

- Courseware (/courses/UTAustinX/UT.6.01x/1T2014/courseware)
- Course Info (/courses/UTAustinX/UT.6.01x/1T2014/info)
- Discussion (/courses/UTAustinX/UT.6.01x/1T2014/discussion/forum)
- Progress (/courses/UTAustinX/UT.6.01x/1T2014/progress)
- Questions (/courses/UTAustinX/UT.6.01x/1T2014/a3da417940af4ec49a9c02b3eae3460b/)
- Syllabus (/courses/UTAustinX/UT.6.01x/1T2014/a827a8b3cc204927b6efaa49580170d1/)
- Embedded Systems Community (/courses/UTAustinX/UT.6.01x/1T2014/e3df91316c544d3e8e21944fde3ed46c/)

The compete software for this robot is included in as the **C14_WallFollower** project included with the TExaS Chapter 14 installation.

VIDEO 14.7. AUTONOMOUS ROBOT DEMONSTRATION

Help

	1:47 / 1:47	1.0x			
--	-------------	------	--	--	--

DR. RAMESH YERRABALLI: Hi.
I'm Professor Yerraballi, and this is the University of Texas at Austin.
DR. JONATHAN VALVANO: And I'm Professor Valvano.
And today we're going to demonstrate this robot we've been building.
DR. RAMESH YERRABALLI: OK, so John, let's talk about some of the components on that robot.
DR. JONATHAN VALVANO: There are three components.
The infrared sensors together with A to D converter
are used to measure distance to the wall.
The background thread, the interrupt service thread
will generate two PWM signals to control the power to the two motors
so that I can turn left and right.
And the controller, the main loop of the

will adjust the power to the two motors
and attempt

to drive straight down the road.

DR. RAMESH YERRABALLI: OK, so we saw
the software, we saw the components,
now let's see it run.

DR. JONATHAN VALVANO: Yeah, let's try it.

Straight down the road, there.

Straight down the road.

DR. RAMESH YERRABALLI: Wally.

DR. JONATHAN VALVANO: Oh, yeah.

Nice and straight.

DR. RAMESH YERRABALLI: Yeah.

DR. JONATHAN VALVANO: Nice and
straight, nice and straight.

DR. RAMESH YERRABALLI: Take it easy.

DR. JONATHAN VALVANO: Look out for
the wall.

Yeah.

And around the corner.

Yeah, Wally.

Good job.

Don't hit the cameraman.

DR. RAMESH YERRABALLI: So Jon, what
have we learned from this lab?

DR. JONATHAN VALVANO: Today we
learned that the sensors collect
information,

and the A to D converter on the micro
controller

converts that information into digital
numbers.

The software then can make decisions on
those numbers,

and then have outputs connected to
actuators that can affect the world.

DR. RAMESH YERRABALLI: So that's it.

Embedded Systems shape the world.

DR. JONATHAN VALVANO: Indeed.

BILL OF MATERIALS

- 1) Two DC geared motors, HN-GH12-1640Y,GH35GMB-R, Jameco Part no. 164786
 - 0.23in or 6 mm shaft (get hubs to match)
- 2) Metal or wood for base,
- 3) Hardware for mounting
 - 2 motor mounts 1-1/4 in. PVC Conduit Clamps Model # E977GC-CTN Store SKU # 178931 www.homedepot.com
 - some way to attach the LaunchPad (I used an Erector set, but you could use rubber bands)
- 4) Two wheels and two hubs to match the diameter of the motor shaft
 - Shepherd 1-1/4 in. Caster Rubber Wheel Model # 9487 www.homedepot.com
 - 2 6mm hubs Dave's Hubs - 6mm Hub Set of Two Part# 0-DWH6MM www.robotmarketplace.com
 - 2 3-Inch Diameter Treaded Lite Flite Wheels 2pk Part# 0-DAV5730 www.robotmarketplace.com
- 5) Two GP2Y0A21YK IR range sensors
 - Sparkfun, www.sparkfun.com SEN-00242 or <http://www.parallax.com/product/28995>
- 6) Battery
 - 8.4V NiMH or 11.1V Lilon. I bought the 8.4V NiMH batteries you see in the video as surplus a long time ago. I teach a real-time OS class where students write an OS then deploy it on a robot. I have a big pile of these 8.4V batteries, so I used a couple for the two robots in this class. NiMH are easier to charge, but I suggest Li-Ion because they store more energy/weight. For my medical instruments, I use a lot of Tenenergy 31003 (7.4V) and Tenenergy 31012 (11.1V) (internet search for the best price). You will need a Li-Ion charger. I have used both of these Tenenergy TLP-4000 and Tenenergy TB6B chargers.
- 7) Electronic components
 - two TIP120 Darlington NPN transistors
 - 2 1N914 diodes
 - 2 10uF tantalum caps
 - 7805 regular
 - 2 10k resistors

WEBSITES TO BUY ROBOT PARTS

Robot parts

Pololu Robots and Electronics (<https://www.pololu.com/>)

Jameco's Robot Store (<http://www.robotstore.com/>)

Robot Marketplace (<http://www.robotmarketplace.com>)

Sparkfun (<http://www.sparkfun.com/>)

Parallax (<http://www.parallax.com/>)

Tower Hobbies (<http://www.towerhobbies.com/>)

Surplus parts

BG Micro (<http://www.bgmicro.com/>)

All Electronics (<http://www.allelectronics.com/>)

Wally drives himself | 14.5. Robot Car Control...

<https://courses.edx.org/courses/UTAustinX/UT...>

Newark (US) (<http://www.newark.com/>) or **element14 (worldwide)** (<http://www.element14.com>)

Digi-Key (<http://www.digikey.com>)

Mouser (<http://www.mouser.com>)

Jameco (<http://www.jameco.com>)

Part search engine

Octopart (<http://octopart.com/>)



About (<https://www.edx.org/about-us>) Jobs (<https://www.edx.org/jobs>)
Press (<https://www.edx.org/press>) FAQ (<https://www.edx.org/student-faq>)
Contact (<https://www.edx.org/contact>)



EdX is a non-profit created by founding partners Harvard and MIT whose mission is to bring the best of higher education to students of all ages anywhere in the world, wherever there is Internet access. EdX's free online MOOCs are interactive and subjects include computer science, public health, and artificial intelligence.



(<http://www.meetup.com/edX-Global-Community/>)



(<http://www.facebook.com/EdxOnline>)



(<https://twitter.com/edXOnline>)



(<https://plus.google.com/108235383044095082735/posts>)



(<http://youtube.com/user/edxonline>)

© 2014 edX, some rights reserved.

Terms of Service and Honor Code -
Privacy Policy (<https://www.edx.org/edx-privacy-policy>)