Lab 1: Building a Mobile Robot Base

Out: Thursday, 22 January 2015
Due: Thursday, 29 January 2015

Reading: The Art of LEGO Design, Fred Martin, handed out in class on Tuesday, 20 January, and also available on the course web site

Overview: This lab is focused on building a mobile base for your CBC, which will be used in future labs.

What to do: For the first labs, we will be using the CBC mounted on a mobile base. This base should have the ability to turn, which is most easily accomplished by building a chassis that has rear wheels with separate motors and some form of caster on the front (could be slides or caster wheels).

You can design your own base using materials in the lab (including Lego, K’Nex and Vex – but you need not feel limited to use only those materials). Plexiglas mounts are available for the modified servos, which will allow the servo to interface easily with Lego.

You can model your base after the Handy Bug 9719 described in Section 2.2.2 of the Martin book (pages 50 – 71), although you will need to adapt it to use the non-LEGO motors that we’ll be using in the course. A copy of this book will be available in the lab (and should stay in the lab). The parts are listed on pages 54 – 56, with the following corrections:

• p. 54, halfway down: 4 2x4 bricks listed (correctly) with incorrect picture (1x2 Technic beam). You need the 4 2x4 bricks, not the 1x2 Technic beam.
• p. 56, last item: 2 black rubber bands are listed. These are too small. Use 2 yellow rubber bands instead. (Better yet, as these will be hard to find in the bins, create a different bumper for your robot.)

You will need to modify the design to hold the CBC, but it shouldn’t require too many modifications. You will definitely need to modify for different touch sensors.

Regardless of your approach, you will need to have your mobile base completed before next Thursday’s lab. In our lab on Thursday 1/29, we will be programming the robot, so it is important that your robot is ready to go. Your grade for this lab will be a binary grade, given on Thursday 1/29 at the start of lab. If your robot is built, you will get full credit. If your robot is not built, you will get no credit. There is nothing to write up for this lab.