



Mini Lab

Project 3

# CONTROL THE BUZZER

## PROJECT N° 3: Control the buzzer

Learn to create a program to control the sound of the buzzer by doing these three exercises.

### EXERCISES INDEX:

- Exercise 3.1: Turn the buzzer on and off by using the button
- Exercise 3.2: Turn on the buzzer and two LEDs by using the potentiometer
- Exercise 3.3: Control the entire system by using the potentiometer

### **Exercise 3.1:** Turn the buzzer on and off by using the button

Create a program so that, when pressing the button, the buzzer will make a sound and when you stop pressing the button the buzzer stops making the sound.

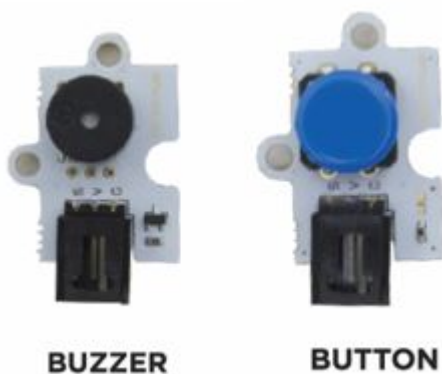
**DIFFICULTY LEVEL:** Beginner.

**DURATION OF THE EXERCISE:** 20 min.

**MATERIALS:**

- 1 Buzzer
- 1 Button
- 1 USB - Micro USB cable
- Computer

The Mini Lab will have to be built according to the instructions manual.



**What is a buzzer?**

A buzzer is an electroacoustic transducer that makes a continuous or intermittent sound, usually treble. It is used as a signaling mechanism or warning and can be applied to multiple systems, such as cars and household appliances, including wake up alarms.

**CONNECTIONS:**

1. Connect the button to the digital port 4 of the Build&Code 4in1 board.
2. Connect the buzzer to the digital port 5 of the Build&Code 4in1 board.

**PROGRAMMING CODE:**

You can do this project using the Arduino, Bitbloq and other visual programming software by blocks compatible. Below you will find the necessary code.

**Arduino Code**

1. Download and install the Arduino IDE program. It is available for Windows, Mac OS and Linux.
2. Open the Arduino program and copy the following program in it:

```
int valuepuls = 0, pinpuls = 4; // BUTTON VARIABLE
AND PIN
int pinBuzzer = 5; // BUZZER PIN

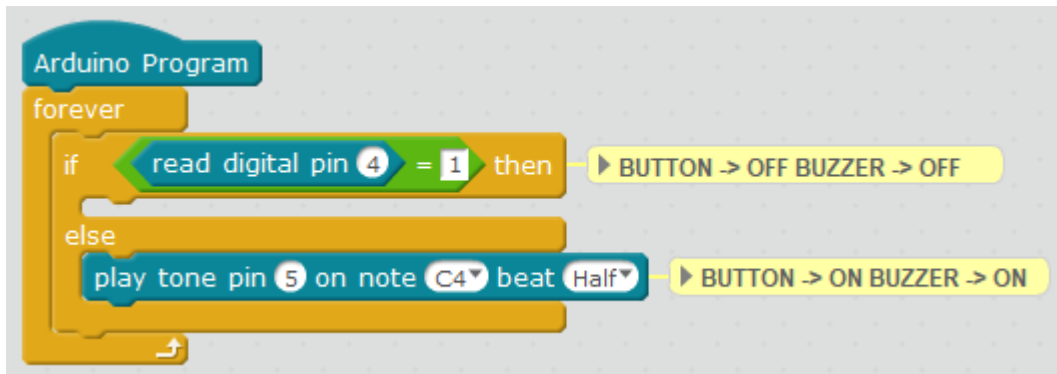
void setup() {
  // put your setup code here, to run once:
  //BUTTON CONFIGURATION
  pinMode (pinpuls, INPUT);
}
void loop() {
  // put your main code here, to run repeatedly:
  // WHEN PRESSING THE BUTTON, THE BUZZER WILL MAKE A
  SOUND
  valuepuls = digitalRead (pinpuls);
  if (valuepuls == HIGH) // BUTTON NOT PRESSED
  {
    noTone(pinBuzzer);
  }
  else
  {
    tone(pinBuzzer, 600); // tone (BUZZER PIN,
    FREQUENCY);
    delay (100); // DURATION OF THE TONE
    tone(pinBuzzer, 294);
    delay (100);
    tone(pinBuzzer, 494);
    delay (100);
  }
}
```

3. Configure and upload the code, following the indications on the Mini Lab First Steps guide.

4. Check that the BTL/USB switch on the Build&Code 4in1 board is set to USB, to upload the code correctly.

**Code for the visual programming software by blocks compatible**

1. Download and install the program.
2. Open the software and copy the following code. Use the following image as a guide:

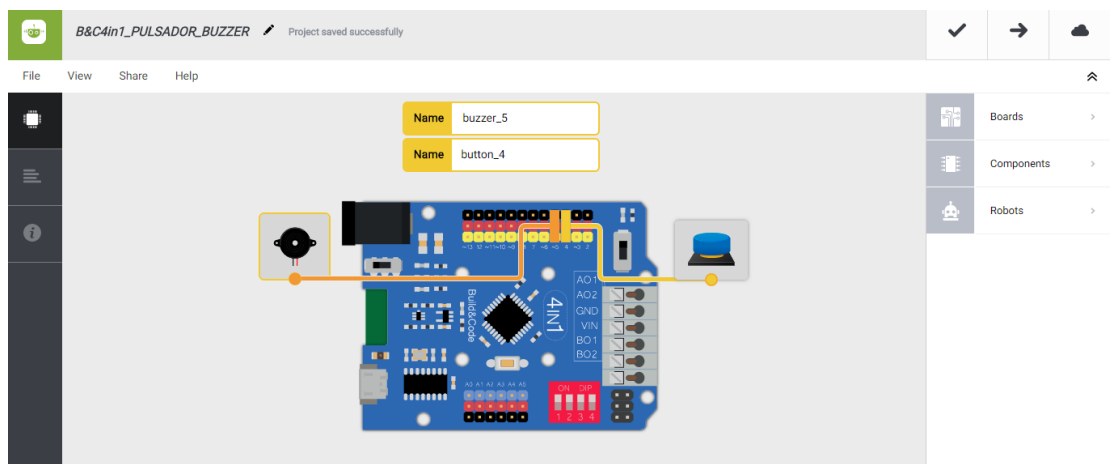


3. Configure and upload the code, following the indications on the Mini Lab First Steps guide.
4. Check that the BTL/USB switch on the Build&Code 4in1 board is set to USB, to upload the code correctly.

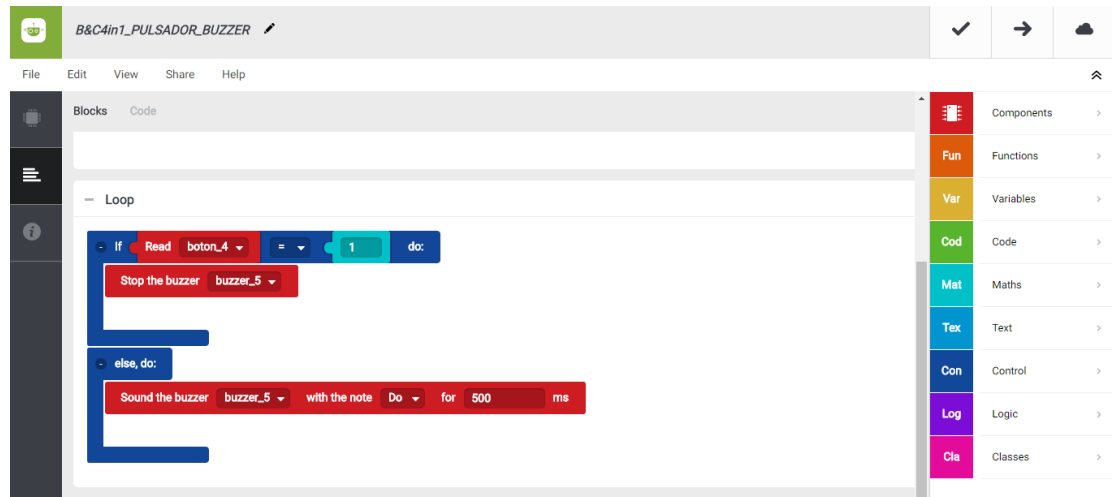
## Bitbloq code

1. Download Bitbloq and install the Web2board app.
2. Open the software and copy the following code.

### ▪ Hardware



### ▪ Software



3. Configure and upload the code, following the indications on the Mini Lab First Steps guide.
4. Check that the BTL/USB switch on the Build&Code 4in1 board is set to USB, to upload the code correctly.

### **RESULT OF THE EXERCISE:**

When pressing the button, the buzzer will make a sound and when you stop pressing the buzzer, the button will stop making the sound.

### **Exercise 3.2:** Turn on the buzzer and two LEDs by using the potentiometer

Learn to create a program to control how long are the buzzer and two LEDs on and off by using the buzzer.

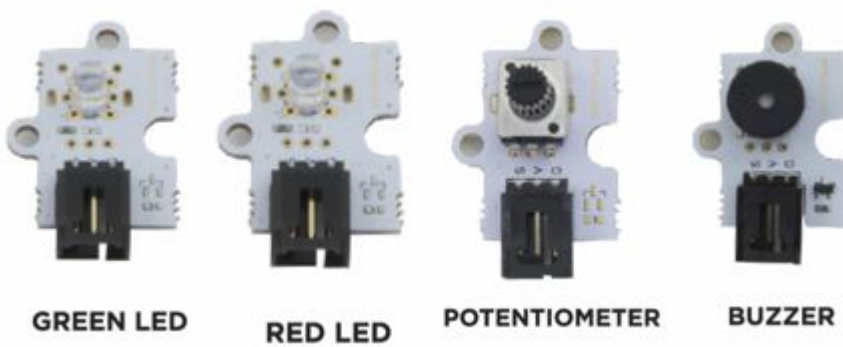
**DIFFICULTY LEVEL:** Beginner.

**DURATION OF THE EXERCISE:** 30 min.

### **MATERIALS:**

- 1 green LED
- 1 red LED
- 1 Potentiometer
- 1 Buzzer
- 1 USB - Micro USB cable
- Computer

The Mini Lab will have to be built according to the instructions manual.



## CONNECTIONS:

1. Connect the buzzer to the digital port 5 of the Build&Code 4in1 board.
2. Connect the potentiometer to the analog port A1 of the Build&Code 4in1 board.
3. Connect the LEDs to the digital ports 10 and 3 of the Build&Code 4in1 board.

## PROGRAMMING CODE:

You can do this project using the Arduino, Bitbloq and other visual programming software by blocks compatible. Below you will find the necessary code.

### Arduino Code

1. Download and install the Arduino IDE program. It is available for Windows, Mac OS and Linux.
2. Open the Arduino program and copy the following program in it:

```
int led10 = 10, led3 = 3, brightness; // // PIN AND  
BRIGHTNESS VARIABLE FOR LED 10  
int pot = 0, pinpot = A1; //POTENCIOMETER PINS  
VARIABLES  
int pinBuzzer = 5; // BUZZER PIN  
  
void setup() {  
  // put your setup code here, to run once:  
  // LEDs 10 AND 3 CONFIGURATION  
  pinMode ( led10, OUTPUT);  
  pinMode ( led3, OUTPUT);
```

```

}

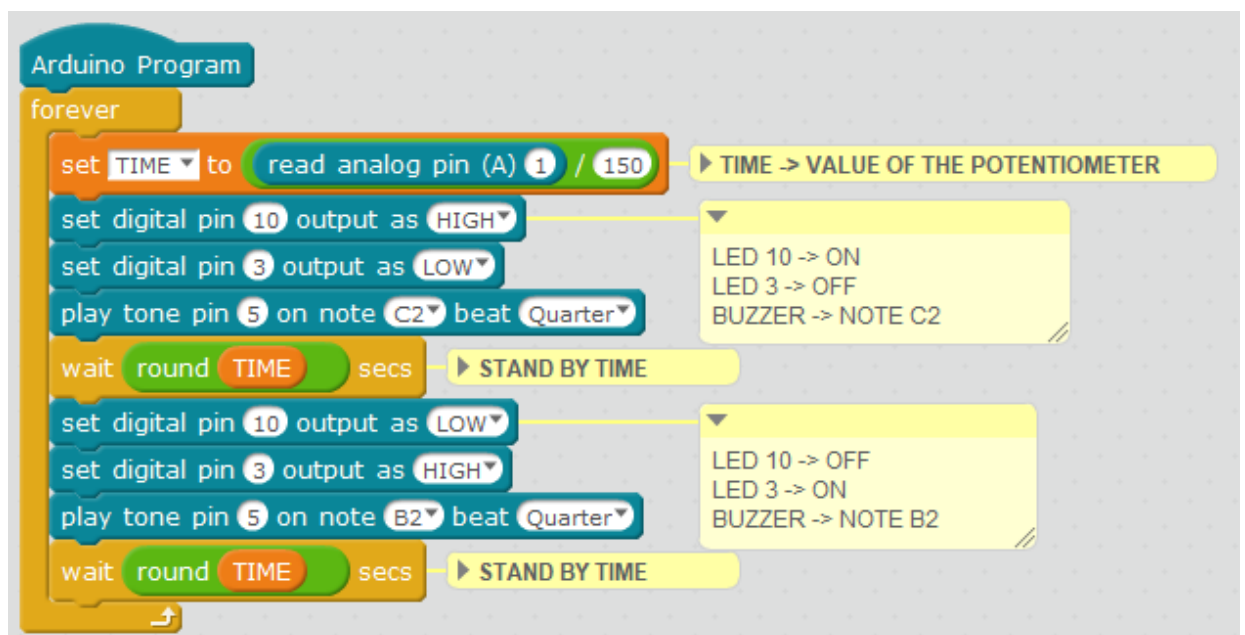
void loop() {
  // put your main code here, to run repeatedly:
  pot = analogRead (pinpot); // POTENTIOMETER VALUE
  READING
  digitalWrite (led10, HIGH); // LED 10 = ON
  digitalWrite (led3, LOW); // LED 3 = OFF
  tone (pinBuzzer, 600); // BUZZER NOTE 1
  delay ((pot)); // STANDBY BY TIME ACCORDING TO THE
  READING OF THE POTENTIOMETER
  digitalWrite (led10, LOW); // LED 10 = OFF
  digitalWrite (led3, HIGH); // LED 3 = ON
  tone (pinBuzzer, 294); // BUZZER NOTE 2
  delay ((pot)); // STANDBY BY TIME ACCORDING TO THE
  READING OF THE POTENTIOMETER
}

```

3. Configure and upload the code, following the indications on the Mini Lab First Steps guide.
4. Check that the BTL/USB switch on the Build&Code 4in1 board is set to USB, to upload the code correctly.

### Code for the visual programming software by blocks compatible

1. Download and install the program.
2. Open the software and copy the following code. Use the following image as a guide:



3. Configure and upload the code, following the indications on the Mini Lab

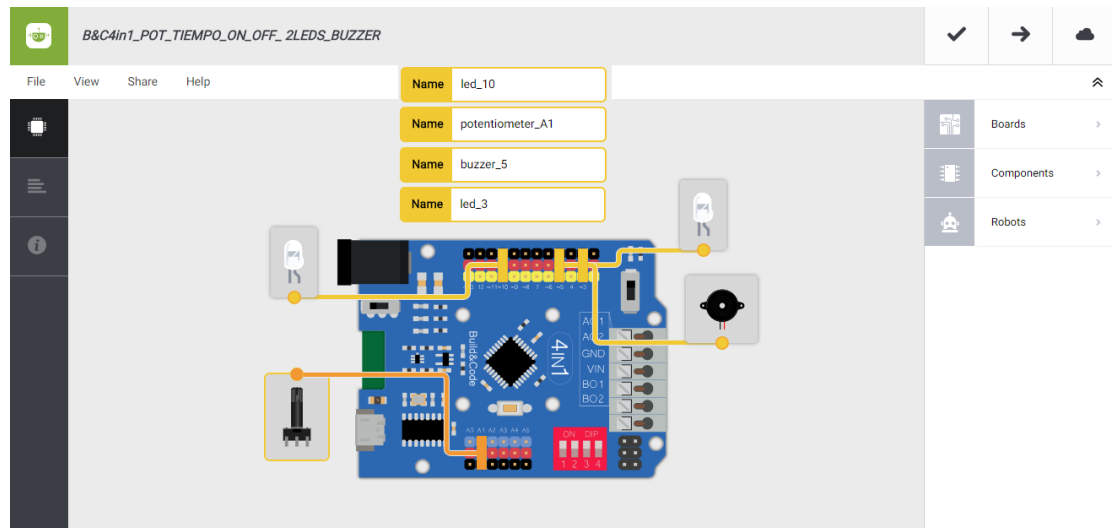
First Steps guide.

4. Check that the BTL/USB switch on the Build&Code 4in1 board is set to USB, to upload the code correctly.

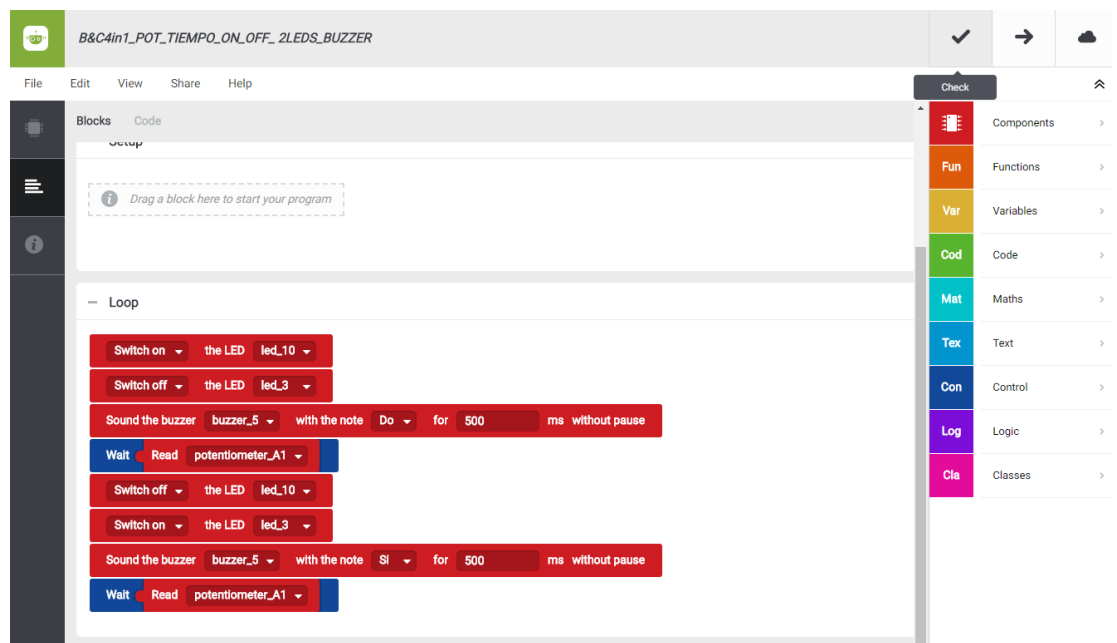
## Bitblog code

1. Download Bitblog and install the Web2board app.
2. Open the software and copy the following code.

### ▪ Hardware



### ▪ Software



3. Configure and upload the code, following the indications on the Mini Lab First Steps guide.
4. Check that the BTL/USB switch on the Build&Code 4in1 board is set to USB, to upload the code correctly.



## **RESULT OF THE EXERCISE:**

When rotating the potentiometer, the LEDs and the buzzer will turn on. The buzzer will make a different sound for each LED, with an interval determined by the rotation of the potentiometer.

### **Exercise 3.3:** Control the entire system by using the potentiometer

This exercise is similar to exercise 3.2 but now, when pressing the button, you will activate the entire system. The buzzer will make a sound when the green LED turns on and a different sound when the red LED turns on, with an interval determined by the potentiometer. When you stop pressing the button, the LEDs and the buzzer will turn off.

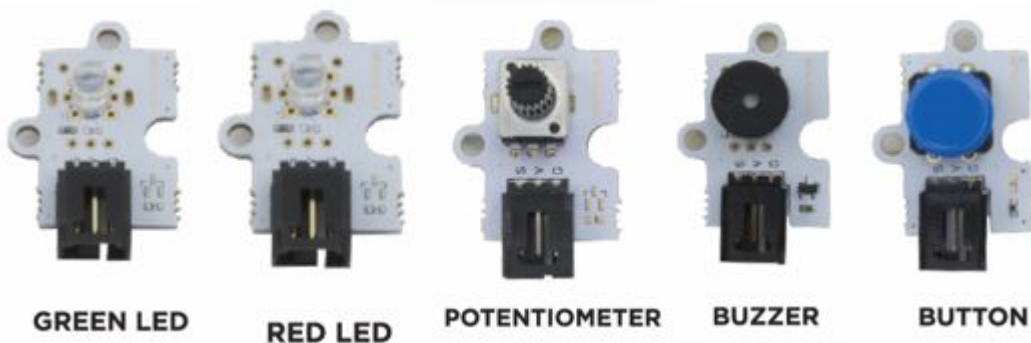
**DIFFICULTY LEVEL:** Beginner.

**DURATION OF THE EXERCISE:** 30 min.

### **MATERIALS:**

- 1 green LED
- 1 red LED
- 1 Buzzer
- 1 Button
- 1 Potentiometer
- 1 USB - Micro USB cable
- Computer

The Mini Lab will have to be built according to the instructions manual.



## CONNECTIONS:

1. Connect the button to the digital port 4 of the Build&Code 4in1 board.
2. Connect the buzzer to the digital port 5 of the Build&Code 4in1 board.
3. Connect the potentiometer to the analog port A1 of the Build&Code 4in1 board.
4. Connect the LEDs to the digital ports 10 and 3 of the Build&Code 4in1 board.

## PROGRAMMING CODE

You can do this project using the Arduino, Bitblog and other visual programming software by blocks compatible. Below you will find the necessary code.

### Arduino Code

1. Download and install the Arduino IDE program. It is available for Windows, Mac OS and Linux.
2. Open the Arduino program and copy the following program in it:

```
int led10 = 10, led3 = 3, brightness; // PINs AND LED
10 AND 3 BRIGHTNESS VARIABLES
int pot = 0, pinpot = A1; // POTENTIOMETER PIN AND
VARIABLE
int pinBuzzer = 5; // BUZZER PIN
int valuepuls = 0, pinpuls = 4; // BUTTON PIN AND
VARIABLE
void setup() { // put your setup code here, to run
once:

    // LEDs 10 AND 3 CONFIGURATION
pinMode ( led10, OUTPUT);
pinMode ( led3, OUTPUT);
// BUTTON CONFIGURATION
pinMode ( pinpuls, INPUT);

}

void loop() {
    // put your main code here, to run repeatedly:
    pot = analogRead (pinpot); // POTENTIOMETER VALUES
READING
    // IF WE PRESS THE BUTTON THE LEDS WILL BLINK AND
```

```

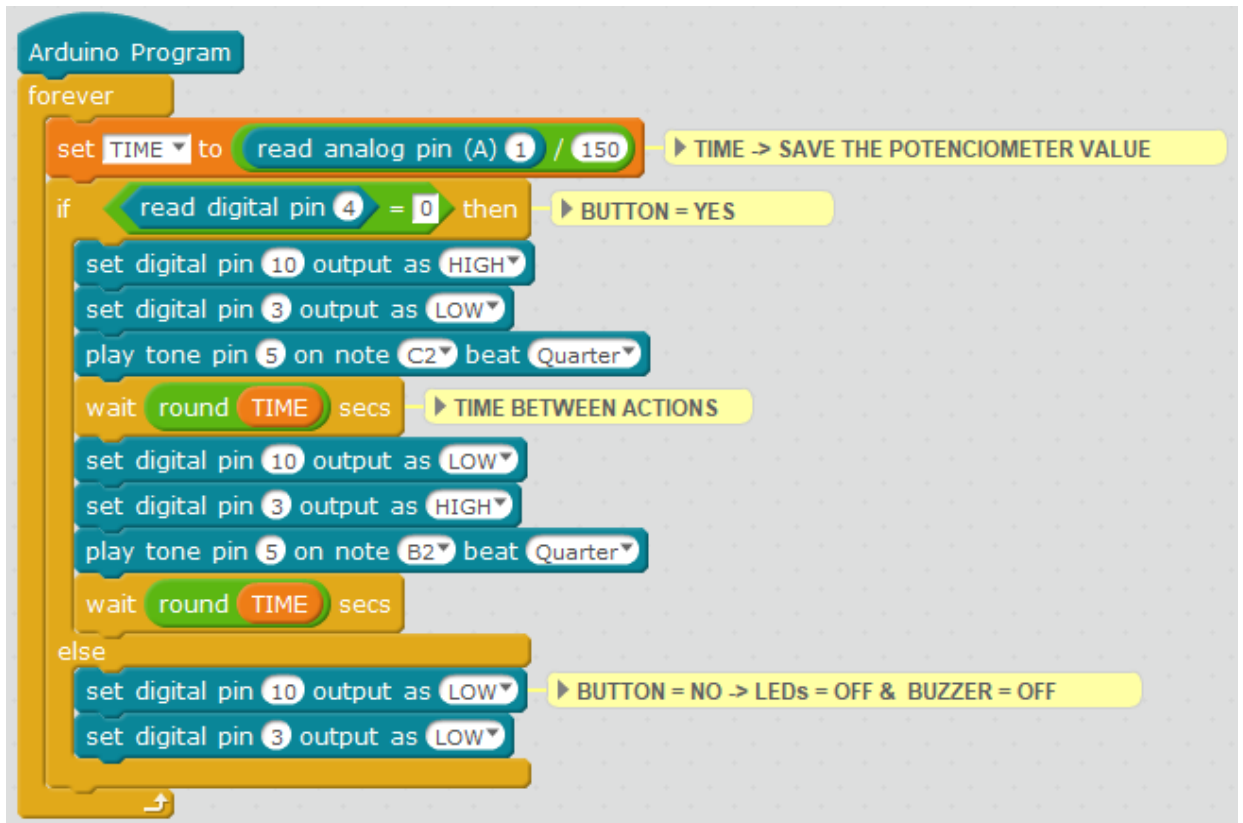
THE BUZZER WILL MAKE A SOUND. WITH THE POTENTIOMETER
YOU WILL REGULATE THE BLINKING SPEED
valuepuls = digitalRead (pinpuls);
if ( valuepuls == HIGH) // BUTTON NOT PRESSED
{
    noTone(pinBuzzer); // THE BUZZER DOESN'T MAKE A
    SOUND
    digitalWrite (led3, LOW); // LED 3 -> OFF
    digitalWrite (led10, LOW); // LED 10 -> OFF
}
else
{
    digitalWrite (led10, HIGH); // LED 10 = ON
    digitalWrite (led3, LOW); // LED 3 = OFF
    tone (pinBuzzer, 600); // BUZZER = NOTE 1
    delay ((pot)); // STANDBY BY TIME ACCORDING TO THE
    POTENTIOMETER READING
    digitalWrite (led10, LOW); // LED 10 = OFF
    digitalWrite (led3, HIGH); // LED 3 = ON
    tone (pinBuzzer, 294); // BUZZER = NOTE 1
    delay ((pot)); // STANDBY BY TIME ACCORDING TO THE
    POTENTIOMETER READING
}
}

```

3. Configure and upload the code, following the indications on the Mini Lab First Steps guide.
4. Check that the BTL/USB switch on the Build&Code 4in1 board is set to USB, to upload the code correctly.

### **Code for the visual programming software by blocks compatible**

1. Download and install the program.
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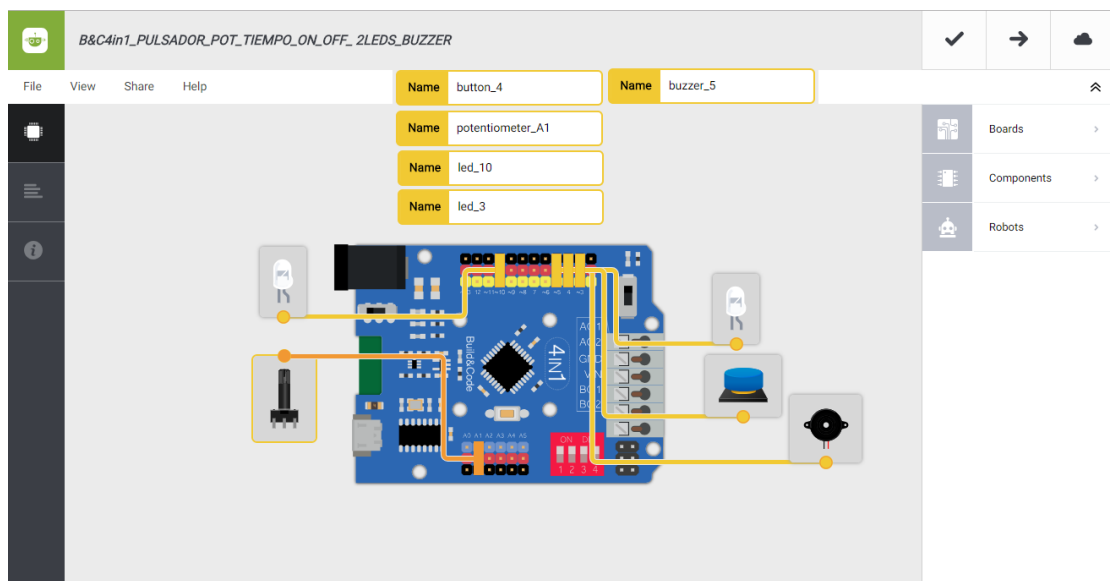


3. Configure and upload the code, following the indications on the Mini Lab First Steps guide.
4. Check that the BTL/USB switch on the Build&Code 4in1 board is set to USB, to upload the code correctly.

### Bitbloq code

1. Download Bitbloq and install the Web2board app.
2. Open the software and copy the following code.

- **Hardware**



## ▪ Software



3. Configure and upload the code, following the indications on the Mini Lab First Steps guide.
4. Check that the BTL/USB switch on the Build&Code 4in1 board is set to USB, to upload the code correctly.

### **RESULT OF THE EXERCISE:**

When pressing the button, the LEDs and the buzzer will turn on. The buzzer will make a different sound for each LED and they will turn on intermittently. All the components will be on with an interval determined by the rotation of the potentiometer.