Gadgetron Robot Factory

STEP 1

DESIGN ROBOTS ON THE WEB

The Robot Factory web tool makes it fun and easy to design simple, Arduino-based robots without any electronics experience. You can select from a menu of parts (e.g., LEDs, motors, servos, buttons, and sensors), and position them using simple drag-and-drop tools. The tool provides feedback about design constraints like microcontroller pin limitations and tracks the cost of your robot.
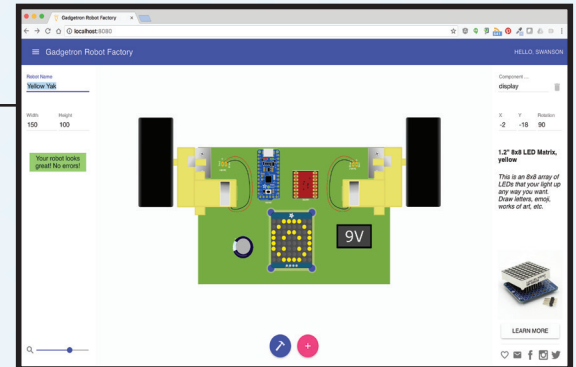

STEP 2

ROBOT FACTORY DESIGNS THE ELECTRONICS

Once your design is complete, the Gadgetron Robot Factory analyzes your design and creates all the design files necessary to manufacture the robot's printed circuit board using an online service like 4PCB.com. It also provides a complete bill of materials so you can order all the parts you'll need from online retailers like Adafruit, Sparkfun, and Digikey.
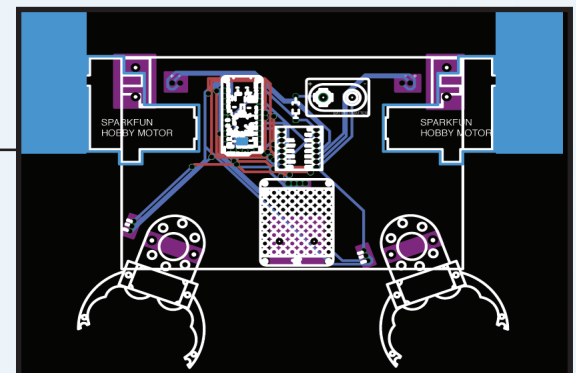
STEP 3

ASSEMBLE AND PROGRAM THE ROBOT

After you've recieved all the parts, you can assemble your robot using simple soldering skills (all the connections are through-hole). Then, you can program your robot using the Arduino IDE. The Robot Factory provides simple starter code to test your robot and help you get started.

TRY IT YOURSELF: http://robots.gadgetron.build
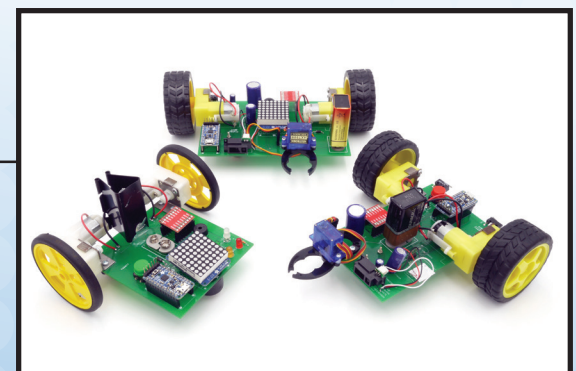
For more information contact Dr. Steven Swanson (swanson@cs.ucsd.edu)

UCSD **CSE** Computer Science and Engineering

UC San Diego

Gadgetron Robot Factory FAQ

1. Who is this for?

The target audience is students and hobbyists. The goal of the robot factory is to make it fun and easy for people with limited electronics experience to build a simple electronic device and program it.

We use the Gadgetron Robot Factory to teach a lab section of UCSD's intro to programming course, but it's also appropriate for motivated junior high or high school students if they have electronics and programming experience. Younger kids could use it as well, with appropriate supervision and guidance. Don't let kids solder on their own!

2. How hard is it?

We are working hard to make it as easy as possible, and it's getting easier all the time. The design process is very easy. The web tool allows you to add and arrange the robot's components using simple, intuitive tools.

The ordering and assembly process requires some knowledge of PCB design and simple soldering skills, and it will require someone with electronics knowledge to either perform the assembly or help out.

To program the robot, you'll use the standard Arduino programming environment. It's relatively easy programming, and the robot factory provides sample code to get started, but you should be familiar with Arduino programming.

3. How much do the robots cost?

Using the Gadgetron Robot Factory tool is free. A typical robot will cost between $50 and $150 to build, but it depends on several factors. This does not include the cost of the soldering iron and batteries.

The bill of materials gives the approximate cost of the robot's parts, but it doesn't include the cost of manufacturing the printed circuit board (PCB) that forms the robot's body. 4PCB.com offers a deal for simple PCBs for $33/board. If you are a student, they will let you order a single board, otherwise you need to order at least four. The design files should work for most PCB manufacturers.

You'll order the rest of the parts from online vendors using the part numbers the tool provides, and the prices listed in the web tool should be mostly up-to-date. If you have your own parts, you can substitute them to reduce the cost.

4. Who are you? Why are you doing this?

We are the Gadgetron research group in the Computer Science and Engineering Department at UC San Diego. Our research focuses on building tools that make it easier for people to design electronics and computer systems. We are releasing the tool because getting real-world feedback is the best way to figure out how we should improve it. The head of the group is Professor Steven Swanson (swanson@cs.ucsd.edu).

5. Can I use this in my club/class/maker space?

Yes! We'd love to have more people use the tool! Go for it! If you want discuss how to best use the Robot Factory, please send email to swanson@cs.ucsd.edu. We can provide access to some features of the robot factory that make it easier managed multiple designs (e.g., producing a single bill of materials for all the robots your group builds).

6. How do I get started?

The robot factory is at http://robots.gadgetron.build, and you can learn more about our research group at http://www.gadgetron.build. Contact gadgetron@eng.ucsd.edu if you have any questions.