Make a drawing robot

By Sophie McDonald for MzTEK.org
The wonderful world of Arduino

An Arduino is a small computer that can receive and send data.

Physical computing is the development of objects and sensors that can be used for interactions.

There are many types of Arduino's.
Send and Receives Data Using Voltage

Information is received and transmitted through the pins

Digital pins can receive LOW or HIGH input

There are different types of pins. Today we’ll use digital pins
Communicate with the computer

**USB**
The Arduino communicates with your computer through USB.

**RESET BUTTON**
If the Arduino crashes, you can reset it by pressing this button.
Digital & Analogue

Digital Pins 0 - 13
Used for sending or receiving digital data

Analogue Pins A0 - A5
used for reading sensors.

5v / 1023
0v / 0

5v / HIGH
0V / LOW
Arduino has its own integrated development environment (IDE) where you can fully control the device.

Arduino is an open source platform, the free software can be downloaded from www.arduino.cc
This is what the Arduino Development Environment looks like when you open/run the software...
Let’s Get Started

Open/run the software

Plug the Arduino into the laptop
Set up the board type

Arduino Uno
- Arduino Duemilanove w/ ATmega328
- Arduino Diecimila or Duemilanove w/ ATmega168
- Arduino Nano w/ ATmega328
- Arduino Nano w/ ATmega168
- Arduino Mega 2560 or Mega ADK
- Arduino Mega (ATmega1280)
- Arduino Leonardo
- Arduino Esplora
- Arduino Micro
- Arduino Mini w/ ATmega328
- Arduino Mini w/ ATmega168
Set up the Serial Port
Test the Arduino.
Open the BLINK Example
Open the BLINK Example

This checks if the code is correct

/*
Blink
Turns on an LED on for one second, then off for one second, repeatedly.

This example code is in the public domain.
*/

// Pin 13 has an LED connected on most Arduino boards.
// give it a name:
int led = 13;

// the setup routine runs once when you press reset:
void setup() {
  // initialize the digital pin as an output.
  pinMode(led, OUTPUT);
}

// the loop routine runs over and over again forever:
void loop() {
  digitalWrite(led, HIGH); // turn the LED on (HIGH is the voltage level)
  delay(1000); // wait for a second
  digitalWrite(led, LOW); // turn the LED off by making the voltage LOW
  delay(1000); // wait for a second
}
Upload the code to your board

```c
/* Blink
   Turns on an LED on for one second, then off for one second, repeatedly.
   
   This example code is in the public domain.
*/

// Pin 13 has an LED connected on most Arduino boards.
// give it a name:
int led = 13;

// the setup routine runs once when you press reset:
void setup() {
    // initialize the digital pin as an output.
    pinMode(led, OUTPUT);
}

// the loop routine runs over and over again forever:
void loop() {
    digitalWrite(led, HIGH);  // turn the LED on (HIGH is the voltage level)
    delay(1000);              // wait for a second
    digitalWrite(led, LOW);   // turn the LED off by making the voltage LOW
    delay(1000);              // wait for a second
}
```

This sends the processed code to the chip
Plug in an LED

Short Leg of the pin in GND

Long Leg in pin 13
BLINK

`/*
   Blink
   Turns on an LED on for one second, then off for one second, repeatedly.

   This example code is in the public domain.
*/

void setup() {
    // initialize the digital pin as an output.
    // Pin 13 has an LED connected on most Arduino boards:
    pinMode(13, OUTPUT);
}

void loop() {
    digitalWrite(13, HIGH);  // set the LED on
    delay(1000);              // wait for a second
    digitalWrite(13, LOW);   // set the LED off
    delay(1000);             // wait for a second
}

'digitalWrite' is telling the pin what to do

'delay' tells the Arduino when to turn off the light. This 1000 milliseconds
Breadboard

The centre holes connect with a gap in the middle

The edge holes are connected all the way along.
Breadboard
Upload the Robot code (this is back on the Tate Create)
Let’s add our capacitive sensor
Add your motor
Motor on the breadboard

battery

ground

power

pin GND

pin 10

motor

fritzing

MzTEK
Don’t forget to upload/run your new code
Lets build the drawing robot!

Take Care!!
wear goggles - the wire can be sharp!

Wrap the sensor wire around the spider leg

motor horn arm
weights

insulate the motor by putting tape all around it.
Connect the Arduino to your battery

To power the Arduino from the battery:
1. Unplug your Arduino from the laptop
2. Add a wire from the + battery to pin Vin on the Arduino.
3. Touch a leg to make your robot move.
Other recommended resources from Mztek

The Arduino community, blogs & instructions
•Arduino.cc
•Instructables.com
•Sparkfun.com
•Adafruit.com
•Fritzing.com – software for designing circuits
•MzTEK.org - workshops

Order Kit from
•Sparkfun.com – comes with instructions & projects
•Adafruit.com (USA)
•Rapid Electronics rapidonline.com – good for bulk orders (cheap & next day delivery)
•Oomlout.com