ELECTRONICS DEPARTMENT   **ENSEIGNANT : M.GARAH**

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Module : systèmes à microcontrôleur

TP 2 : Analog inputs

1 .Introduction :

An analog signal11 varies continuously over time. Its value is therefore a real number. We find analog signals constantly, such as temperature, speed, etc.


The Arduino Uno has 6 analog inputs, numbered A0 to A5. In reality, the microcontroller is not able to understand an analog signal. It must therefore first convert it into a digital signal by a special circuit called an analog / digital converter. This converter will sample the signal received in the form of a voltage variation and transform it into values between 0 and 1023. Be careful not to enter a voltage higher than 5V, which would destroy the Arduino.
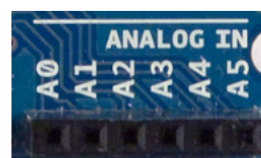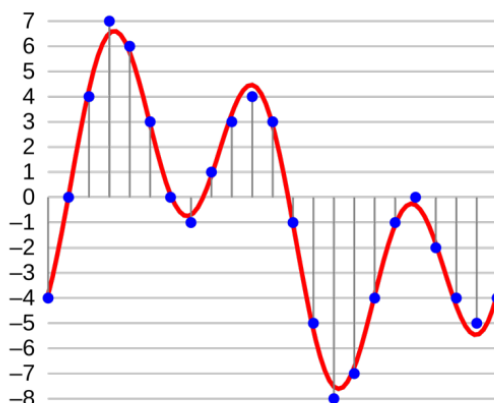
2 .The photoresistor :   A photoresistor is an electronic component whose resistance (in Ohm Ω) varies according to the light intensity; When the brightness is high, the resistance will be low .It can therefore be used as

•a light sensor for

• Measurement of ambient light for a weather station

• Light detector in a room

 • Light follower in a robot

• Passage detector. …

Its electronic symbols are as follows:
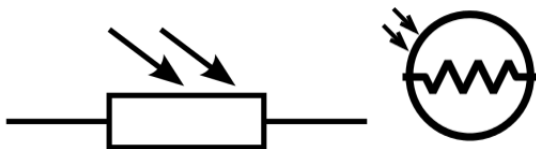
3. The potentiometer: The potentiometer is a variable resistor. It is the volume adjustment knob on a radio. Most potentiometers are either rotary or linear. Potentiometers are very common in electronic devices, e.g. mixers.

Here are the electronic symbols (European above and American below) of the potentiometer:
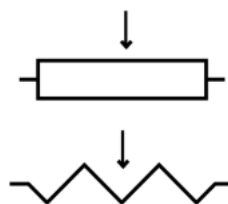
Like any resistor, the potentiometer changes the voltage of a circuit. So we're going to use it primarily as input into an analog pin (A0 to A5) of the Arduino.

Potentiometers typically have three pins; Outer pins are connected to the power supply +5V and grounded, while the center pin sends the signal to the Arduino's analog input pin.
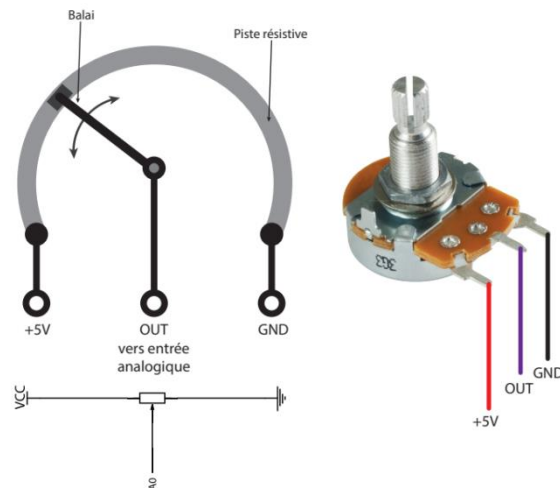

3. DHT11 sensor

The DHT11 sensor comes with many kits for Arduino, The DHT11 only measures positive temperatures, between 0°C and 50°C with an accuracy of ± 2°C and relative humidity levels from 20 to 80% with an accuracy of ± 5%. For more specific needs where it is necessary to measure negative temperatures, it is necessary to use the DHT22, which is twice as expensive, but with a measuring range of -50°C to +125°C,
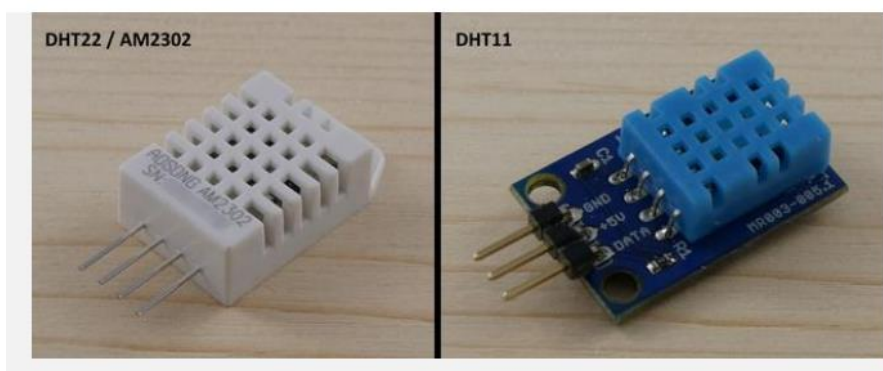
Objectives of the TP:

The objective of this first part is to write Arduino programs that utilize Analog inputs, to implement these programs, and to conduct relevant investigations

Manipulation1: we must define a brightness threshold beyond which an LED is turned off. We are going to use a statement: if... else (if ... if not). So it's a condition
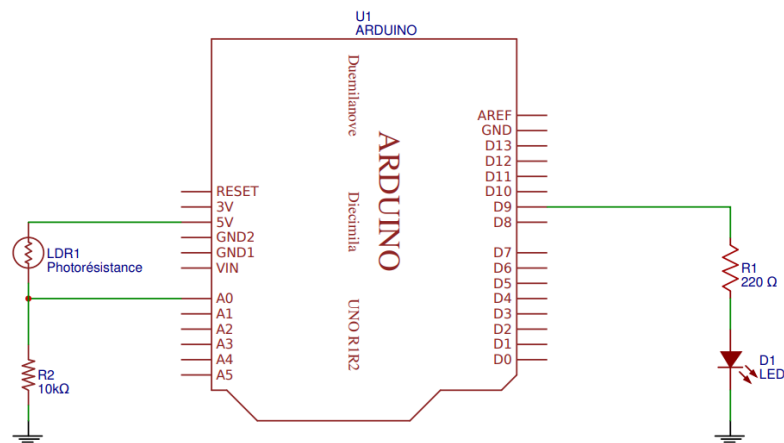
List of components

1 Leds

1 resistance of 10 KΩ

1 resistance of 220 Ω

1 photoresistor

Software:

Proteus

Arduino IDE

- Start by creating the circuit as indicated in Proteus.
- Propose an Arduino program that meets this specification.
- Then, simulate and test the program.

Manipulation 2 :

 The objective of this manipulation is Variation of the brightness of an LED depending on the light of the Room

- Begin by creating the circuit as indicated (previous figure) in Proteus.
- Propose an Arduino program that meets this specification.
- Then, simulate and test the program.