



## **ERASMUS+ PROJECT**

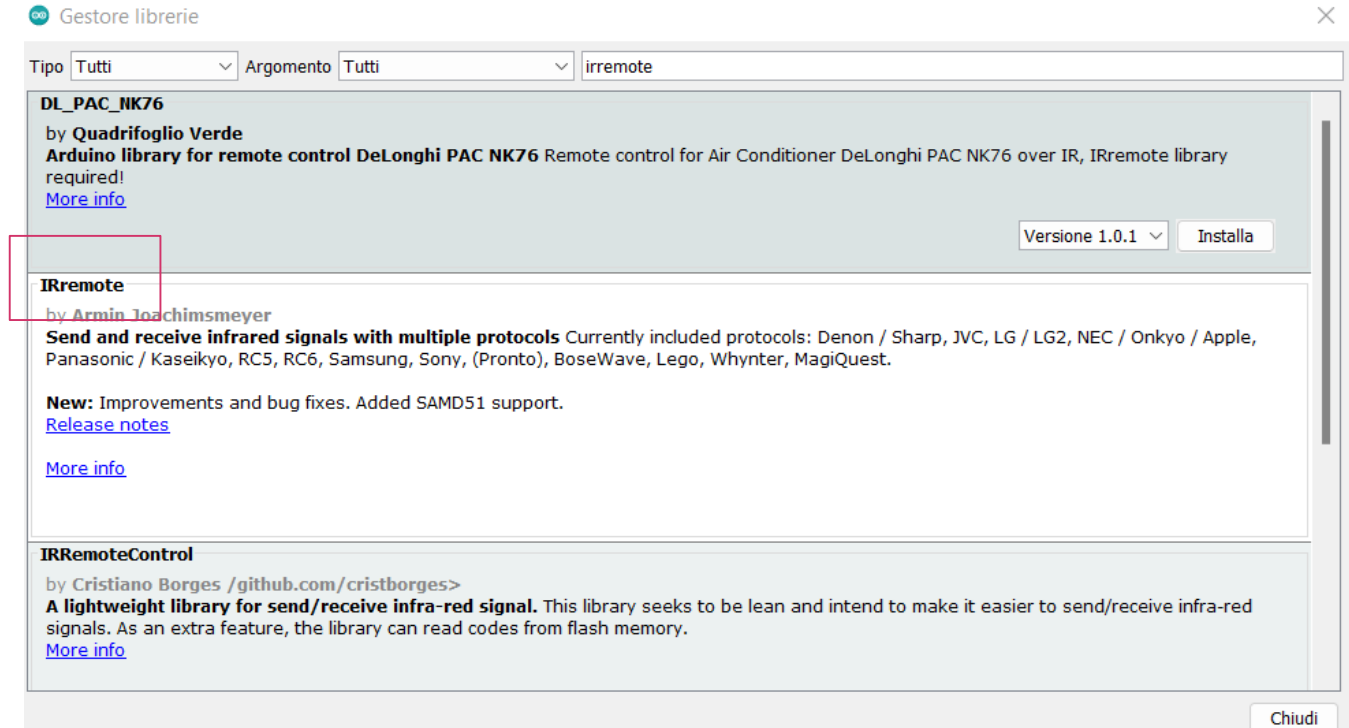
**Innovative Information Technologies in the Modern VET School**

**2020-1-RS01-KA202-065381**

# Arduino Connections

# Operating examples: the Single Led

We need to install the «IRremote» library before working with the infrared remote receiver



Gestore librerie

Tipo Tutti Argomento Tutti irremote

**DL\_PAC\_NK76**  
by [Quadrifoglio Verde](#)  
**Arduino library for remote control DeLonghi PAC NK76** Remote control for Air Conditioner DeLonghi PAC NK76 over IR, IRremote library required!  
[More info](#) Versione 1.0.1 Installa

**IRremote**  
by [Armin Joachimsmeyer](#)  
**Send and receive infrared signals with multiple protocols** Currently included protocols: Denon / Sharp, JVC, LG / LG2, NEC / Onkyo / Apple, Panasonic / Kaseikyo, RC5, RC6, Samsung, Sony, (Pronto), BoseWave, Lego, Whynter, MagiQuest.  
**New:** Improvements and bug fixes. Added SAMD51 support.  
[Release notes](#)  
[More info](#)

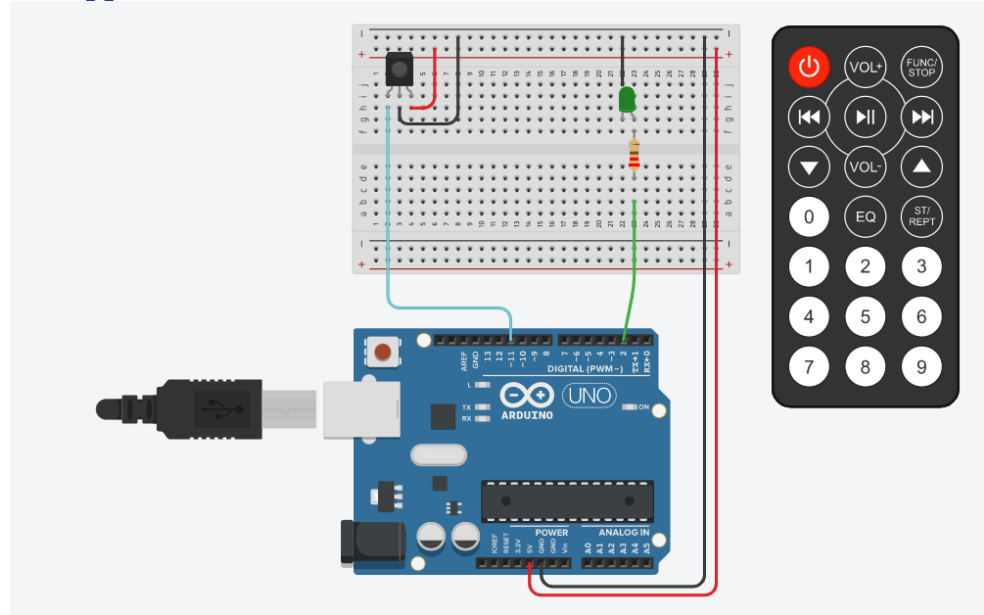
**IRRemoteControl**  
by [Cristiano Borges / github.com/cristborges](#)  
**A lightweight library for send/receive infra-red signal.** This library seeks to be lean and intend to make it easier to send/receive infra-red signals. As an extra feature, the library can read codes from flash memory.  
[More info](#)

Chiudi

# Operating examples: the Single Led

Let's examine the electrical circuit with the proper code

<https://www.tinkercad.com/things/1UJs1xw7ofj>

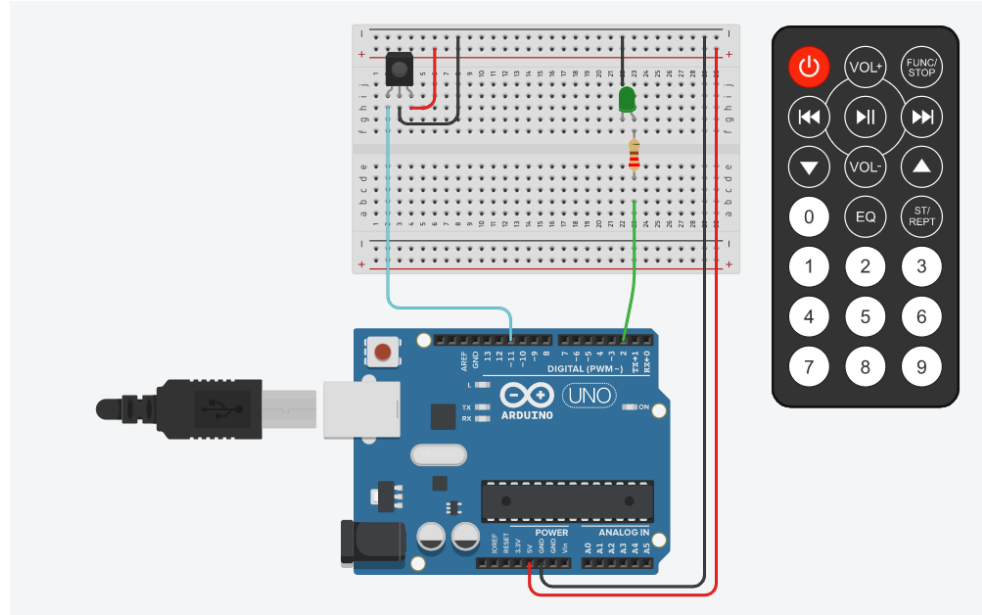


# Operating examples: the Single Led

The 220Ω resistor has the task of limiting the current to an ideal value for switching on the LED.

Considering that the ON voltage of a green LED diode is about  $V_d = 2V$  and that the Arduino output voltage is equal to  $E=5V$ , by using Kirchhoff's Current Law, we obtain that the current is about  $I=13.5 \text{ mA}$ .

$$I = \frac{E - V_d}{R}$$

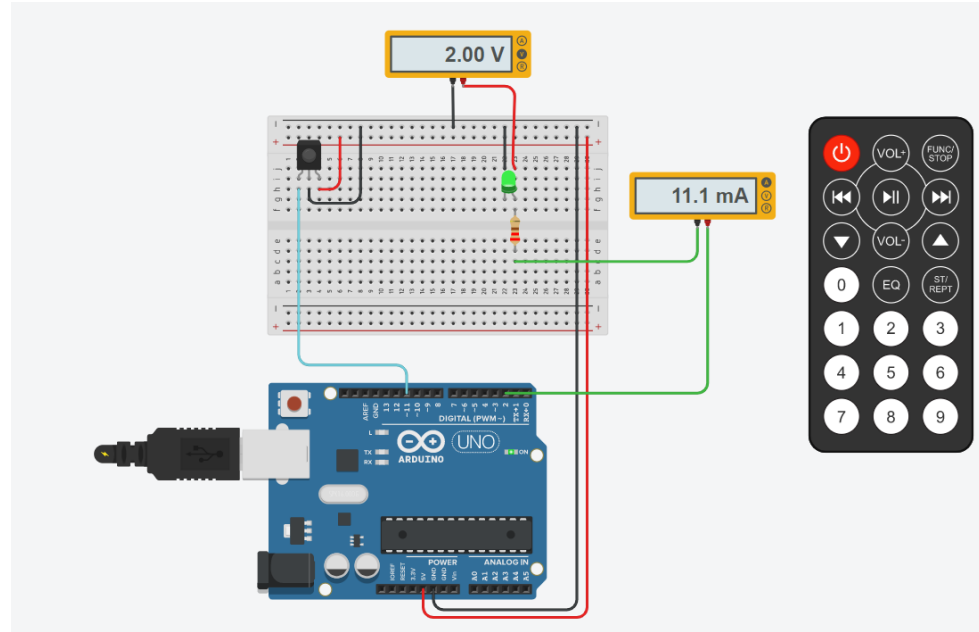


# Operating examples: the Single Led

By measuring these values with TinkerCAD virtual instruments we obtain a current value very close to the theoretical one previously calculated.

This is acceptable as the simulation takes into account the internal resistances of the instruments.

<https://www.tinkercad.com/things/jUhE7J1PTNB>



# Operating examples: single led

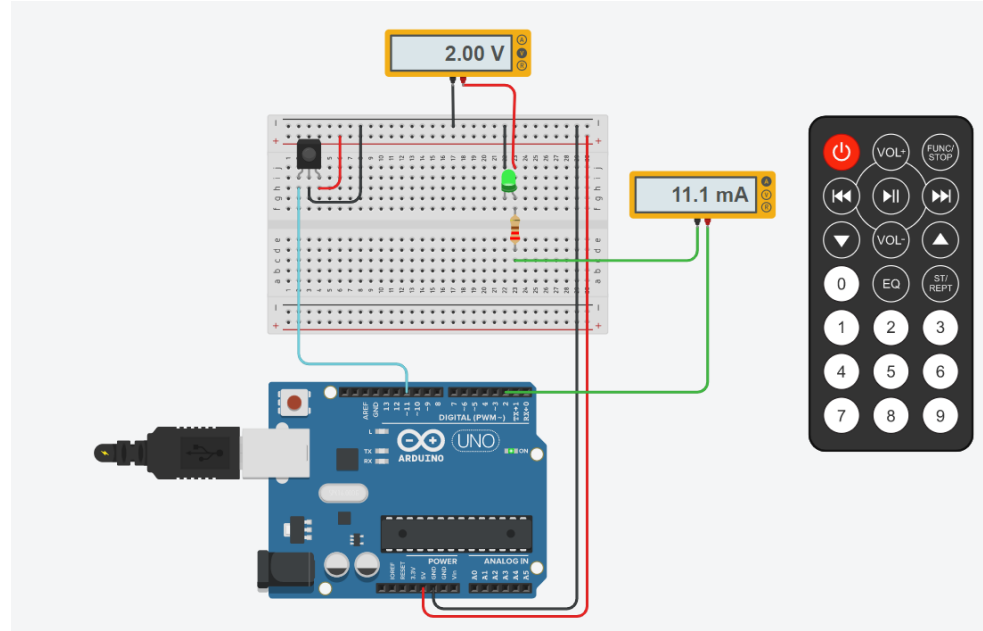
## IMPORTANT NOTE n° 1

To determine what is the hexadecimal code of a key, you can use the Arduino SERIAL MONITOR



Arduino **kit** monitor output example

```
FF18E7 ← #1 push button
FFFFFFFF
FF10EF ← #4 push button
FFFFFFFF
FF38C7
FFFFFFFF
FF42BD
4CB0FADF
FFFFFFFF
```



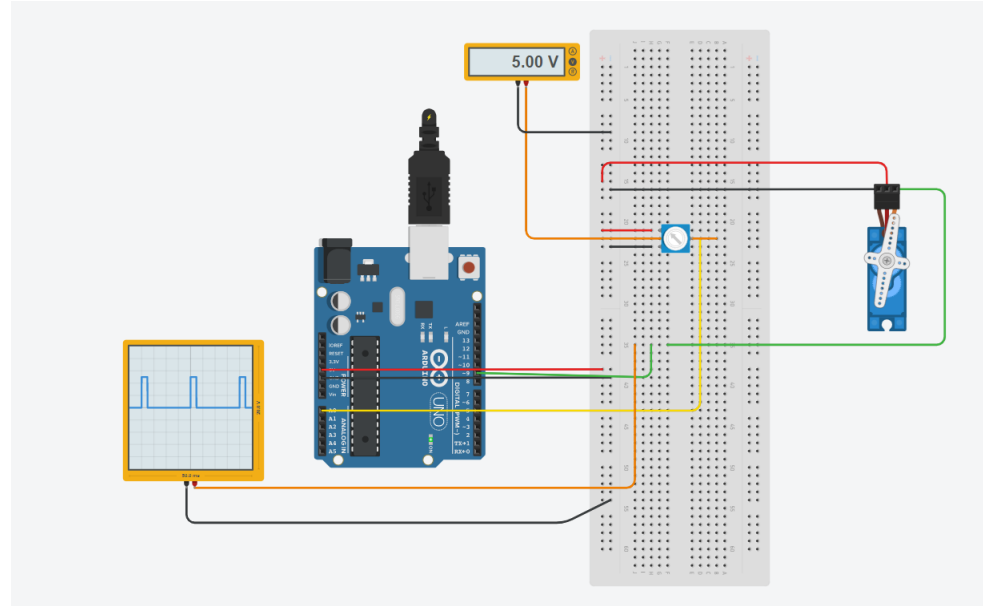
# Operating examples: the Servomotor

In this example we check the operation of a servomotor

With the trimmer (variable resistor) we generate a variable voltage that we apply in input to Arduino.

The Arduino ADC (Analog Digital Converter) generates a number from 0 to 1023

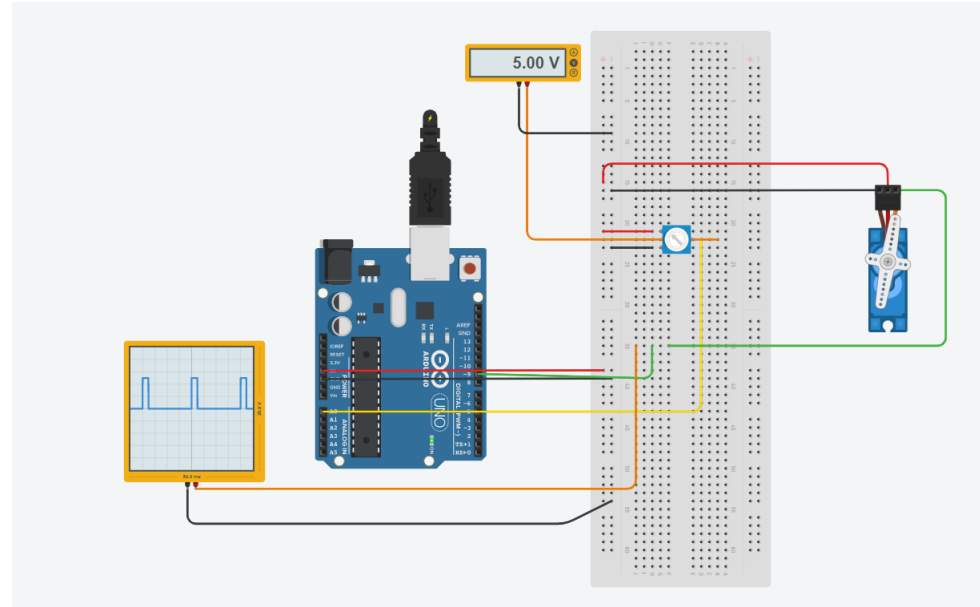
With the Arduino “map” function we generate a rotation angle proportional to this number



# Operating examples: the Servomotor

For all details see the example code

<https://www.tinkercad.com/things/bz1EH6xp15W>

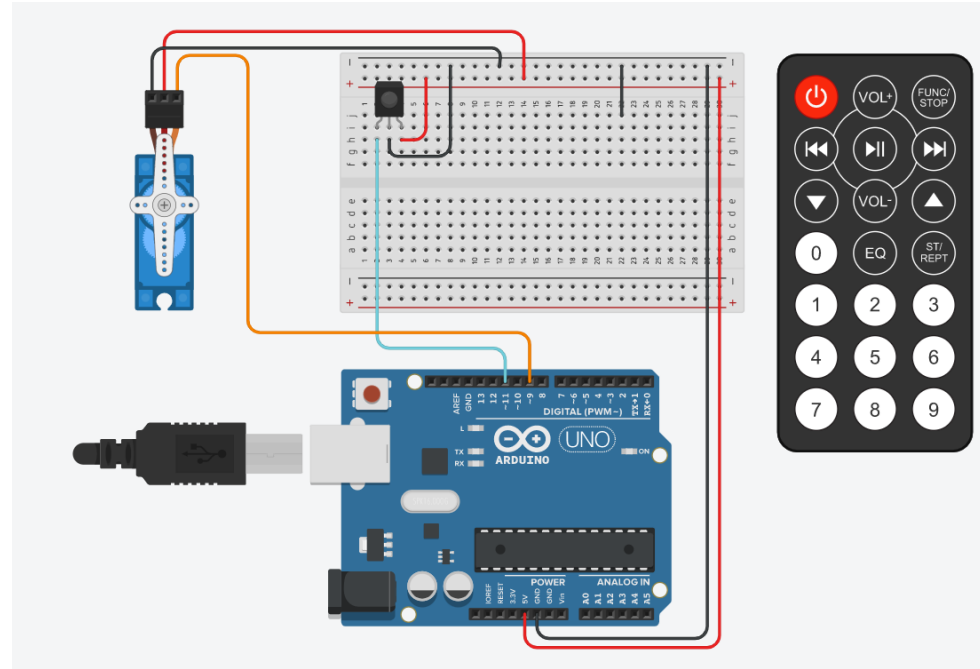




# Operating examples: the Servomotor

In this example we use the remote control to operate the servomotor.

<https://www.tinkercad.com/things/emPTPSHnx1i>



# Thanks for your attention



Co-funded by the  
Erasmus+ Programme  
of the European Union

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.