Programming the EV3 with Swift Playgrounds Lesson 4 – Move Object

by Ahmad Sahar

Hi, It's Shah again. For those who don't know me, I'm a professional trainer specialising in MacOS and iOS software and hardware, and I also conduct classes on iOS App Development and LEGO® Mindstorms.

In the last lesson, we made our robot turn. In this lesson, we're going to make our robot interact with an object.

What you need:
An iPad with Swift Playgrounds installed.
LEGO® Mindstorms EV3 Education (set no. 45544) or Home (set no. 31313).

Before you begin

For this lesson you need to build either the Educator robot from the 45544 set or the DrivingBas3 from the 31313 set.

45544   *31313*

The instructions for the Educator robot can be found here:
http://robotsquare.com/wp-content/uploads/2013/10/45544_educator.pdf

The instructions for DrivingBas3 can be found here:
http://ev3lessons.com/RobotDesigns/instructions/DrivingBas3.pdf

Make sure you have fresh batteries in your robot, that your iPad is fully charged, and that your iPad is paired to your robot.

You'll also need to build a Cuboid. Instructions are provided in the Education version of the LEGO® Mindstorms software, which can be downloaded here:
https://education.LEGO®.com/en-us/downloads/mindstorms-ev3/software

If you have the 31313 set, just build something similar in size and shape. Color isn't important at this stage.
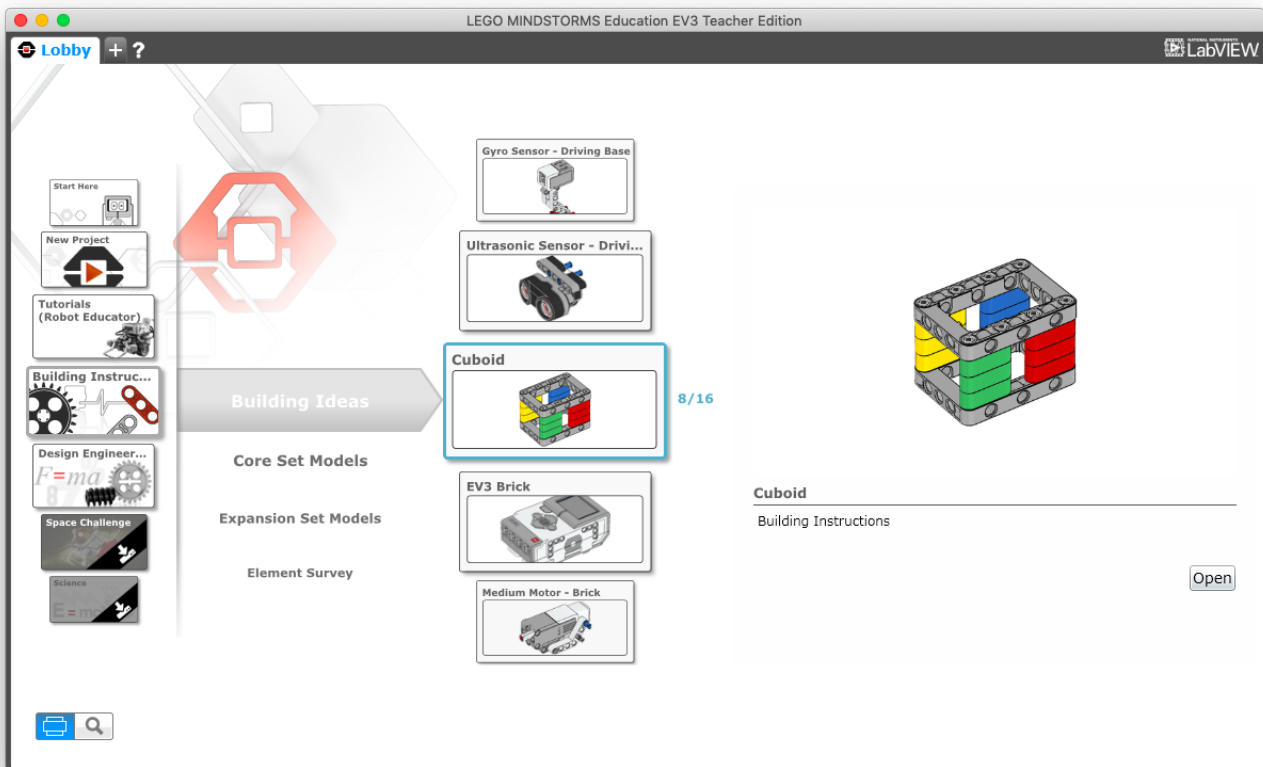
Move Object

You can use the template we used in the last lesson, or you can download a fresh copy. Remove all the code from the template, and connect to the EV3 brick.

Tap ev3 from the suggestions list. It appears on the page. Tap the dot in the suggestions list. Scroll through all the suggestions in the suggestions list until you see this one:

motorOn(forDegrees: Float, on: OutputPort, withPower: Float, brakeAtEnd: Bool)

Tap it to insert onto the page.

This is a Swift function which is similar to the EV3-G Motor block.
It has a number of parameters:
forDegrees: Number of degrees to execute
on: The port the medium motor is connected to. Can be .a, .b, .c or .d
withPower: The power level specified for the selected port.
brakeAtEnd: Brake or coast at the end of the move.

As you learned in the previous lesson, to change the value for the parameters, tap a parameter. You can either use the on-screen keyboard to enter the value, or choose from the suggestions list.

Modify the code so it looks like this:

ev3.motorOn(forDegrees: 100, on: .a, withPower: -30, brakeAtEnd: true)

This makes the motor turn the knob wheel connected to the robot arm, lowering it. Please note you must manually raise the arm so that it's pointing straight up before you run the program.

Next we're going to make the robot move backwards and turn as it does so.

Instead of using the move tank block that you learned about in the last lesson, we'll use the same block you used to move the arm. Copy and paste the earlier instruction and modify it so it looks like this:

ev3.motorOn(forDegrees: 360, on: .b, withPower: -50, brakeAtEnd: true)

31

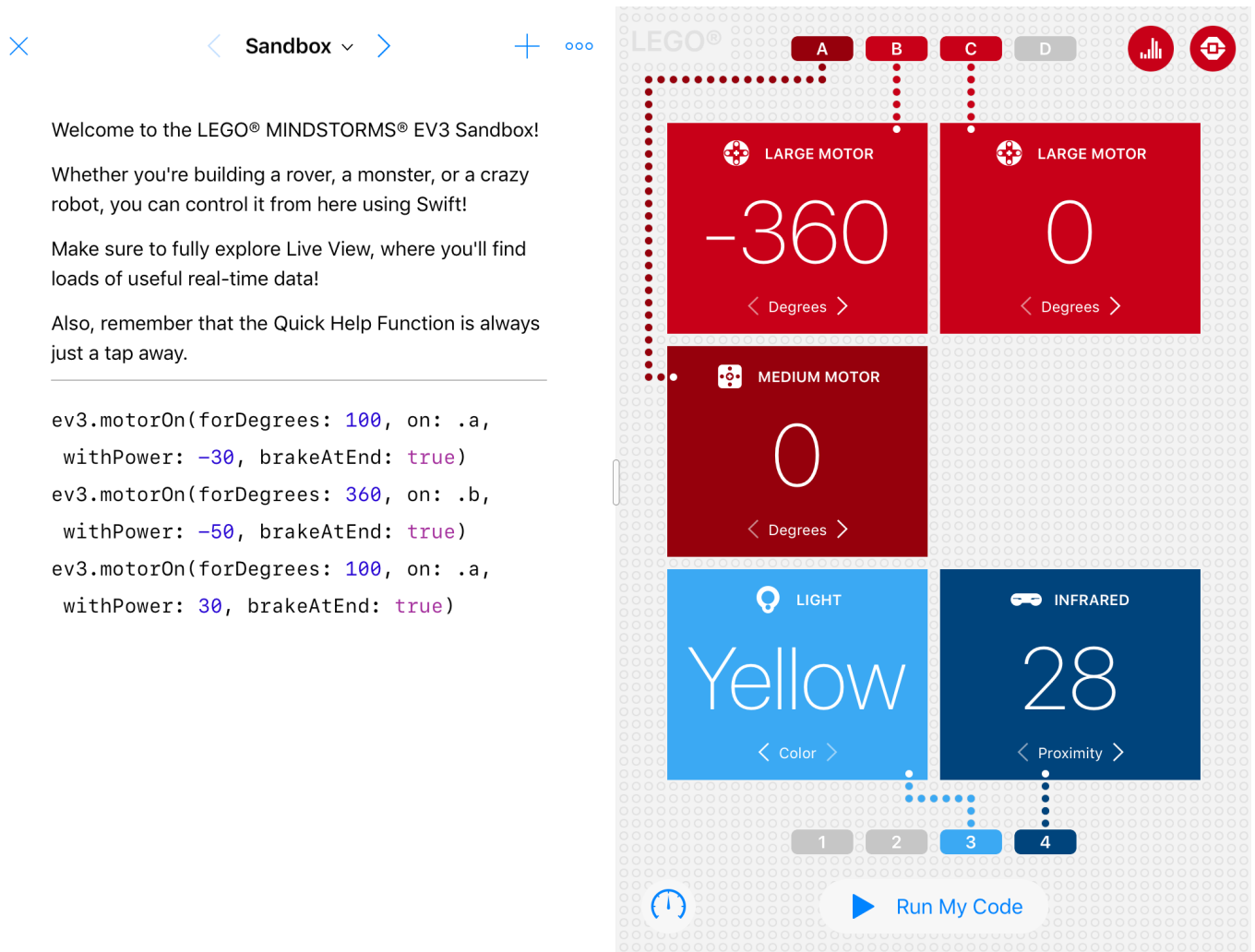This rotates the wheel connected to motor b, making the robot move backwards and slewing it to the right.

Now copy and paste the earlier instruction again and modify it so it looks like this:

ev3.motorOn(forDegrees: 100, on: .a, withPower: 30, brakeAtEnd: true)

This makes the motor turn the knob wheel connected to the robot arm, raising it back to its original position.

Your complete program should look like this:

ev3.motorOn(forDegrees: 100, on: .a, withPower: -30, brakeAtEnd: true)
ev3.motorOn(forDegrees: 360, on: .b, withPower: -50, brakeAtEnd: true)
ev3.motorOn(forDegrees: 100, on: .a, withPower: 30, brakeAtEnd: true)

Sandbox

Welcome to the LEGO® MINDSTORMS® EV3 Sandbox!

Whether you're building a rover, a monster, or a crazy robot, you can control it from here using Swift!

Make sure to fully explore Live View, where you'll find loads of useful real-time data!

Also, remember that the Quick Help Function is always just a tap away.

```
ev3.motorOn(forDegrees: 100, on: .a,
 withPower: -30, brakeAtEnd: true)
ev3.motorOn(forDegrees: 360, on: .b,
 withPower: -50, brakeAtEnd: true)
ev3.motorOn(forDegrees: 100, on: .a,
 withPower: 30, brakeAtEnd: true)
```

LEGO®

A B C D

LARGE MOTOR
-360
‹ Degrees ›

LARGE MOTOR
0
‹ Degrees ›

MEDIUM MOTOR
0
‹ Degrees ›

LIGHT
Yellow
‹ Color ›

INFRARED
28
‹ Proximity ›

1 2 3 4

▶ Run My Code

Place the cuboid just in front of the robot. Position the arm so that it is pointing straight up. Run the program. The robot should lower the arm, trapping the cuboid, move backward while turning to the right, and raise the arm again.

Great job! We've come to the end of the lesson. In the next lesson, we'll program the infrared or ultrasonic sensor to stop the robot when it detects an obstacle.

If you wish to know more about me and what I do, feel free to visit my company website, http://tomafuwi.tumblr.com, like my Facebook page at http://facebook.com/tomafuwi, follow me on Twitter at https://twitter.com/shah_apple and subscribe to my YouTube channel at https://www.youtube.com/c/CoderShah.

All the best and take care.
#