LEGO Mindstorms EV3 Workshop
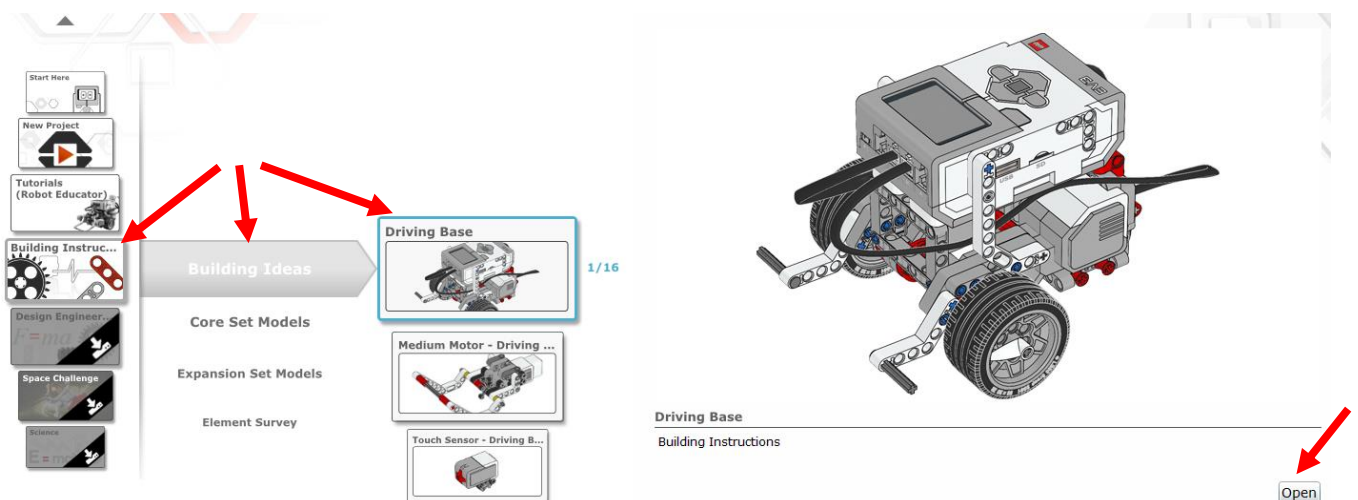
Task: Use LEGO to build a robot with an attached sensor, then program it to drive around and detect objects.

1. Open the **LEGO MINDSTORMS Education EV3** app. You should be able to find it on the desktop, the taskbar, or by searching for it in the Start menu.
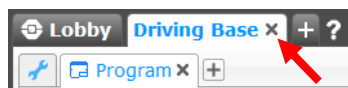

Note: If you see a message saying "What's new in this version", you can click **Close**; if you see a message telling you an update is available, you can click **OK**.

2. From the menu on the left, click **Building Instructions**, then **Building Ideas**, then **Driving Base**. Then click **Open**.
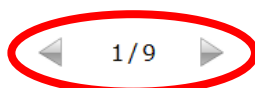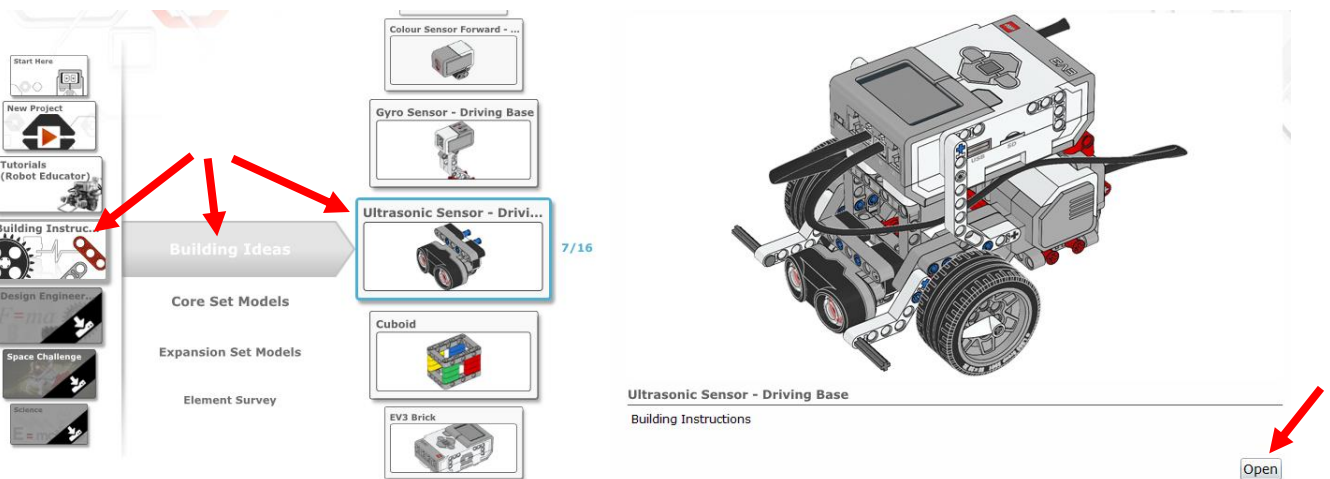
3. Use the arrows at the bottom of the screen to navigate through the build instructions.
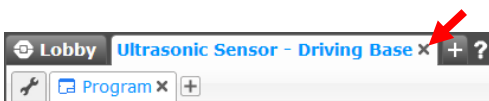

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4. Once you have completed the build, you can close the **Driving Base** tab.

5. Now it's time to attach a sensor! From the menu you used earlier, scroll down the **Building Ideas** list until you find **Ultrasonic Sensor – Driving Base**. Once you find this, click on it, then click **Open**.
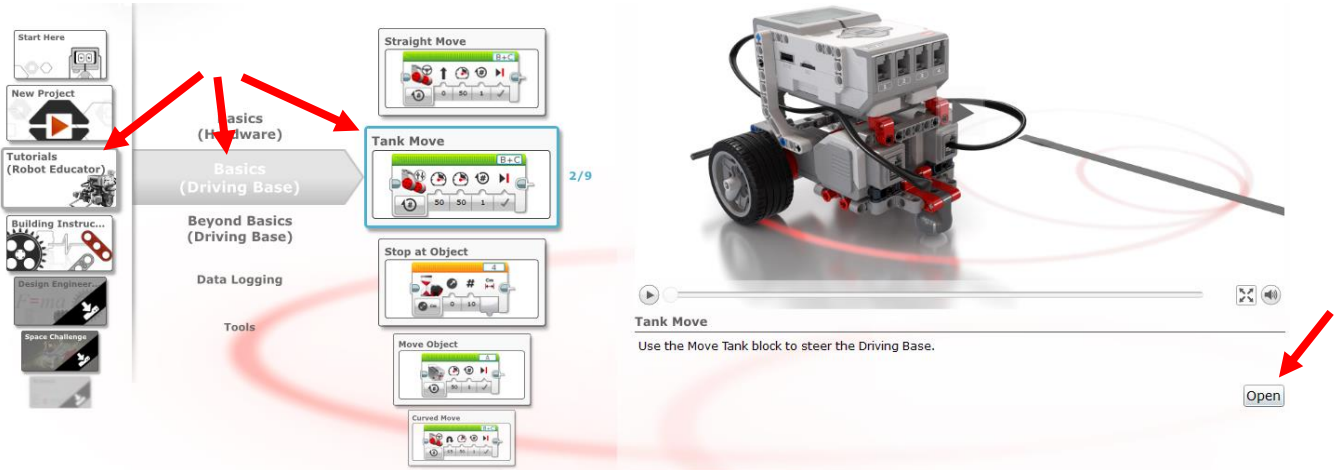

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6. Use the arrows at the bottom of the screen again to go through the instructions for attaching the ultrasonic sensor.
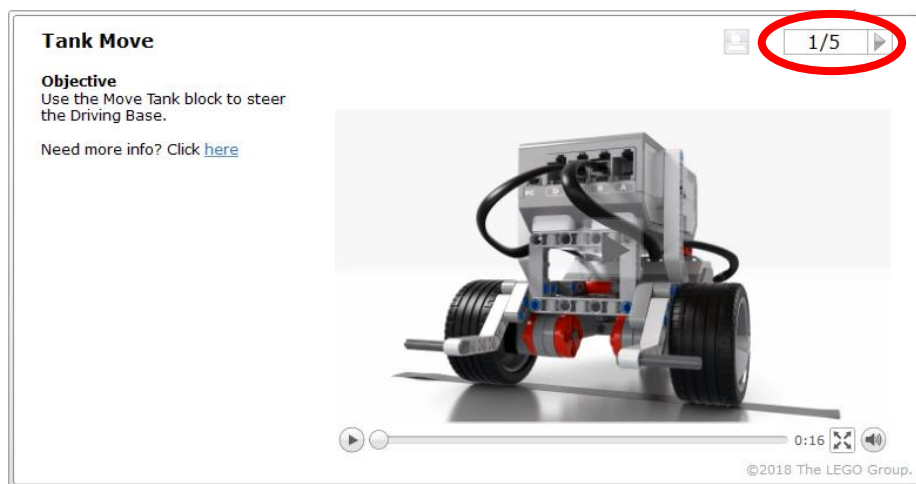

7. Once you've finished attaching the sensor, you can close the **Ultrasonic Sensor – Driving Base** tab.

8. Now we can try out the robot we've built. In the menu on the left, go to **Tutorials (Robot Educator)**, then **Basics (Driving Base)**, then click **Tank Move** and click **Open**.

Note: You can also try *Straight Move* and *Curved Move*, but for this workshop we will be using **Tank Move**.

9. In the box in the top-right corner, use the arrows to go through the steps. You can skip step 2, as you have already built the robot. When you are ready to start coding, go to step **4**.

10. Step **4** will ask you to recreate the program shown, which can be made using the blocks from the bottom of the screen. Before you try this, you may want to look at the example on the next page, which explains what parts of the blocks do.

This sets the amount of power to the left motor.

This sets the amount of power to the right motor.

This sets whether or not the robot will brake at the end of this block.

This block plays any code that is attached to it.

This sets the mode in which the motor operates – try looking at the different options.

This sets the number of rotations of the motor, which affects how long the robot drives for. You can also watch the white piece on the robot's wheel to see how much it rotates.

This block tells the robot to wait, and for how long.

If you can't find a block, try looking at the colour of the block in the example, then looking at the different coloured tabs at the bottom of the screen.

You can also hover the mouse over the tabs to see what kind of blocks are included in that category.

11. Go to step **5** and add more blocks to your code to try and complete it!
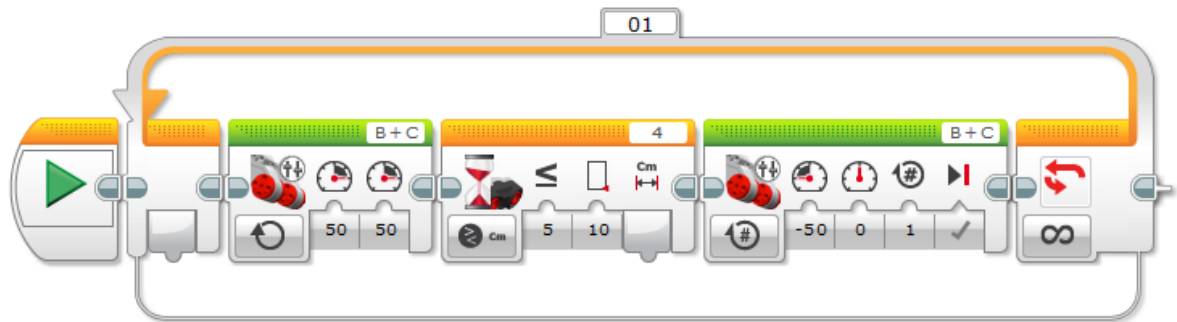
12. Once you've completed step **5**, it's time to try out the ultrasonic sensor you fitted earlier. This sensor detects objects, and the robot can be coded to use the sensor to stop before colliding with and object.

Close the **Tank Move** tab, then use the menu on the left to open the next project: **Stop at Object**, then click **Open**. (As before, this is in **Tutorials (Robot Educator)**, then **Basics (Driving Base)**).

13. Use the arrows in the top-right corner to go through the steps. You can skip step 2, as you have already built the robot.

14. Once you've finished the **Stop at Object** project, you can close the tab, and try experimenting with more code, or try some of the other projects, such as the other movement methods.

Or, if you'd like a challenge, you can try copying the code below – this will make the robot keep driving around until the ultrasonic sensor detects an object, at which point it will turn away and keep driving until another object is detected.

You could also try modifying the code to make it better, or set up an obstacle course for the robot to navigate!