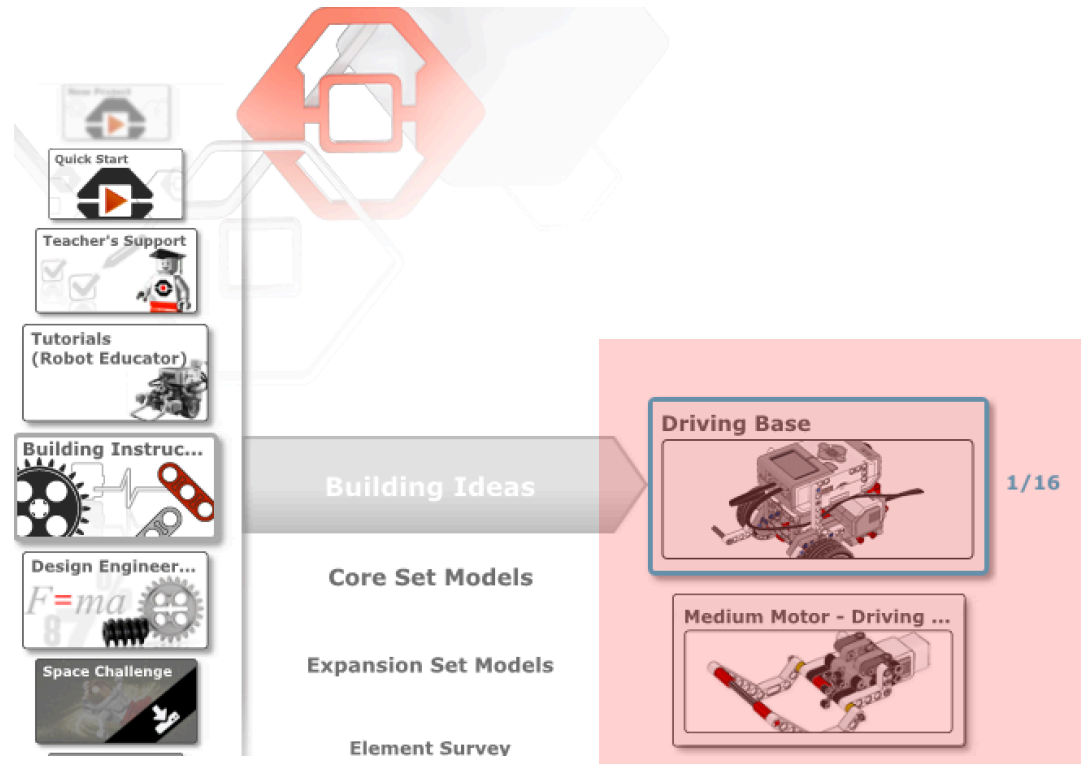
CRANE MISSION TIPS & TRICKS
EV3-G Tablet/Chromebooks Version

By Sanjay & Arvind Seshan for EV3Lessons.com & FLLTutorials.com

Step 1: Build a Basic Educator Robot

- Start by building the basic educator robot. You can find the instructions inside the EV3 Education Software from the Lobby page
- You will need to build the **Driving Base** and **Medium Motor** modules which can be found in the **Building Instructions** section.



Step 2: Download the Crane Mission files

- Visit the Challenge Downloads page on the FIRST website
- Download the Crane Mission Lesson for an overview
- Download the Crane Mission EV3 Solution. These are building instructions for modifying your robot.
- Visit FLLTutorials.com → CITY SHAPER Resources → Worksheets → Crane Mission Tips
  - Download the .ev3m file (This file will work on tablets and Chromebooks)

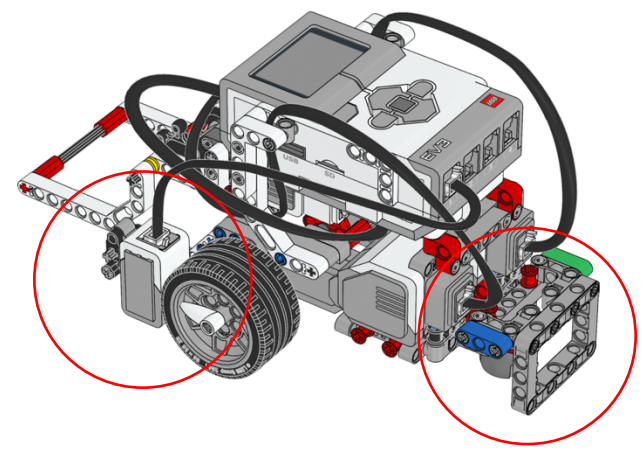
CITY SHAPER Challenge and Resources:

File		
Challenge	Letter	A4
CITY SHAPER Kickoff Video		
Mission Model Building Instructions		
Challenge Updates (updated 28 August)		
Game Guide	Letter	A4
Rubrics	Letter	A4
Table Building Instructions		
Table Overview	PDF	A4
Score Sheet		
Crane Mission Lesson		
Crane Mission EV3 Solution		
Crane Mission EV3 Program		

US & Canada teams - Message regarding the Engineering notebook

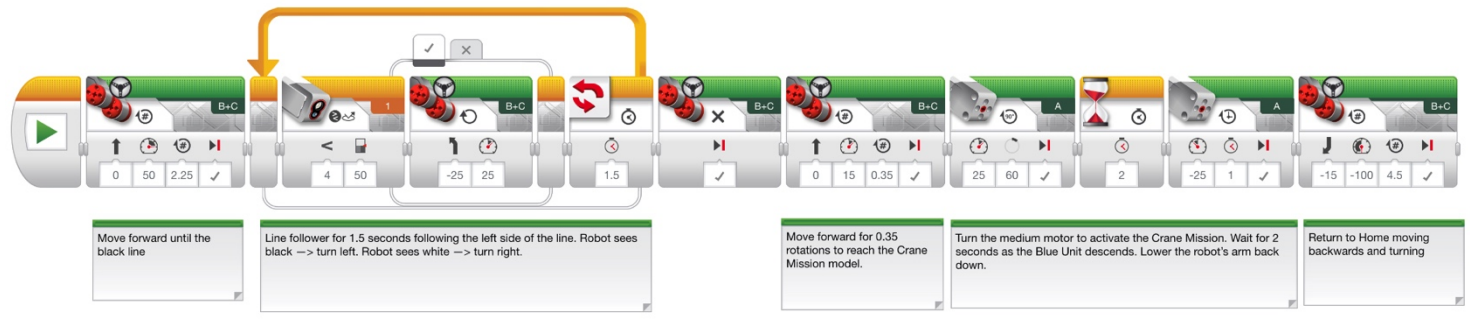
Step 3: Modify the Robot

- Modify your robot using the **EV3 Solution file**
- A back bumper is constructed to help you align against the south wall of the FIRST LEGO League Table.
- The color sensor is mounted on the left side of the robot so that you can follow lines on the CITY SHAPER mat (Note: that it gets plugged into Port 1. The standard EV3 default is usually Port 3.)



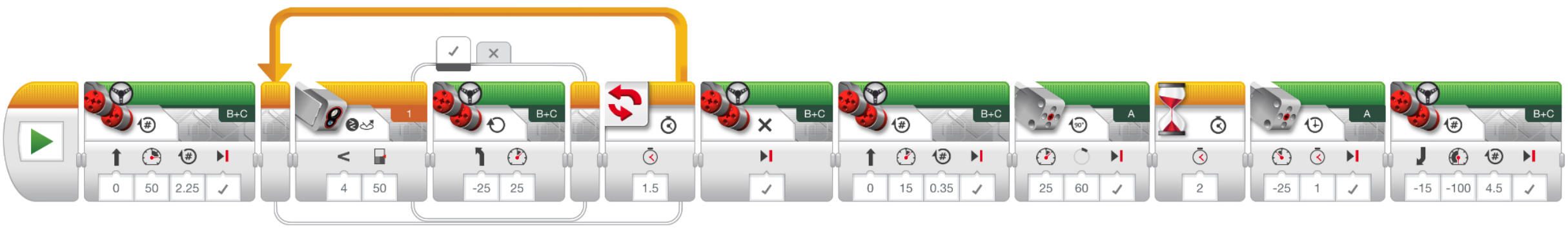
Step 4: Learning the Program

- Turn to the next page to learn the program



Crane Mission Tips & Tricks by EV3Lessons.com and FLLTutorials.com

Crane Mission Solution for Chromebooks/Tablets



Move forward until the black line

Line follower for 1.5 seconds following the left side of the line. Robot sees black —> turn left. Robot sees white —> turn right.

Move forward for 0.35 rotations to reach the Crane Mission model.

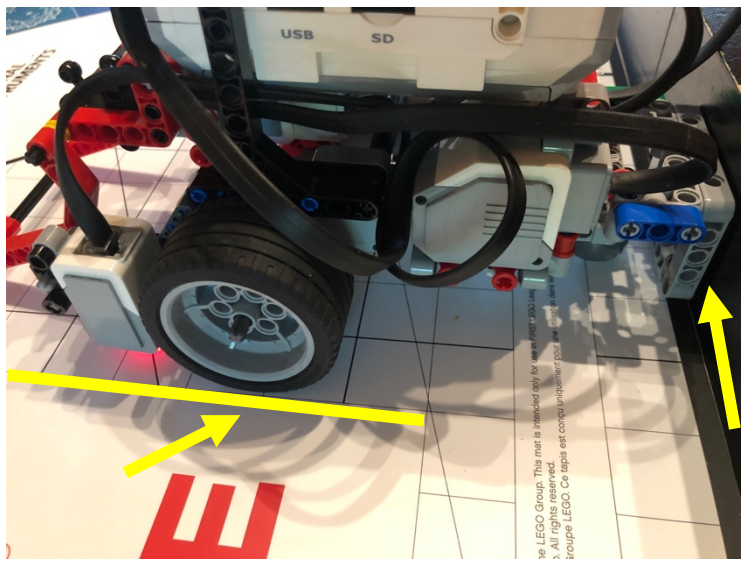
Turn the medium motor to activate the Crane Mission. Wait for 2 seconds as the Blue Unit descends. Lower the robot's arm back down.

Return to Home moving backwards and turning

You can download this code file from FLLTutorials.com → Resources → Worksheets

Note: Code in the loop was provided by Catherine Sarisky (Roanoke STEM & Outreach). Rest of code is a modified version of code created by FIRST for this mission

Preparations: Setting up in Launch

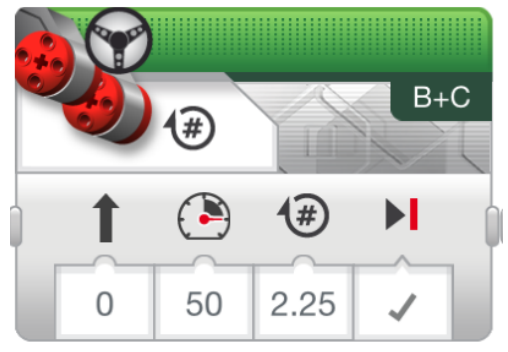


Align the robot flat against the South wall using the bumper

The left wheel should be along the thin black border of the FIRST LEGO League logo

Video to learn more

Part 1: Moving out of Launch

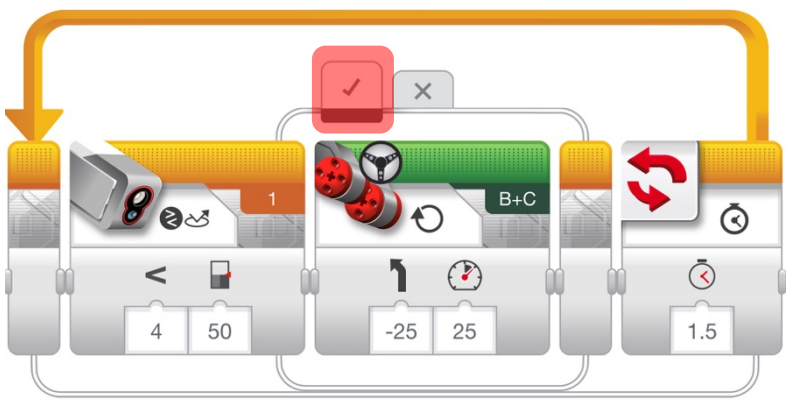


This a Green Move Steering Block. It moves both motors at once and they are synchronized. The same block is used again after the line follower ends.

Tip: *There are different ways of moving – using rotations, degrees or seconds.*

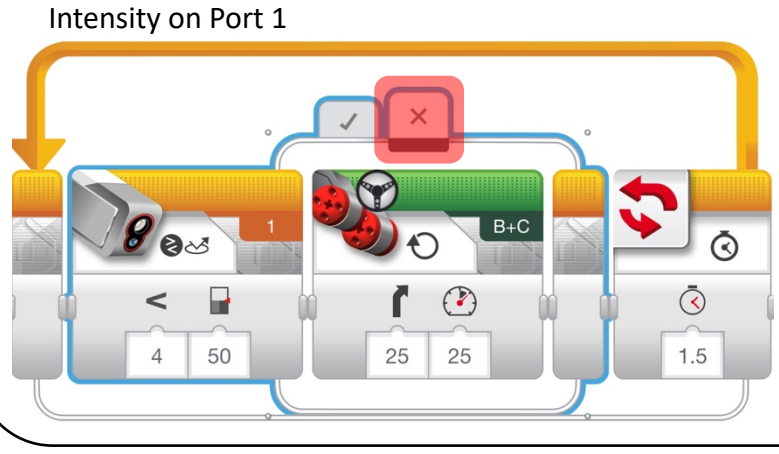
Where can I learn more?
http://ev3lessons.com/en/TabletLessons.html

Part 2: Line Following



The color sensor is set to Compare → Reflected Light Intensity on Port 1

Line follow for 1.5 sec

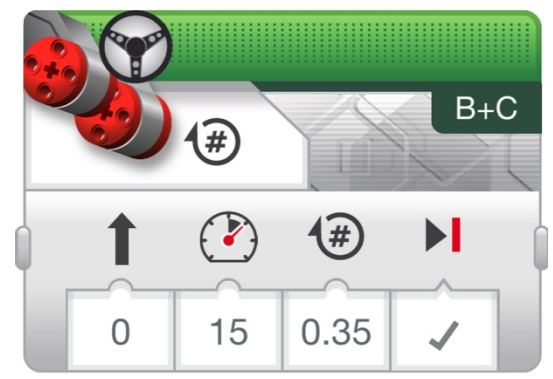


Note: *Since the sensor block and math block from the original code provided by FIRST do not exist in this version of the software, this section of the code uses a basic line follower*

The robot turns left when True (ie. the threshold value read by the color sensor is less than 50)

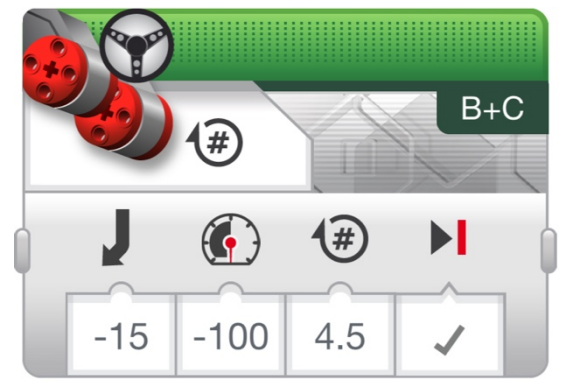
The robot turns right when False (ie. the threshold value read by the color sensor is greater than 50).

Part 3: Approaching the Mission



Note: *The number of rotations has been increased from the original code provided by FIRST so that the robot can reach the model.*

Part 4: Returning to Home Area



Note: *This code moves backwards while turning so that your robot returns Home. This has been modified from the original code provided by FIRST which only returned to Launch.*

Part 3: Activating the Crane Mission Model

Tip: *When activating a motor arm, it is important to start from the same position each time. Make sure the arm is down (as far as it can go) at the start of the program.*