

# Musical Cans

**Ciro Castellano**

**Lucas Cervera**

**Marc Piera**

**Sergi Cullell**

**Pau Ingla**

**Bernat Cots**

**Projectes de Tecnologia**

**2nC**

**2020-2021**

## Introduction

We have chosen to do an instrument very similar to a piano or a drummer, but instead of using drumsticks or piano keys we will use soda cans. To do it we are going to program an Arduino board and connect different cables to the cans in a way that when you touch the can it will produce a musical note.

This system will allow us to create musical melodies and play different songs. In order to improve our project, we also want to add two speakers which will produce a musical beat that will help the instrument to sound better.

## Materials and Tools

Breadboard

Arduino UNO

Long and short jumper wires

Buzzer (mini speaker)

8 Resistors 1M ohm

Soda cans

Computer (Arduino Blocks)

## Developing process

Once we have all the materials and tools,

1. Attach the buzzer and the resistors to the breadboard
2. Connect a jumper wire to the buzzer's negative pin to the Arduino ground
3. Do the same but with the positive pin to the pin 11 in the Arduino Uno
4. Connect with jumper wires the end of the resistors to the pin 3,4,5,6,7,8,9 and 10 in Arduino Uno
5. Connect a jumper wire to all end of resistors and connect this end of jumper wire with all the soda cans
6. Finally, do all the programming process.

## Corpus

To execute our project, our main electronic device is the Arduino.

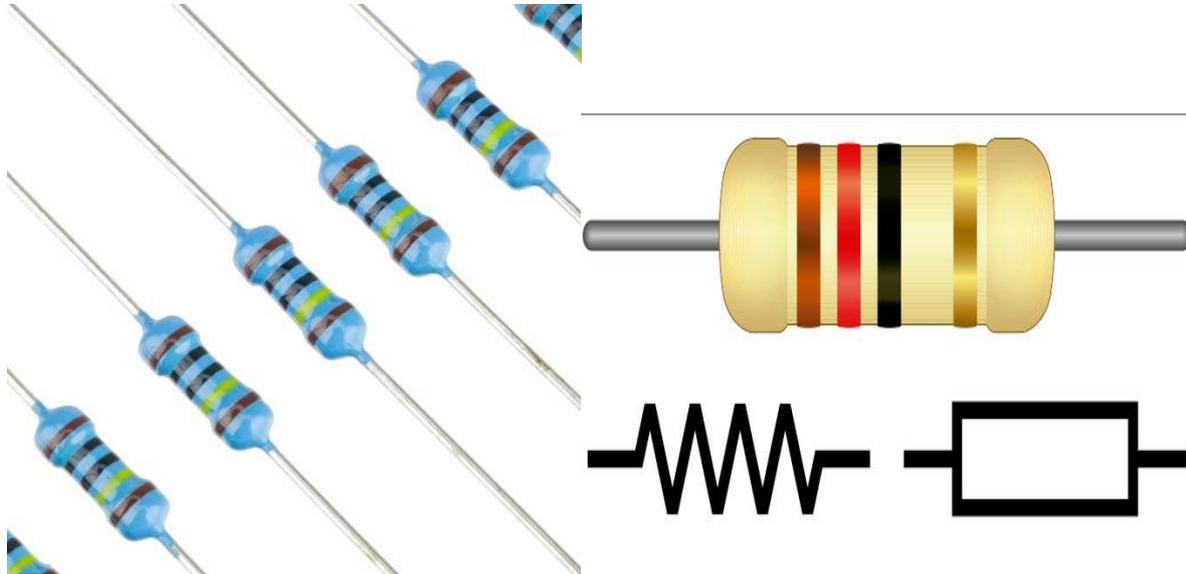
The Arduino is a board based on an ATMEGA microcontroller. Microcontrollers are integrated circuits in which instructions can be recorded, which you write with the programming language that you can use in the Arduino IDE environment. These instructions allow you to create programs that interact with the circuitry on the board. The Arduino microcontroller has what is called an input interface, which is a connection in which we can connect different types of peripherals on the board. The information from these peripherals that you connect will be transferred to the microcontroller, which will oversee processing the data that comes through them. The type of peripherals that you can use to send data to the microcontroller largely depends on what use you are considering. They can be cameras to obtain images, keyboards to enter data, or different types of sensors. It also has an output interface, which is responsible for carrying the information that has been processed in the Arduino to other peripherals. These peripherals can be screens or speakers in which to reproduce the processed data, but they can also be other boards or controllers.



In order to produce a sound by touching the coke, we will put a resistor with a wire at the end of the cable so with touching the coke it will sound a noise that will be previously programmed for the Arduino.

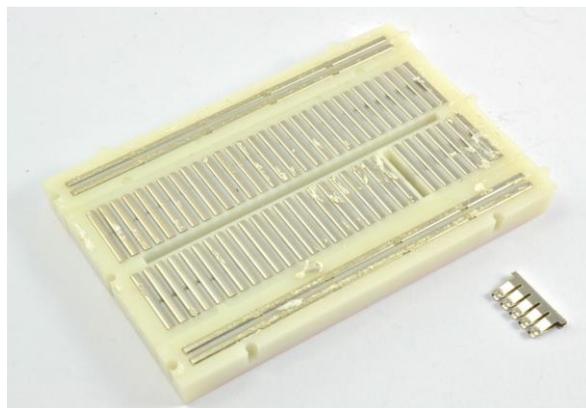
A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. In electronic circuits, resistors are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements, and terminate transmission lines, among other uses. High-power resistors that can dissipate many watts of electrical power as heat,

may be used as part of motor controls, in power distribution systems, or as test loads for generators. Fixed resistors have resistances that only change slightly with temperature, time or operating voltage. Variable resistors can be used to adjust circuit elements (such as a volume control or a lamp dimmer), or as sensing devices for heat, light, humidity, force, or chemical activity.



For our project we need to connect to the Arduino UNO to a breadboard. The breadboard is a way of constructing electronics without having to use a soldering iron. Components are pushed into the sockets on the breadboard and then extra 'jumper' wires are used to make connections.

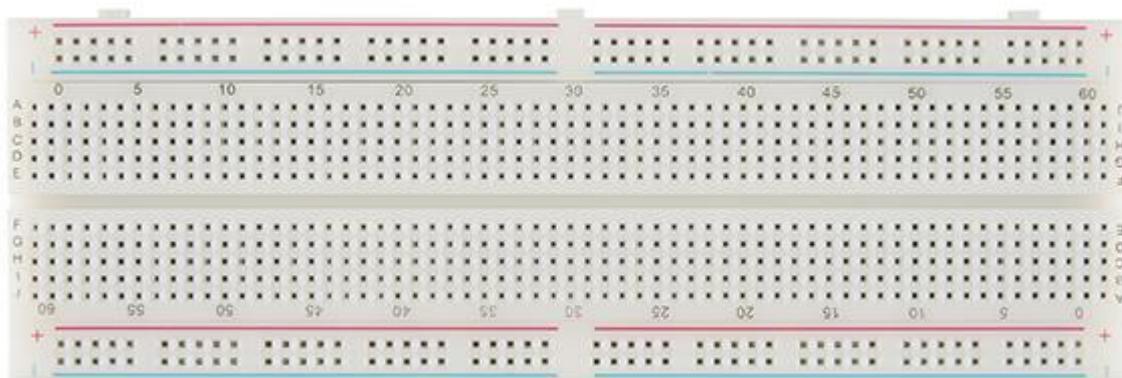
If you were to pull the self adhesive backing off the back of your breadboard, it would look something like this.



Why do we call this electronic “circuit builder” a breadboard? Many years ago, when electronics were big and bulky, people would grab their mom’s breadboard, a few nails or thumbtacks, and start connecting wires onto the board to give themselves a platform on which to build their circuits. Since then, electronic components have gotten a lot smaller, and we’ve come up with better ways to connect circuits, making moms all over the world happy to have their breadboards back. However, we are stuck with the confusing name.

For those new to electronics and circuits, breadboards are often the best place to start. That is the real beauty of breadboards, they can house both the simplest circuit as well as very complex circuits. If your circuit outgrows its current breadboard, others can be attached to accommodate circuits of all sizes and complexities. Another common use of breadboards is testing out new parts, such as Integrated circuits (ICs). When you are trying to figure out how a part works and constantly rewiring things, you don’t want to have to solder your connections each time.

The middle section of the board has two columns, each with 30 strips of connector, like the one pulled out and to the side of the breadboard. These connect anything that is pushed through from the front into one of those five holes.



On either edge of the board are much longer sections of clip that join the columns of holes marked by the blue and red lines on the front of the breadboard. These are generally used for GND (blue) and 5V (red).

One of the most common uses for breadboards is prototyping, that is the process of testing out an idea by creating a preliminary model from which other forms are developed or copied. If you aren’t sure how a circuit will react under a given set of parameters, it’s best to build a prototype and test it out.

There is no controller interface when creating a MIDI controller with an Arduino. You can use standard buttons and sliders or distance and motion sensors. Anything we can use to generate a signal can be part of a controller. We have such a project here, Lucas Zanella created a piano that consists only of cans of Coca-Cola.



Each can is connected to the BC548B transistor, which essentially amplifies the signal from the body when the can is touched. The Arduino reads the signal from the transistor and converts it to a note sent to your computer through a serial connection.

A Python script on a computer reads serial data from an Arduino and responds by playing various audio loops. It can be easily customized to support a standard MIDI interface, so you can control any synthesizer with coke plates. This is a pretty smart idea and you can use any collection of metal items instead of cans. For example, you can use a chime as a MIDI controller or as a set of cubes.

## **Bibliografia (videos de youtube)**

<https://www.youtube.com/watch?v=sqQzIN7G6Oc&list=PLPdCLkyiesHDAQLxfwyHh3v-UIMJiNzx&index=4&t=125s>

<https://www.youtube.com/watch?v=A7h-iWN-d08&list=PLPdCLkyiesHDAQLxfwyHh3v-UIMJiNzx&index=3>

<https://www.youtube.com/watch?v=92s0ofCxBDU&list=PLPdCLkyiesHDAQLxfwyHh3v-UIMJiNzx&index=2&t=5s>