

# Review: The LEGO® MINDSTORMS EV3 Discovery Book

By Jetro

Pictures courtesy of No Starch Press

## The LEGO® MINDSTORMS EV3 Discovery Book by Laurens Valk Editorial: No Starch Press

It is almost a year ago that the latest iteration of the MINDSTORMS platform, the EV3 (31313), was launched. Some LEGO sets aren't available that long - although a majority lasts a bit longer - but in the case of the EV3 it feels as if the set is only just starting to gain momentum. Very shortly after the set was launched the first books about the set surfaced, but on the whole they were of relatively little interest. Writing a good book that is well edited simply takes time. In the previous edition of HBM (019) I reviewed Daniele Benedettelli's EV3 book, The LEGO MINDSTORMS EV3 Laboratory, and in this issue I will have a closer look at Laurens Valk's latest offering, the LEGO MINDSTORMS EV3 Discovery Book.

Anyone who has been in touch with the MINDSTORMS community for some time will recognise the name. As a matter of fact there was a small bio on Laurens in HispaBrick Magazine® 008, together with a review of his earlier book, The LEGO MINDSTORMS NXT Discovery Book. So is this just a rehash and update of the existing book?

Well, first of all, bear in mind that The LEGO MINDSTORMS NXT Discovery Book very quickly became the de facto standard text on the NXT set, the place to go after completing the official models, or, according to some, the place to start. That book was well written and easy to use and included instructions for such successful robots as the Snatcher, which we were proud to adapt for the 2012 World Mobile Congress in Barcelona (as described in HBM013).

This great starting point has proven valuable, but not the sole reason why this new book is once again a solid starting point for anyone who wants to make the most of his EV3 set. While the structure of the book is largely the same as its predecessor, Laurens has rewritten most of the contents and developed a number of new models that can be built with the EV3 31313 inventory. The sections explaining mechanical functions and programming have not only been adapted to the new technology, but improved and expanded. Additionally, the book is presented in full colour, with high quality images and building instructions, making it so much easier on the eyes and a delight to read.

**Condition: The Touch Sensor on port 1 is pressed.**

**This block is run if the condition is true.**

**These blocks are run if the condition is false.**

*configuring a switch block*

You define the condition by configuring the mode and settings of the Switch block. Once the program arrives at the Switch block, the robot checks whether the condition is true. Then, it decides which set of programming blocks in the switch to run.

There's a mode for each sensor; in this case, you'll choose the one for the Touch Sensor, namely **Touch Sensor - Compare - State** (the only available option). Once you've chosen this mode, you can specify in the state setting whether the Touch Sensor must be pressed (1) or released (0) for the condition to be true. As before, set Port to 1 to specify how the Touch Sensor is connected to your EV3.

*sensors and the switch block in action*

The TouchSwitch program you'll now create makes the robot drive forward for three seconds. Then, if the Touch Sensor is pressed, the robot reverses for a short while. If the sensor is not pressed, the robot instead says "No Object." Finally, regardless of the Switch block's decision, the robot plays a tone. Now create the program, as shown in Figure 6-13.

Figure 6-12: The Switch block checks whether the condition is true or false and runs the appropriate blocks. You specify the condition using the mode and settings on the Switch block.

Figure 6-13: The TouchSwitch program has the robot decide what to do based on a sensor reading.

Try running this program a few times, and determine when you need to press the Touch Sensor to make the robot go backward. Your experiments should show that the robot takes a measurement when the Switch block runs and that it uses this single measurement to determine whether the condition is true. In this program, the sensor measurement is taken just after the robot finishes going forward. When either the reverse action or the "no object" action is complete, the tone plays.

### adding blocks to a switch block

There's no limit to the number of blocks you can place inside a Switch block. If one part of a switch has multiple blocks, they're simply run one by one. You can also leave one of the two parts of a Switch block empty, as shown in Figure 6-14.

Run this modified program to see what happens. If the condition is true (the bumper is pressed), the robot should say "Object" and move backward, and the program should continue by playing the tone. If the condition is false (the sensor is not pressed), the program will find no blocks in the lower part of the switch and instantly move on to the Sound block after the switch.

### DISCOVERY #27: STAY OR MOVE?

**Difficulty:** [Icon] **Time:** [Icon]

Make the robot stand still for three seconds. Then, if the Touch Sensor is released, the robot should turn around and drive forward for five wheel rotations. But if the sensor is pressed, the robot should do nothing, and the program should end immediately.

### DISCOVERY #28: DIFFICULT DECISIONS!

**Difficulty:** [Icon] **Time:** [Icon]

Let's practice with the Switch block! Create a program to implement the decision tree shown in Figure 6-15. How do you configure the Switch block, and why do you have to put a Wait block at the end of the program?

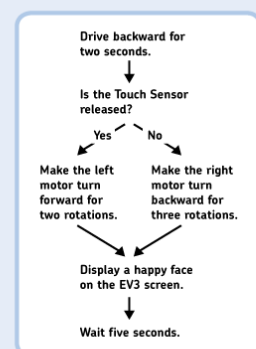


Figure 6-15: The program flow for Discovery #28

Figure 6-14: A modified version of the TouchSwitch program. The switch does not have any blocks to run if the condition is false, so the program immediately plays a tone after moving forward if the sensor is not pressed.

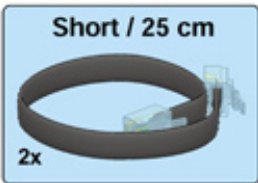


# THE LEGO® MINDSTORMS® EV3 DISCOVERY BOOK

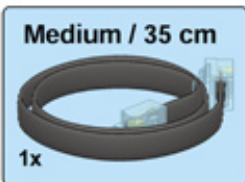
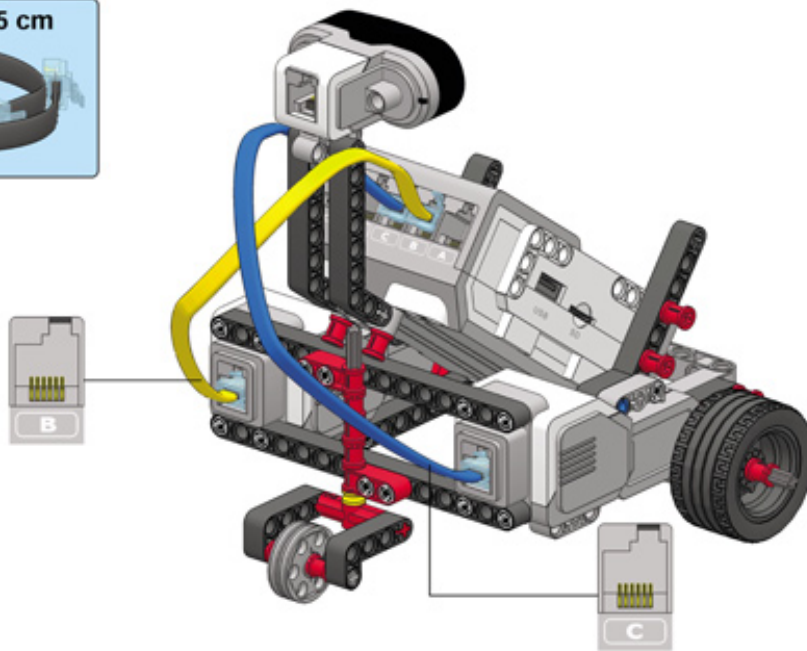
a beginner's guide to building and  
programming robots

laurens valk

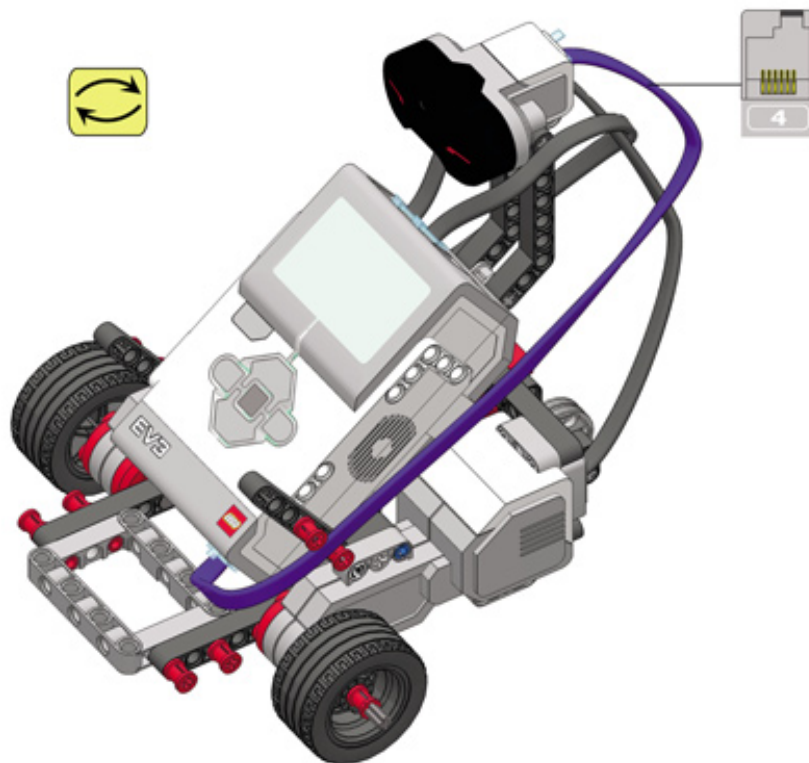




13



14



**NOTE** Connect the cables as shown. (The cables aren't actually colored, of course, but the colors help you see how to connect each cable.)

So which book should you get? Well, taking into account that this is a Review of The LEGO MINDSTORMS EV3 Discovery Book, the obvious answer is "this one". However, both this book and Daniele Benedettelli's offering are published by NoStarch and while there is some competition between the two, they are also very clearly different. The LMS EV3 Laboratory is a story that teaches you to build and program. The LMS EV3 Discovery book is a technical manual that ... does the same thing, but with a different approach. When I received this book, I couldn't resist the urge to place it next to Sarel's The Unofficial LEGO Technic Builders Guide (reviewed

in HBM013). There are strong parallels between the two books, as they both use a very similar approach and have strong technical foundations. In the end it is a question of style (and maybe colour). Personally, I'm very happy to have a copy of all three books, and maybe your best option is to get your own copies and compare. I'm sure you won't regret it!

Thanks to No Starch Press for the book and graphic material.  
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