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CONSEJERÍA DE EDUCACIÓN
IES La Cala de Mijas
Dpt. Tecnología e Informática

WORKING ON ERASMUS+
UNIVERSE AN ODYSSEY OF SPACE AND TIME
Guide to start programming with EV3

Outline

The purpose of this document is to provide some keys to start programming a LEGO Mindstorm brick with EV3 software. This is therefore not an exhaustive list of instructions but summarizes the main functions that exist and gives some examples of use.
More information is available at the following addresses:

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c/ Arbolete nº 9, 29649 La Cala de Mijas (Málaga)
Tf.: 951 269 538 - Fax: 951 269 541
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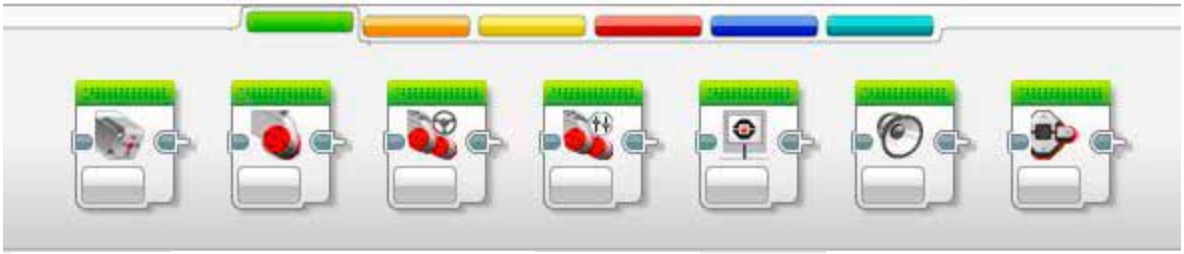
Action blocks



Medium Motor | Large Motor | Move Steering | Move Tank | Display | Sound | Brick Status Light | Motor

What do they do?

The action blocks control:

- motor rotations
- image, sound and light on the brick

Motor rotations

Each "action" block contains subdivisions each containing different options. Thus for the "**Medium Motor**" block, it is possible to choose the number of rotations to be made or the power of the motor.

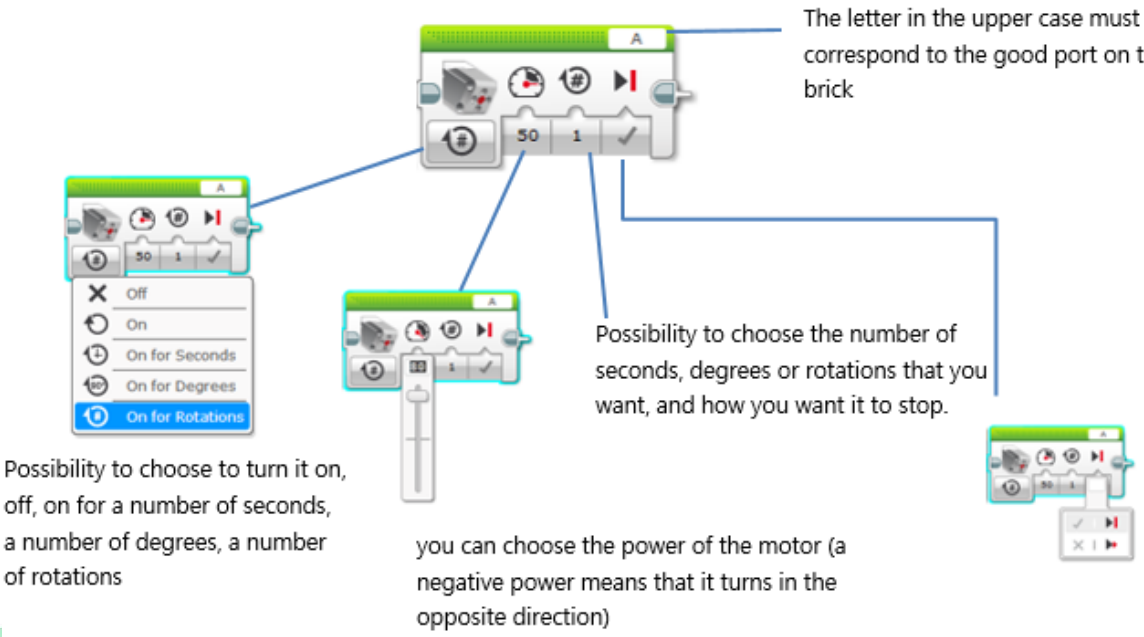


Figure 1: Medium Motor block

Image, sound and light on the brick

You can choose to display an image on the Lego brick, or to make a sound, or to use the lights on the buttons brick

Example with the **Display** command

You can choose to display a text, shapes, or images on the brick window, or reset screen.

Figure 2: Display block

If you have chosen an image, click on the white case to see all the possible images.

Make your tests

Try by yourself to modify some parameters and see what happens.

Flow blocks

Start | Wait | Loop | Switch | Loop interrupt

What do

The flow blocks control :

- The flow of the programme

The "Wait"

The instruction "Wait" allows you to put the programme on hold for a number of seconds, or until a particular condition is verified.

In the example below, the programme will be on hold until the distance measured by the distance sensor is smaller than 50 cm.

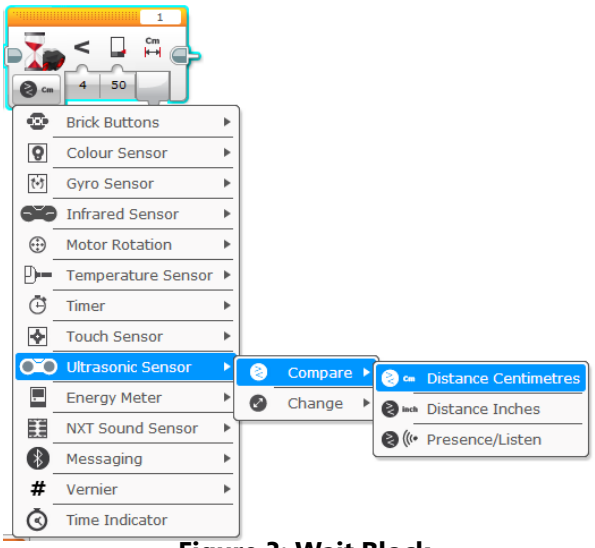


Figure 3: Wait Block

The "Loop"

The Loop allows to repeat an action: indefinitely, or a certain number of times, or until a particular condition is verified

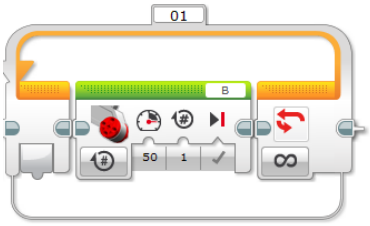


Figure 4: An action is repeated indefinitely

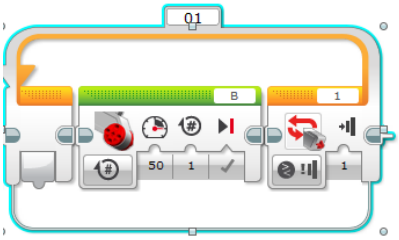


Figure 5: An action is repeated until the touch sensor is in state 1

You can choose a condition to go out of the loop. In the example here above, the loop is going on until the touch sensor is in state 1. When it is in state 1, the loop stops

The name of the loop can be changed.

The "Switch"

The Switch allows you to command an action if a condition is true, and another action if the condition is false.

In the example below, if the touch sensor is in state 1, the brick will display a love image, in other cases, the brick will play a sound.

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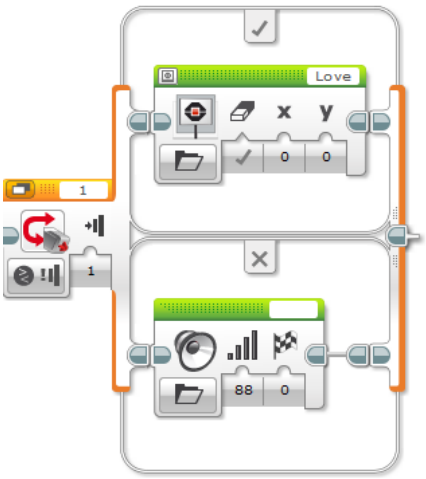
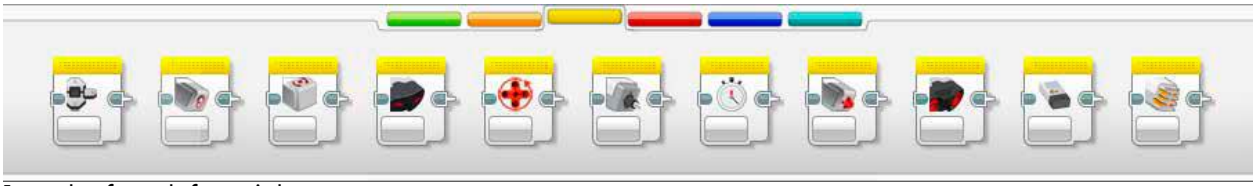


Figure 6: Example of Switch

Sensor blocks



In order from left to right:
Brick Buttons, Colour Sensor, Gyro Sensor, Infrared Sensor, Motor Rotation, Temperature Sensor
Timer, Touch Sensor, Ultrasonic Sensor, Energy Meter, NXT Sound Sensor

What do they do?

The Sensor blocks allow the programme to:

- Read the inputs from the sensors

Example of use

Here below is an example where the Touch Sensor block is used as an input on a Switch
The program checks if the touch sensor is in state 1. The result is then loaded on the switch. If the state is 1 (i.e. True), an action is executed. If the value is not 1 (i.e. False), another action is executed.

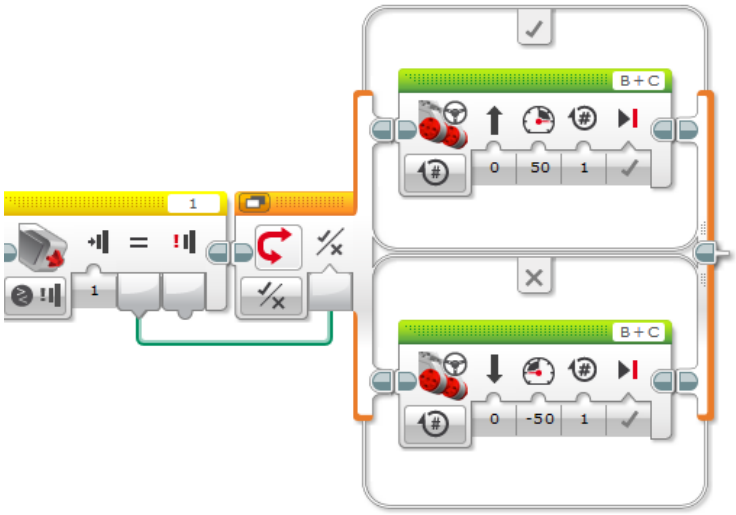
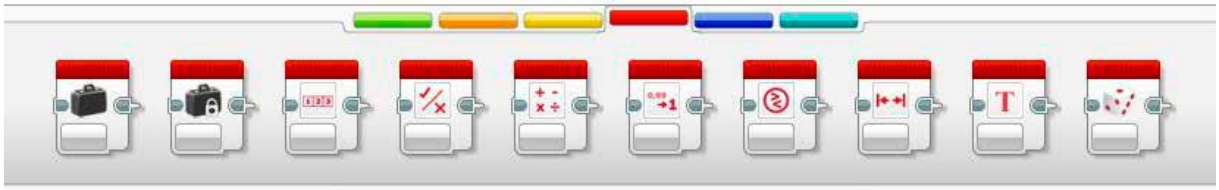


Figure 7: Example of Switch with the touch sensor as input

Data blocks



In order from left to right:
Variable, Constant, Array operations, Logic operations, Math, Round, Compare, Range, Text, Random

What do they do?

The Data blocks allow you to:

- Write and read variables
- Compare values

Example of use

This programme executes two instructions simultaneously.

- It reads continuously the value of the IR sensor and puts it in a variable (" write" mode).
- It reads continuously the value of the variable ("read" mode) and compare it with the number 4. If the value in the variable is bigger than 4, the "True" part of the switch is executed. If not, the "False" part of the switch is executed

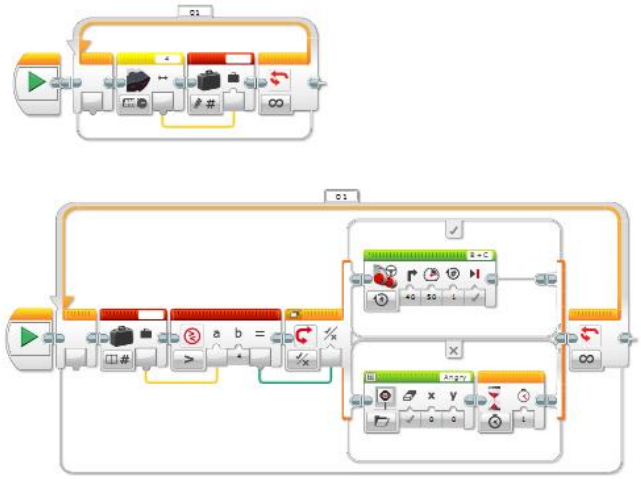
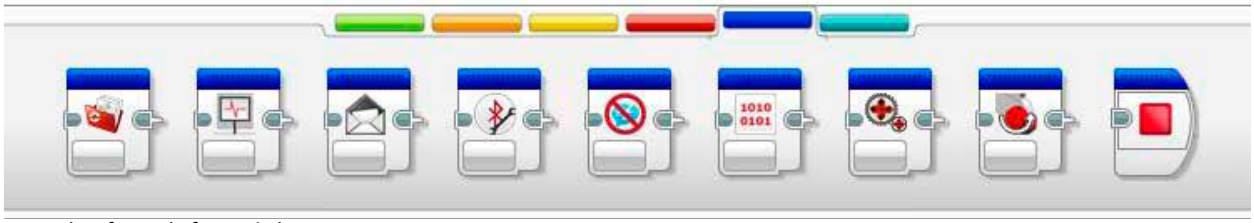


Figure 7: Example of use of the variable

Advanced blocks



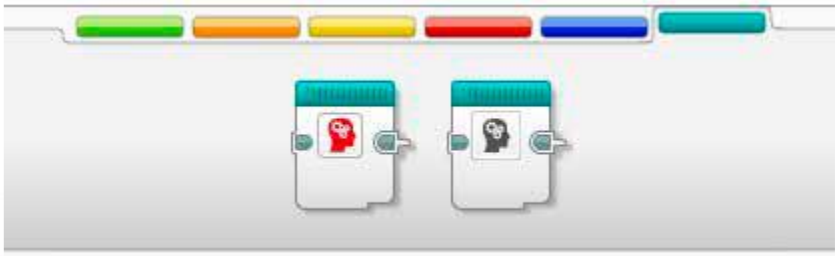
In order from left to right:
File Access, Data Logging, Messaging, Bluetooth Connection, Keep Awake
Raw Sensor Value, Unregulated Motor, Invert Motor, Stop Program

What do they do?

The advanced blocks allow you to:

- Manage files, Bluetooth connections…

My blocks



What do they do?

Your blocks allow you to:

- Create blocks that can be used in future programmes (particularly useful when you often use the same segment of a programme in many programmes).

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