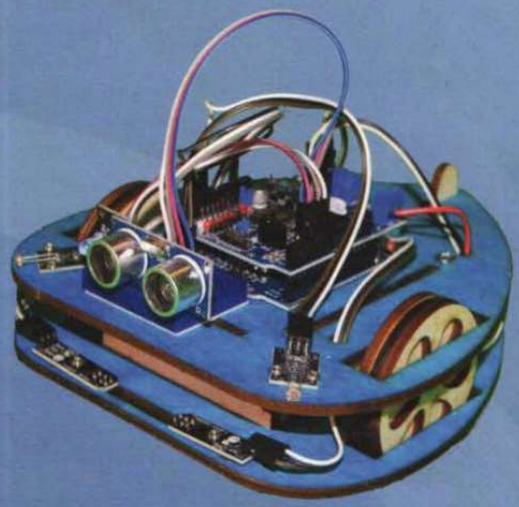
Leaphy Original

tips



LEAPHY

Robotica voor iedere leerling

Contents

Preface.

How does this book work?

During the programming of your Leaphy, you might run into problems. You're sure you've wired everything correctly, so it must be the program. But what is it you're missing? This booklet contains tips. They require time to read and think. Put your energy towards that. If you can figure it out after all, you get a real kick out of that.
Still searching? Then there's always the red booklet with solutions, but hey, spoilers!

Have fun!
The team at Stichting Leaphy

Level 2- Shining and driving.

2.1 & 2.2 Testing the LED & Blinking.

Make a mini-program that has “red” set to 255. Upload the program and see if the red light comes on. Swap the wires around if it doesn’t. Do the same for green and blue. It may seem cumbersome, but this way you can steadily find out if all the wires have been connected correctly. After that you can triple the LED block and set all kinds of colours on and off. Don’t forget to put a wait block after every LED block. Otherwise the colour will only be on for 0.00000001 seconds and Leaphy will go on to the next command before you’ve seen anything. You can also mix colours by turning them on with different values.

2.3 LED and distance sensor.

Arduinos love IF-THEN-ELSE commands. IF the distance sensor’s value is smaller (<) than a certain number in centimeters, THEN you can have the LED respond by giving it a different colour. ELSE the LED is the colour you’ve defined for ELSE. Use the “repeat forever” block. Otherwise Leaphy will run the program once and finish within a second.

2.4 Motor control.

Set M1 to speed 100 and upload the program. Don’t forget to turn on your Leaphy. Is Leaphy going forward with that wheel? Then it’s set correctly. Isn’t it going the right way? Switch the wires around on the shield. Run the same test on M2.

2.5 Backwards when in danger.

Use the program that makes the LED respond to your hand. Now put an extra block in the ELSE loop: “go forward”. In your IF loop, add “go backwards”. Leave the LED colours. Leaphy then does both: drive and shine.

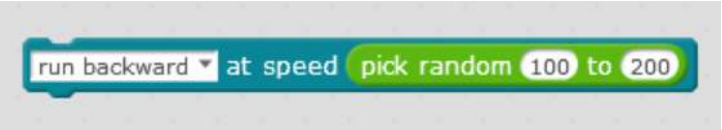
2.6 & 2.7 Evading & Changing colour.

Add a command to the program’s IF loop: turn left (or turn right). Don’t forget to insert a short wait after each command, otherwise the commands will all take place in a split second.

Level 3- A robot with character.

3.1 Random speed 1.

Random speeds are made with light green “random” blocks. You can drag those into your speed command. A Leaphy motor can be set to any value between 0 and 255. At about 70 the motor will start turning.

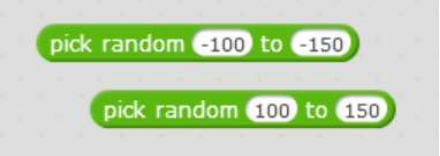


3.2 Random speed 2.

You can have the motor go backwards with a “go backwards” block, but you can also put in a negative value. Then the motor will also go backwards.

3.3 Random turning speed.

You can set any motor to a random turning speed. If you want Leaphy to make a sharp turn, give one motor a random negative number and the other one a random positive number. Make sure the values on the left aren’t too low, otherwise the motor will barely turn.



3.4 – 3.7 Random left or right and random colours.

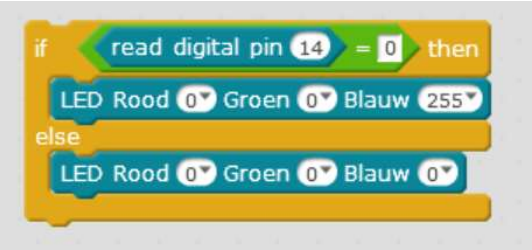
Make a variable. This is a kind of container Leaphy stores a number in. This value can be changed, but the name remains the same. When Leaphy finds the variable in a program, it takes the value it has at that moment.

The LED colours can also be programmed with a “random” block, but that way you’re making it very broad. Instead, work with variables such as R, G and B.

Level 4- Line followers.

4.6 LED reacts to sensors.

It is best to work with two IF-THEN-ELSE blocks in this case. When the left line follower sees something dark, it sends 0 to Leaphy's digital pin 14. You can then set: IF Digital pin 14 = 0 THEN the LED turns blue. ELSE turn the LED off. Do the same for the line follower on pin 15 and see what happens.

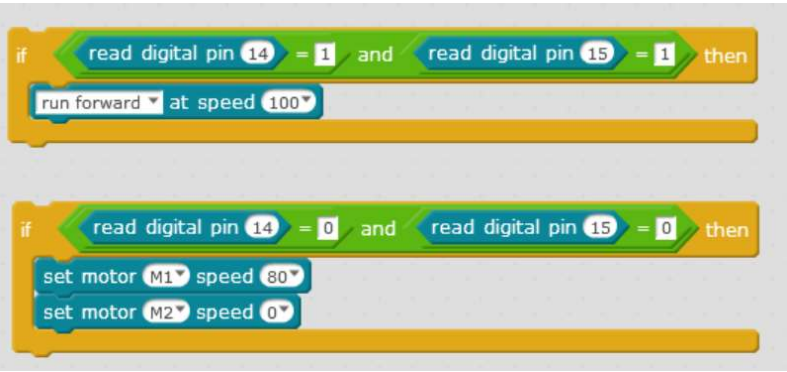


4.7 & 4.8 Following a line & stop at the finish.

As is mentioned in the workbook you have four different possible situations:

1) Both sensors give value 1 to the Arduino on Leaphy.
2) Both sensors give value 0.
3) The left sensor gives value 1 and the right sensor gives value 0.
4) The left sensor gives value 0 and the right sensor gives value 1.

You can now tell Leaphy for each of these situations what to do. This is really handy: maybe you've noticed at 4.6 that the LED colours change with the sensors, but become vague when both sensors send out value 1. Why is this? Because Leaphy then gets a double command: one says LED colour ON, the other says all colours OFF. That's not too bad with an LED, but it becomes something else with a motor. Your Leaphy will struggle to drive on. So rather tell your Leaphy for each situation what to do. Here's a sample for two of the four situations. You should be able to finish the whole program now.



Level 5- Light sensors.

5.5 Test session light sensors.

You're using a green block to compare the values of the sensor with a value that you manually add beforehand. IF the value is smaller than, say, 800, THEN the LED should be off. ELSE it should be the colour of your choice.

5.6 Leaphy is looking for the light.

Imagine you're Leaphy. You've also got two light sensors: your eyes. Imagine your left eye sees less brightness than your right eye. Which leg do you move faster to go to the light? Try it for yourself. You can use that principle for your program. You're comparing the values for two sensors and then you let one of the motors spin faster than the other. Good luck!