LAPORAN PRAKTIKUM MINGGU KE-8

“LDR & HC-SR04”

INTERNET OF THINGS

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D4 TEKNIK INFORMATIKA

TEKNOLOGI INFORMASI

POLITEKNIK NEGERI MALANG

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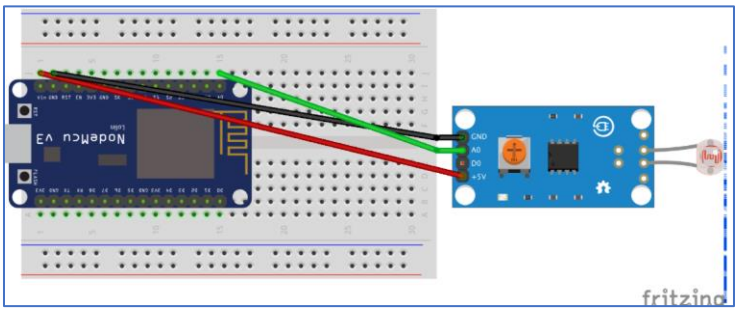
PRACTICUM

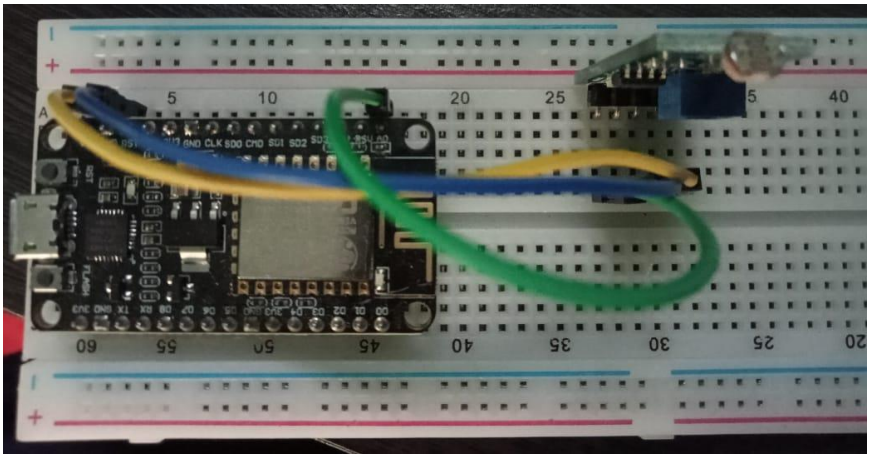
1. Reading light intensity data using LDR Sensor
   a. Schema

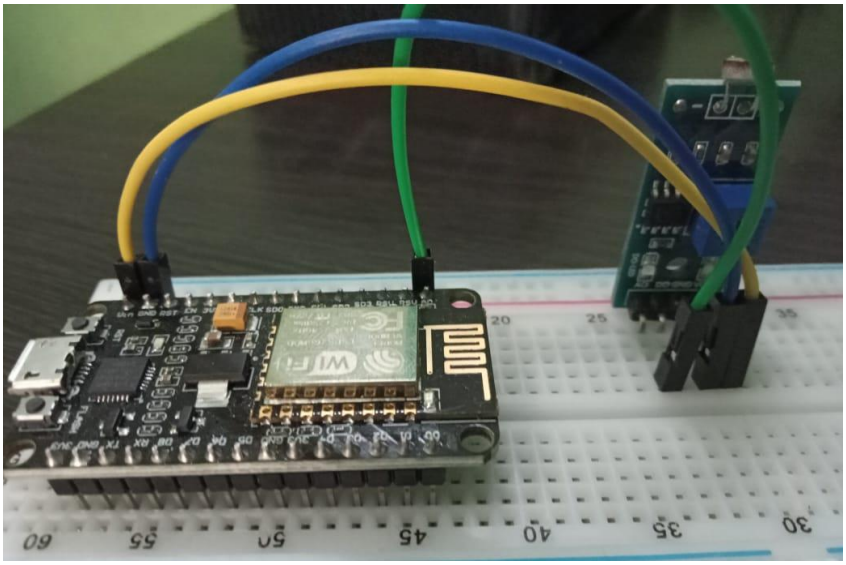


   b. Program Code

```
#include <Arduino.h>
#define sensorLDR A0
int nilaiSensor;

void setup() {
  Serial.begin(9600);
  Serial.println("The example of Sensor LDR usage");
  delay(3000);
}

void loop() {
  nilaiSensor = analogRead(sensorLDR);
  Serial.print("Sensor Value: ");
  Serial.println(nilaiSensor);
  delay(1000);
}
```

   c. Schema in real

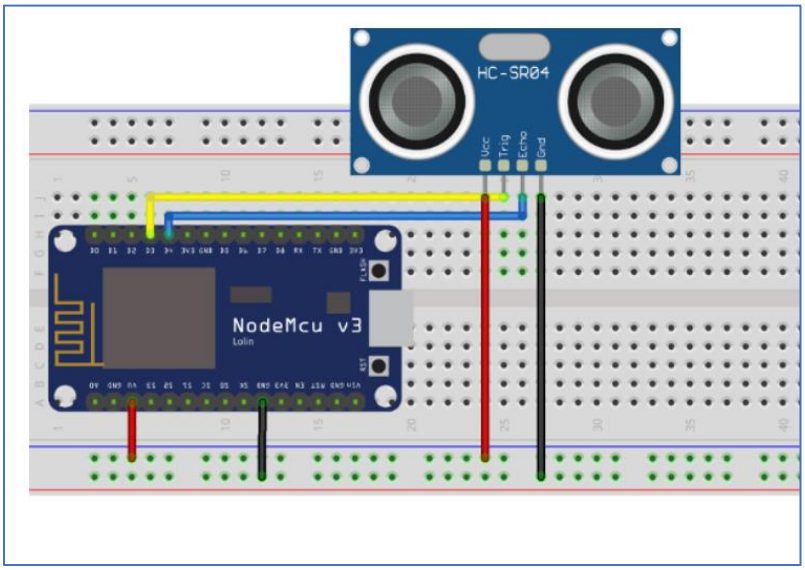




d. Video : [Link]

e. Explanation:
In practicum 1, the activity carried out is reading the light intensity using the LDR Sensor. The problem faced when doing this practicum is that the serial monitor does not display the light intensity value, then by changing the value 115200 to 9600 on the Serial.begin(9600) serial monitor works again. Based on the results of the light sensor, the darker it is, the results displayed on the serial monitor show a greater value. Conversely, if the light is bright, the value displayed is getting smaller.

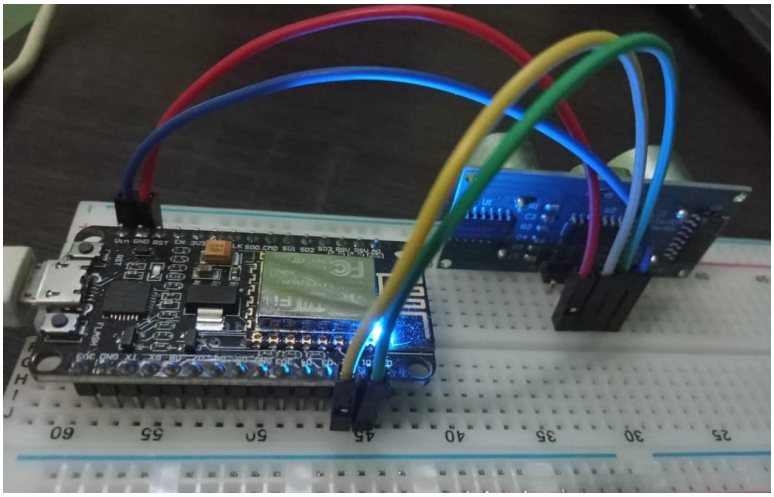
2. Reading object distance data using HC-SR04 sensors
   a. Schema

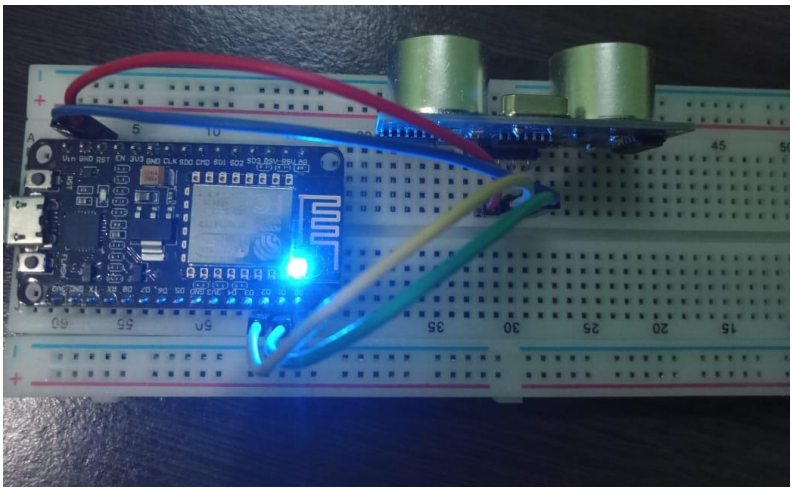


   b. Program Code

```
#include <Arduino.h>

#define triggerPin D1
#define echoPin D2

void setup()
{
  Serial.begin(9600);
  pinMode(triggerPin, OUTPUT);
  pinMode(echoPin, INPUT);
  pinMode(BUILTIN_LED, OUTPUT);
}

void loop()
{
  long duration, jarak;
  digitalWrite(triggerPin, LOW);
  delayMicroseconds(2);
  digitalWrite(triggerPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(triggerPin, LOW);
  duration = pulseIn(echoPin, HIGH);
  jarak = duration * 0.034 / 2;
  Serial.println("Distance: ");
  Serial.print(jarak);
  Serial.println(" cm");
  delay(2000);
}
```

c. Schema in real





d. Video: [Link]

e. Explanation:
In practice reading the distance using the HC-SR04 the distance obtained is quite accurate but it is rather difficult to get a distance of 1 cm. If the object is too close to the HC-SR04 sensor, the distance read is 1192 cm. In this practicum there are no obstacles that arise because I made a suggestion to Jobhseet, namely to triggerPin on pin D1 and echoPin on pin D2

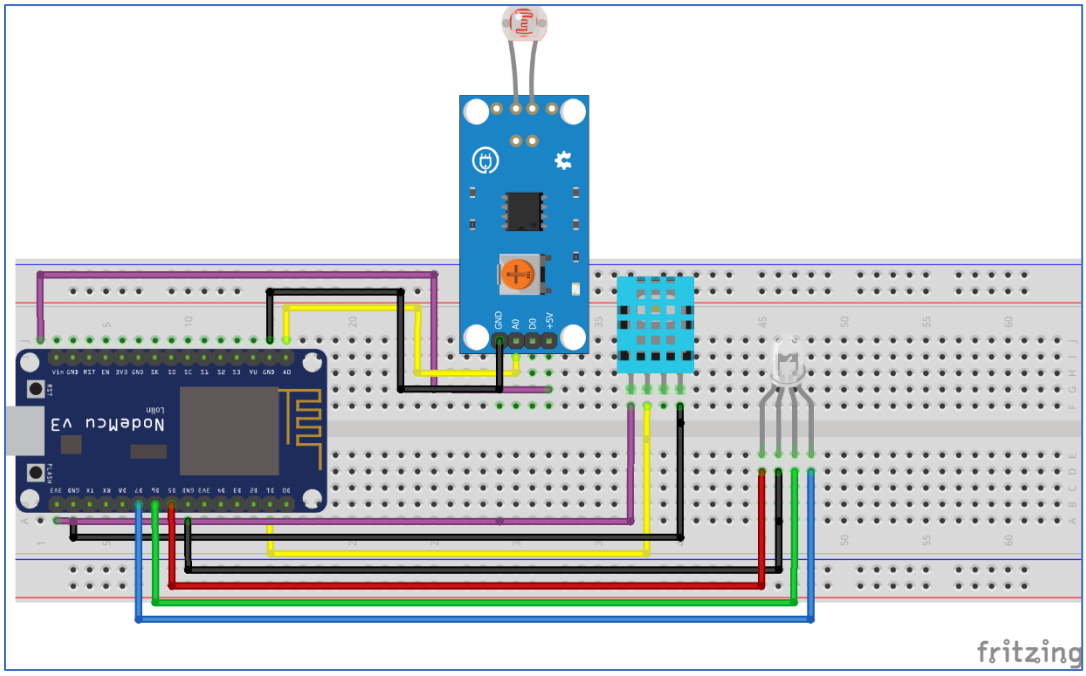
TASK

1. Make a circuit for the LED, light sensor and temperature sensor using fritzing, then make a program with the following scenario

- When the light is dim and the temperature is cold, the blue LED will flash.
- When the light is bright and the temperature is high, the red LED will light up.
- If you don't have RGB LEDs, please take advantage of the built in LEDs, which are the esp8266's built-in LEDs, usually blue or red

Answer:

a. Schema



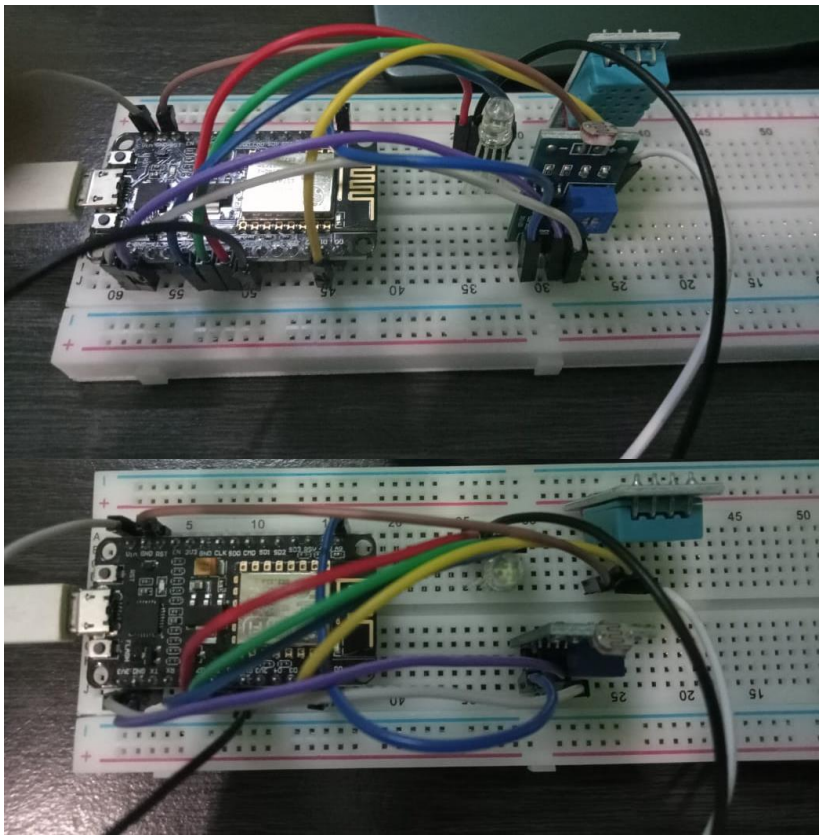
b. Program Code

```
#include <Arduino.h>
#include <SimpleDHT.h>

// DHT Sensor
#define pinDHT 7   // SD3 pin signal sensor DHT

byte temperature = 0;
byte humidity = 0;

SimpleDHT11 dht11(D1); // instan sensor dht11

// LED RGB
#define RED_LED D5
#define GREEN_LED D6
#define BLUE_LED D7

// LDR Sensor
#define sensorLDR A0
int nilaiSensor;
```

```
void TempLDR()
{
  int err = SimpleDHTErrSuccess;
  nilaiSensor = analogRead(sensorLDR);

  if ((err = dht11.read(&temperature, &humidity, NULL)) !=
SimpleDHTErrSuccess)
  {
    Serial.print("Read DHT11 failed, err=");
    Serial.println(err);
    delay(1000);
    return;
  }


  if ((int)temperature <= 30 && nilaiSensor >= 500)
  {
    Serial.println("==============================");
    digitalWrite(RED_LED, LOW);
    digitalWrite(BLUE_LED, HIGH);
    Serial.println("Temperatur    : Cold");
    Serial.println("Light         : Dim");
    Serial.println("LED           : BLUE");
    Serial.print("Celcius Temp  : ");
    Serial.print((int)temperature);
    Serial.print(" *C, ");
    Serial.println();
    Serial.print("Light Value   : ");
    Serial.print((int)nilaiSensor);
    Serial.println();
    Serial.println("==============================");
  }


  else
  {
    Serial.println("==============================");
    digitalWrite(RED_LED, HIGH);
    digitalWrite(BLUE_LED, LOW);
    Serial.println("Temperatur    : Hot");
    Serial.println("Light         : Bright");
    Serial.println("LED           : RED");
    Serial.print("Celcius Temp  : ");
    Serial.print(temperature);
    Serial.print(" *C, ");
    Serial.println();
    Serial.print("Light Value   : ");
    Serial.print((int)nilaiSensor);
    Serial.println();
    Serial.println("==============================");
  }
}

void setup()
```

```
{
  Serial.begin(115200);
  Serial.println("TASK 1 : DHT11 SENSOR AND LDR SENSOR");
  pinMode(RED_LED, OUTPUT);
  pinMode(BLUE_LED, OUTPUT);
  delay(1000);
}
void loop() {
  TempLDR();
  Serial.println("");
  delay(3000);
}
```

c. Schema in real



d. Video: [Link]

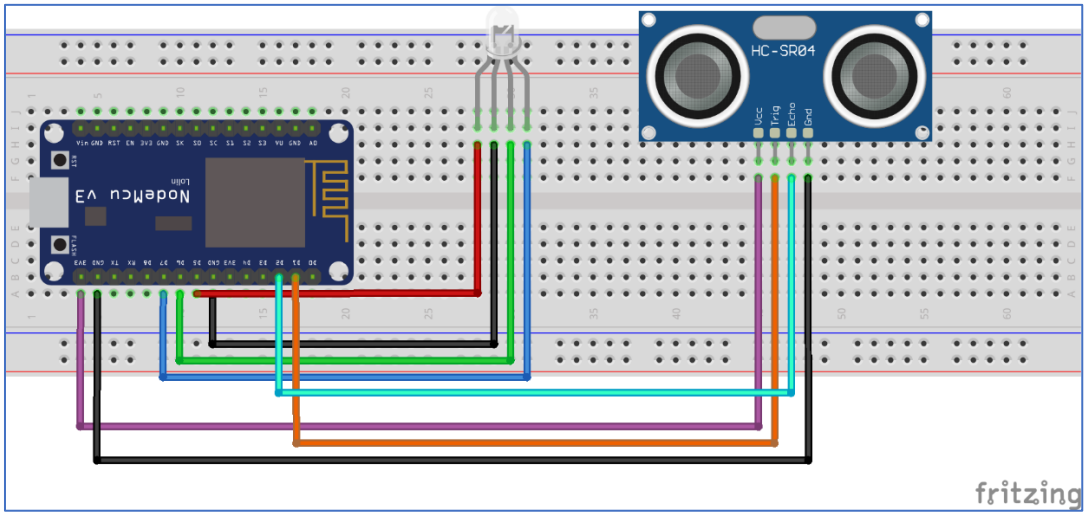
e. Explanation:
In task number one, which is reading the temperature and light intensity, two different sensors are used, namely the DHT11 sensor to read the temperature and the LDR sensor to read the light intensity. In addition, RGB LEDs are also used which will light up under certain conditions. For cold conditions and low light, temperature must be <= 30*C and light intensity >= 500 then the blue RGB LED will light up. in addition, the red RGB LED will light up which indicates the hot temperature and bright light intensity.

2. Make a series and program code where:

- There is an additional 1 RGB LED,
- Blue LED lights up if the distance read is 1 cm
- Green LED lights up if the distance read is 2 cm
- Red LED lights up if the distance read is 3 cm
- The LEDs are all lit and flash for 1 second if the distance is more than 3 cm

Answer:

a. Schema



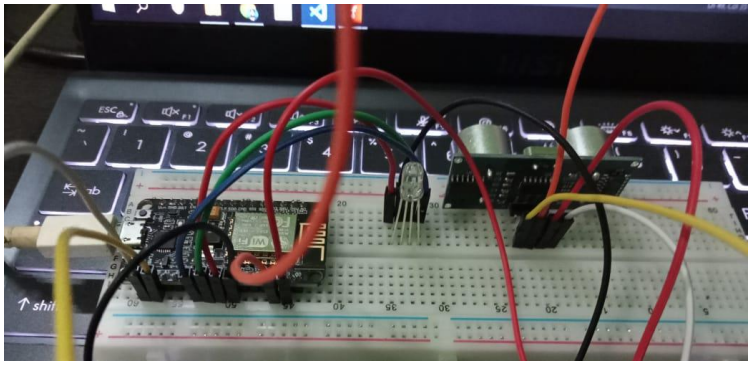
b. Program Code

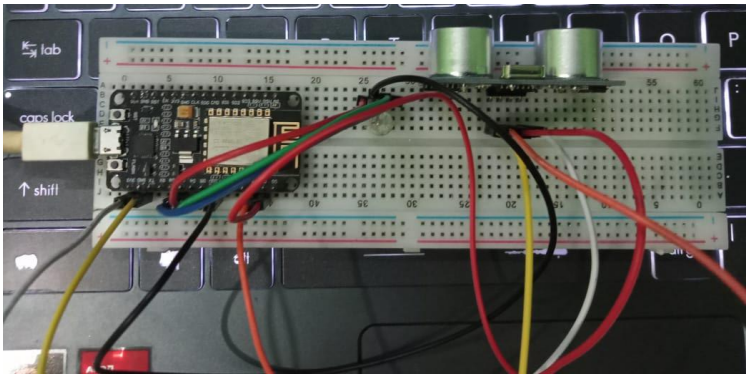
```
#include <Arduino.h>

// LED RGB
#define RED_LED D5
#define GREEN_LED D6
#define BLUE_LED D7

// HC-SR04
#define triggerPin D1
#define echoPin D2

void setup()
{
  Serial.begin(115200);
  Serial.println("TASK 12: HC-SR04 Sensor");
  pinMode(RED_LED, OUTPUT);
  pinMode(BLUE_LED, OUTPUT);
  pinMode(GREEN_LED, OUTPUT);
  pinMode(triggerPin, OUTPUT);
  pinMode(echoPin, INPUT);
  delay(1000);
}

void readDistance(){
  long duration, distance;
  digitalWrite(triggerPin, LOW);
```

```
    delayMicroseconds(2);
    digitalWrite(triggerPin, HIGH);
    delayMicroseconds(10);
    digitalWrite(triggerPin, LOW);
    duration = pulseIn(echoPin, HIGH);
    distance = duration * 0.034 / 2;

    if (distance == 1){
      digitalWrite(BLUE_LED, HIGH);
      digitalWrite(GREEN_LED, LOW);
      digitalWrite(RED_LED, LOW);
      Serial.println("LED             : BLUE");
      Serial.print("Distance        : ");
      Serial.print(distance);
      Serial.print("cm");
      Serial.println();
      Serial.println("==============================");
    }
    else if(distance == 2){
      digitalWrite(BLUE_LED, LOW);
      digitalWrite(GREEN_LED, HIGH);
      digitalWrite(RED_LED, LOW);
      Serial.println("LED            : GREEN");
      Serial.print("Distance        : ");
      Serial.print(distance);
      Serial.print("cm");
      Serial.println();
      Serial.println("==============================");
    }
    else if(distance == 3){
      digitalWrite(BLUE_LED, LOW);
      digitalWrite(GREEN_LED, LOW);
      digitalWrite(RED_LED, HIGH);
      Serial.println("LED             : RED");
      Serial.print("Distance        : ");
      Serial.print(distance);
      Serial.print("cm");
      Serial.println();
      Serial.println("==============================");
    }
    else {
      digitalWrite(RED_LED, HIGH);
      digitalWrite(GREEN_LED, LOW);
      digitalWrite(BLUE_LED, LOW);
      delay(500);

      digitalWrite(RED_LED, LOW);
      digitalWrite(GREEN_LED, HIGH);
      digitalWrite(BLUE_LED, LOW);
      delay(500);

      digitalWrite(RED_LED, LOW);
      digitalWrite(GREEN_LED, LOW);
      digitalWrite(BLUE_LED, HIGH);
      delay(500);
```

```
      Serial.println("LED             : COLORFUL");
      Serial.print("Distance        : ");
      Serial.print(distance);
      Serial.print("cm");
      Serial.println();
      Serial.println("==============================");
    }

  }

  void loop()
  {
    readDistance();
    delay(2000);
  }
```

c. Schema in real





d. Video: [Link]

e. Explanation:

In task number 2, which is reading the distance with certain conditions, only one sensor is used, namely the HC-SR04 sensor. In this practice also uses RGB LEDs to light up according to the specified conditions. For a distance equal to 1 cm it will light up blue, if the distance is equal to 2 cm it will light up green, then for a distance equal to 3 cm it will light up red. If the distance is not equal to 1cm, 2cm, and 3cm, the LED will light up colourfully, that is, it lights up from red, green and blue alternately and in a short time.

3. Upload the result as a video file using YouTube or Google Drive and insert the link in your report.
   Answered in question 1 and 2.