



NXT Programming

by Paul Cain

Programming With Lego NXT

- Simple Motors
- Sensors
 - Color
 - Pressure
 - Ultrasonic
 - Others depending on kit
- Many Homebrew opportunities



Graphical NXT Programming

The screenshot displays the LEGO MINDSTORMS NXT graphical programming environment. The window title is "LEGO MINDSTORMS NXT" and the menu bar includes "File", "Edit", "Tools", and "Help". The toolbar contains various icons for file operations and navigation. The "User Profile" is set to "Default".

The main workspace shows a program titled "back_into_garag". The program starts with a "Decide which path to take" block, which branches into three paths:

- Top Path:** Labeled "Turn around", it contains a "CB" (Control Block) with a gear icon and a downward arrow.
- Middle Path:** Labeled "Go backwards", it contains a "CB" with a gear icon and a downward arrow.
- Bottom Path:** Labeled "Keep going forward", it contains a "CB" with a gear icon and an upward arrow.

After the decision block, the paths merge and lead to a "STOP" block. A text annotation above the "STOP" block reads "The Stop Block stops the program".

Additional annotations include "and the sensor distance slider for the flower/mountain paths" with an arrow pointing to the sensor icon in the decision block, and "3" next to the sensor icon. A large orange box highlights the "Turn around", "Go backwards", and "Keep going forward" blocks.

The interface includes a "Common" sidebar with various icons (gears, play, speaker, screen, infinity, refresh, arrows) and a "back_into_garag" tab. A "User Profile: Default" dropdown is visible in the top right. A navigation panel with a play button and other controls is located in the bottom right corner.

Text-Based NXT Programming

- Ada
- C++
- Objective C
- Java
- Haskell
- Perl
- Python
- MATLAB
- Many others...

```
Java - NewPCProject/src/com/mydomain/HelloWorld.java - Eclipse
File Edit Source Refactor Navigate Search Project Run leJOS NXJ Window Help

Package Explorer
NewNXTProject
NewPCProject
src
  com.mydomain
    HelloWorld.java
JRE System Library [JavaSE-1.7]
LeJOS PC Libraries

HelloWorld.java
package com.mydomain;

import lejos.nxt.Motor;

public class HelloWorld {
    /**
     * @param args
     */
    public static void main(String[] args) {
        System.out.println("Hello World!");
        Motor.A.forward();
    }
}

Problems Javadoc Declaration Console
<terminated> HelloWorld (1) [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (30.01.2012 23:2
Hello World!
Found NXT: NXT-51 001653114851

com.mydomain.HelloWorld.java - NewPCProject/src
```

http://lejos.sourceforge.net/nxt/nxj/tutorial/Preliminaries/ecl_project_pc11.png

http://en.wikipedia.org/wiki/Lego_Mindstorms#Programming_languages_2

LEGO Pinball Machine



<http://www.youtube.com/watch?v=hbGTGc3cZnU>

Android Remote Control with Bluetooth



<http://www.youtube.com/watch?v=fPV9YG6XnG4>

Lego Desert Eagle



<http://www.youtube.com/watch?v=LAQmMISd-Mo>

Lego Automatic Toilet Flusher



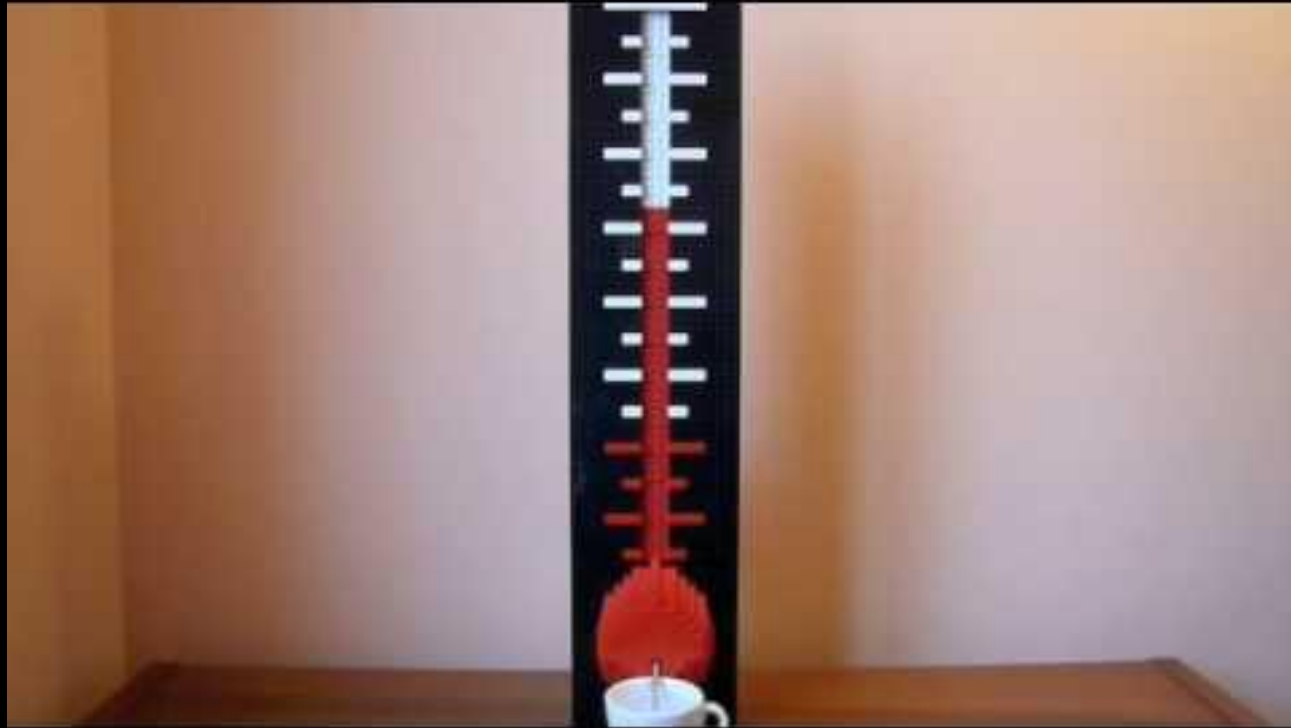
<http://www.youtube.com/watch?v=xvZU2PchUmY>

Lego Safe



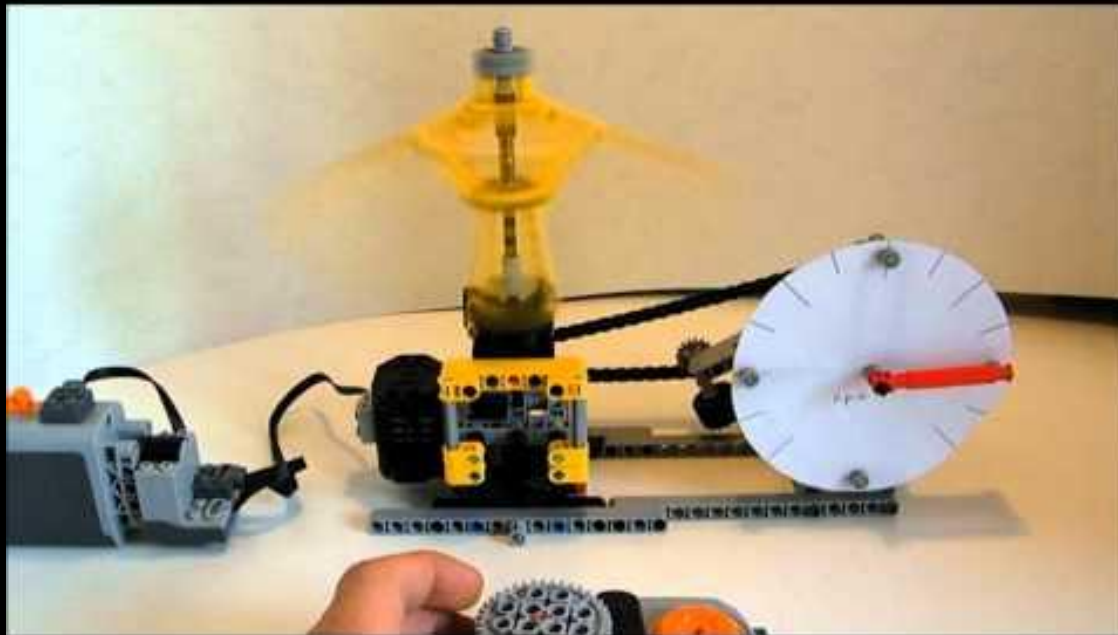
<http://www.youtube.com/watch?v=XjWt4O4bSjQ&feature=related>

Giant Thermometer



<http://www.youtube.com/watch?v=plQ8Y3XAKvA>

LEGO Centrifuge



<http://www.youtube.com/watch?v=-k2xWoyP-SA&feature=related>

Demonstration

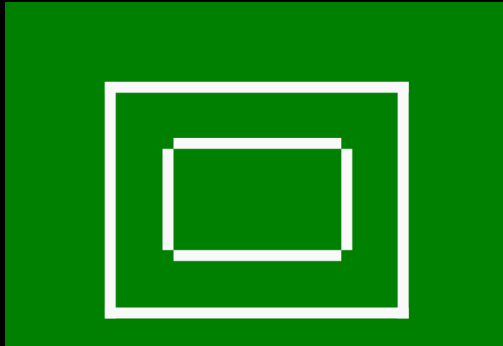
Demonstration of the movements listed in the handout

Challenges

Start



- Challenge 1: Drive into Garage
- Challenge 2: Back into Garage



- Challenge 3: Two Laps around a Track
- Challenge 4: Two Laps backwards around a Track

Review/Discussion

- What was your favorite one of the NXT devices I showed you?
- What do you think of NXT programming? Was it easy? hard? fun?
- Any other comments?