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Warm Up activities for programming the DIY robotic car

Introducing the 5 Big Ideas in Artificial Intelligence using Internet of Things in STEM education

T2.4 IoT Projects Design & Resources Development

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AI4STEM IoT Projects Design & Resources Development
Project: The DIY robotic car
Warm Up activities for programming the DIY robotic car

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1.Programming the DIY robotic car

1.1 Introduction

This document contains some warm up activities that you can do with your students in order to familiarize them with the Makecode programming environment as well as with the ways that the electronic components can be programmed, to create a functionable robotic car. The activities are indicative. Encourage your students to experiment with different script and programming scenarios.

1.2 The Kitronik Compact motor driver extension

Open the Makecode environment (https://makecode.microbit.org/) and create a New Project. To program the Kitronik Compact Motor Driver you need to add the corresponding extension. Therefore, click on the Extensions (+) menu. On the search bar (Figure 1, **1**) type "Compact motor driver" and press enter. The corresponding extension will appear (**2**). Click on it to add the corresponding programming blocks to the project.

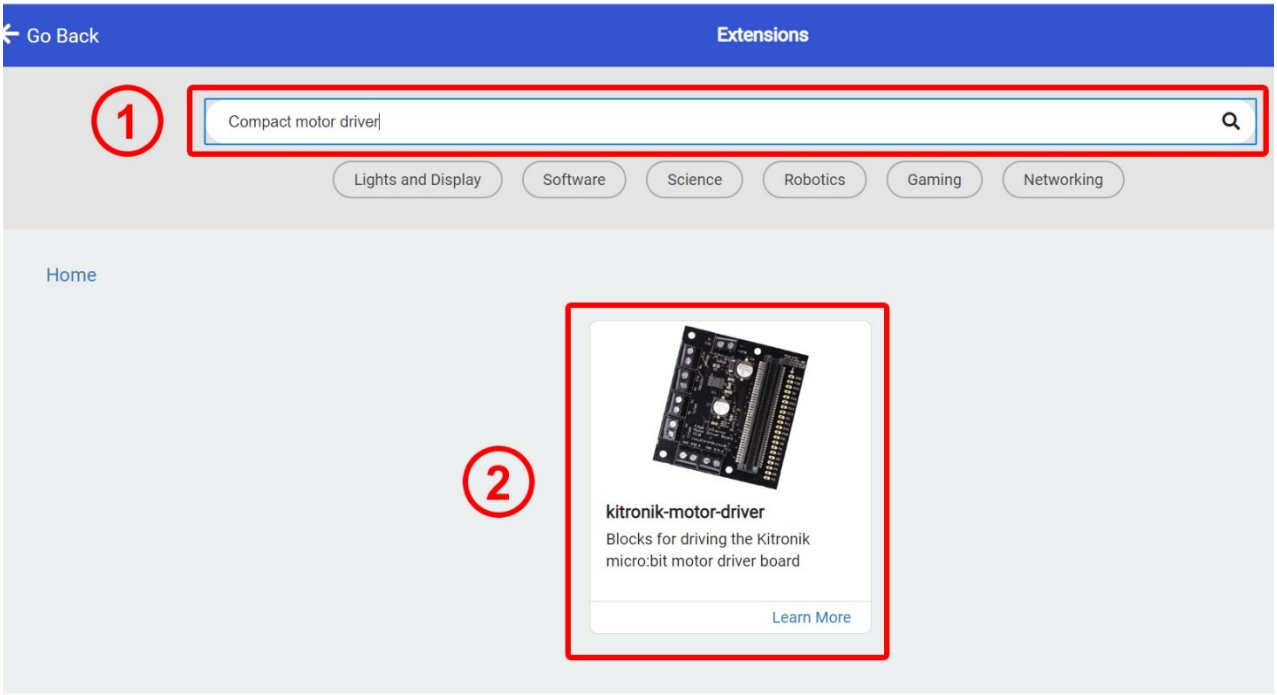

Figure 1: Finding the extension for the Kitronik Compact motor driver

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Click on the Motor Driver menu to have a look to the available block of commands (Figure 2).

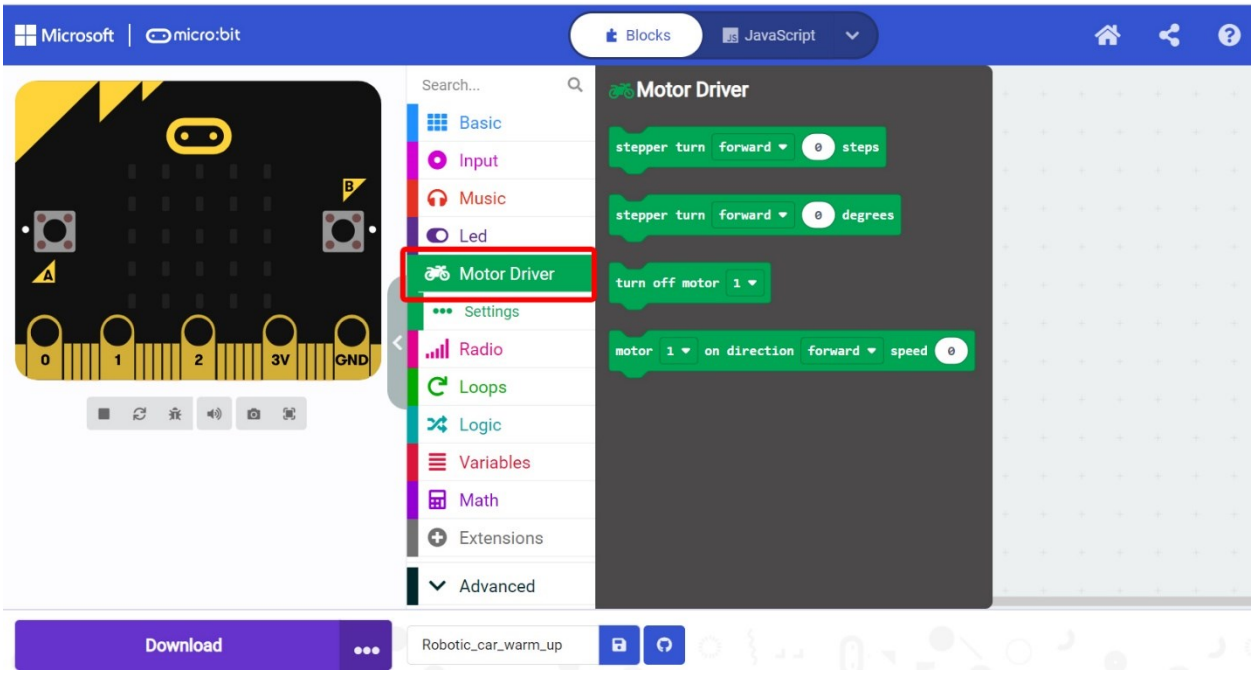

Figure 2: Click on the Motor Driver to see the available block of commands

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1.3 Activity 1:

In the first activity you will learn how to create a loop that will instruct the mobile car to move forward for 2 seconds and then move backwards.

For this activity you will need the "**motor _ on direction _____speed _**" command.

Inside the forever block snap this block twice. In the first block select **motor 1,** and in the second **motor 2**. Set in both blocks the direction to "**forward**". Then set the speed to 50. After these two commands, add a **pause** command and change the time to 2000 (2s). Then, add to more "**motor _ on direction _____speed _**" commands. Choose **motor 1** to the first block and **motor 2** to the second, and set the speed to 50, but this time set the direction to "**reverse**". Finally add one more **pause** command. Your script should look like the one depicted in Figure 3. Download this script to your robotic car to observe how these blocks are executed.

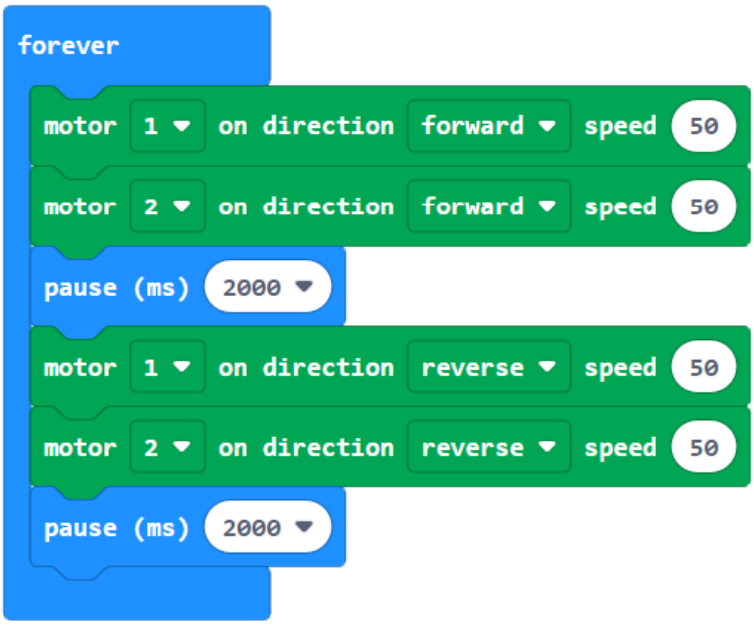

Figure 3: The script for the 1st Activity

Note: Through this activity you can also check whether the wires of the one motor should be switched or not.

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1.4 Activity 2

In this activity you will create a script that will instruct the robotic car to move forward for 2 seconds, turn left for 1 second and move forward for 2 more seconds. To make the robotic car turn left or right you just need to instruct one DC motor to spin forward, while instructing the other to spin backwards. Therefore, the script should look like the one in Figure 4.

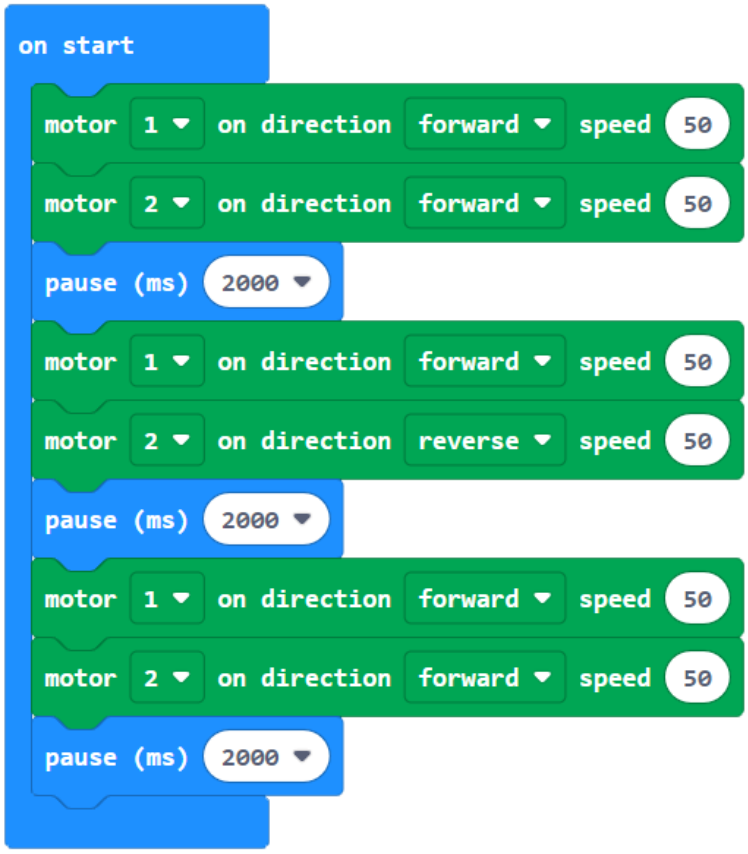

Figure 4: The script for the 2nd Activity

Tip: you can encourage your students to use the forever loop instead and see how the robotic car performs. Ask them if the robotic car is shaping a particular shape and encourage them to think how they can make the robotic car to shape a square.

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