
Arduino Breadboard Advanced Kit User Guide v2.1

By IMP-EBUSINESS

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Install Arduino IDE

1. Get an Arduino board and USB cable

In this tutorial, we assume you're using Makerduino. Makerduino uses the same Serial-to-USB chip as Arduino Duemilanove, and the same bootloader as Arduino UNO.

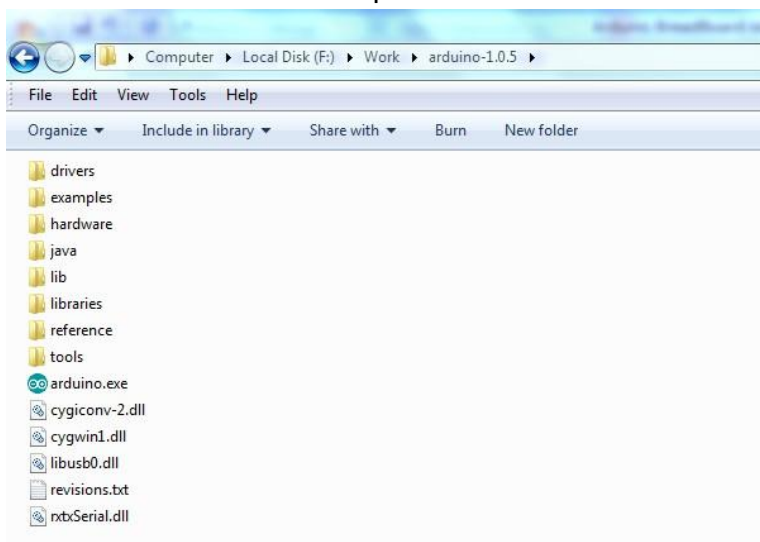
You also need a standard USB cable (A plug to B plug): the kind you would connect to a USB printer, for example.



2. Download the Arduino environment

Get the latest version from the [download page](#).

When the download finishes, unzip the downloaded file. Make sure to preserve the folder structure. Double-click the folder to open it. There should be a few files and sub-folders inside.



3. Connect the board

Connect the Arduino board to your computer using the USB cable. The green power LED (labelled **ON**) should go on.

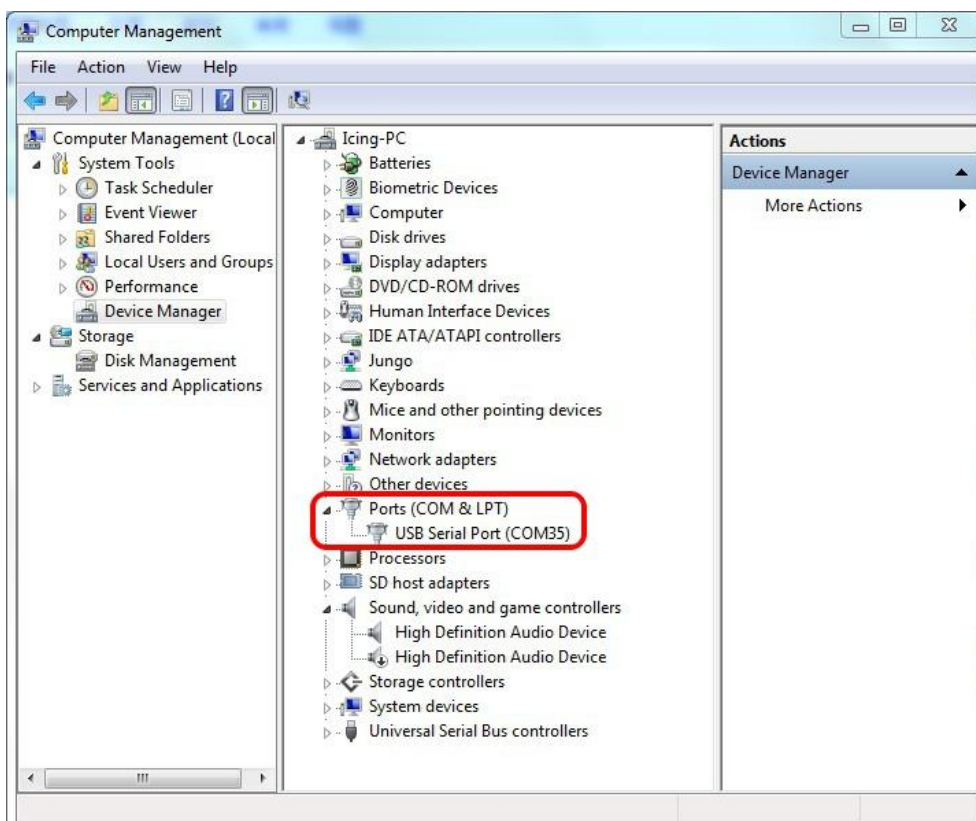
4. Install the drivers

When you connect the board, Windows should initiate the driver installation process (if you haven't used the computer with an Arduino board before).

On Windows 7/8, the driver should be automatically downloaded and installed. If it does not work for you, it can also be installed manually:

- When asked **Can Windows connect to Windows Update to search for software?** select **No, not this time**. Click next.
- Select **Install from a list or specified location (Advanced)** and click next.
- Make sure that **Search for the best driver in these locations** is checked; uncheck **Search removable media**; check **Include this location in the search** and browse to the **drivers/FTDI USB Drivers** directory of the Arduino distribution. Click next.
- The wizard will search for the driver and then tell you that a "USB Serial Converter" was found. Click finish.
- The new hardware wizard will appear again. Go through the same steps and select the same options and location to search. This time, a "USB Serial Port" will be found.

You can check that the drivers have been installed by opening the Windows Device Manager (in the Hardware tab of System control panel). Look for a "USB Serial Port" in the Ports section; that's the Arduino board.



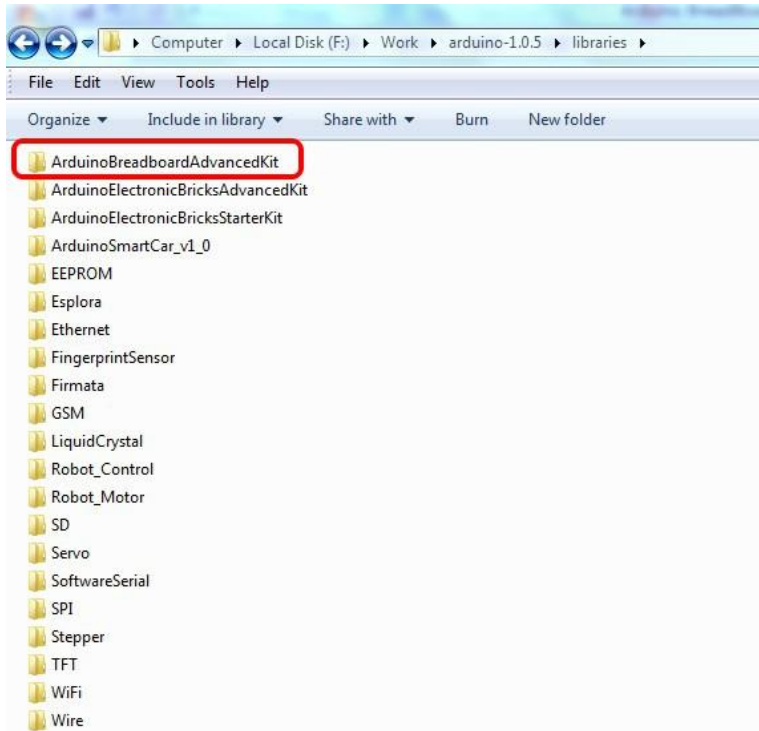
Download and Install Arduino Code Library for the Kit

Open the Google Drive Share link:

<https://drive.google.com/folderview?id=0BzxrU4QvH7jEekN5RW1SNG1DMmM&usp=sharing>

Download the zip file **ArduinoBreadboardAdvancedKit.zip**.

Unzip it directly to the path of xxx\arduino-1.0.x\libraries



Experiment 01 - Blinking LED

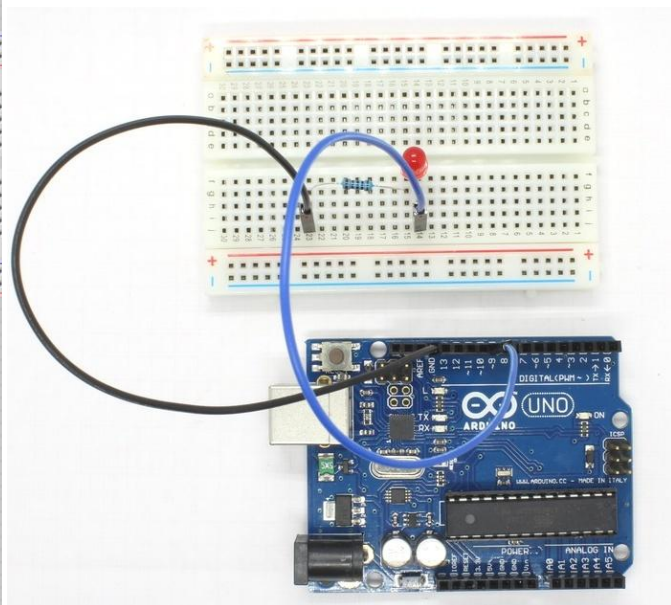
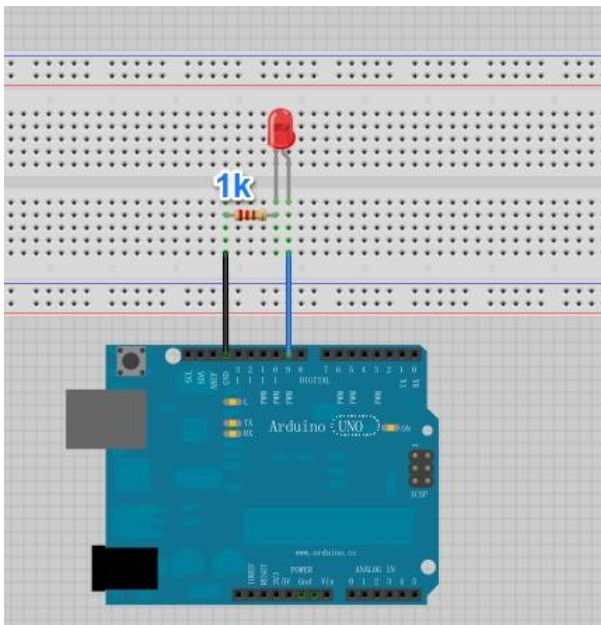
The First experiment gets you know the development flow of Arduino projects. You may learn the following functions. (Explore more Arduino functions here: <http://arduino.cc/en/Tutorial/HomePage>)

`pinMode()`

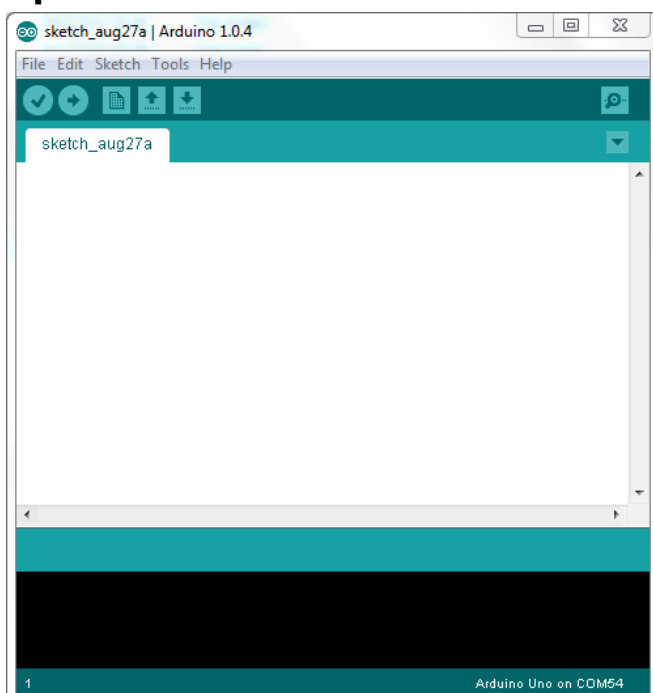
`digitalWrite()`

`delay()`

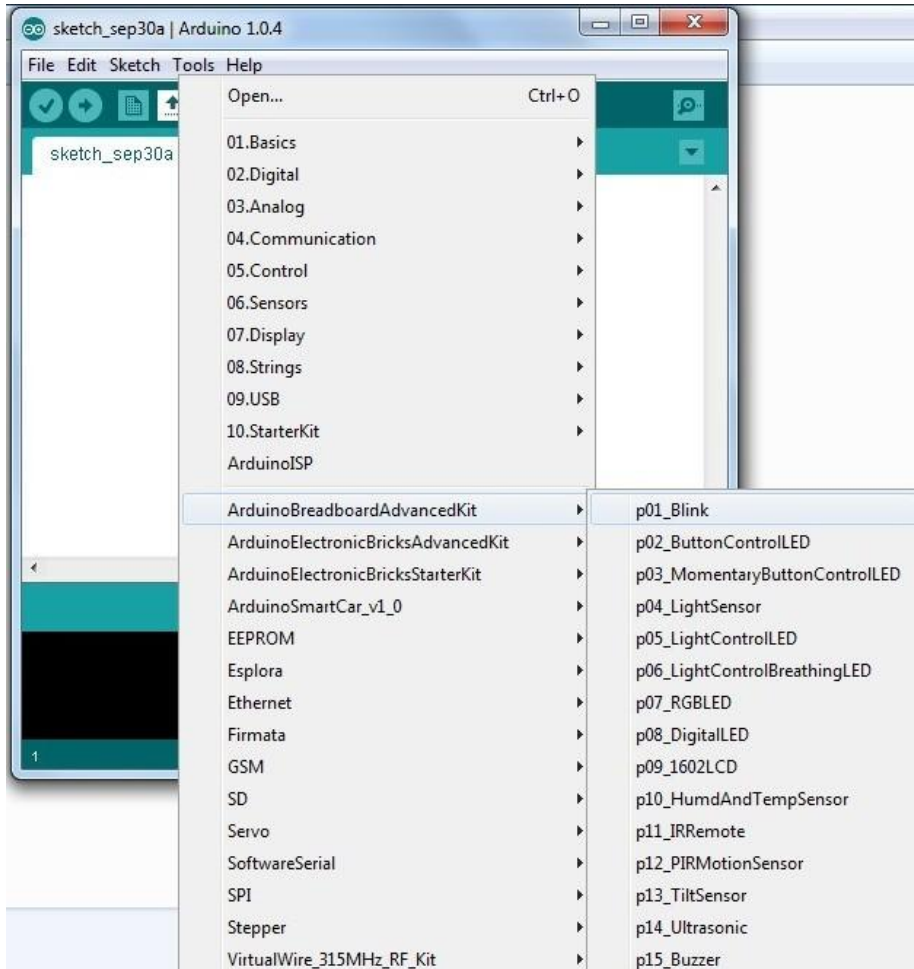
Hardware Connection



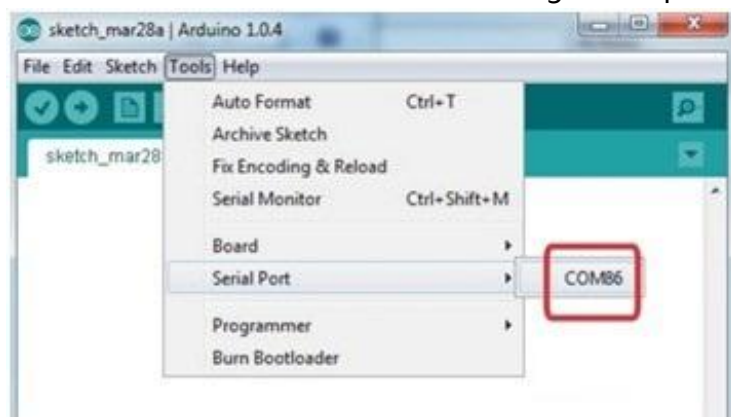
Open the Arduino IDE



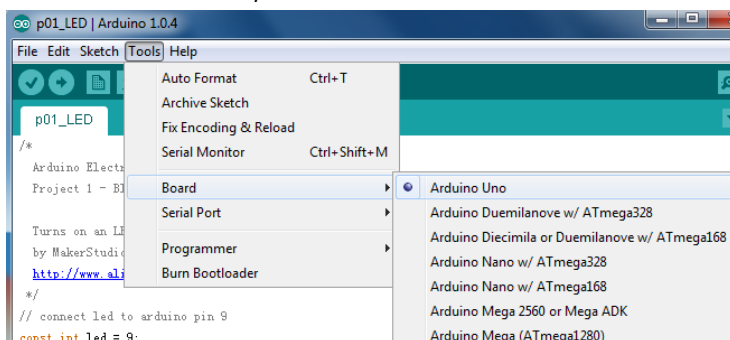
Click Open from the menu, and chose ArduinoBreadboardAdvancedKit -> p01_Blink



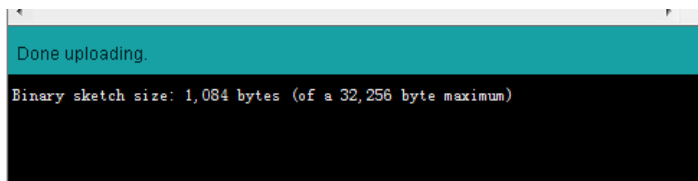
Click Tools->SerialPort, and choose the right com port, which will list after the driver successfully installed



Click Tools->Board, then choose Arduino Uno



Click Upload, the code will be compiled and uploaded to the board and shows the following information if it is success.

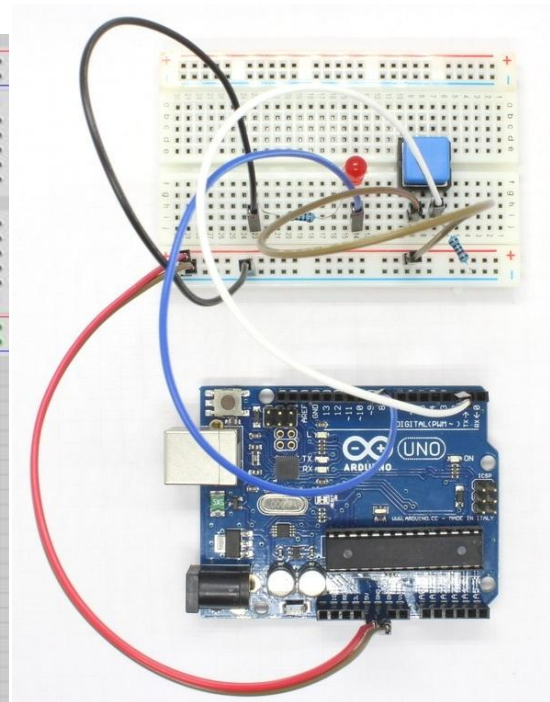
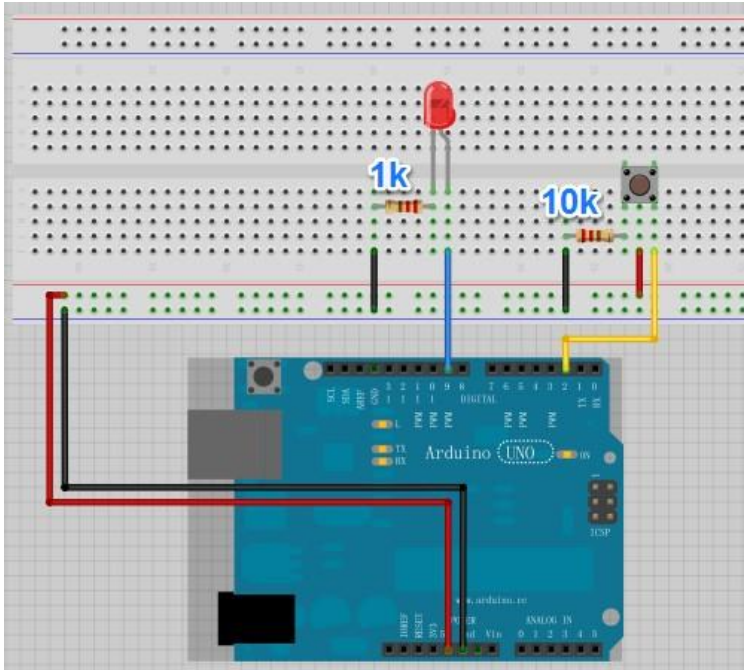


The LED on the breadboard will be blinking every one second.

Experiment 02 – Button Controlled LED

Use a button to control the LED.

Hardware Connection



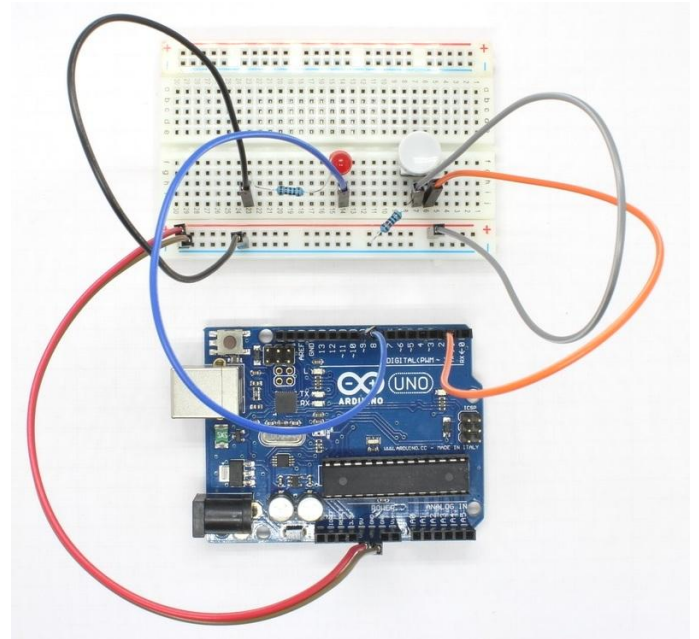
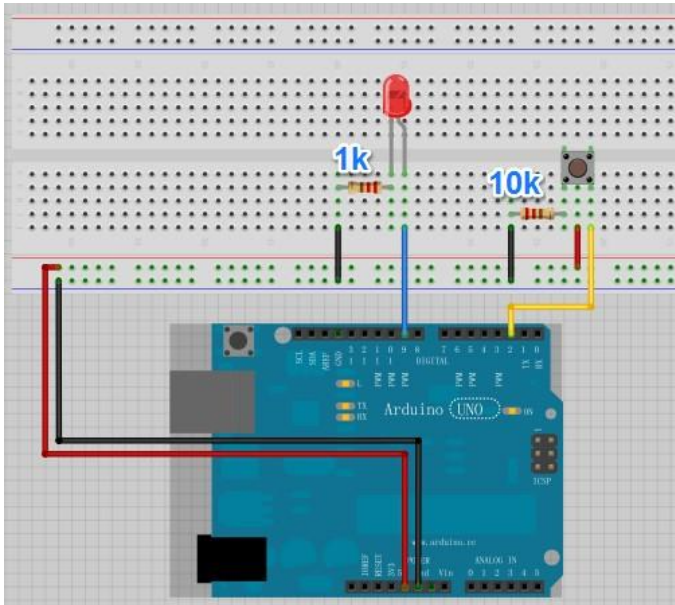
Open Arduino sketch `p02_ButtonControlLED.ino` and upload it to the Arduino.

If successful, when the button is pressed, the LED is on, and when released, the LED is off.

Experiment 03 – Momentary Button

The experiment is a little different from the last one.

Hardware Connection



Open Arduino sketch Arduino Code p03_MomentaryButtonControlLED.ino and upload it the Arduino. If uploading is success, the state of the LED will be kept when the hand left the pressed button.

Experiment 04 – Light Sensor

Use Arduino read the light information by Light Sensor and output it on the Serial Terminal. Functions used :

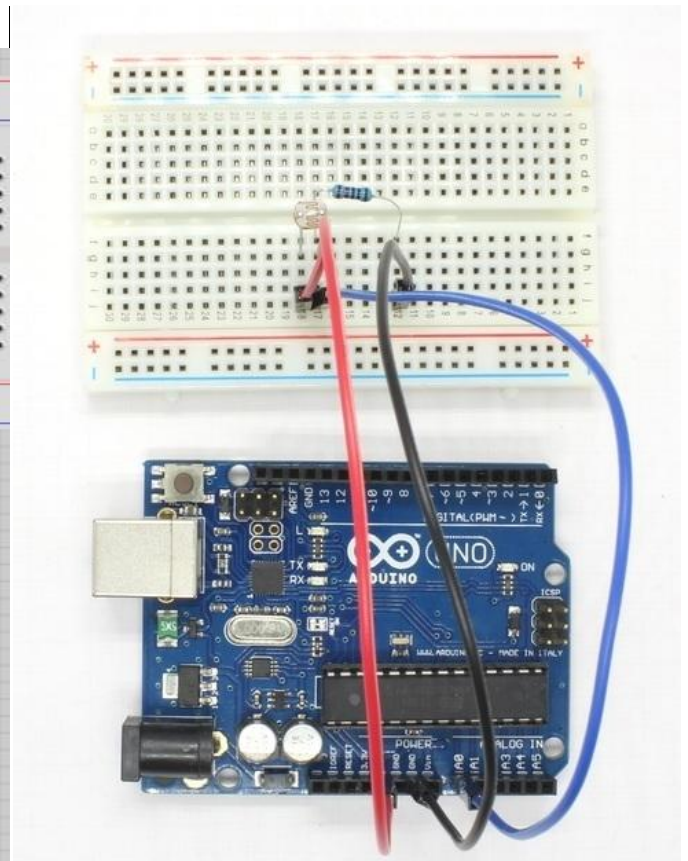
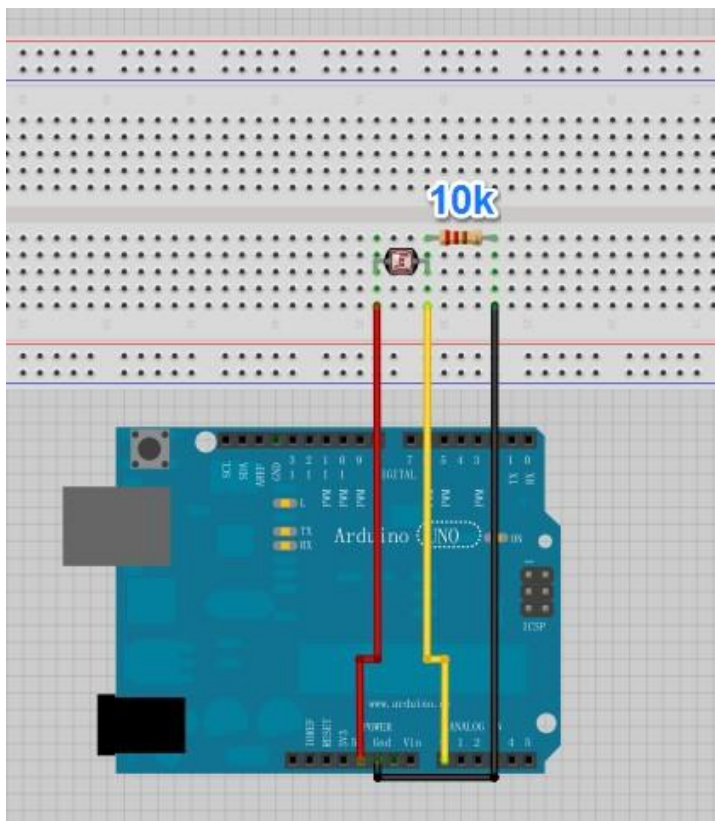
`analogRead()`

`Serial.begin()`

`Serial.print()`

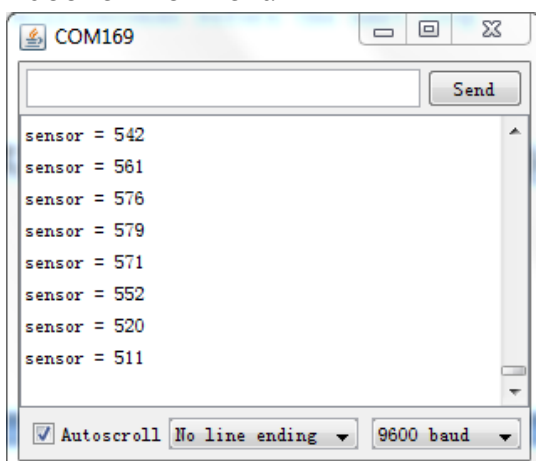
`Serial.println()`

Hardware Connection

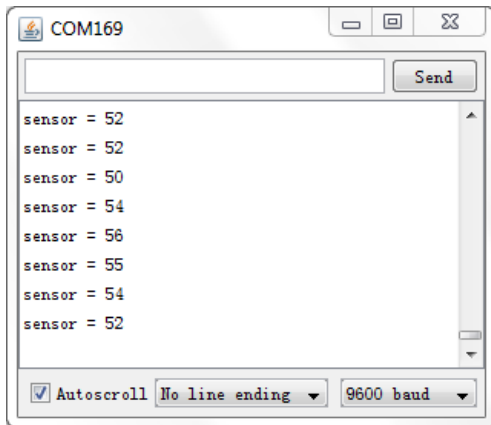


Open the Arduino sketch p04_LightSensor.ino and upload it to the Arduino.

After successfully uploading the code, the Serial Terminal outputs the following information under the indoor environment.



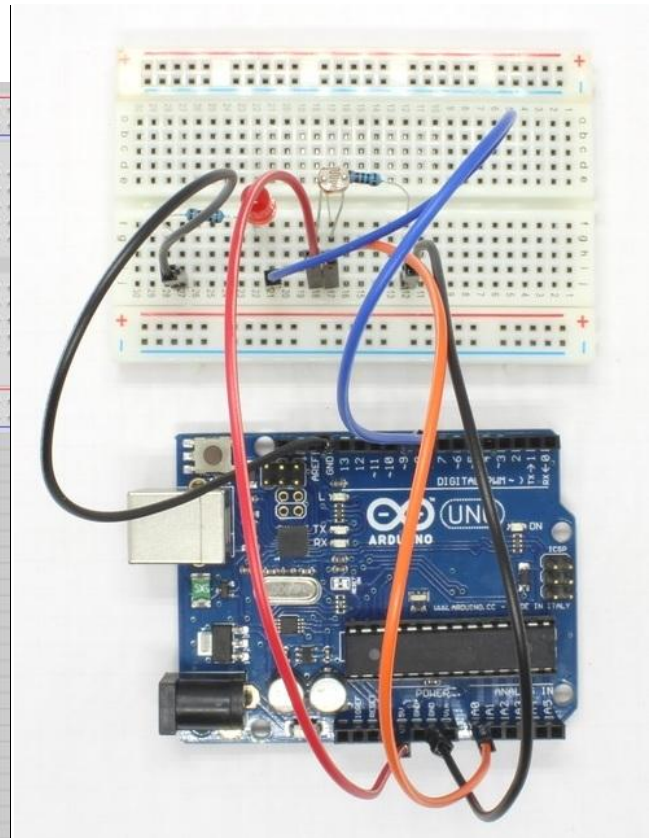
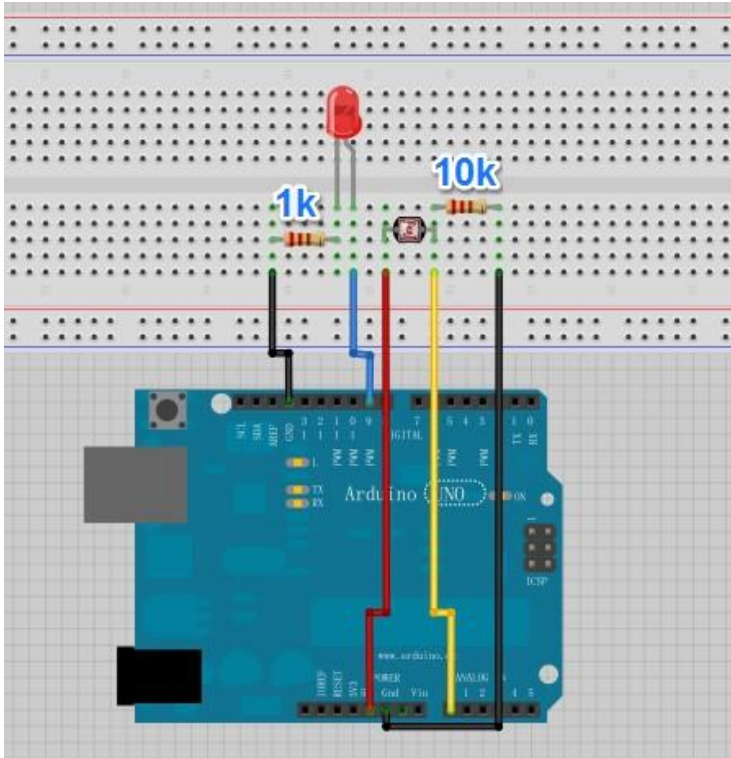
When hiding the sensor by hand, the output value decreases, from which we can tell there's little light sensed.



Experiment 05 – Light Controlled LED

When dark, turn LED on, otherwise turn LED off.

Hardware Connection



Open Arduino sketch `p05_LightControlLED.ino` and upload the code to the Arduino. When hiding the light sensor by hand, the LED will turn on; When the hand moves, the LED will turn off.

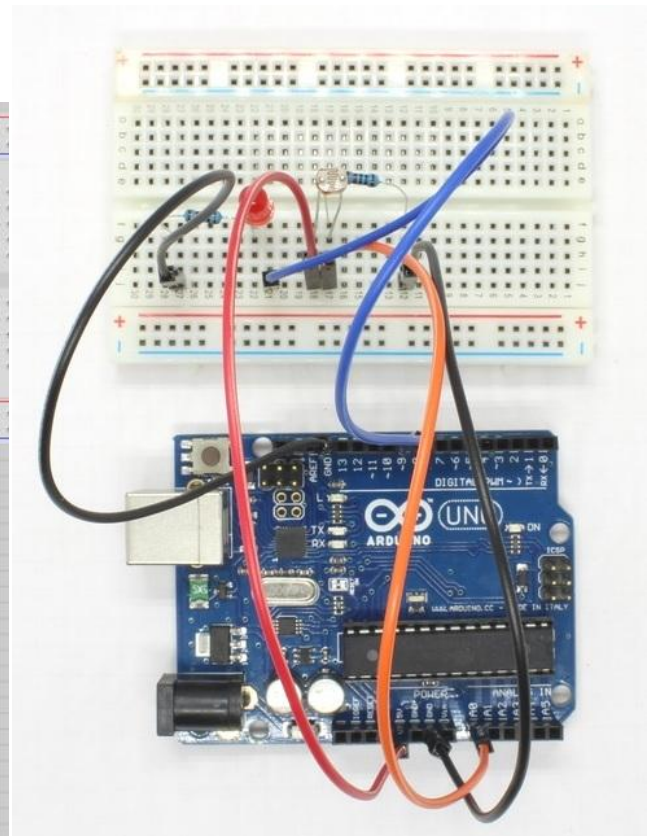
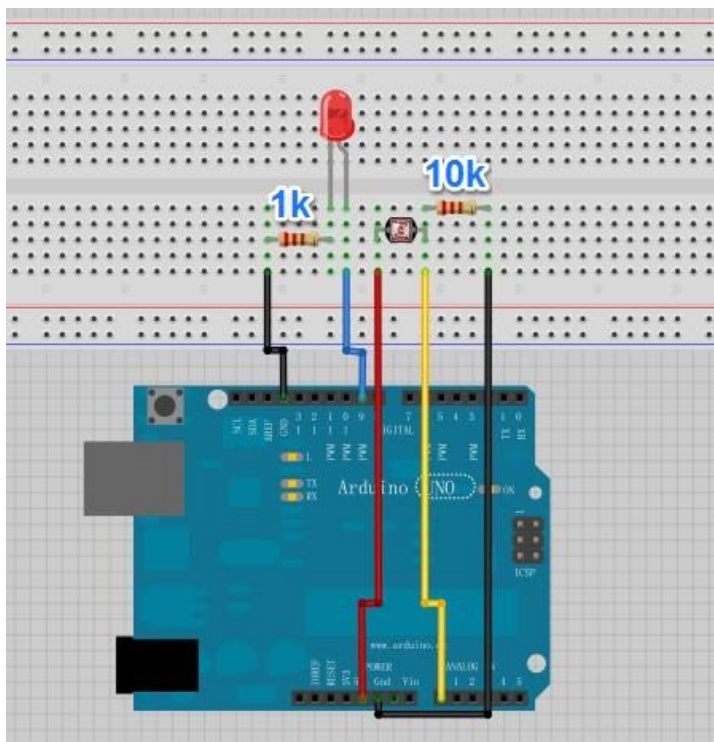
Experiment 06 – Light Control Breathing LED

In this experiment, the hardware connection is the same as the last one. But the LED here will breathe in different frequency controlled by the Lightness.

Try to learn the function:

`analogWrite()`

Hardware Connection

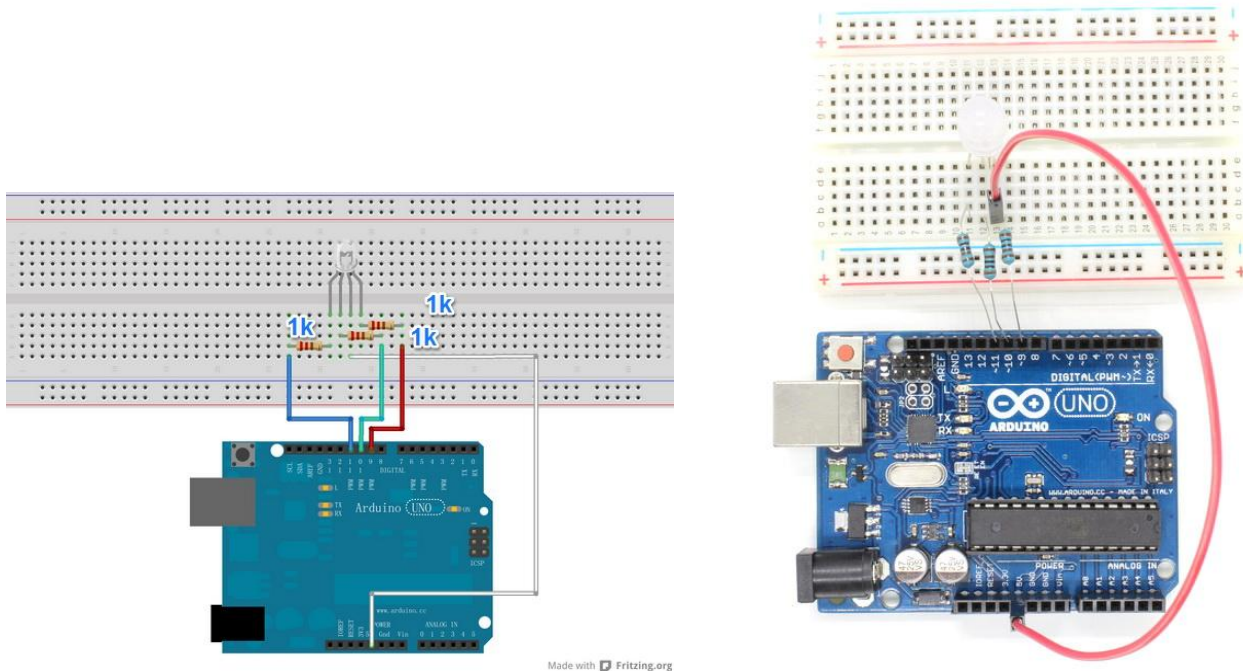


Open the Arduino sketch `p06_LightControlBreathingLED.ino`, and upload it to the Arduino. Close the hand to hide the light sensor, the led will increase the frequency of breathing.

Experiment 07 – RGB LED

Use Arduino to control the color of RGB LED.

Hardware Connection

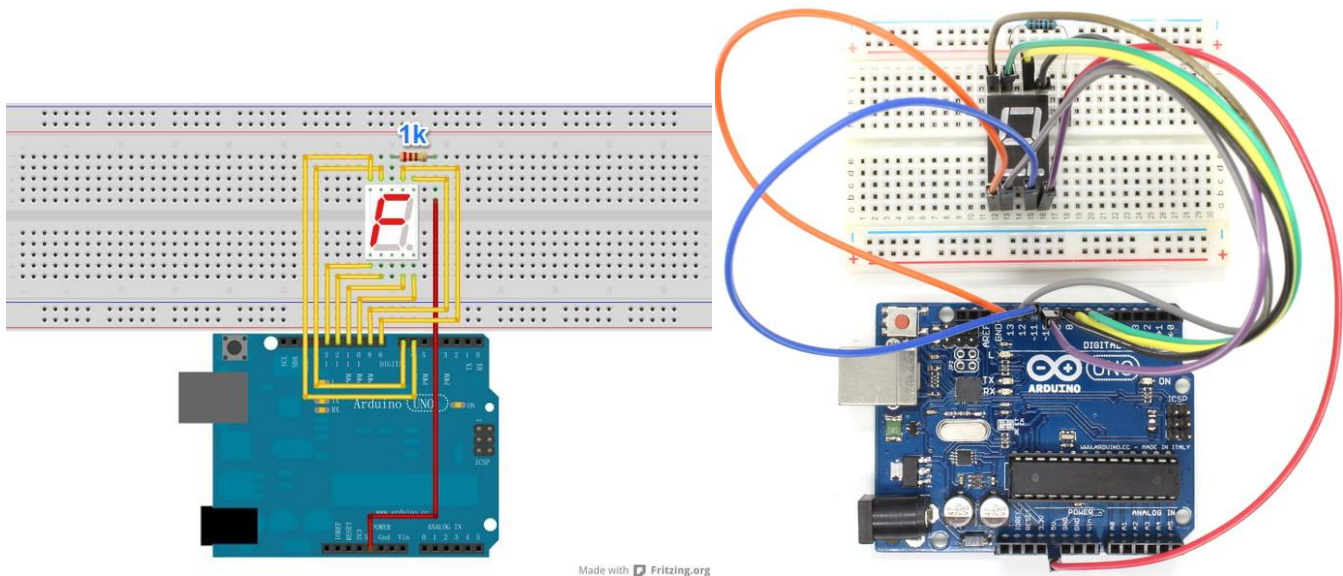


Open Arduino Code p07_RGBLED.ino and upload it to the Arduino. The LED will change the color and the brightness.

Experiment 08 – 7 Segmental LED

Display digital number from 0 to 9 on a 7 segmental LED

Hardware Connection

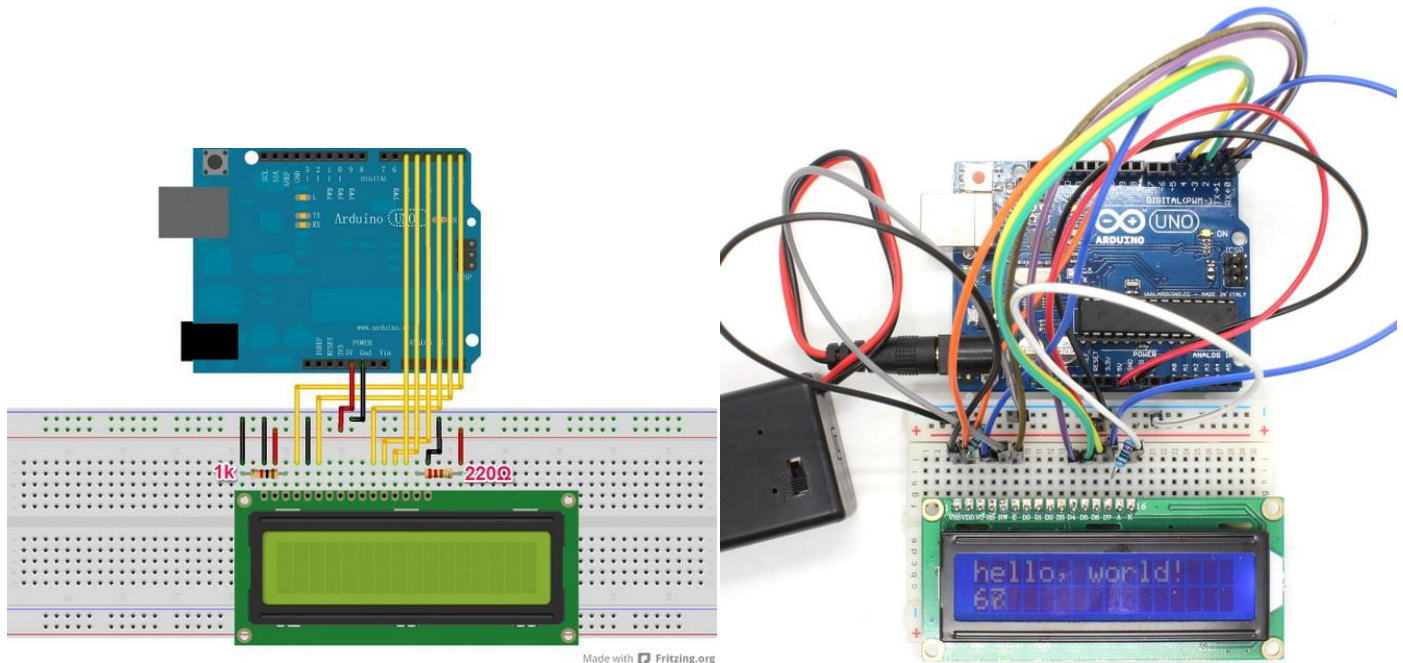


Open the Arduino sketch p08_DigitalLED.ino, and upload it to the Arduino. The digital LED will display number from 0 to 9 and the dot.

Experiment 09 – 1602LCD Display

Display characters on 1602 LCD. Try to learn Arduino library LiquidCrystal.

Hardware Connection

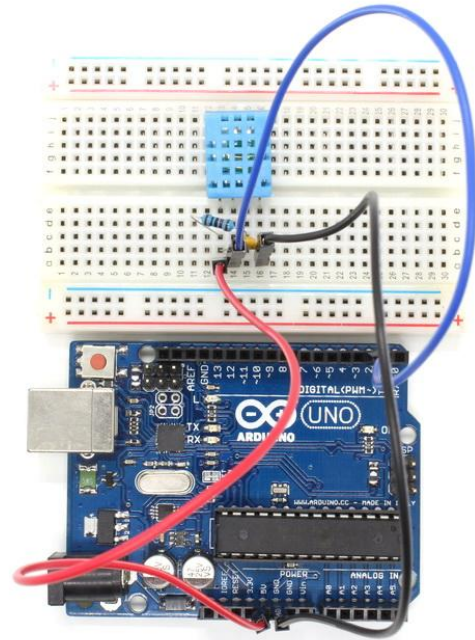
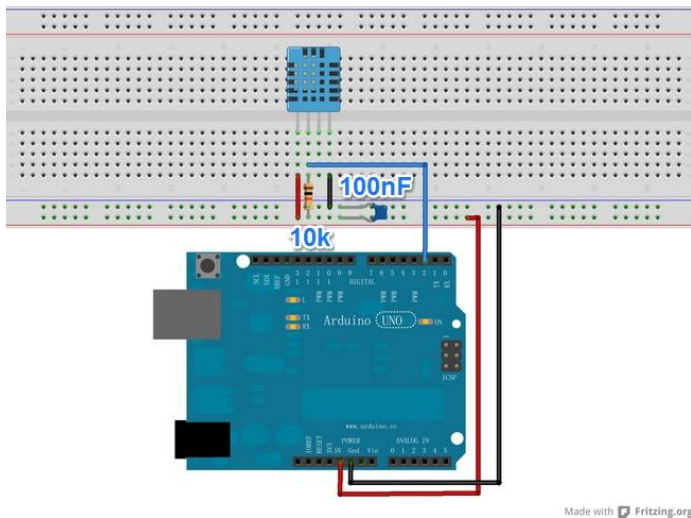


Open the Arduino the sketch p09_1602LCD.ino and upload it the Arduino. The LCD will display the time passed in second.

Experiment 10 – Temperature and Humidity Sensor

Use Arduino and DHT11 to get the temperature and humidity of the environment and to display them on the Serial Terminal.

Hardware Connection

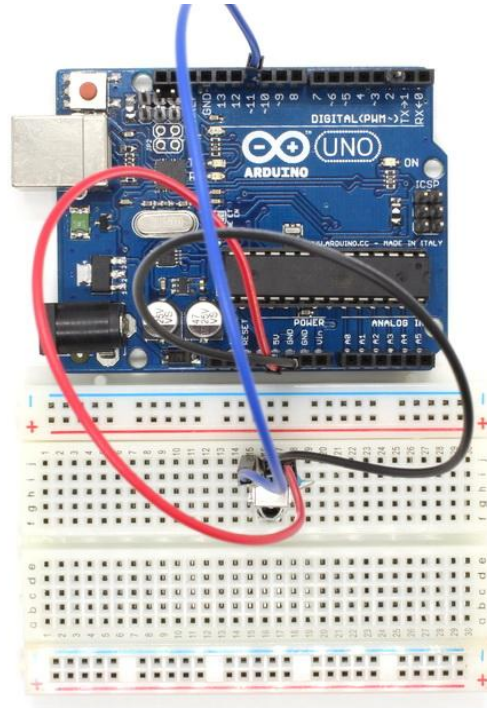
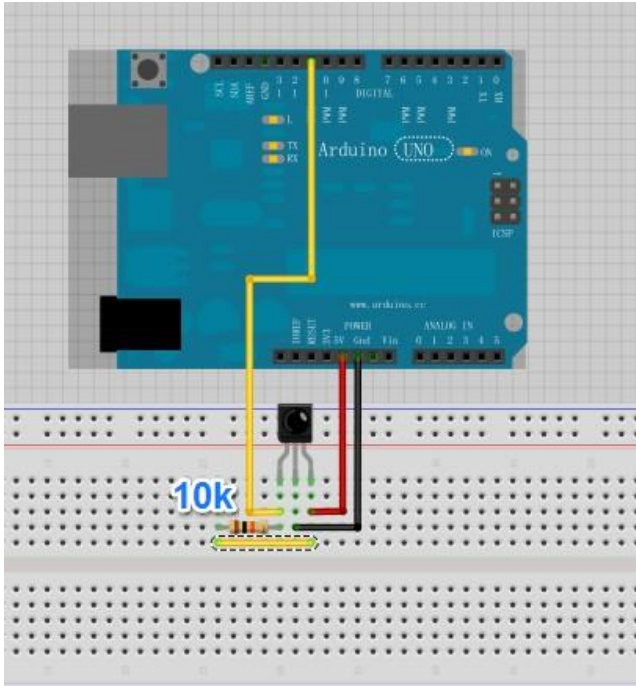


Open the Arduino sketch `p10_HumAndTempSensor.ino` and upload it to the Arduino. Open the Serial Monitor, it will display the temperature and humidity.

Experiment 11 – Remote Infrared Control

Use Arduino and Infrared Receive Sensor to receive the Remote Control Signal and display it on the Serial Monitor

Hardware Connection



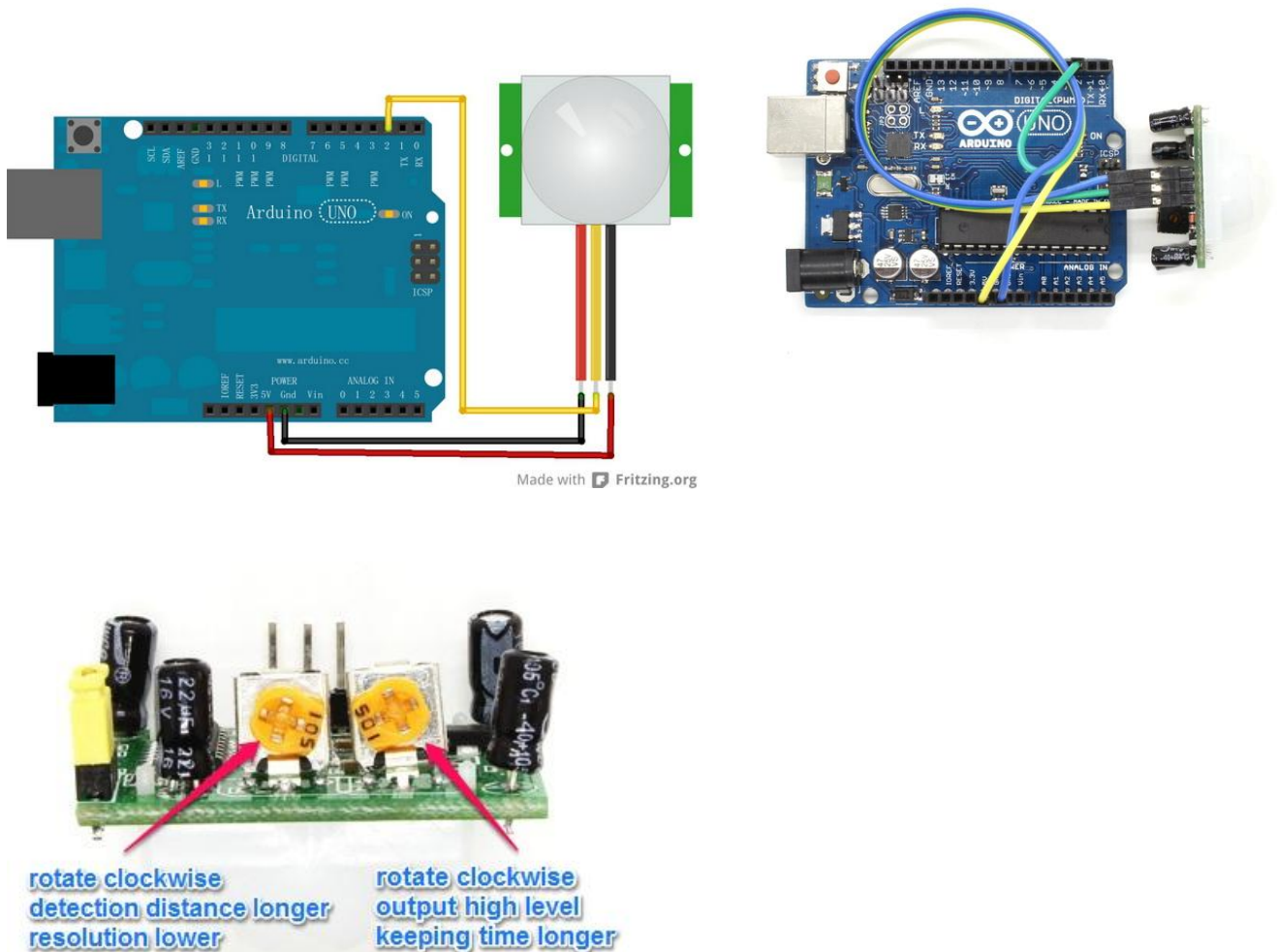
Open Arduino sketch p11_IRRemote.ino and upload it to the Arduino. Open the Serial Monitor, press the key of remote controller, and the code will display.

Note: The controller uses CR2025 Cell. It is not shipped with the Kit to some countries because of security checking problems. If so please buy it in your local store.

Experiment 12 – PIR Motion Sensor

The PIR Motion Sensor outputs High level when detecting a moving body. The high level will be kept for a while and goes back to Low level. The sensor is widely used in the Human Sensing Light.

Hardware Connection

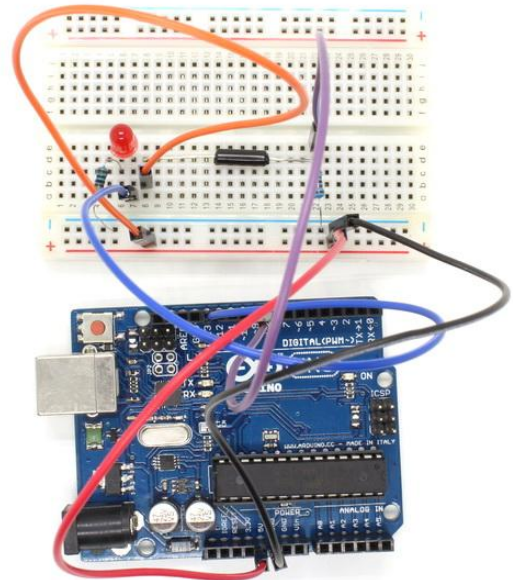
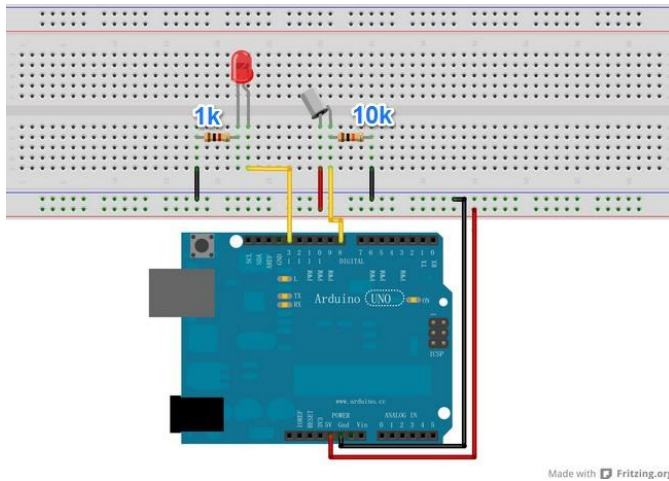


Open the Arduino sketch `p12_PIRMotionSensor.ino` and upload it to the Arduino. If there is people moving around, the LED on the Arduino board will turn on. The LED will keep the state for a while and turn off if moving stops.

Experiment 13 – Tilt Sensor

Detect if the object is tilted in one direction. If tilted, turn the LED on.

Hardware Connection



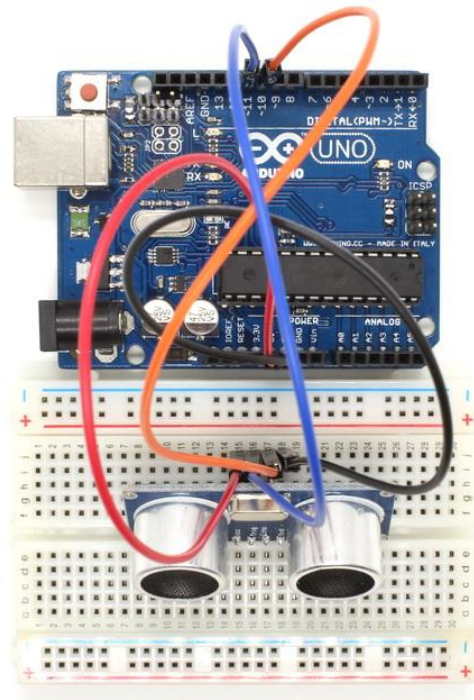
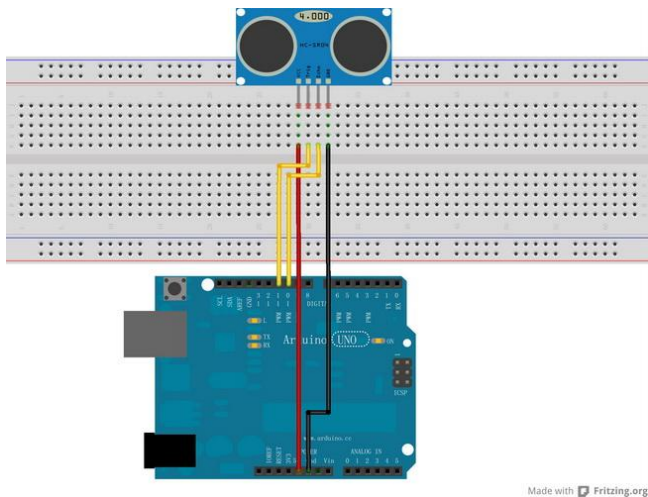
Open Arduino sketch p13_TiltSensor.ino and upload it to the Arduino. Tilt the Sensor in one direction, the LED will turn on.

Note: The sensor only works in one direction.

Experiment 14 – Ultrasonic Sensor

Use Ultrasonic Sensor to measure the distance between the sensor and the object.

Hardware Connection

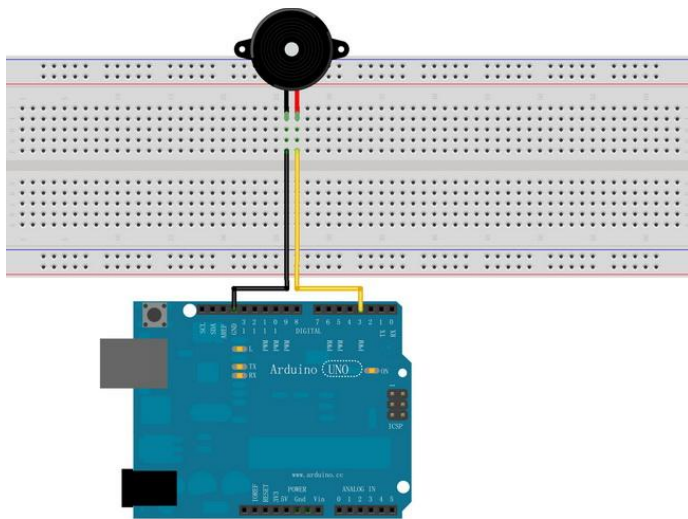


Open the Arduino sketch p14_Ultrasonic.ino and upload it to the Arduino. Open the Serial Monitor, it will show the distance measured.

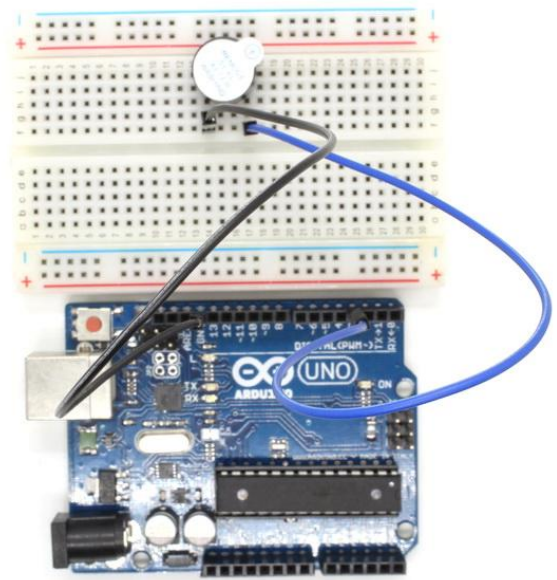
Experiment 15 - Buzzer

Use Arduino and Buzzer to make sound.

Hardware Connection



Made with  Fritzing.org



Open the Arduino sketch `p15_Buzzer.ino` and upload it to the Arduino. The buzzer will make sound in different ways.