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Arduino
The components and notions necessary to perform an experiment

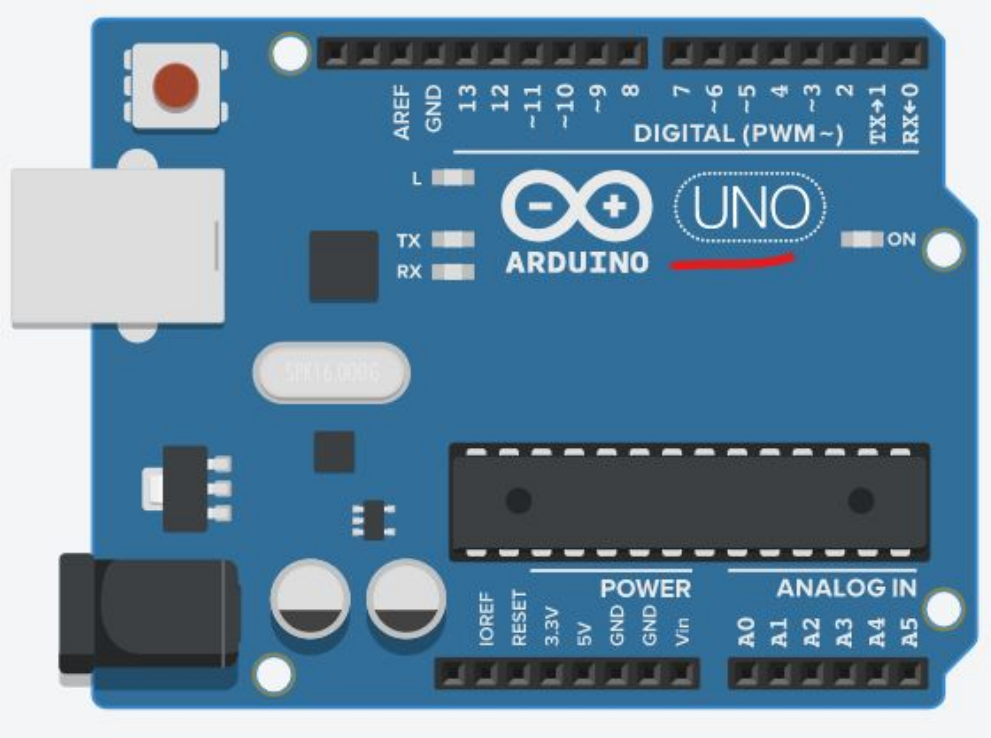
ing.Franco Babbo - 2022

Contents just

In this presentation we will review all the components and notions necessary to carry out the challenge.
We shall just use the kit components.

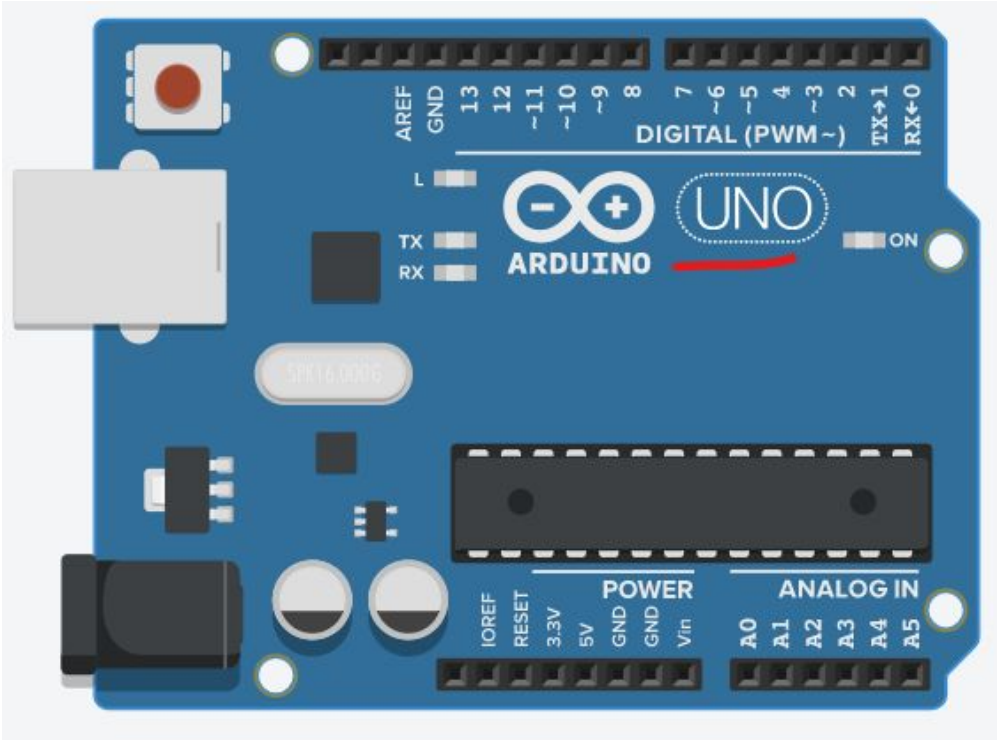
Contents

We obviusly need an Arduino UNO R3 board



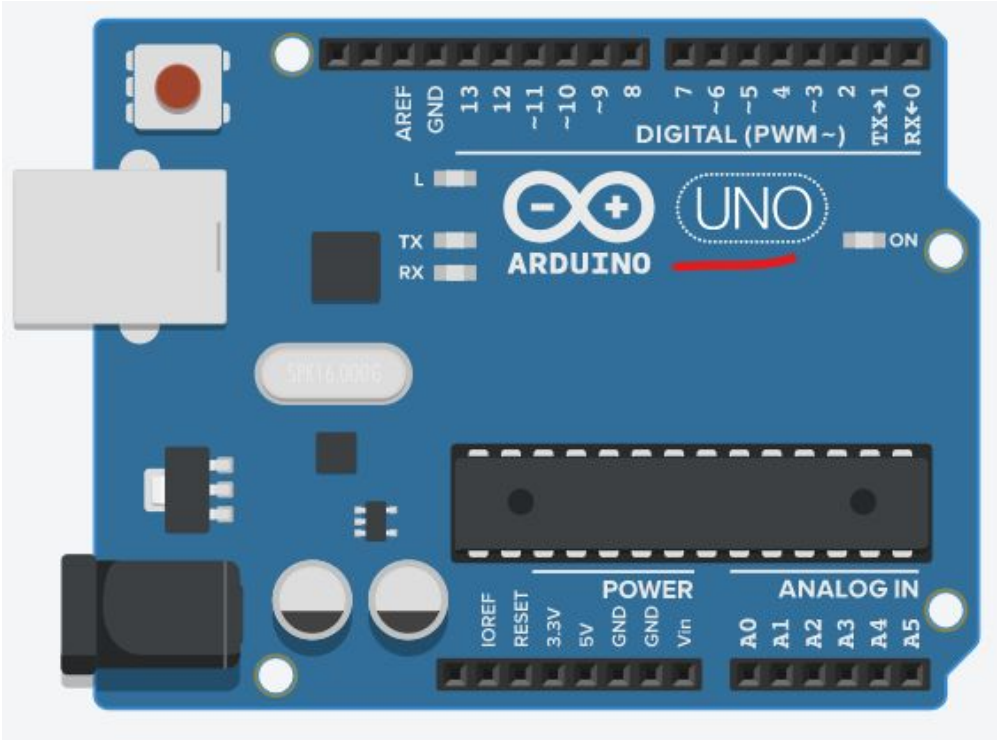
Contents

In the examples we will use both digital Inputs/Outputs and analog Inputs/Outputs.



Contents

We need to install additional libraries



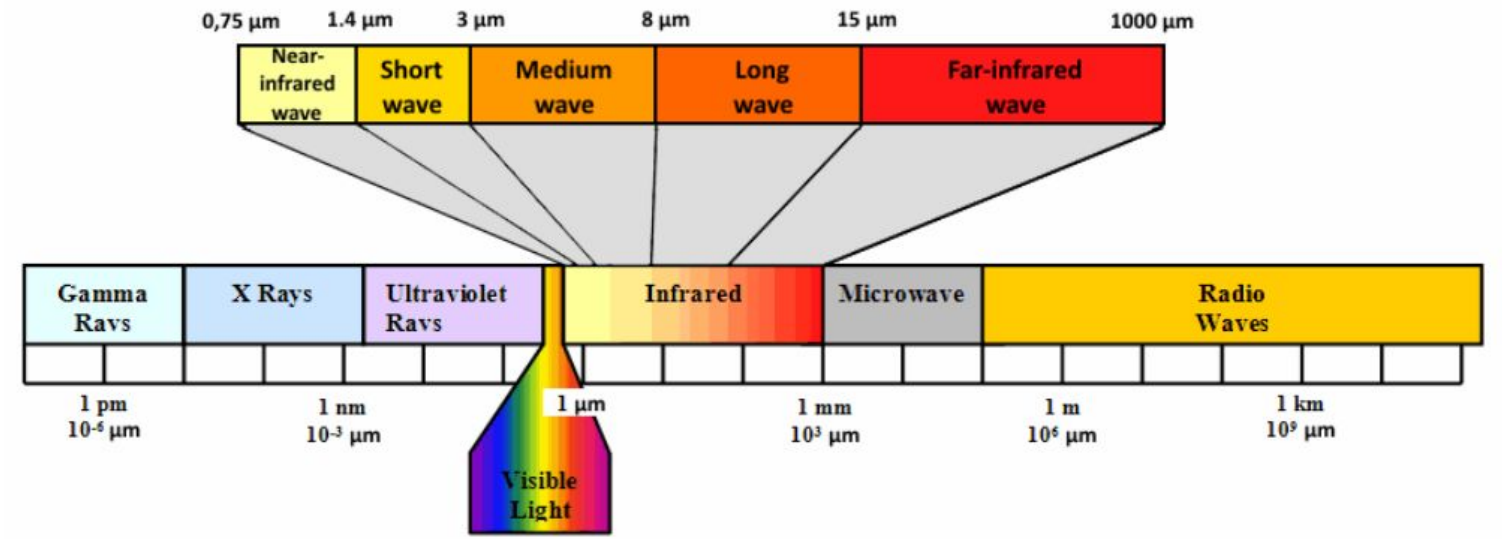
A little bit of Physics

Infrared Radiation

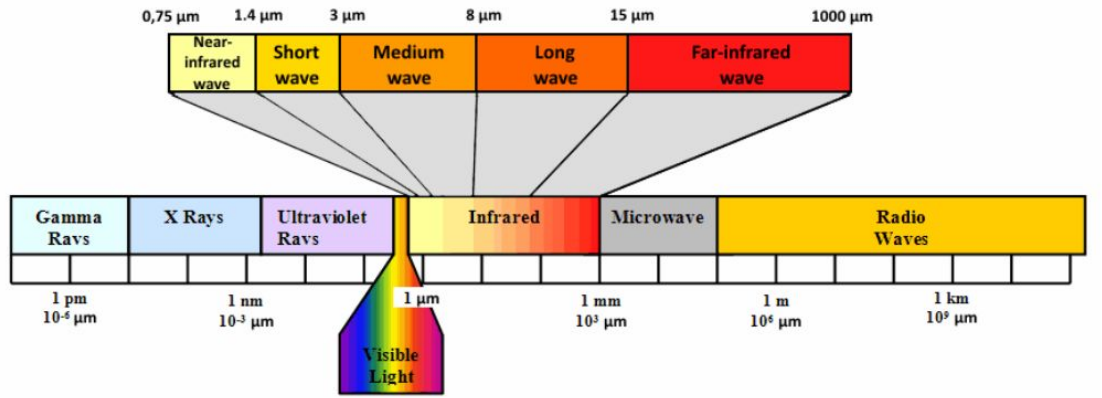
In our experiments we will use an infrared remote controller and receiver

A little bit of Physics

Visible light spectrum range

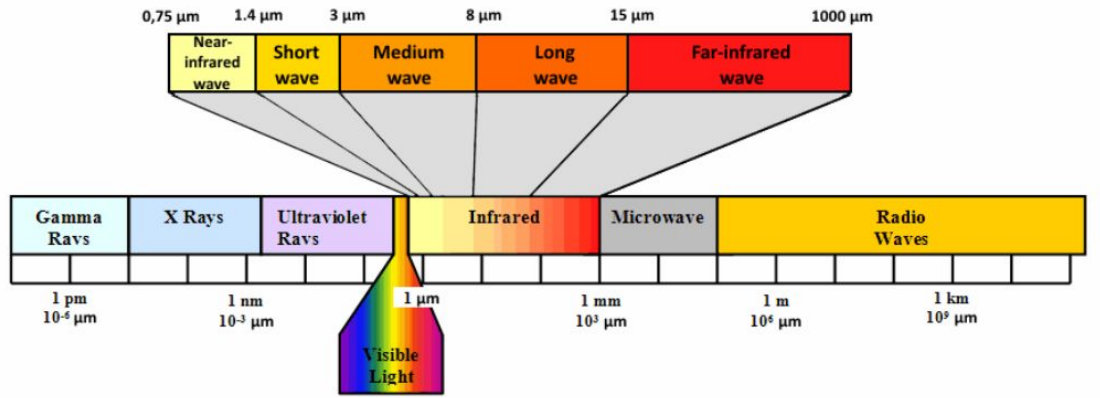


A little bit of Physics



As you can see, at the two extremes of visible light there are ultraviolet and infrared rays.

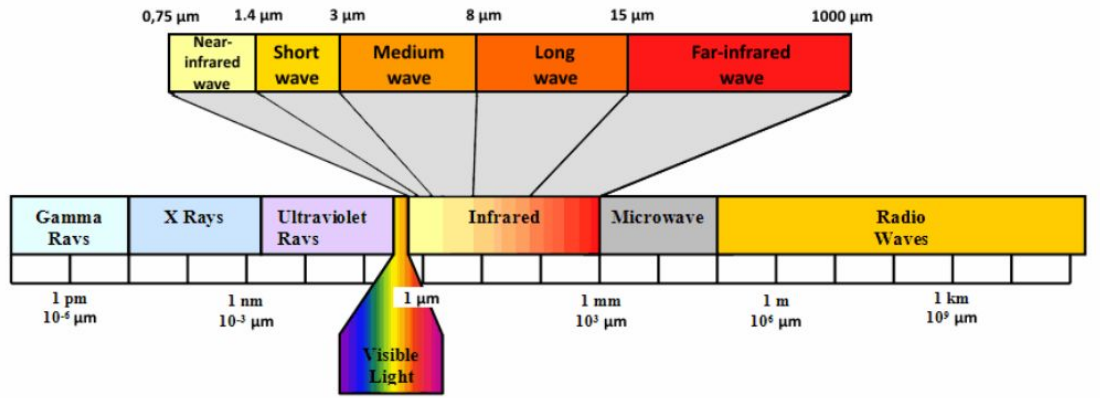
A little bit of Physics



The physical variable shown in the graph is called **wavelength.**

It is measured, like every length, in meters.

A little bit of Physics



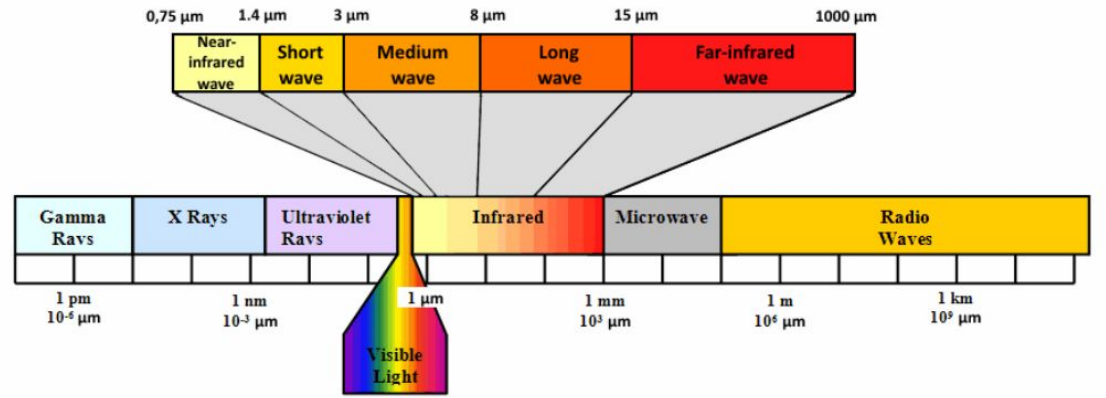
The radiation frequency and wavelength are inversely proportional.

$$\lambda = \frac{c}{f}$$

c = speed of radiation(in vacuum)
v=300.000 km/s)

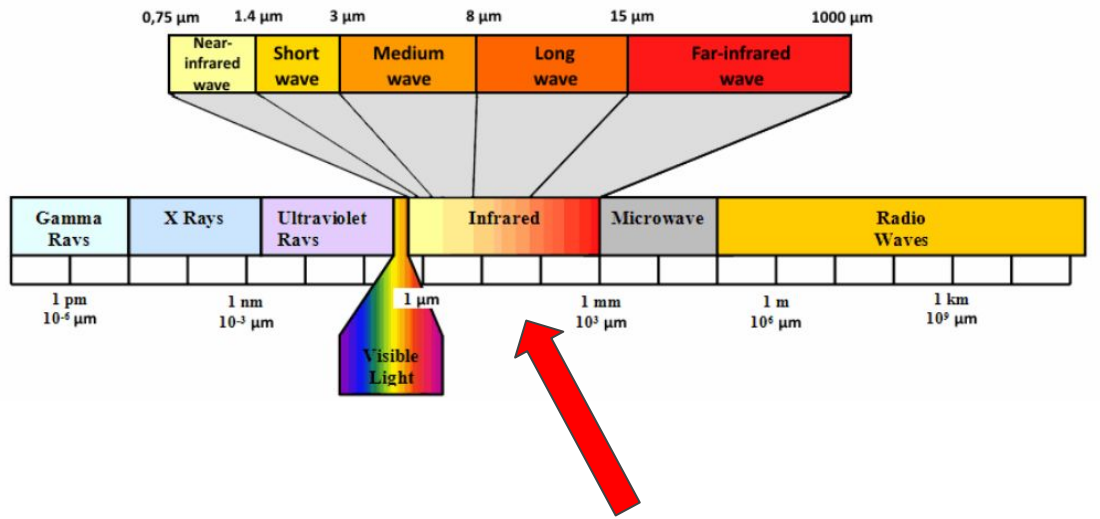
A little bit of Physics

As shown in this graph, the wavelength increases going to the right while the frequency decreases.



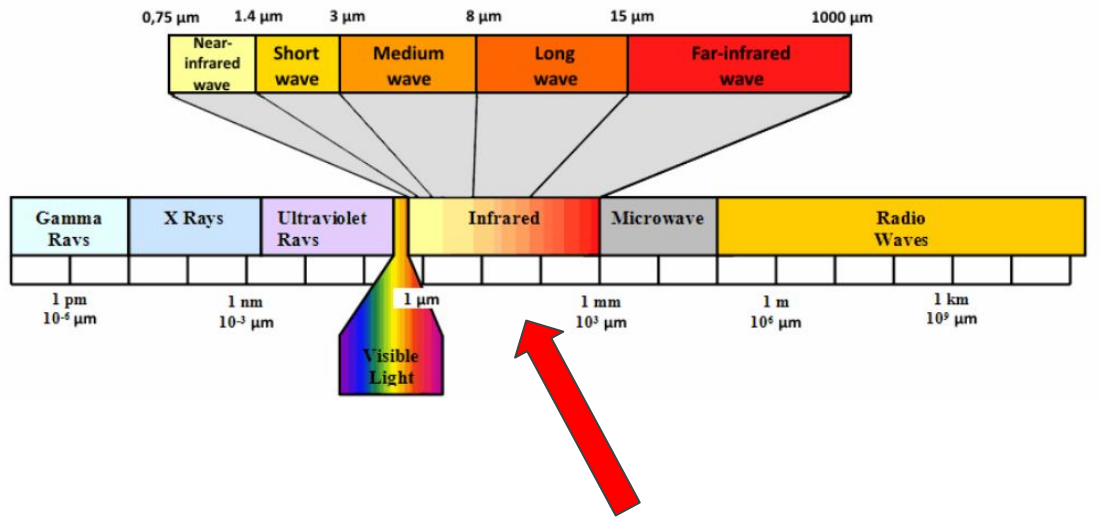
$$\lambda = \frac{v}{f}$$

A little bit of Physics



In our experiment we will use the infrared part of the electromagnetic spectrum to transport the signal from the transmitter to the receiver.

A little bit of Physics



This infrared part of the electromagnetic spectrum, as shown by the graph, is not visible.

A little bit of Electronics

LED (Light Emitting Diode)

It’s a semi-conductor component capable of emitting a certain wavelength radiation

We can have LEDS capable of emitting a visibile colored light like red, green, yellow or green.

Infrared LEDs emit radiation with a wavelength included in the infrared range, therefore outside the visible

A little bit of Electronic

Infrared remote controller

It is an electronic device that sends encoded signals through an infrared diode.

The **remote controller** provided with the kit is powered by a 3V button battery like the one shown here

A little bit of Electronics

The infrared receiver

It’s a receiver diode having the same wavelength of the remote controller

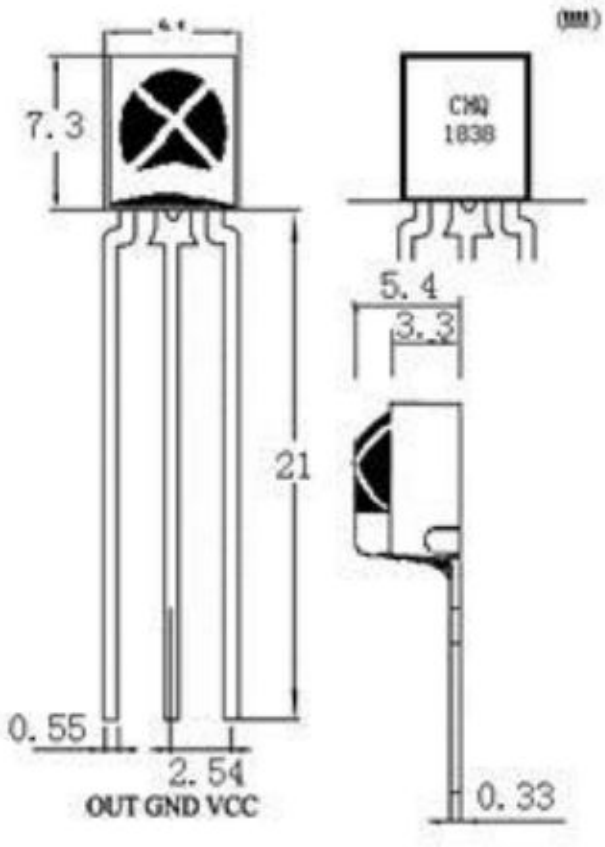
The receiver diode provided with the kit is marketed under the TL1838 code

A little bit of Electronics

The infrared receiver

The device pin arrangements are shown here

Two of the pins are dedicated to the power supply, one is dedicated to input/output data



A little bit of Electronics

The servomotor

It’s a kind of electric motor turning when commanded by a signal received on the pin «signal».

The two other pins are dedicated to the power supply.

A little bit of Electronics

The servomotor

The driving pulses of a servomotor have a fixed frequency and a variable time lenght.

The time lenght of a pulse determines the angle of rotation.

This driving method is called **PWM (Pulse Width Modulation)**

Thanks for your attention

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