

PRACTICE 1: THE CONFINED AREA



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1. Description

The purpose of this document is to assist users in programming the Moway and perform the various practices required to program it.

In this first practice denominated “Confined Area” the Moway must remain within an enclosed area outlined by lines drawn on the ground. We will learn how to use two very simple types of commands, required to control the robot. The first one will detect the line that marks the limits of the confined area and the second will control the movements of the robot.

2. Strategy

The first step in preparing a program is to plan carefully how it will be executed. In this practice the most important task to be executed by the robot is to check the line sensors. These must be checked continuously while it is moving forward. When the sensors indicate that one of the limits of the enclosed has been detected, the robot must turn on itself in order to not go beyond the boundary limits.

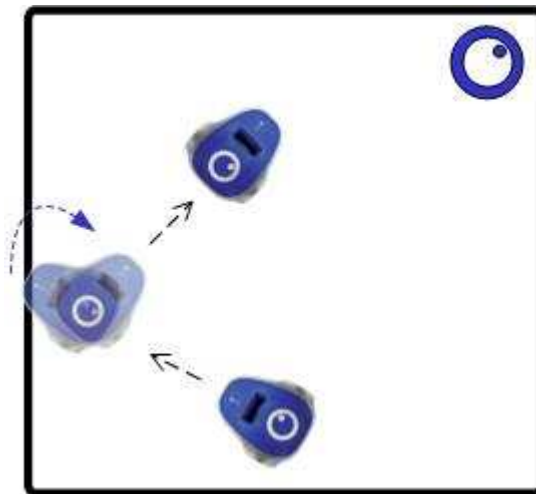


Image 1. The Confined Area

There are three key elements in the program:

1. Verification of the line sensors
2. Straight movement
3. Turning when it detects the line

For each one of these tasks there is a function in the Moway libraries. For this purpose all we need to do is call up these functions and make decisions depending on the feedback received.

3. Solution

The complete code of the practice may be downloaded from Moway's Website: the assembly, the CCS and the MowayGUI versions. The image below displays the program's flow diagram.

1. First, we must configure the Moway's micro-controller to enable the use of the sensors and the drive unit.
2. After this the infinite continuous movement starts. Once the straight movement command is given, we do not have to worry about the movement of the robot until it finds a line in its path.
3. From now on the robot will be continuously checking the line sensors.
4. If any line is detected, we will send a command to rotate a certain number of degrees. While the robot turns, the program is waiting for the end of the command by verifying the MOT_END input pin.
5. Once the command ends (MOT_END='1') we send an infinite straight movement command and continue monitoring the sensors.

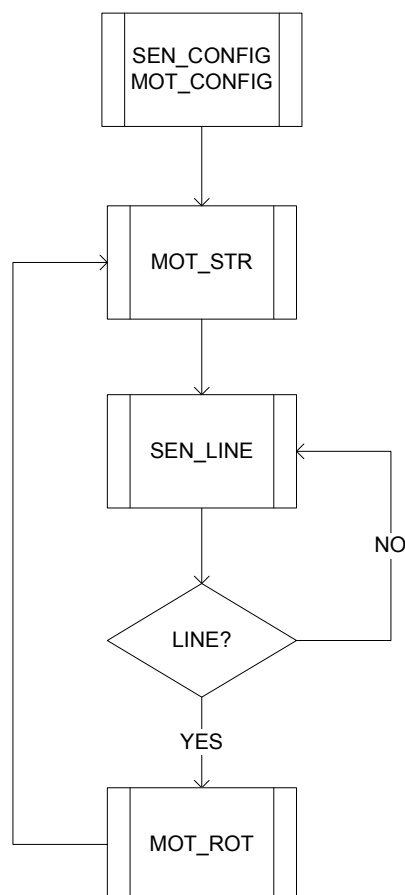


Image 2. Flow Diagram

The image that appears next will show the solution in the MowayGUI program, with which with very few blocks and without any notion of programming we can execute applications in Moway.

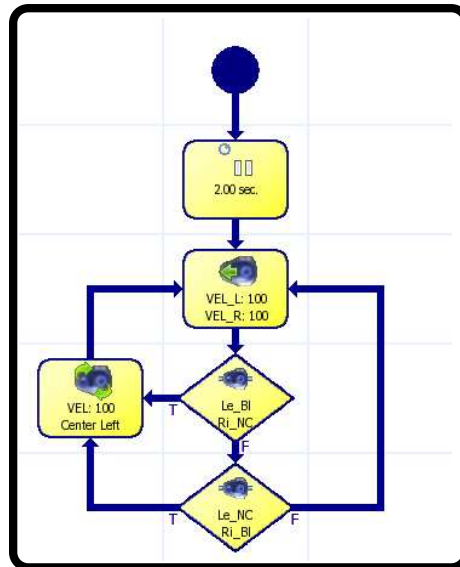


Image 3. MowayGUI Diagram

4. Improvement

From this project we can introduce improvements to become more familiar with the programming of the robot:

- Change the rotating angle.
- Change the speed of movements.
- Light the luminous indicators when the line is found.
- Change the straight movement to a zigzag movement.
- Replace the lines by walls and use obstacle sensors.
- Send messages to the PC via RF when the line is detected.

5. Documentation

All the necessary documentation is available in Moway's website www.moway-robot.com.

Moway Manual

Moway User Manual.pdf

Source Code

mOway_enclosed_ASM

mOway_enclosed_CCS

mOway_enclosed_GUI

User Manual for Module RF BZI-RF2GH4

Manual RF.pdf