

# Faculty Showcase 'o6

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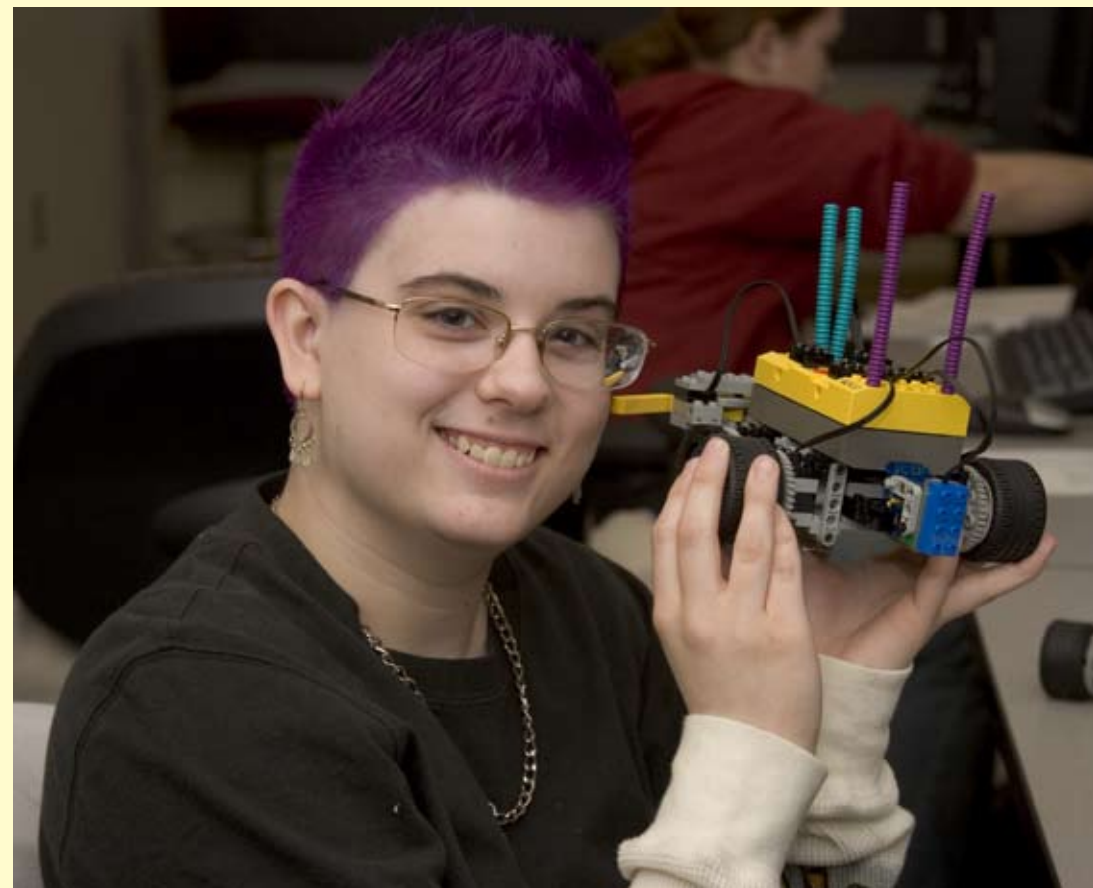
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## Goals

- Use robots as demonstration models for computer programming
- Develop a more intuitive grasp of the structure of computer code in relationship to the physical world
- Apply mathematics to a real-world problem



## Using Lego Robots to Teach Computer Programming



### Project Overview

Computing and robotics are ubiquitous. Although many of us aren't aware of it, we interact with some form of programmable device on a daily basis, like the embedded software in our cars, elevators, and telephones. However, in most introductory programming courses, assignments focus on programs that are used only at a computer console. Using robots in CS 112 demonstrates the portability and flexibility of computer programs by un-hooking them from the computer console.



In addition, programmable robots can be made to demonstrate very tangibly the cause and effect of specific written commands. The programmer can see, through the robot's actions, the effect of her code on the robot's actions. This helps the student programmer gain an intuitive grasp of the machine interface as well as the relationship between the structure of the code and the physical world. These robots also use programmed mathematics to navigate their world. The student codes the formulas to regularly sample the environment through light and touch sensors and then react by, e.g. turning away from an obstacle or light.

### Applications Beyond

Because embedded computer programs are so widespread, any application that allows students to gain an intuitive grasp of the power and limitations of these programs helps her navigate this technology rich world. In addition, building a device, even one as simple as a toy robot, encourages a tactile and active participation with one's work. Once the robot is built, the student has to apply critical thinking to map out the strategy for solving a very visible problem. This kind of active participation and multi-sensory feedback is a very effective pedagogical tool.

