CHAPTER 3

Creating a LEGO MINDSTORMS EV3 Vehicle

Now that I have shown some basics of programming on LEGO MINDSTORMS EV3, it is time to talk about a popular project among LEGO MINDSTORMS enthusiasts, building a vehicle. Not only am I going to talk about how to make a decent vehicle, but I am also going to talk about how you can program a vehicle to do all kinds of things such as propulsion, steering, and using the other sensors to work with it.

Instructions for Making a Souped-up Driver's Base Vehicle

The Core Set has instructions for a Driving Base, but it has three wheels. Actually, it has two wheels and one ball bearing wheel in the front. Not only is this Driving Base on the Core Set instruction booklet, but you can find it on the LEGO MINDSTORMS software packet. Just look on the Lobby, under Robot Educator, Building Instructions, Driving Base.

I highly recommend assembling this Driving Base, especially if you are new to LEGO MINDSTORMS or even LEGO in general. The Driving Base has two large motors which power its two back wheels, and it is very simple to program it to move backward or forward using the Move Steering and Move Tank programming blocks that we discussed in the previous chapter. You will discover that its ball bearing wheel makes turning simple, and the instructions show how you can use the other sensors to make this Driving Base do many cool things. Many of the programs that I will list later in this chapter will be compatible with that basic driving unit.

One of the advantages of this Driving Base is that it can literally turn on a dime. Unfortunately, it is not set up to handle all of the sensors, but the vehicle I am about to show you can. Not only that, you are going to set it up with the yellow programming blocks as well. Figures 3-1 to 3-16 describe the steps for building the vehicle.

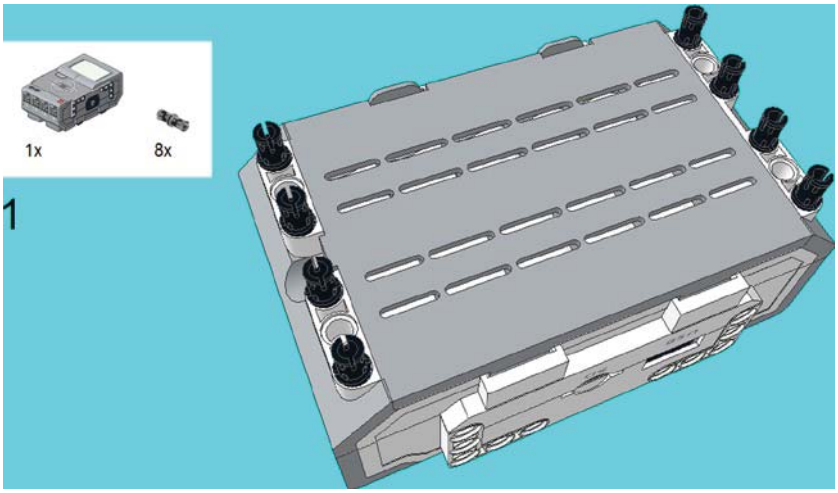

Figure 3-1. *Turn the EV3 Brick over and insert eight connector pegs as shown*

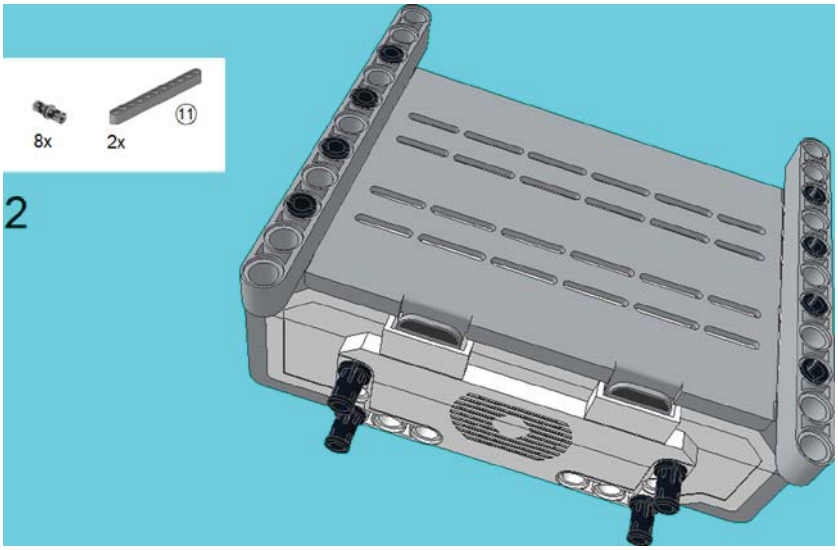

Figure 3-2. *Snap on the two 11M beams as shown. The connector pegs go on each side as shown, with the other side mirroring the same pattern*

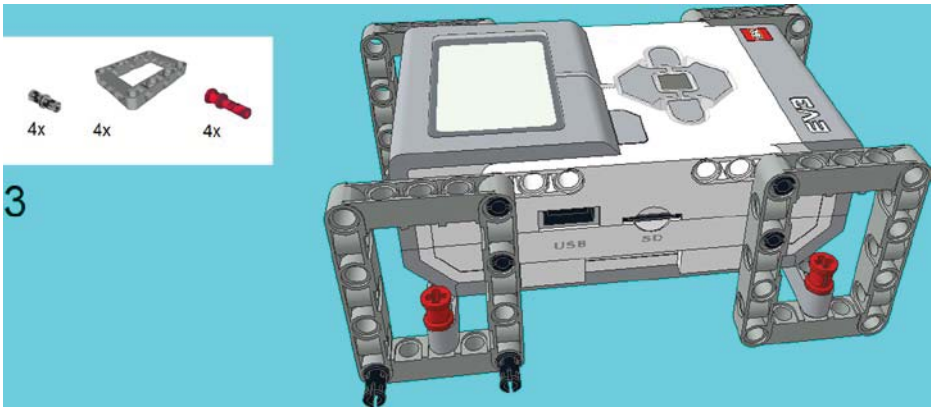

Figure 3-3. *Snap on the four 5 x 7 beam frames on the connector pegs from the last step. Use the four friction snaps to lock the beam frames into place. Insert the four connector pegs as shown*

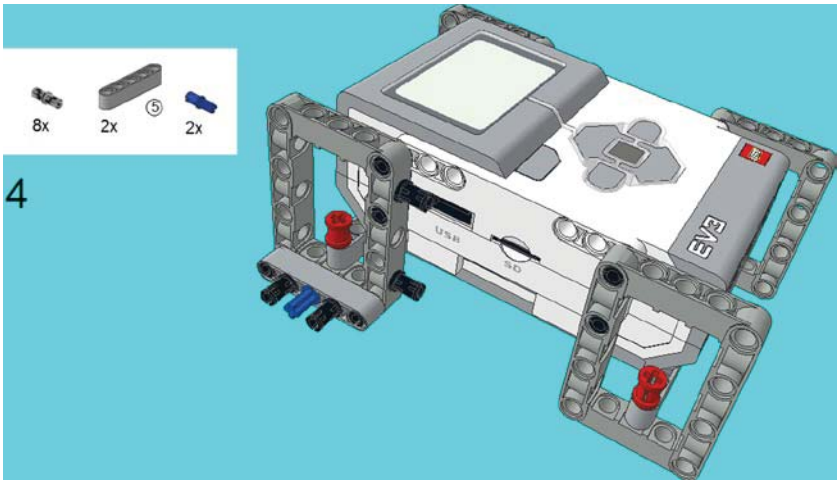

Figure 3-4. *Snap on the 5M beams, and place the connector peg/cross axles in the center through-hole of the 5M beam. Place a connector peg on each side of the connector peg/cross axle*

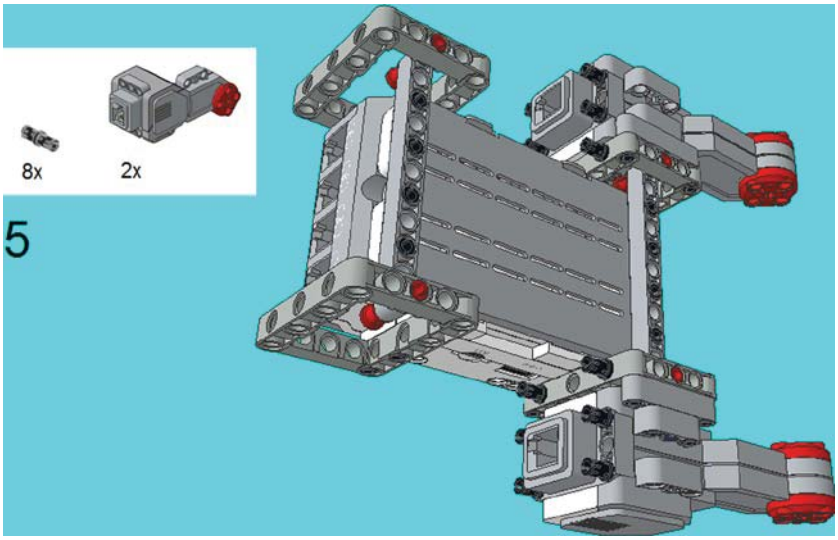

Figure 3-5. *Insert the Large Motors on the sides, atop the connector pegs and connector peg/cross axles from the previous step. Attach the four connector pegs to the Large Motors as shown*

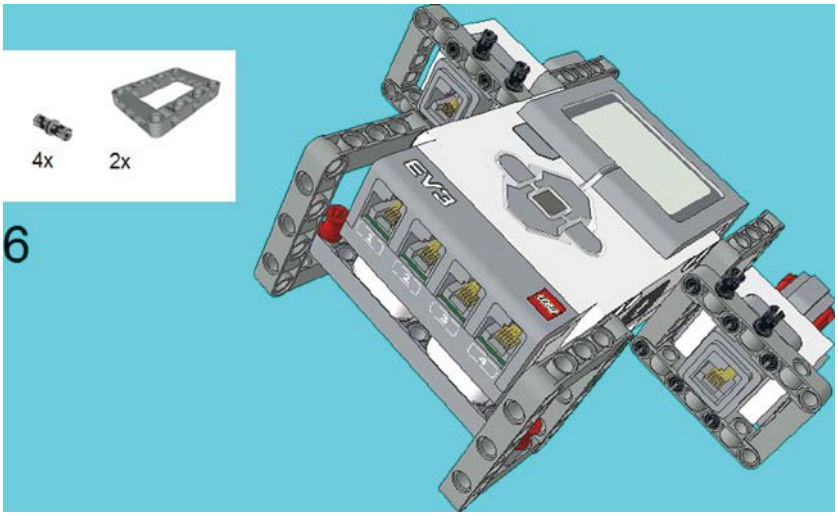

Figure 3-6. *Insert two beam frames on the construction, and insert the connector pegs on as shown*

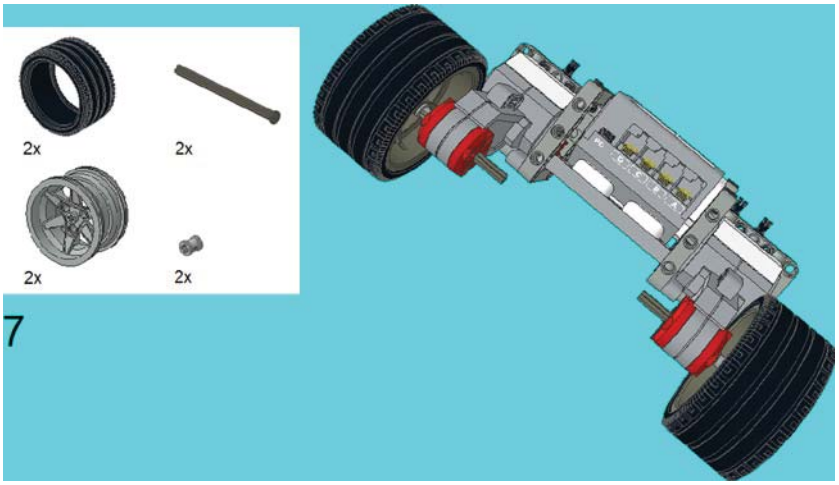

Figure 3-7. *Place the 8 x 36 low wide tires on the 56 x 34 Rims, and slide them on the 8M axles with stop until they hit the stop. Slide on the bushes all the way, and then slide the axles through the Large Motors*

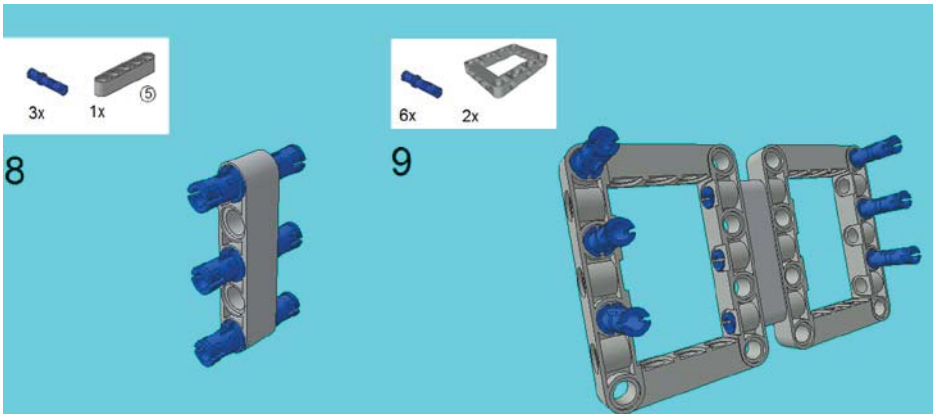

Figure 3-8. *Center three 3M connector pegs on the 5M beam. Attach a 5 x 7 beam frame on each side, and then insert three 3M connector pegs on each side*

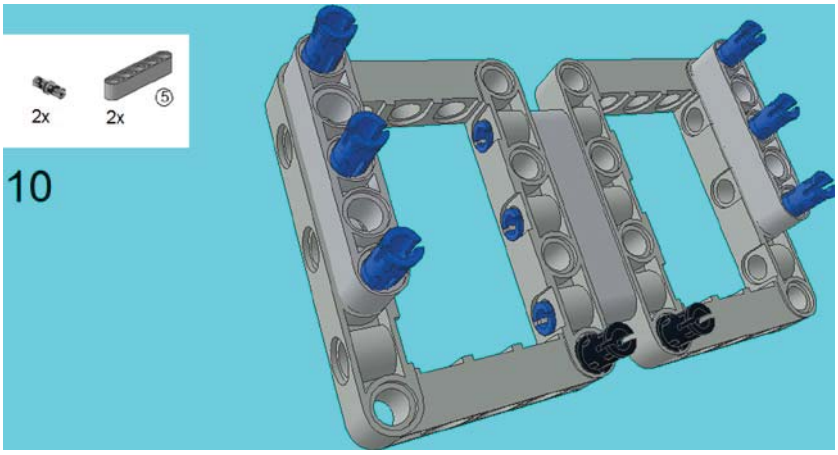

Figure 3-9. *Slide on a 5M beam on each side and add two connector pegs*

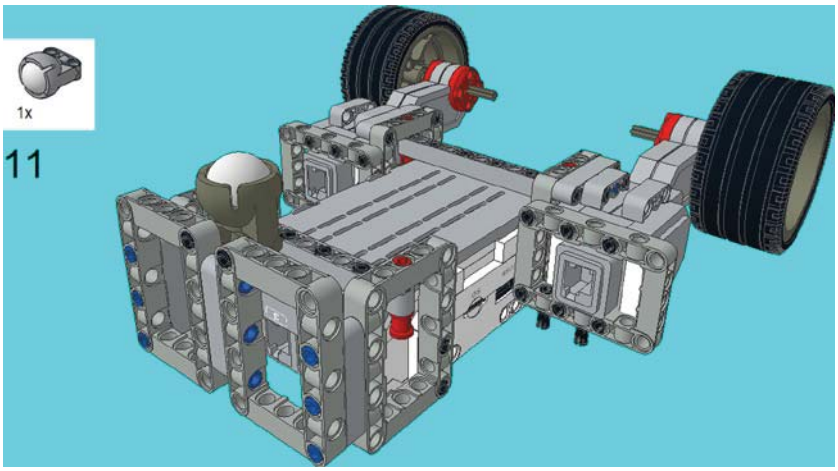

Figure 3-10. *Take the structure from steps 8-10 and snap it into place as shown. Insert the metal ball into the power joint, and snap it into place on the two connector pegs from the last step*

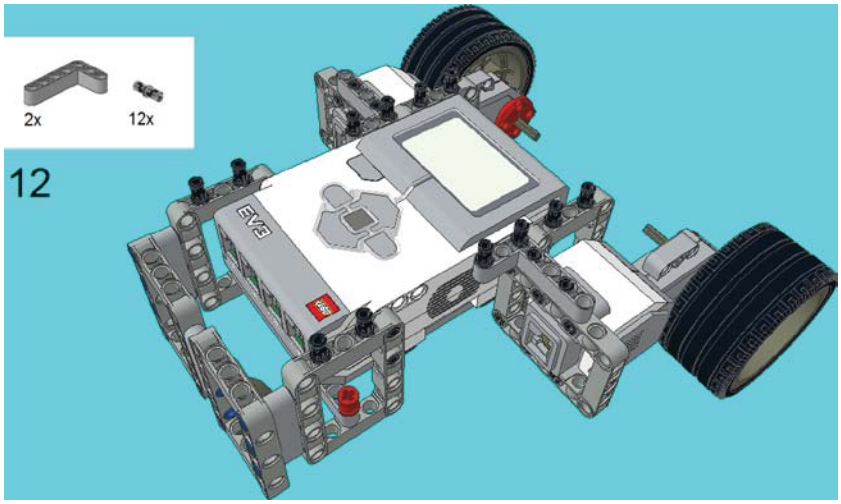

Figure 3-11. *Insert the 5 x 3 beam on the top of the structure as shown, and then the 12 connector pegs as shown*

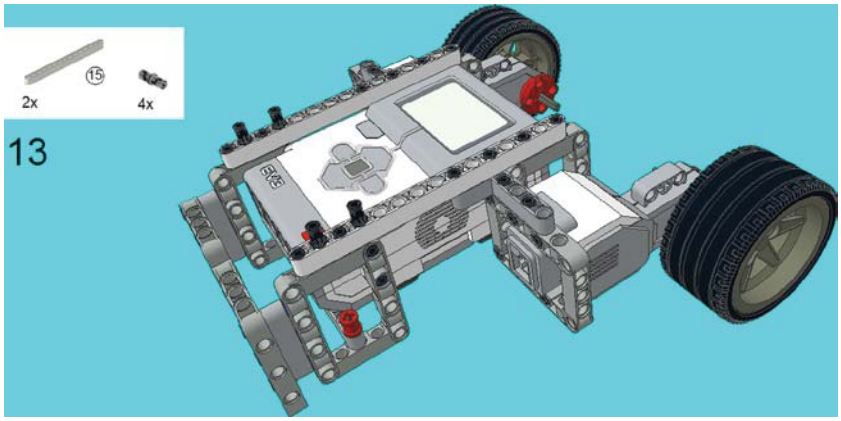

Figure 3-12. *Snap on the 15M beams, which will cap off the structure. Place the four connector pegs as shown*

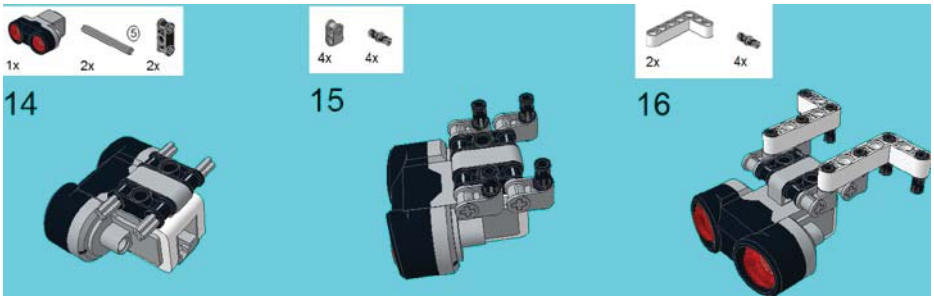

Figure 3-13. *Slide the two 5M axles on the Ultrasonic Sensor, and then cap them off with the double cross blocks. Slide on the 90 degree cross blocks, and insert the connector pegs. Snap on the 5 x 3 beams, and insert the connector pegs underneath*

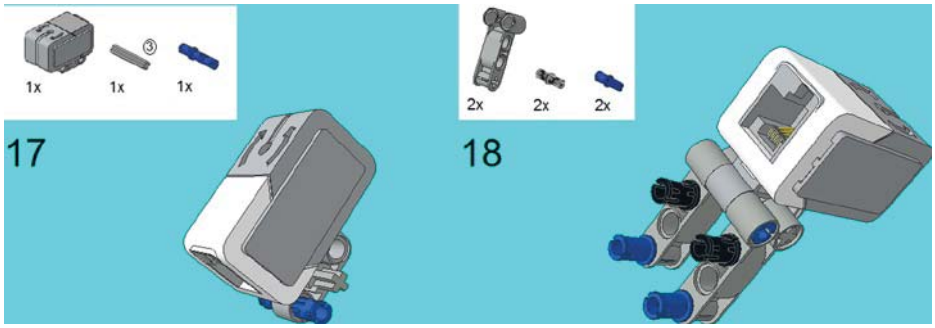

Figure 3-14. *Center a 3M axle and 3M connector peg on the bottom of the Gyro Sensor. Snap on the 2 x 4 cross block on this, as well as the connector pegs and connector peg/cross axles*

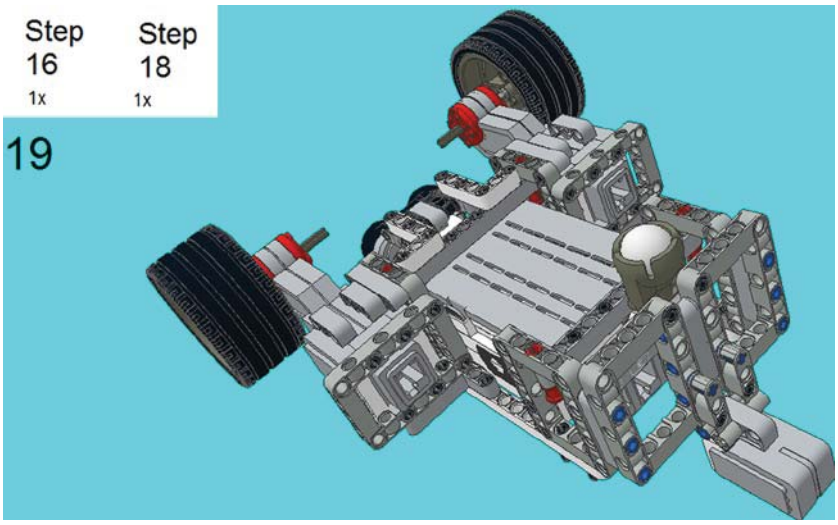

Figure 3-15. *Turn the construction upside down, and you can insert the steps from 14-16 on the bottom as shown. Insert the construction from steps 18-19 on the other side*

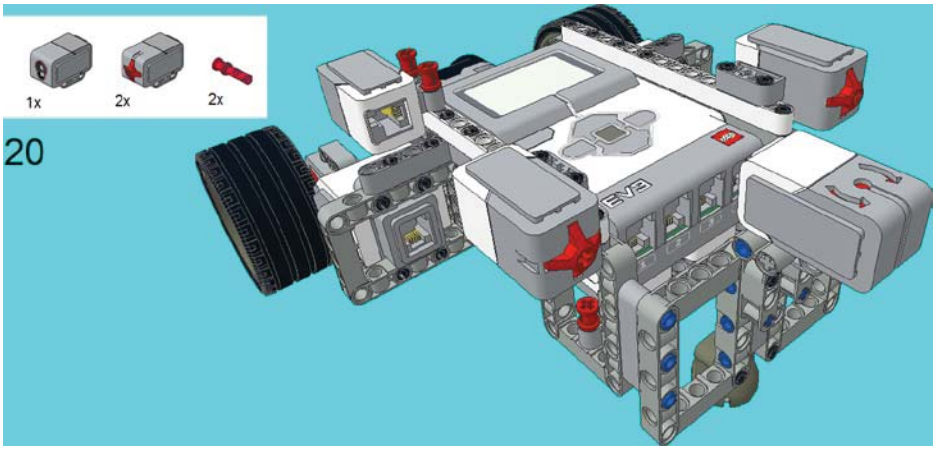

Figure 3-16. *Insert two Touch Sensors on the connector pegs on top. Snap the Color Sensor into place with the friction snaps*

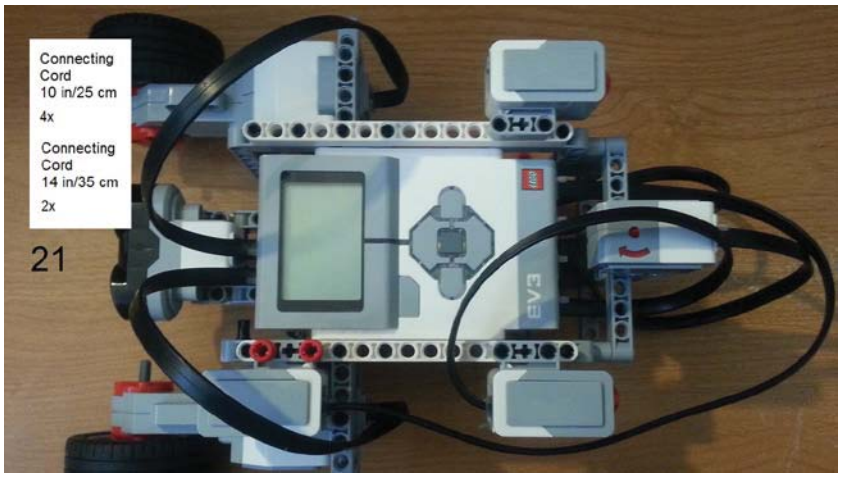

Figure 3-17. *Insert the connecting cords. Connect the Large Motors to Ports B and C. Connect the Touch Sensor to Port 1, the Gyro Sensor to Port 2, the Ultrasonic Sensor to Port 3, and the Color Sensor to Port 4*