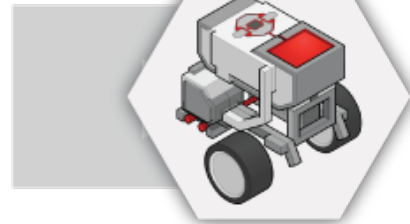# Introduction to Programming
# LEGO® MINDSTORM® EV3

CHAPTER CHALLENGE

CHAPTER 10: Pipeline Explorer Challenge

In this Challenge, you will program your EV3 robot to move from its starting area into a cardboard box representing a pipe, where it will encounter a black line on the ground, representing a damaged area. The robot must calculate, store, and eventually display two pieces of data:

- Start of the damaged area
- The length of the damage

Rules and Procedures:
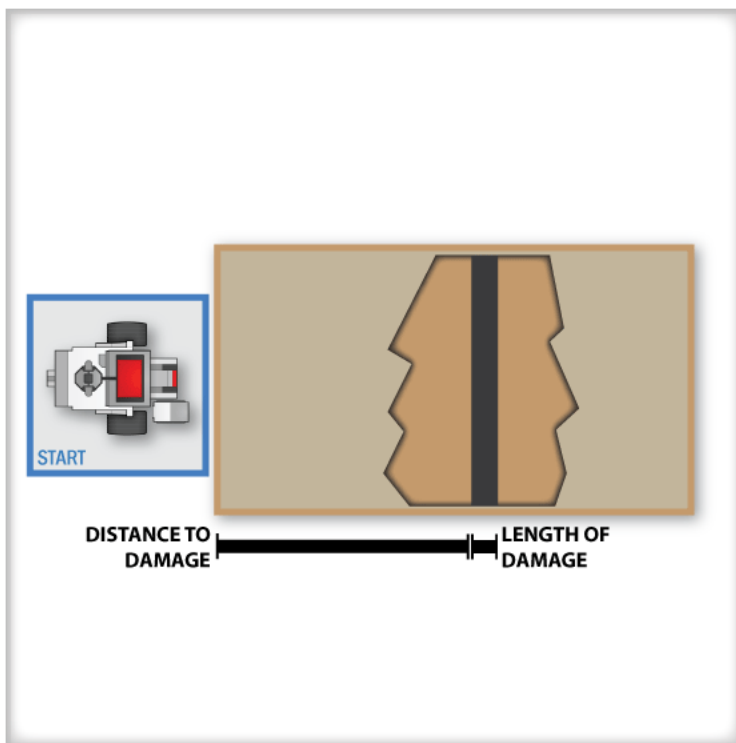
- Use a large cardboard box (or series of smaller boxes)
- Place multiple pieces of electrical tape inside the box. Make sure it is wide enough for robot to detect.
- The robot must go into the pipe, retrieve the necessary information, return to the pipe opening, and display both values on screen together.
- The displayed data must be in centimeters.
- The displayed data must remain on screen long enough to be read.

Hints:

- The Ultrasonic Sensor can sometimes be confused by the side walls and echoes within the pipe, so it may not be the most reliable sensor for this task.
- Find out how far your robot goes in each rotation, and use that value to convert Motor Rotations or Degrees to centimeters.
- If you are worried about the displayed values disappearing too quickly, have the robot wait for a Touch Sensor or EV3 Button press after displaying the values.
- Remember to break down big problems into little ones! Get the program working for one piece of data before trying to get the second one working.
- If you need to reset the Motor Rotation Sensor, use the Motor Rotations Block with its Mode set to Reset. Its value will reset to 0 and begin counting again.