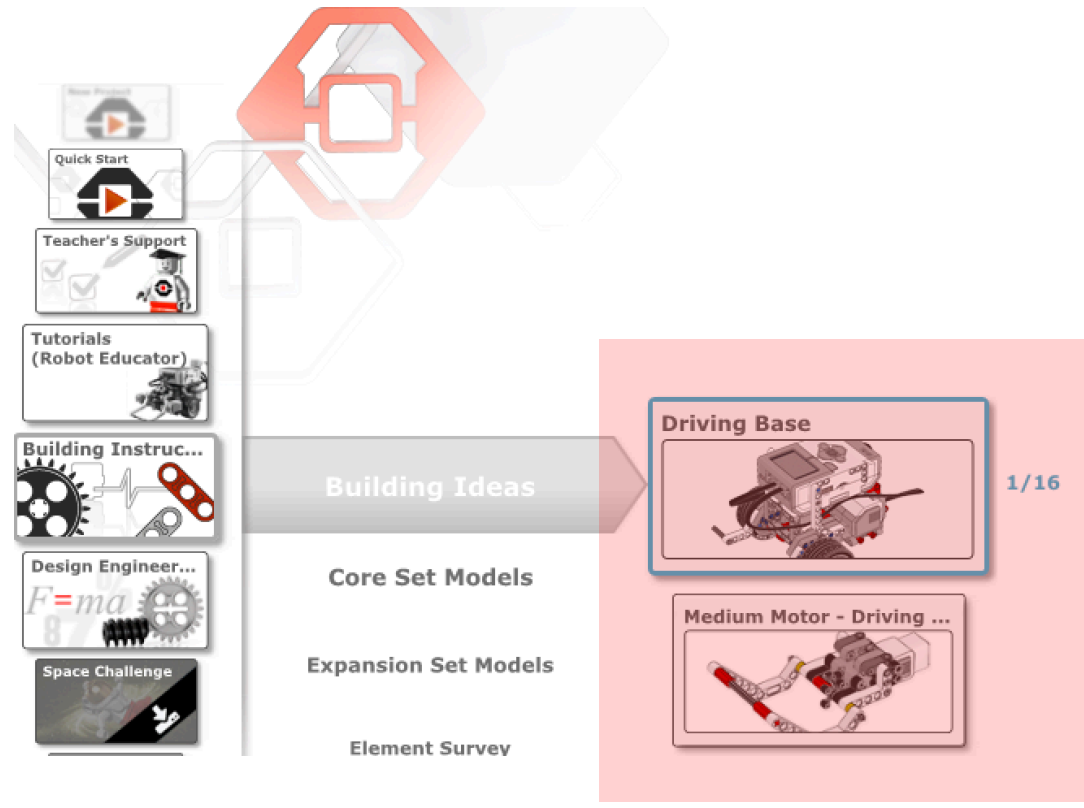
CRANE MISSION TIPS & TRICKS

EV3-G Full Software Version

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



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.
- Download the EV3 Program for a copy of the program

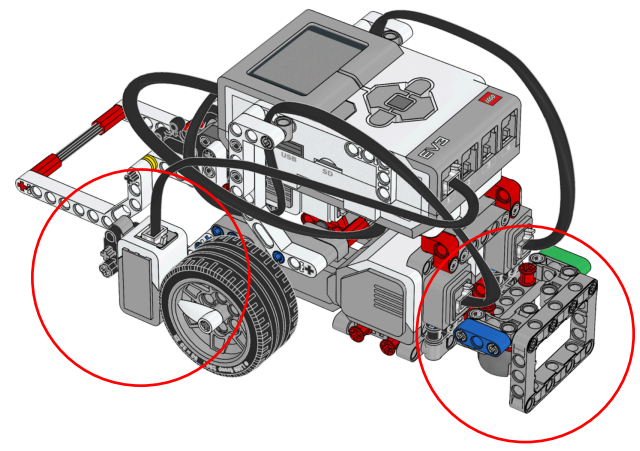
CITY SHAPER Challenge and Resources:

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

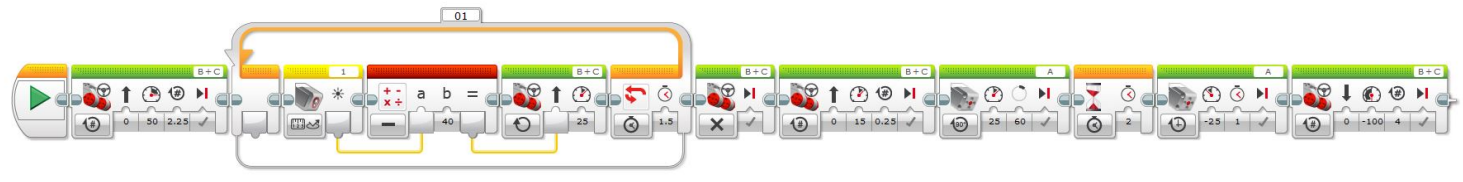
Step 3: Modify the Robot

- 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.)



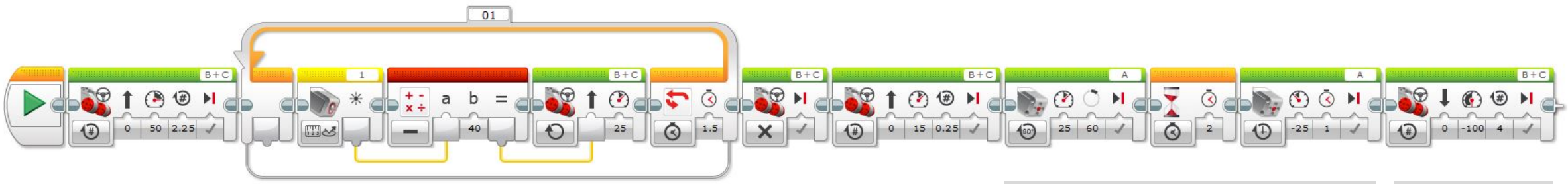
Step 4: Learning the Program

- Turn to the next page to learn the program



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

Crane Mission Solution Provided by FIRST



Move forward until Black Line

Line Follow for 1.5 seconds

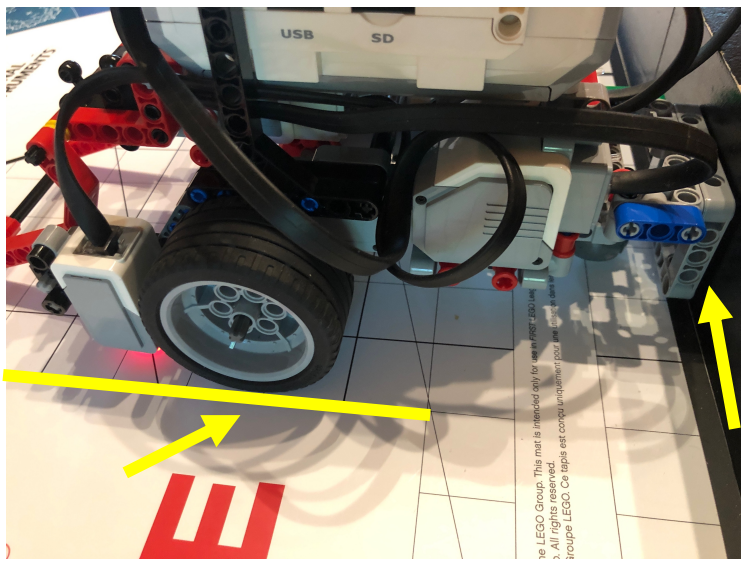
Move forward for 0.25 rotations to reach the Crane Mission model

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 Launch Area moving backwards

Tip: *Always comment your code so that it is easy for others to understand your code*

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

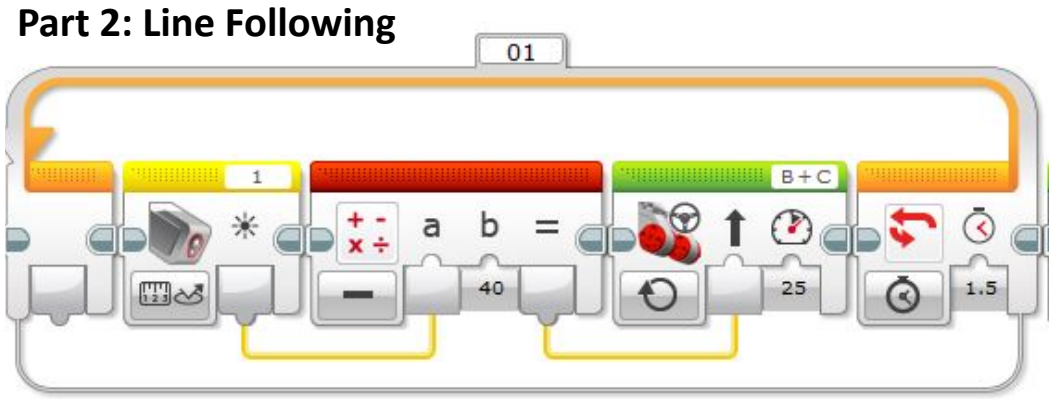
Part 1: Moving out of Launch

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?
EV3Lessons.com → Beginner → Moving Straight

Part 2: Line Following



This is a Proportional Line Follower

This is a Sensor Block set to reflected light mode and connected to Port 1. It is not available in the App version of the software

This is a Math Block that subtracts 40 from the light sensor reading. The value 40 represents a reading between black and white for the sensor.

This Steering Block moves the robot with steering based on the math computation. This makes it always steer towards the line.

Repeats for 1.5sec in this Loop Block

Note 1: *This program uses the color sensor in reflected light mode. You may need to calibrate your color sensor.*

Note 2: *The Sensor Block and the Math Block above are not available in the EV3 Programming App on iPads/Tablets/Chromebooks. This code is for the full Software Version only*

Where can I learn more?
EV3Lessons.com → Intermediate → Color Sensor Calibration

Tip 1: *You might consider Line following for a particular distance instead of for seconds.*

Tip 2: *You might want to begin with a simpler line follower*

Where can I learn more?
EV3Lessons.com → Beginner → Line Follower

Where can I learn more?
EV3Lessons.com → Advanced → Proportional Control, Proportional Line Follower

Part 3: Activating the Crane Mission Model

Tip: *When activating a motor arm, it is important to start from the same position each time, otherwise when you move a certain degree, the arm could over-rotate and stall the motor. Consider using seconds to prevent stalling.*

Where can I learn more?
EV3Lessons.com → Beginner → Move Object

Where can I learn more?
EV3Lessons.com → Advanced → Stall Detection

Part 4: Returning to Launch Area

Tip: *This code simply moves straight backwards. You will have to learn how to turn to make sure that your robot returns into Home instead of Launch for the City Shaper season.*

Where can I learn more?
EV3Lessons.com → Beginner → Basic Turning