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Feb. 27: Carnegie Mellon's Robotics Academy Develops Programming Language for Robots

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ROBOTC Language Supports LEGO Mindstorms and Other Educational Robots

PITTSBURGH — Educators at Carnegie Mellon University's Robotics Academy have developed ROBOTC, a programming environment optimized for use with educational robots at the high school and college levels. Its industry-leading features enable the beginning student to successfully design and program sophisticated robots in hours, rather than the weeks of instruction typical of other systems.

The ROBOTC programming language works with LEGO Mindstorms RCX & NXT, as well as with the Innovation First VEX and FRC controllers. These are the dominant controllers used to teach robotics in today's classrooms and are also used in a growing number of robot competitions, such as FIRST.

"Students interested in robotics migrate to a new robot platform every year or two as they progress from middle school through college," said Robin Shoop, director of the Robotics Academy. "Prior to ROBOTC, each time the robot 'brain' changed, the student needed to learn a completely different programming solution. ROBOTC, with its cross-platform capabilities, eliminates the re-learning as students migrate to different and more sophisticated 'brains.'"

An innovation unique to ROBOTC is an integrated, full-featured debugger that allows the programmer to find and eliminate programming errors. A beginning roboticist often finds that it takes longer to debug a program than to write the program. The integrated debugger in ROBOTC can significantly reduce that correction time. The PC-based debugger works with the robot in wireless mode without slowing the execution of the program being debugged.

The new programming language also has a "power user" mode for the gifted or expert student. Built-in tutorials and how-to videos are just some of the techniques that shrink the learning curve. ROBOTC is continuously being upgraded based on feedback from thousands of early student users.

"Our experience is that by the end of the first 45-minute lesson, students have successfully designed and programmed a simple program in ROBOTC," Shoop said.

Unlike other programming platforms for educational robots, ROBOTC is a full-featured implementation of the industry-standard C programming language. It is not a "reduced" feature or proprietary platform-unique solution. ROBOTC has an optional user-controlled "novice" mode that hides advanced features and concepts from the beginner.

A version of ROBOTC for use with Qwerk robot controllers is expected later this year. The Qwerk controller was developed jointly by the CREATE Lab in Carnegie Mellon's [Robotics Institute](#) and by Charmed Labs of Austin, Texas, and can be used to build a wide variety of custom robots.

The Robotics Academy (www.education.rec.ri.cmu.edu), an outreach program of the Robotics Institute, is a leader in the use of robots as teaching tools in support of science, mathematics and engineering education. A free test drive of ROBOTC is available at www.robotc.net.

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