

# January 2005

MAINE'S SOURCE FOR ENGINEERING AND PROGRAMMING EVENTS

## UPCOMING EVENTS

**FEBRUARY 22<sup>ND</sup>-24<sup>TH</sup>**

Winter Robotics Camp

**APR 30<sup>TH</sup>**

Spring LEGO® Track Meet

**MAY 21<sup>ST</sup>**

High School Robotics &  
Programming Competition

**July and August**

Summer Robotics Camps

Maine Robotics is home to Maine's FIRST™ LEGO® League, Maine's summer robotics and engineering camps for youth, the Spring LEGO® track meet, and the High School Robotics and Programming Competition.

Maine Robotics believes that only by working with Maine's youth from an early age and continuing through their entire educational experience can we expect our youth to successfully grow into the fields of science, engineering, computers, and technology.

Our youth want the experiences, they are ready for the tasks and lives that lay ahead of them, but we as a state and a people must help them realize this potential for their sakes as well as the sake of our state's well being.

## Maine Robotics

167 Bennoch Road

Orono, ME 04473

207-866-4340

Tom Bickford, Director

[bickford@mainerobotics.org](mailto:bickford@mainerobotics.org)

[www.mainerobotics.org](http://www.mainerobotics.org)

## Why Robots?

By Tom Bickford

I've been in science for as long as I can remember; I started taking educational classes in high school; and I've been doing both together since I graduated from college many years ago.

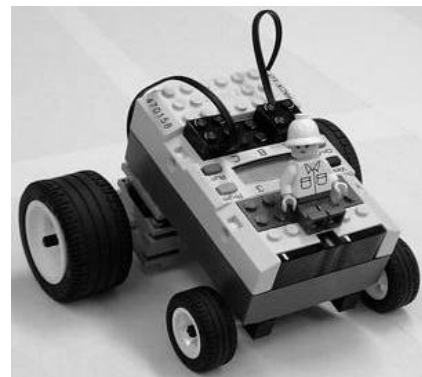
I have interests and degrees in biology, biomedical engineering, computers, and informational technology. So why Robotics?

In 2000 when I went looking for educational outreach programs to interest youth I looked at dozens and dozens of the current science programs out there on a state and national level. Many have the same problem, keeping the children (and those running them) interested throughout the year, year after year.

When I came across the FIRST™ LEGO® League program it was still new. I think that first year we participated there were about 1600 children in the program across the U.S. Last year there were 40,000. And you didn't see it advertised on T.V., or the radio. By word of mouth and volunteers the program has been growing almost exponentially since it started, largely because of its innate appeal to children.

They already know about LEGOs, they grew up with them. They also have grown up, in large part, with computers. But now they can do a project in a reasonable amount of time (hours versus days or weeks) in which they can affect their environment. They can control these devices by thinking through what needs to be done and using their imagination to get it done.

It works! Don't believe me? Find a local team in your area and see what fun they have while learning. It is an empowering, multidisciplinary process all the way.



## Maine's Spring LEGO® Track Meet (MSLTM)

*April 30<sup>th</sup>, 2005*

*Brewer High School*

*Registration required for participation, but event is open to the public.*

**NEW!**

Since 2000 hundreds of youth across the state have been participating in the FIRST™ LEGO® League program in the fall. Many of these teams, schools, and children have been looking for a program that can take them beyond the fall and keep them active in their robotics interest.

The track meet is geared toward using more straightforward principles of physics and programming in order to compete in a track meet event. With 6 events including:

1. Slope climbing
2. Table navigation
3. Line following
4. Fastest Robot
5. Strongest Robot
6. Strongest bridge (non-robotic)

There is something for everyone and we are working with any interested

teacher or group in educating our youth on the basic principles of physics, engineering and programming needed to successfully compete this year.

The program is good for either experienced FLL teams, or new groups starting out for the first time.

### Maine's High School Robotics and Programming Competition

May 21<sup>st</sup>, 2005

Brewer High School

Registration required for participation, but event is open to the public.

**NEW!**

Since 2000 youth from Maine's schools and communities have been participating in the FIRST™ LEGO® League and have not had an equivalent opportunity to participate in robotics and programming in High School.

This program is designed to give these students and others with an interest in engineering and programming an opportunity to "show their stuff".

Each team will have the opportunity to build a creation out of LEGO's that operates using the LEGO MindStorms robotics platform. What the creation does and how it performs will be up to the team's imagination.

Designed very much like a science fair, each team will be evaluated and receive feedback on their engineering, programming, and presentation skills.

### The FIRST™ LEGO® League Tournament

December 2005

The FLL is a rapidly growing international program designed to foster an interest in science. FIRST means For Inspiration and Recognition of Science and Technology and was founded by famed US inventor Dean Kamen. It was first piloted in 1998 and Maine has been a part of the program since 2000. In 2004 there were some 40,000 children across North America participating in the program, making the FLL one of the largest, and certainly one of the fastest growing programs of its kind.

Each fall teams with children from 9 to 14 build, test, and program robots to perform a series of thematic missions on the year's playing field. The teams also research a related topic, prepare, and then present their hypothesis, findings, and recommendations for using robotics to improve a condition they have identified.

Last year's theme was "No Limits" and was focused on how robotics could improve the lives and accessibility of people living with disabilities.

The 2005 theme will be "Oceans Odyssey" and focus on our interdependence with the oceans and seas of the world. While picked long before the December catastrophe in the Indian Ocean it is a timely matter that will affect everyone on the planet over the coming year.

Registration for teams starts at the beginning of May and if interested you should check out our website and the [www.firstlegoleague.org](http://www.firstlegoleague.org) website for additional information.

### Summer Robotic Camps

**Beginner Camps: Weeks of**

July 7<sup>th</sup>

July 25<sup>th</sup>

August 1<sup>st</sup>

August 8<sup>th</sup>

**Advanced Camps: Weeks of**

July 25<sup>th</sup>

August 15<sup>th</sup>

**Orono and Bangor Area**

**Eligible for Camp Bangor funding**

**5 day weeks from 9 to 4**

We have run robotic camps for three years and are looking forward to our fourth year with anticipation.

Each week children from 9 to 14 join us for a week of learning, building, and fun. While an academic camp in nature the program is more about having fun while learning than anything else.

Children work in small groups, usually two in a group, and build robots to perform missions at the camp. The missions start off easy and get progressively more complex as the week goes on. Staff is on hand to help children move on with new skills as they master earlier ones.

Most children have built their first successful robot by the end of day one and are doing programming for simple out and back type movements. By the end of the third day, most are programming the robot to do more complex things, usually involving sensors that can "see" the robots environment.

Advanced camps are held as well for children who have been involved with the program before and need more challenging and independent projects.

For more information and specific dates please go to our website.

### A Word about LEGOs and LEGO Robotics

By Tom Bickford

Some would think that you can't build a meaningful robot or engineering project out of LEGOs, but as a lifelong educator and engineer I can assert that this is not the case.

Would you build a factory, a car, a microwave oven, or a space craft out of LEGOs? Of course not, but the **principles** of organizational structure, systems control, distribution of mass, balance, energy utilization, mechanics, and programming are the same.

It is not within our school budgets to build prototypes out of steel, Lexan, hydraulics, and programmable computer systems as often used in the industrial setting. However, for an investment of under \$300 a school can be building, prototyping, and programming with a LEGO MindStorms kit.

The Robotic Control System (RCX) is the brain of the MindStorms kit and can be programmed in almost any language. However, it comes with one of several powerful, yet easy to learn iconized languages. I have used these languages to teach children from grade 3 to college and have taught adults how to use the system so they may in turn use it with youth at their schools. The children by far have the easier time learning the fundamentals of engineering and programming, mostly I believe, because they haven't built up the stereotypes of these areas of science.



This example of a simple ROBO LAB program shows the program start (green light), turns on the A and C motors in the forward direction, runs until the touch sensor is pushed, then stops all the motors, plays a note, and ends the program (red light).

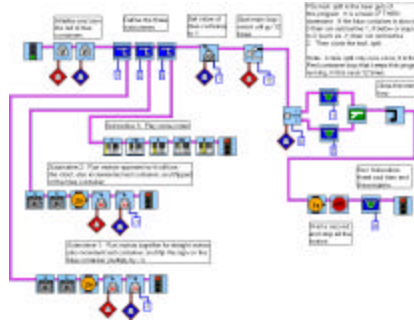


This example shows the same program but with variables added (speed of motors, where the touch sensor is attached, and which noise to make).

Mentioning programming to children is just another new experience for them and they are doing it within minutes of being shown the basics. Many adults, once you mention programming, develop a glazed look and you must not only teach the basics, but strip away the years of societal and self limitations that programming is "not for me".

## Programming is NOT a dirty word!

It would be good enough for me if it stopped there, but it doesn't.



Example of a complex program using variables, subroutines, counters, loops, and conditional statements.

The RoboLab program that comes with some of the kits, or purchased separately, has behind it the powerful LabVIEW program used by thousands of research facilities and labs across the world. You can use the RCX and sensors to do data logging. Data logging is where you collect data using the RCX and a sensor and store that information for later download to the computer. For example, maybe you want to monitor the temperature inside your terrarium or fish tank for a 24 hour cycle. With the RCX you can set how often to log the temperature (assuming you have a temperature sensor) and collect the data. The next day you download the information back to your computer and either use it within the RoboLab program or

export it for use in a spreadsheet program, allowing students and adults to graph the data and perform statistical analysis.

Again, the limit is more on your imagination, that on the ability of the equipment.

An excellent example of what can be accomplished with the system is the Rubik Cube Solver built by JP Brown. Using 2 RCXs, a USB camera, the LEGO Vision Command software, a mess of parts, and software that he wrote, the System can take scrambled Rubik's cubes and unscramble them in approximately 10 minutes (20 moves at 30 seconds a move).



For more of JP Brown's inventions, check out [jpbrown.i8.com/index.html](http://jpbrown.i8.com/index.html) website.

So what can YOU imagine doing with the kit?

### **REQUEST FOR MORE INFORMATION**

(Please check out our website for more detailed information and registration information)

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

E-mail address: \_\_\_\_\_

Phone: \_\_\_\_\_

School or organization: \_\_\_\_\_

#### **Interested in:**

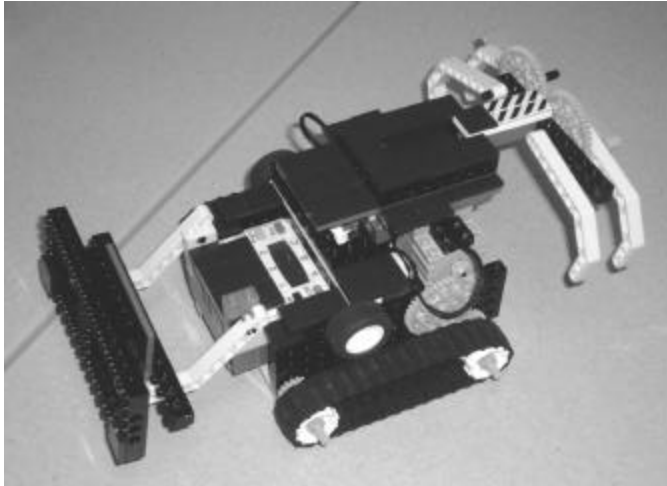
- Spring LEGO Track Meet (Grades 4 to 8)
- High School Robotics and Programming Competition
- Summer Camp Programs (Ages 9 to 14)
- FIRST™ LEGO® League (September to December - Ages 9 to 14)

Send to:  
**Maine Robotics**  
167 Bennoch Road  
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Or call us at  
207-866-4340

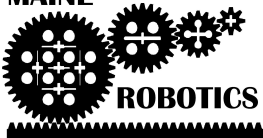
Or e-mail us at  
[bickford@mainerobotics.org](mailto:bickford@mainerobotics.org)

- ❑ **Fun for all ages of children**
- ❑ **Learning to be engineers, programmers and scientists through hands on experimentation**
- ❑ **Programs for the spring, summer and fall**



**FIRST LEGO League**  
**Spring LEGO Track Meet**  
**HS Robotics & Programming**  
**Summer Camps**

**MAINE**



**ROBOTICS**

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