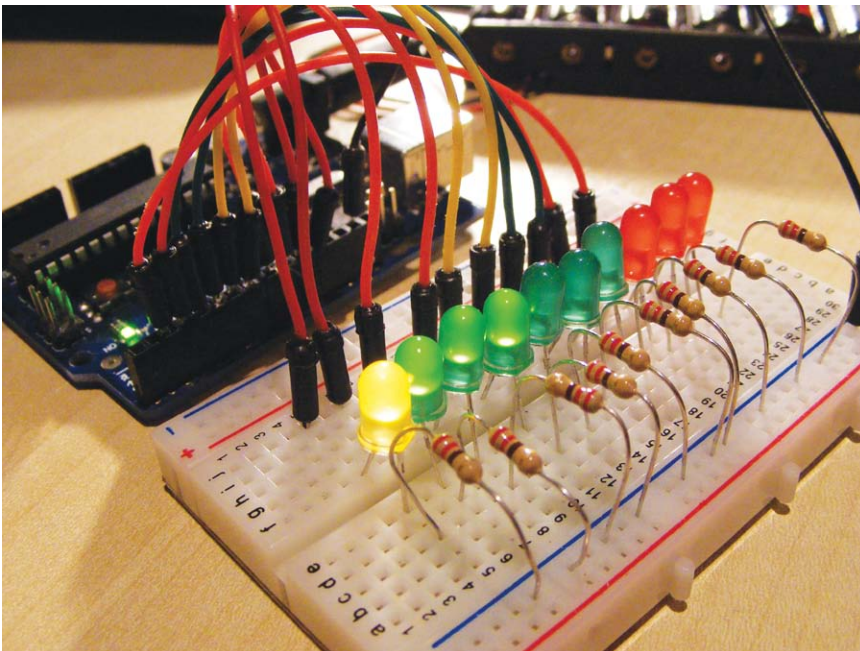
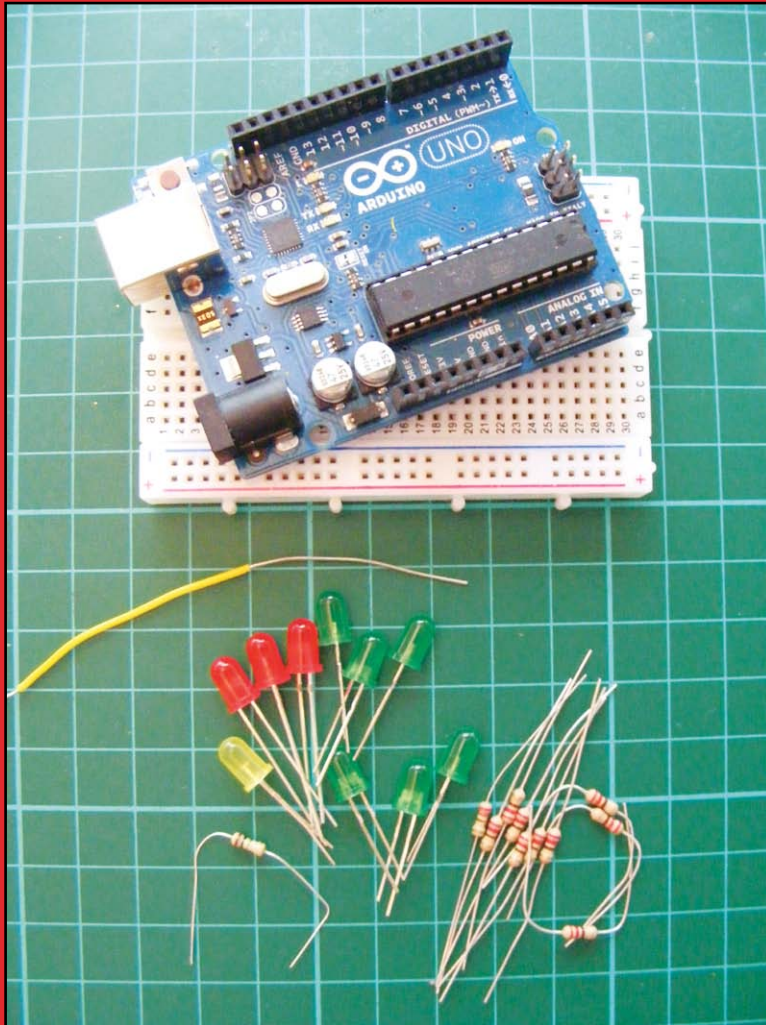


# PROJECT 6: GHOST DETECTOR

WHO WOULDN'T WANT TO MAKE A GHOST DETECTOR? THIS IS A REALLY SIMPLE PROJECT THAT DOESN'T TAKE LONG TO PUT TOGETHER, SO YOU CAN START DETECTING GHOSTS RIGHT AWAY.





### PARTS REQUIRED

- Arduino board
- Breadboard
- Jumper wires
- 3 red LEDs
- 1 yellow LED
- 6 green LEDs
- 10 220-ohm resistors
- 20-centimeter length of single-core wire
- 1M-ohm resistor

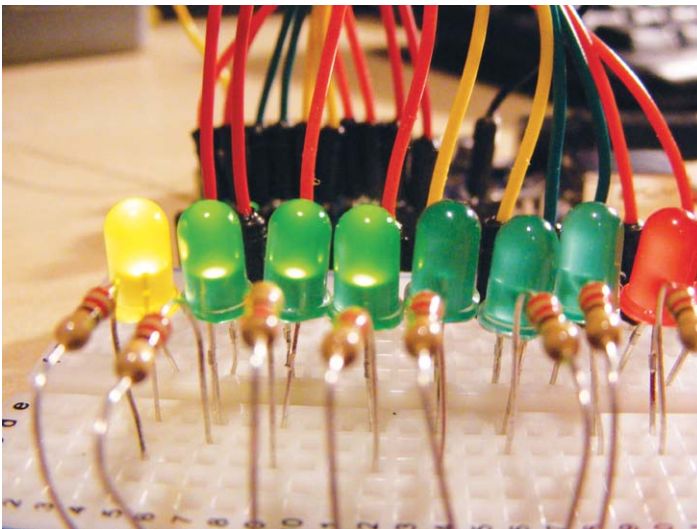
## HOW IT WORKS

Okay, so I might be stretching things a bit by calling this project a ghost detector. This project actually detects *electromagnetic fields*, but many people believe this is how to tell if there are ghosts or spirits around.

In this project, you'll set up a ghost-detecting antenna and LED bar graph system to tell whether there is a high level of electromagnetic activity in the vicinity. A length of bare wire acts as an antenna to pick up an electromagnetic field within a radius of two meters. Depending on the strength of the signal, the LEDs will light in sequence: the stronger the signal, the more LEDs will light. Power up the Arduino, and point your detector into a room to pick up any unusual presences. Be aware that electrical appliances such as televisions will cause the detector to dance around because of the signal they emit.

## THE BUILD

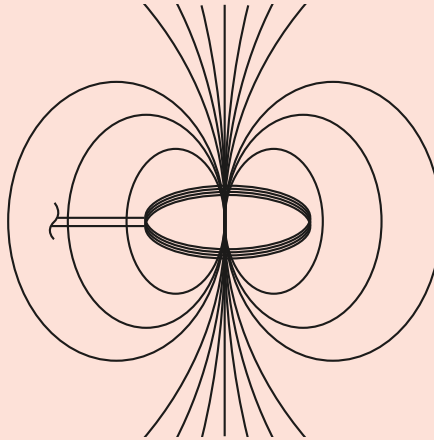
1. Place the LEDs into the breadboard with the legs on either side of the center divide (see “Breadboards” on page 4 for more on the layout of the breadboard), as shown in Figure 6-1. I started with a yellow LED, then used six green and three red LEDs to create a scale from left to right. You can use any color LEDs and position them in the sequence you prefer.



**FIGURE 6-1:**  
Placing the LEDs

## ELECTROMAGNETIC FIELDS

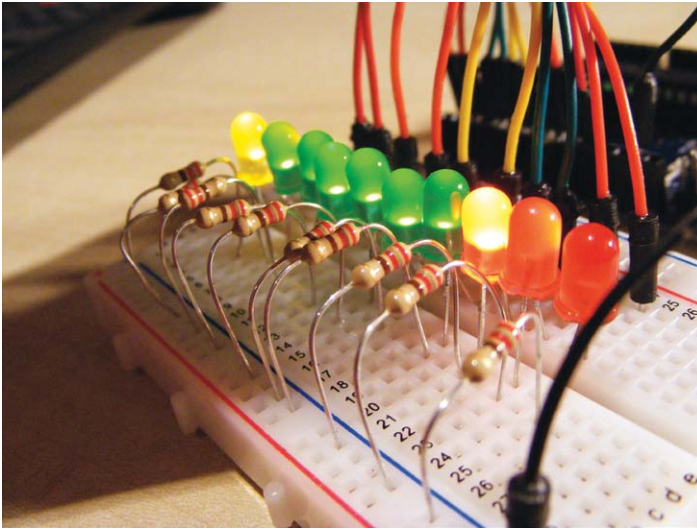
*Electric fields* are created by differences in voltage: the higher the voltage, the stronger the resultant field. *Magnetic fields* are created when electric current flows: the greater the current, the stronger the magnetic field. An *electromagnetic field (EMF)* can be thought of as a combination of the two.



Electromagnetic fields are present everywhere in the environment but are invisible to the human eye. Electric fields are produced by the local buildup of electric charges in the atmosphere and associated with thunderstorms. The earth constantly emits a magnetic field. It is used by birds and fish for navigation and causes a compass needle to orient to the north.

2. Connect one leg of a 220-ohm resistor to each negative LED leg, and insert the other resistor leg in the GND rail of the breadboard (see Figure 6-2). Connect each positive LED leg to digital pins 2 through 11 in turn.

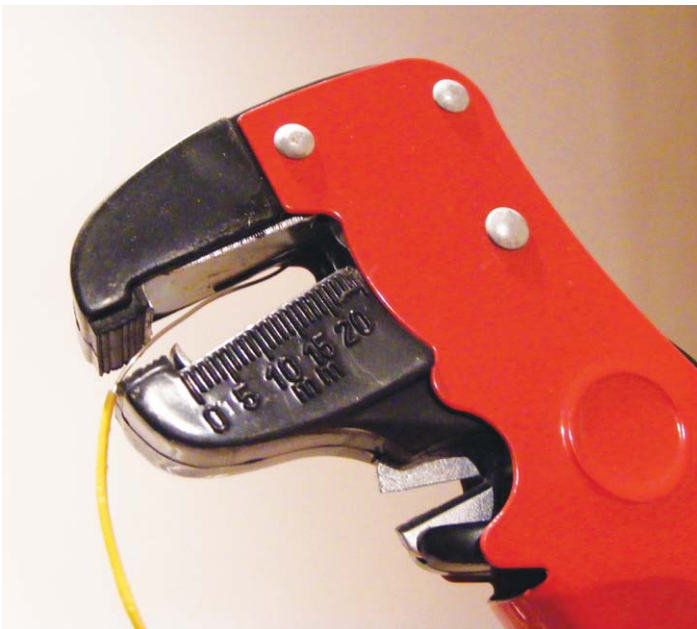
LEDs	ARDUINO
Positive legs	Pins 2–11
Negative legs	GND via 220-ohm resistors



**FIGURE 6-2:**

Connecting the LEDs to the breadboard

3. Take the 20-centimeter length of single-core wire and use a wire stripper to strip about 1 centimeter of the insulation from one end. Attach this end to Arduino pin A5. Strip about 7 centimeters from the other end—this open, bare wire end is your antenna and will pick up the electromagnetic signal (see Figure 6-3).



**FIGURE 6-3:**

Stripping wire to create an antenna



**FIGURE 6-4:**  
Circuit diagram for  
the ghost detector

4. Connect one leg of the 1M-ohm resistor directly to GND on the Arduino and the other leg to Arduino pin A5; this will increase the sensitivity of your device.
5. Check that your setup matches that of Figure 6-4, and then upload the code in “The Sketch” on page 59.

