.



DISTANCE SENSOR – CONSIDER THIS

A sensor is designed to provide input information to the robotic system. As a form of artificial intelligence (AI) the robot will respond to the environmental circumstances noted by the sensor and take specific actions in response.

The coding provides the robotic system the ability to perform this feat of machine intelligence. Conditional statements are essentially true or false questions that provide the logic that allows the robot to read the sensor input and then make a decision (according to the code) based on what the information was.

DISTANCE SENSOR – PING-PONG CHALLENGE

Create a code sequence to make the Robocar go back and forth between two wooden blocks four times using input from the distance sensor to determine when to turn around.

Pair the distance sensor with either the “wait until” condition or the “if then” condition in your coding.

Keep the wood blocks about 50 cm apart.

Precision of movement is required to keep the Robocar as straight as possible and not veer in different directions after each turn.

Show Mr. Desmond your “ping-pong” coding and the Robocar in action. Be prepared to explain what is happening and why.

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DISTANCE SENSOR – PING-PONG COUNT CHALLENGE

Modify your code from the Ping-Pong Challenge.

Create a variable called count.

Have the Robocar count each time the distance sensor sense one of the blocks.

Include the count as part of the conditional coding as the Robocar “ping-pongs” back and forth between the two wooden blocks.

Have the Robocar continue to move between the two wooden blocks until the count has reached nine.

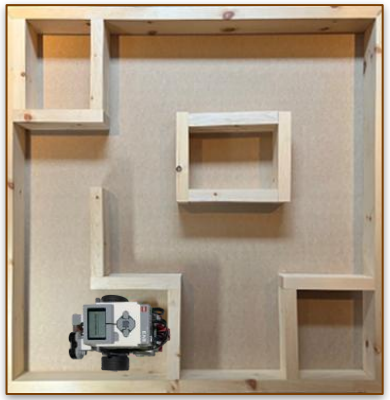
Show Mr. Desmond your code and the Robocar in action. Be prepared to explain what is happening and why.

SD

DISTANCE SENSOR – AMAZING CHALLENGE

Create a maze of your own design using blocks or other solid objects. [Do not make it overly complex.] Create the code that will allow the Robocar to independently navigate the maze using the distance sensor to determine when to stop moving and turn.

You are expected to demonstrate your success to Mr. Desmond. Be prepared to show both the Robocar in action and your code.



*Placement of maze blocks must allow ample space for the Robocar to move forward and backward as well as to turn.

SD