**Final Project – Temperature and Relative Humidity Monitoring**

**Trabajo Final Integrador (TFI) - Monitoreo de Temperatura y Humedad relativa**

The final Project idea is to solve a real problem which consists of measuring two physical variables (in this case are the temperature and humidity), displaying the corresponding values on the LCD display, and issuing a warning signal at given a value

For this purpose, I will use a temperature sensor and a humidity sensor DHT11 or DHT22

**DHT11 sensor: Pinout and connection**

If we look at it head-on and list it from left to right:

1. The first pin is VCC, and we will connect it to the 5[Volts] or 3.3[Volts] of the RPico

2. On the other end we have pin 3 and it is the GND, which will be connected to a GND pin of the RPico.

3. Pin 2 in te middle (DATA) which will give us the temperature and humidity information, must be connected to a digital input of the RPico.

An example of a connection is shown as follows.

1. the sensor power is taken from pin *\_3V3\_* (physical pin 36).

2. *\_GND\_* (physical pin 38),

3. The data is read using the *\_GP28\_* pin as input (physical pin 34).

![link](img/WhatsApp%20Image%202022-12-18%20at%2001.43.27.jpeg)

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**## Import "dht" Library**

- If we introduce by console help("modules"), will appear many of library that we can use with MicroPython

![link](img/microPy-library.png)

- we import this library becase the whole process of transmitting values involves respecting certain start and end times for communication between the microcontroller and the sensor, so this can saves us a lot of time

            from dht import DHT11

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- Then we create the DHT11 sensor objet

        dht11\_sensor = DHT11(Pin(28,Pin.IN))

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**## Let's start !**

**## Part I - Reading and measuring values**

- We have to use different methods to measure the values.

  1. method *\*measure()\**

  2. method *\*temperature()\**

  3. method *\*humidity()\**

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- Then, we save them in variables:

        dht11\_sensor.measure()

        temperature = dht11\_sensor.temperature()

        humidity = dht11\_sensor.humidity()

**\*\*MicroPython code:\*\***

        from machine import Pin

        from utime import sleep

        from dht import DHT11

        dht11\_sensor = DHT11(Pin(28, Pin.IN))

        dht11\_sensor.measure()

        temperature = dht11\_sensor.temperature()

        humidity = dht11\_sensor.humidity()

        while True:

            sleep(5)

            temperature = dht11\_sensor.temperature()

            humidity = dht11\_sensor.humidity()

            print("Temperature : ", temperature, "°C")

            print("Humidity : " , humidity , "%")

            print()

![link](img/temperatureAndHumidity.png)

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**## Part II - Viewing measured data**

![link](img/viewingMerginData.jpg)

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**\*\*MicroPython code\*\***

            from machine import Pin, I2C

            from utime import sleep

            from dht import DHT11

            from lcd\_api import LcdApi

            from pico\_i2c\_lcd import I2cLcd

            # -------- DHT11 Sensor --------

            dht11\_sensor = DHT11(Pin(15, Pin.IN))

            dht11\_sensor.measure()

            temperature = dht11\_sensor.temperature()

            humidity = dht11\_sensor.humidity()

            # -------- LCD display -------

            # I2C

            scl = Pin(1)

            sda = Pin(0)

            freq = 400000

            i2c = I2C(0,sda=sda, scl=scl,freq=freq)

            I2C\_ADDR = 0x27

            I2C\_NUM\_ROWS = 2

            I2C\_NUM\_COLS = 16

            #LCD object

            lcd = I2cLcd(i2c,I2C\_ADDR,I2C\_NUM\_ROWS,I2C\_NUM\_COLS)

            while True:

                sleep(3)

                lcd.clear()

                temperature = dht11\_sensor.temperature()

                lcd.move\_to(0,0)

                lcd.putstr("Temp: ")

                lcd.putstr(str(temperature))

                lcd.putstr(chr(223))

                lcd.move\_to(0,1)

                humidity = dht11\_sensor.humidity()

                lcd.putstr("Humidity: ")

                lcd.putstr(str(humidity))

                lcd.putstr("%")

![link](img/WhatsApp%20Image%202022-12-18%20at%2003.01.42.jpeg)

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**\*\*The circuit :\*\***

![link](img/WhatsApp%20Image%202022-12-18%20at%2003.04.17.jpeg)

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**## Part III - Weather Station**

- Will incorporate an alarm signal, which is triggered when a certain condition occurs.

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