A.3.3Learning activity

Temperature measurement circuit through a NodeMCU ESP32

Sources of support to develop the activity

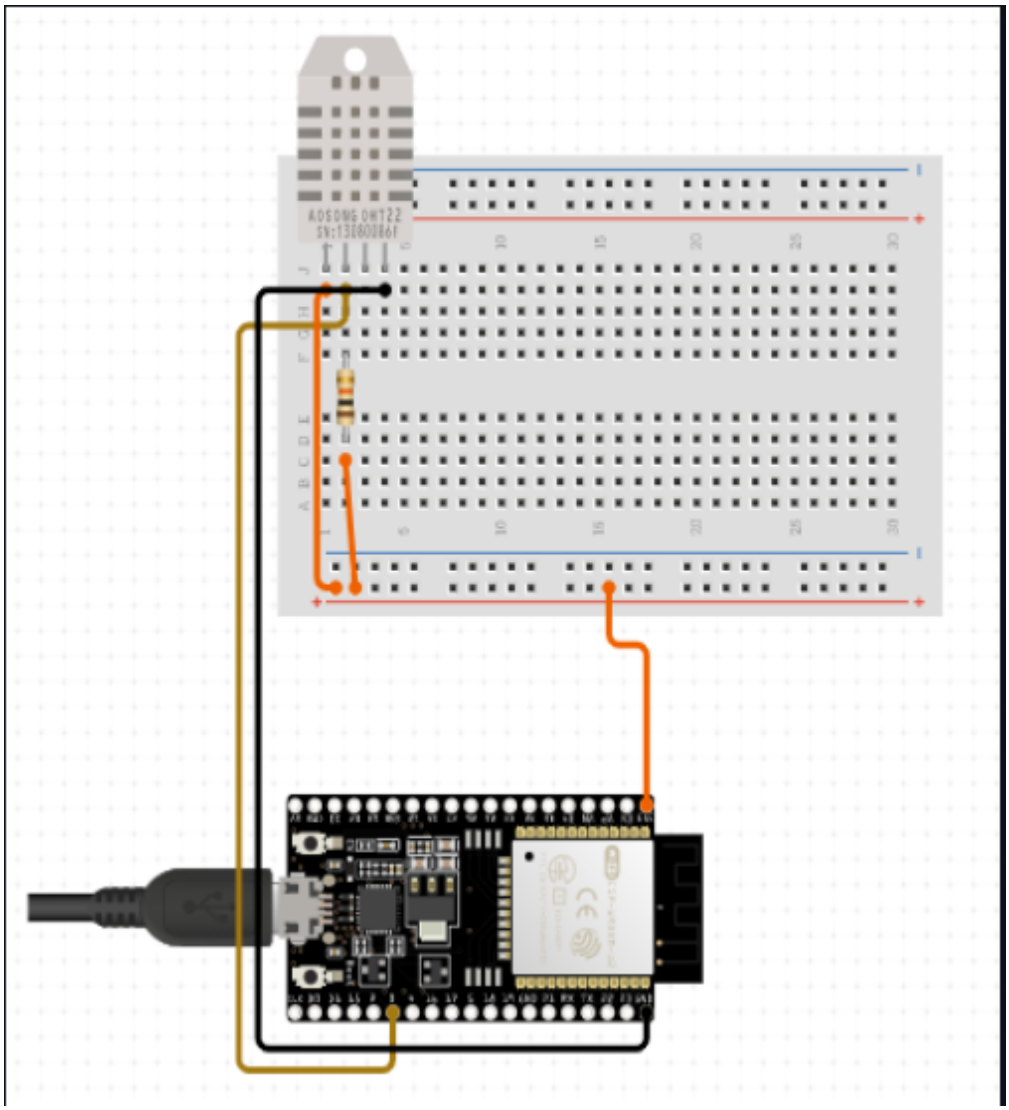
- ☑ Random Nerd Tutorial ESP32 DHT11/DHT22
- ☑ ESP32/ESP8266 RGB LED

Development

1.Use the following list of materials for the development of the activity

Quantity	Description
1	Temperature and humidity DHT11 sensor o DHT22
1	Diodo led RGB
1	Resistance 4.7 kohms
3	Resistances 1 kohm
1	Power supply 5V
1	NodeMCU ESP32
1	BreadBoard
1	Jumpers M/M

2. Based on the images shown in **Figuras 1**, assemble the circuit into a single electronic circuit, in such a way that you could obtain a system capable of complying with the instructions previously requested for this activity



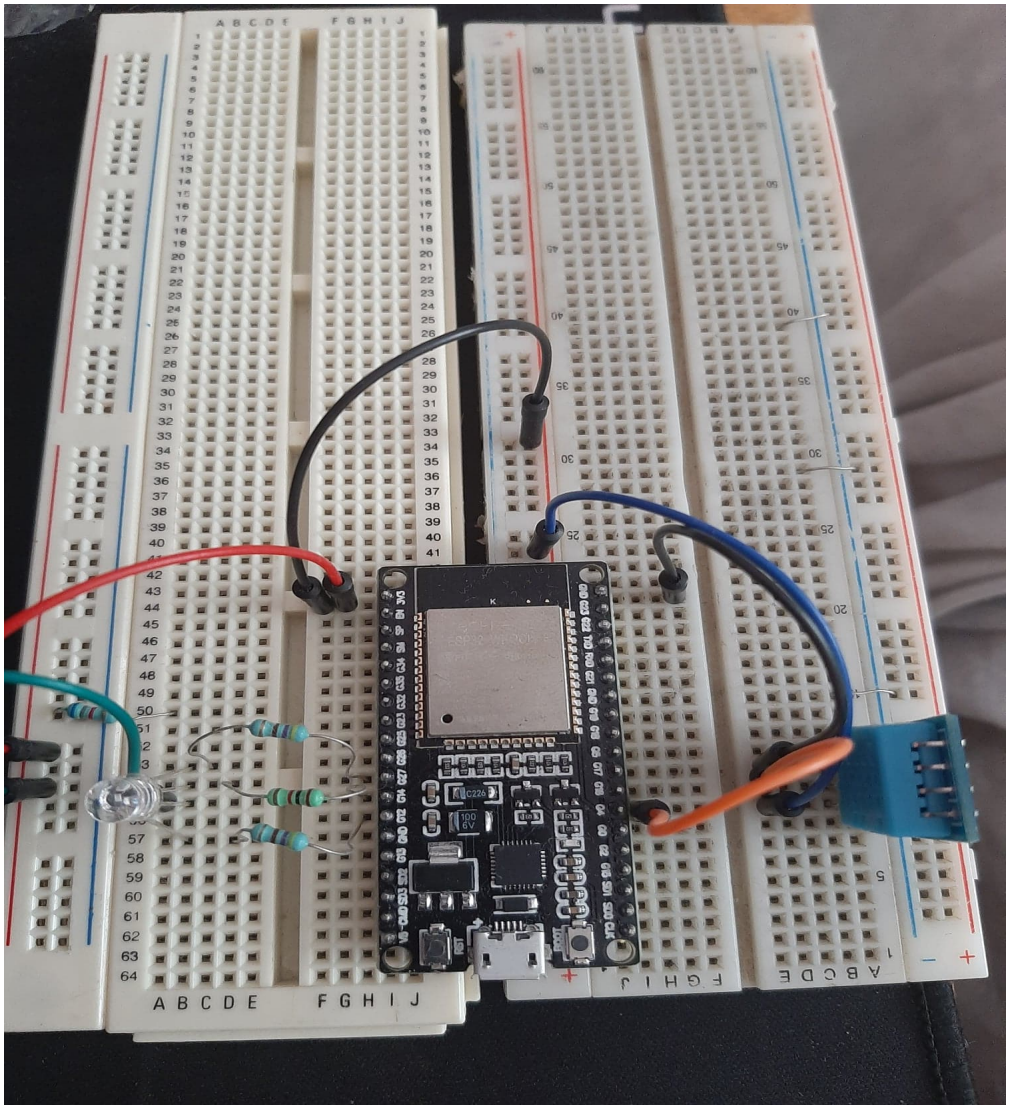
1. Once the previous circuit is assembled, add an RGB LED and make a program that allows the RGB LED to function as an indicator for the following conditions:
    - The temperature sensor will be sensing at all times, sending the value registered by the serial terminal, for example "Ambient temperature: 25 degrees" and the **RGB LED** will be lit green.
    - When the temperature sensor register a value of ~ 20% above the ambient temperature, it should display "High Temp:? degrees" and the **RGB LED** will turn red.
    - When the temperature sensor register a value of ~ 20% below the ambient temperature, It should display the message "Low Temp:? degrees" and the **RGB LED** will turn blue.

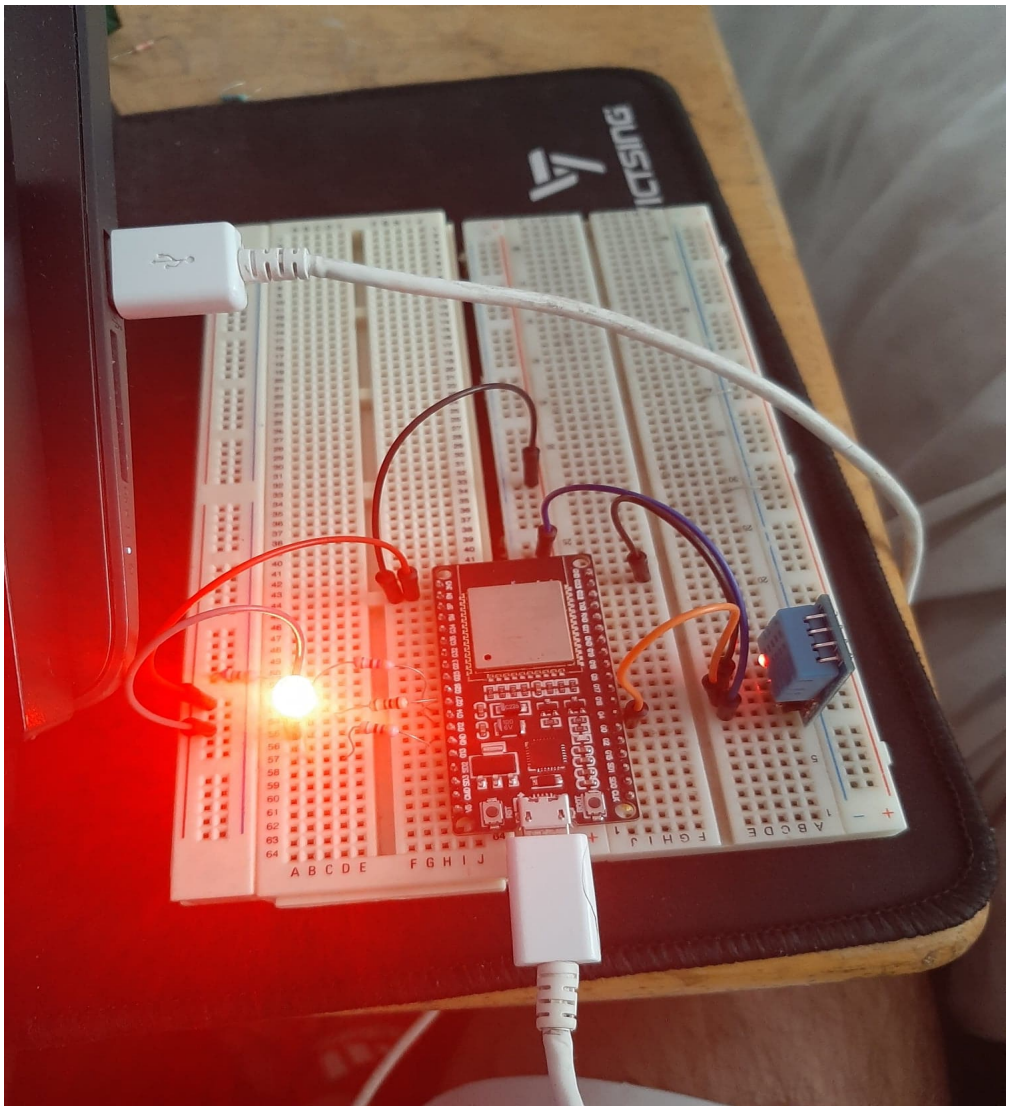
```
#include <DHT.h>


const int freq = 5000, ledChannel0 = 0, resolution = 8,ledChannel1 = 1,ledChannel2
= 2;
const int R = 12, G = 14, B = 27;
const int Temp= 25;

#define DHTPIN 4
#define DHTTYPE DHT11

DHT dht(DHTPIN, DHTTYPE);
```

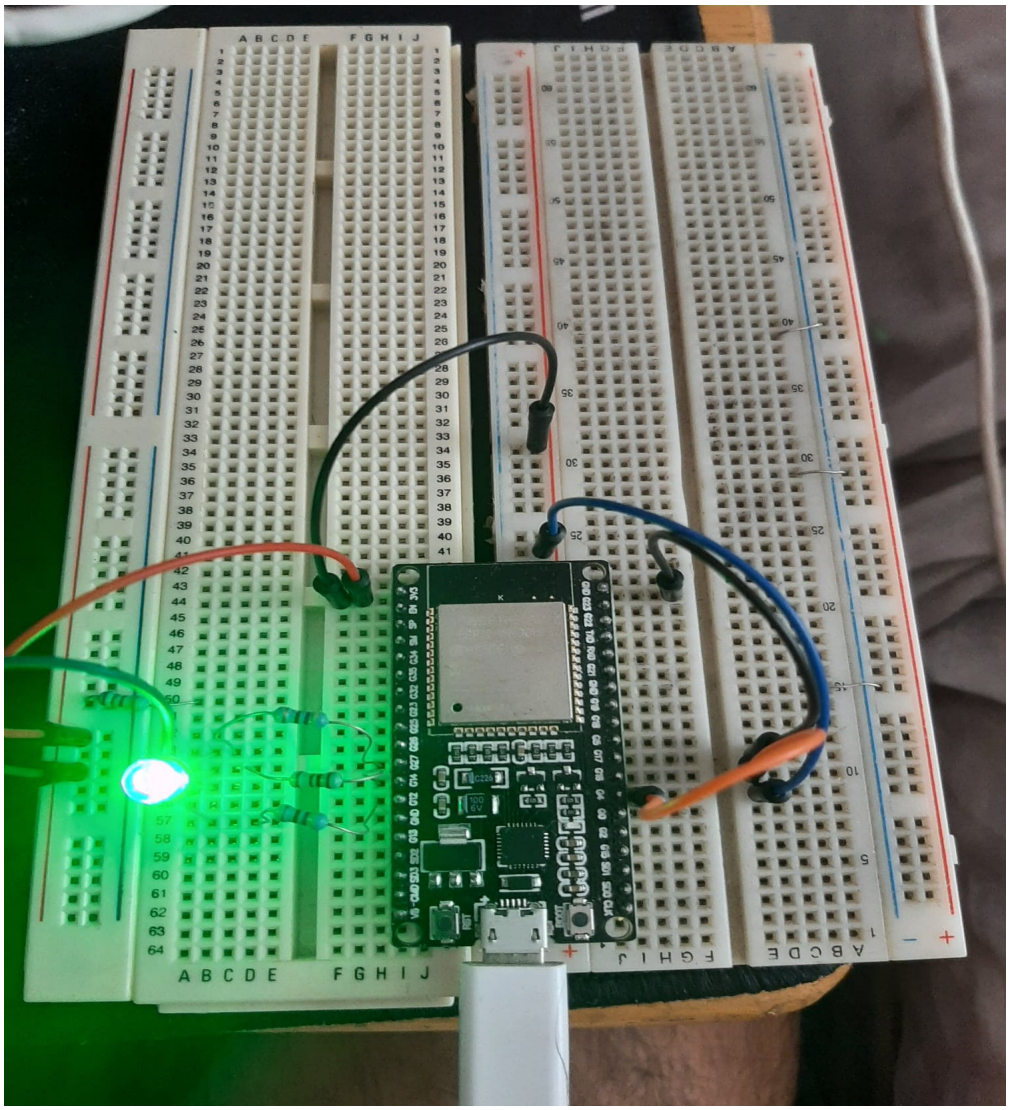
```
void setup() {
  // put your setup code here, to run once:
  ledcSetup(ledChannel0,freq,resolution);
  ledcSetup(ledChannel1,freq,resolution);
  ledcSetup(ledChannel2,freq,resolution);

  ledcAttachPin(R,ledChannel0);
  ledcAttachPin(G,ledChannel1);
  ledcAttachPin(B,ledChannel2);

  ledcWrite(ledChannel0,255);
  ledcWrite(ledChannel1,255);
  ledcWrite(ledChannel2,255);
  Serial.begin(9600);
  dht.begin();
}

void loop() {

  delay(2000);
  // Read temperature as Celsius (the default)
  float t = dht.readTemperature();

  if (t >= (Temp + Temp*.2))
  {
      Rojo();
      Serial.println("Temperatura Alta: ");
      Serial.println(t);
  }
  else if (t <= (Temp - Temp*.2))
  {
      Azul();
      Serial.println("Temperatura Baja: ");
      Serial.println(t);
  }
  else
  {
      Verde();
      Serial.println("Temperatura Ambiente: ");
      Serial.println(t);
  }


}

void Rojo()
{
  ledcWrite(ledChannel0,0);
  ledcWrite(ledChannel1,255);
  ledcWrite(ledChannel2,255);
}
```

```
void Azul()
{
  ledcWrite(ledChannel0,255);
  ledcWrite(ledChannel1,0);
  ledcWrite(ledChannel2,255);
}

void Verde()
{
  ledcWrite(ledChannel0,255);
  ledcWrite(ledChannel1,255);
  ledcWrite(ledChannel2,0);
}
```

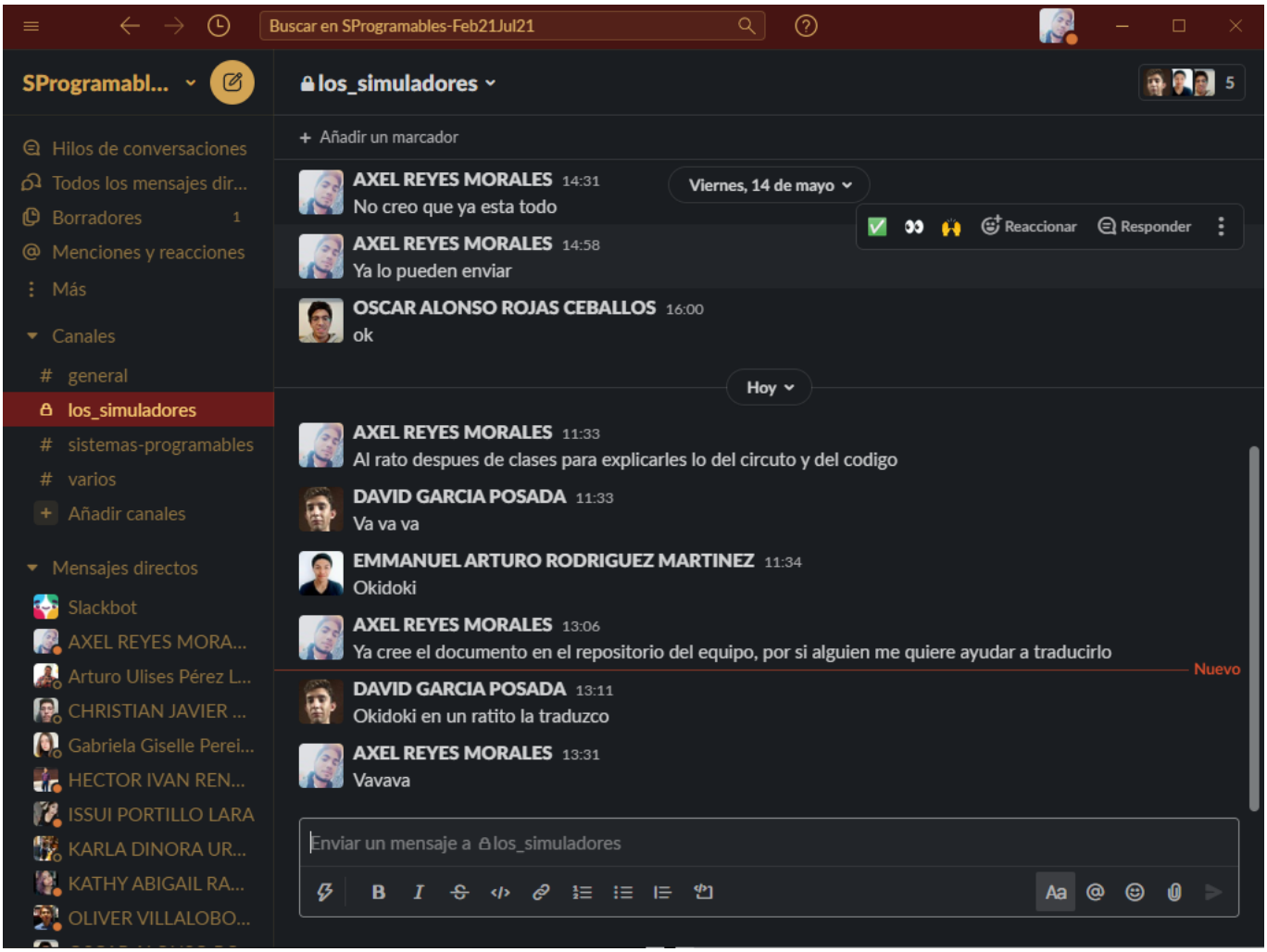
2. Place here evidence that you consider important during the development of the activity

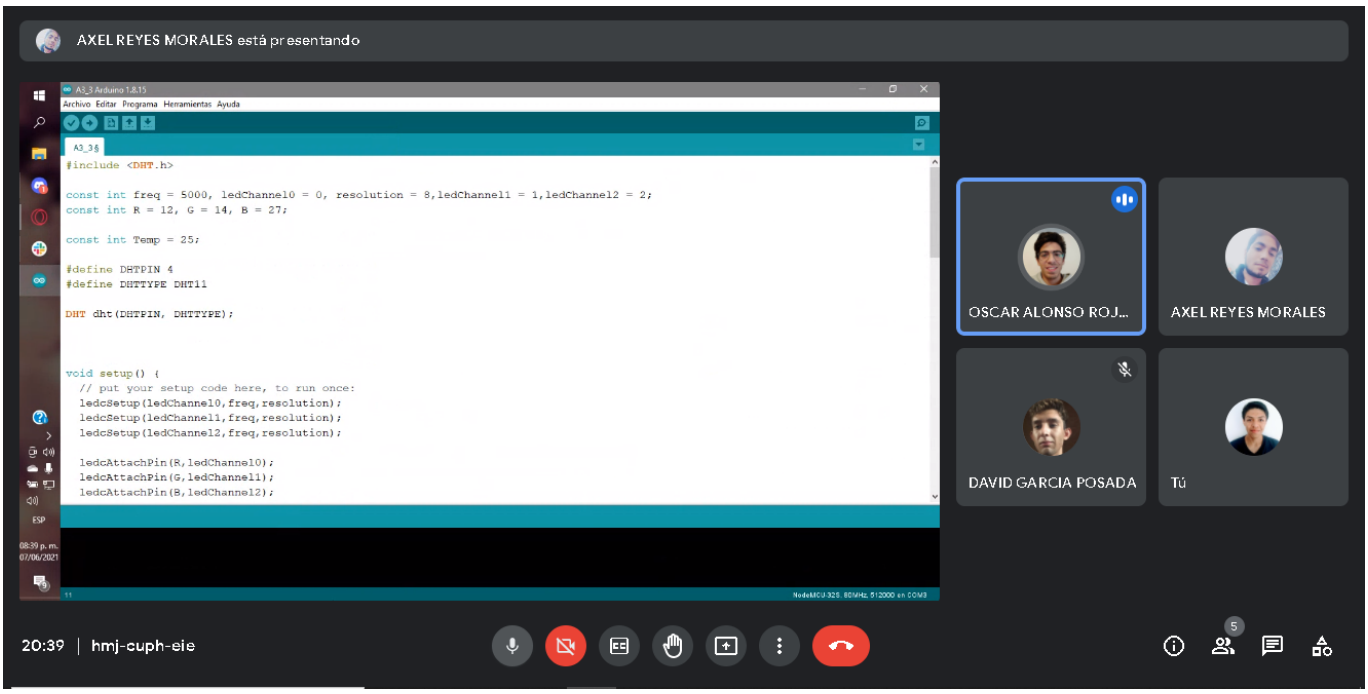






3. Insert images of **evidences** such as meetings of team members held for the development of the activity.





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Conclusions

Axel: To conclude I can say that in this practice was learned the use and implementation of the temperature and humidity sensor DTH11, with the microcontroller ESP32, in which depending on the detection of the

temperature the color of an RGB Led had to be changed, in case the temperature is ambient must be green, if the temperature is low to blue and if it is higher to red, in order to use the DTH11 libraries had to be downloaded to make use of it, Without them the sensor measurement data could not be obtained.

David: Along the development of the activity we were able to use the temperature and humidity sensor and with it we could learn about the way we can program it to work and the functionality it has, we also could observe the way it reacts with heat. besides that we were able to use a RGB led that stands for Red,Green,Blue red that we could program to react to de temperature sensor and change its color.

Emmanuel: In conclusion, the practice was based on the use of a DTH11 temperature sensor which is connected to the ESP32 which, depending on the temperature it detects, will light the led of different color, if it is low temperature it will light blue, if it is ambient temperature it will light green and if it is high temperature it will light red. The environmental temperature is 20 to 25 degrees Celsius, the low temperature is less than 20 and the high temperature is greater than 25.

Oscar Rojas: With this practice we learned how to take advantage of the DHT11 sensor, it is easy to use this sensor with the library and measure temperature its important to know that its mandatory the use of the libraries to make a succesful read of temperatur from the sensor, with this temperature read we make the RGB led to change its color, it was easy and interesting to do this just one led beacause we can use different color in just one led, when the temperature was around the normal range or ambient temperature the led turned green, when it cas below this range it turned blue and when it was above the range the led turned red.

Repositories

Axel Go to my repository

David Go to my repository

Emmanuel Go to my repository

Oscar Rojas Got to my repository