

TUTORIAL 4: MOVING IN CIRCLES

Description: We humans have two legs, and we can move in any direction we want. Robots can be set up with two wheels and we can instruct them which direction to go. How fast, where to stop, how to turn, it is up to you.

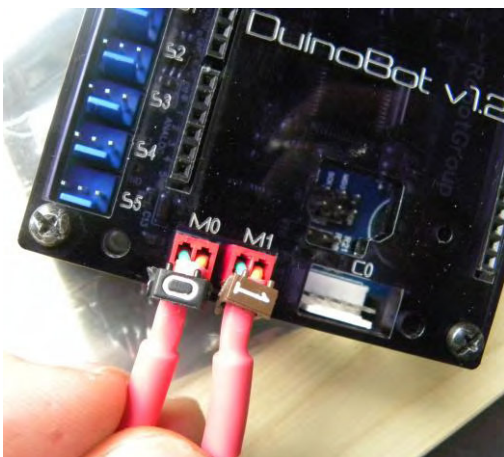
Materials needed:

- USB Cable
- Duinobot v1.1 or higher (or any board, just check what kind of batteries and motor it needs)
- Computer with miniBloq (v0.81 or higher)
- 3 x AA batteries (rechargeable recommended, protect the environment!)
- 2 x Motor 12VDC Multiplo compatible
- 2 x Cable (red) Multiplo compatible



STEP 1: Connect the batteries, as the motor needs more power than the provided by your USB. Remember to use 3xAA alkaline or rechargeable Ni-MH batteries. Switch it ON after connecting the batteries.

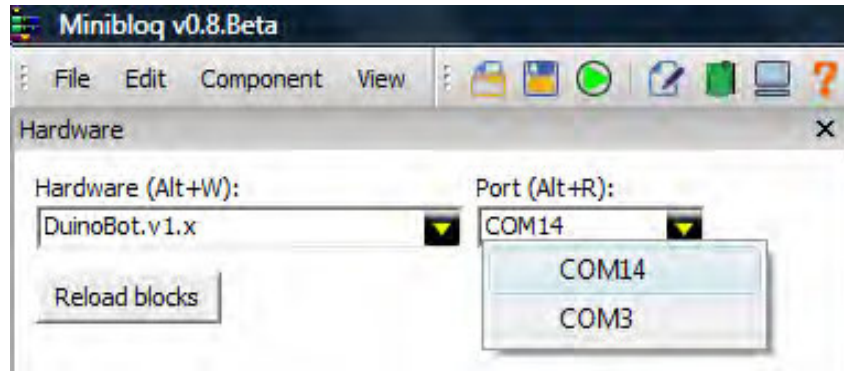
STEP 2: Connect the red cable into the motor output. Use the M0 input for the motor at the left and M1 for the motor at the right. If you mess up the connections, the robot will go backwards. So don't worry and learn by doing.



Connect the other side of the cables to the motors.

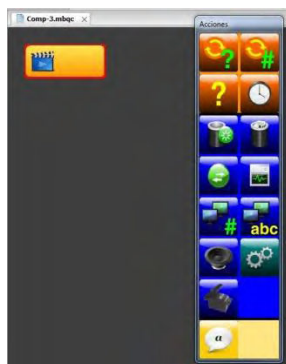


STEP 3: After connecting the board with the mini-USB cable, switch it ON. Make sure that the Hardware has your correct model of board. You should select the port with which it communicates and the type of board in the “hardware” miniBlok section (top left side of the screen).

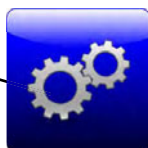


STEP 4: With the board connected and miniBlok properly configured, create a new project, selecting from the “File” menu, the option “Create”.

On your empty and new sketch, select the gears icon, which symbolizes setting the motor state.



Select this icon

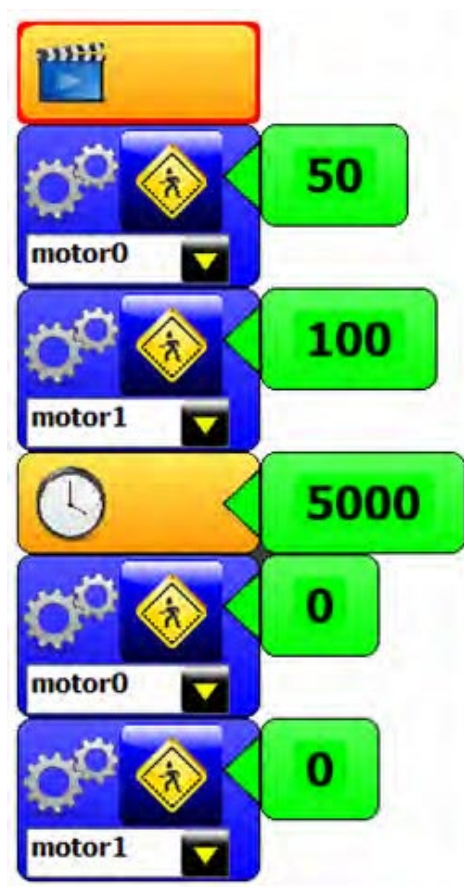
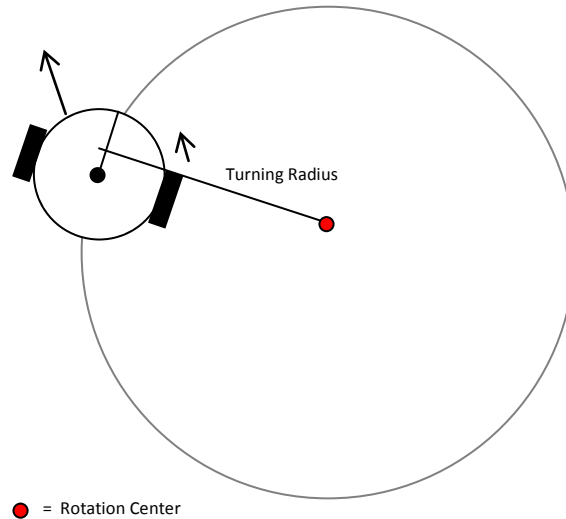


You will see how both motors go at the same speed. Let's put wheels and make the robot go somewhere!

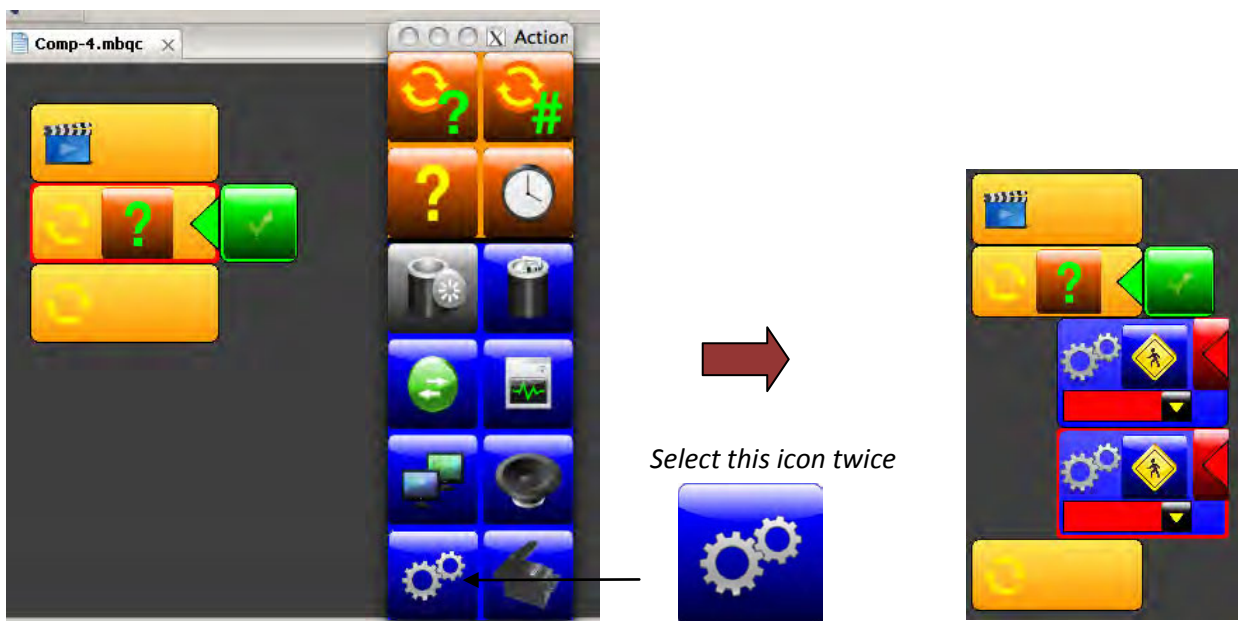
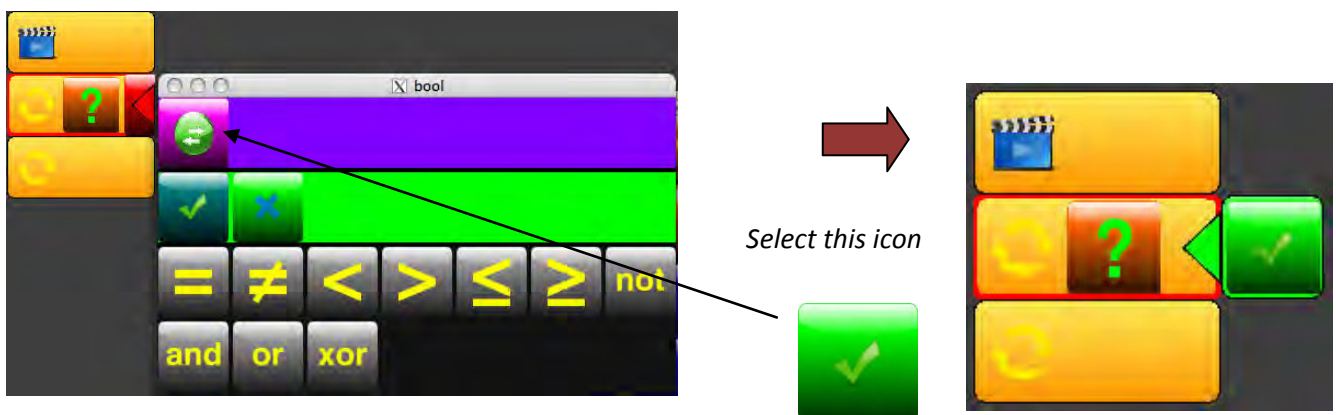
You can use any of the detailed assembly guides shipped with your Multiplo kit. You can tape both motors to a piece of cardboard or you can “laser cut” one of the blueprints for motor chassis. It is your call which one to use; this tutorial here shows you how to move the robot in the direction you want.

The robot will start to move according to how you did set up the motors.

STEP 5: After seeing how the robot moves ahead, you can go ahead and program to go on circles. You need to use the delay and additional blocks from previous tutorials in order to make it stop after some time.



STEP 6: You can give the instruction of doing a pattern and then repeating it for endless time.



Now you can practice what we have been using in the previous steps. You can try out to run the motor for some seconds, make it stop and wait. This way it will repeat the cycle endlessly. Also you can try to go ahead and then turn left. It will make squares instead of circles!

Give it a try to the following blocks to see the result.



Software Engineers call this thing of “repeating the following orders forever” in a fancy way. What they say is “while (true)” robot should do the following. This and other commands are called “Control Structures”. These are the basics for feedback loops. Eventually, the way that Artificial Intelligence works.

We add this with the double arrow and using as an input the “TRUE” value. Instead of going only forward, the result that our robot will perform is a clumsy go and coming back. Use your imagination to do more interesting things. Maybe you want to make the robot move ahead some time, turn left, go ahead, turn around and then come back to the initial point. Something similar to what the moon patrols do, just that slightly simpler. And on earth...