
**CSM 3401 KOMPUTERAN IOT**

**TITLE OF ASSIGNMENT**

**GROUP PROJECT ASSIGNMENT**

**PREPARED BY :**
**GROUP 1**

| MATRIC NO | NAME |
|---|---|
| S56485 | SYAZA NUR IZZATI BINTI SAHARUDDIN |
| S56870 | FATIN NUR FADZILAH BINTI AZIZ |
| S56874 | NOOR SHAHIRA BINTI SHA'ARI |

**PREPARED FOR:**

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**COMPUTER SCIENCE(MOBILE COMPUTING)**
**SEMESTER 2 2020/2021**
**FACULTY OF OCEAN ENGINEERING TECHNOLOGY AND INFORMATIC**

## Table of Contents

# 1.0 Executive Summary

The following is a report on the use of technology to make our daily jobs easier for Lab Exercise Internet of Things (IoT) Computing. The purpose of this project is to provide students an overview to the Internet of Things (IoT). Students will need to use sensors, a module, and a FavorIOT connection. This is a good place to start for students who want to learn more about the Internet of Things.

To complete the objective, this project employs both hardware and software. Potentiometer, breadboard, jumper wire, resistors, LED, ESP32 module, and DHT11 sensors are examples of components. Each task will use the appropriate hardware based on the requirements specified in the problem description. In terms of software, Favoriot utilized to convey data from the hardware to the owner or developer so that they might be notified.

This project may encourage students to use the Internet of Things more in their daily lives, resulting in technological growth. This project will also be ideal for small-scale applications and could lead to low-cost surveillance and control systems.

# 2.0 Introduction

The Internet of Things (IoT) refers to a system of interrelated, internet-connected objects that are able to collect and transfer data over a wireless network without human intervention. Things have evolved due to the convergence of multiple technologies, real-time analytics, machine learning, ubiquitous computing, commodity sensors, and embedded systems. Internet of Things (IoT) is becoming more popular during the 4th Industrial Revolution and the emergence of 5G technology. But we are very short on experts who have practical skills and knowledge about IoT in Malaysia.

So, Universiti Malaysia Terengganu (UMT) has decided to implement a new subject in the IT syllabus to produce competent IoT developers. Our group is given a task to use IoT technologies to design a circuit and write an appropriate python code to control the dim of LED using the potentiometer and design a circuit and write an appropriate python code to establish a connection to WlFl network, read the temperature and humidity of current environment using DHT11/22 and store the temperature and humidity data to the favorlOT cloud. Setup a decision on favorlOT cloud, so that, a SMS will be send to a mobile number when the temperature exceeding 28 degree or when relative humidity fall below than 68%.

# 3.0 Problem Statement

This section will cover problem statements that occur in project 1 and project 2. For more details, the problem statement will be listed as follows.

## 3.1 Project 1

Students are unable to get up early to review lessons because they are always asleep. So they need dim sleeping lights to help them to wake up early in the morning.

## 3.2 Project 2

House fires in Malaysia have been a very serious issue lately. The fire may affect people who are not present at home and are unaware of the high temperature in their house. There have been attempts to increase the number of people guarding the area but it is a waste of human resources and is very inefficient.

# 4.0 Objective

The following is the objective for this project that is determined to be achieved. The objectives are categorized by respective project. The details for objectives are shown as below.

## 4.1 Project 1

I. To look at an existing project that has the same or almost the same problem statement in order to find an excellent solution.
II. Create a project that addresses the problem description.
III. To develop a project that allows students to control the dimming of light for them to wake up from sleep.

### 4.2 Project 2

I. To look into ways to deal with the present house fires that are occuring.
II. To create a project that will aid in the reduction of casualties and will alert the owner of abrupt changes in air temperature and humidity.
III. Create a project that can alert its owner if the temperature or humidity levels suddenly rise.

## 5.0 Proposed Solution

This section will explain problem solutions from problem statements. For more details, the problem statement for project 1 and project 2 will be listed as follows.

### 5.1 Project 1

Students are able to build lights for themselves that can control the dimming of the light. When they are awake, the lights can be set to a bright level while at bedtime they can be set to a dim level. Therefore they do not have to turn off the lights at night and sleep in the dark. They can control the brightness of the lights so that they can wake up from sleep early in the morning and the students can turn them on according to their eye needs and time.

### 5.2 Project 2

According to the problem description, the issue can be solved by developing a humidity sensor that can alert users when the temperature rises to a given threshold. Users can learn about the humidity in their home and monitor it from afar. This method is also a more cost-effective and energy-efficient option.

# 6.0 Methodology

The following is the methodology used to accomplish this project. The details for project 1 and project 2 are listed as follows.

## 6.1 Project 1

Step 1: Design the circuit based on Figure 1 using Potentiometer and ESP32.

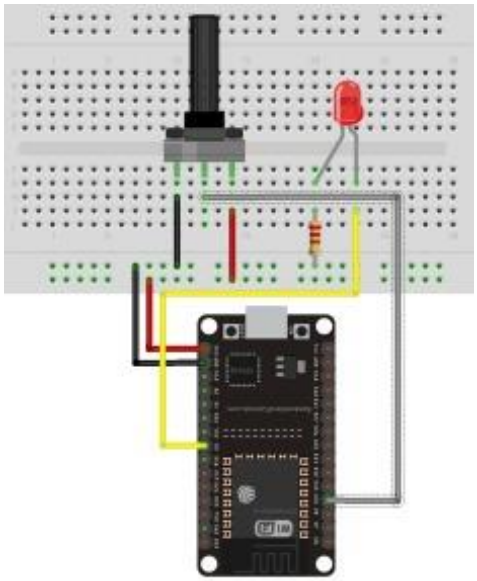


**Figure 1 : Designed circuit**

Component Requirements :

1. ESP32 and USB Micro B cable
2. Potentiometer
3. Breadboard
4. Jumper Wire
5. Resistor LED Light (Any Color)
6. LED Light (Any Color)

Step 2: Connect your ESP32 to a laptop with a USB Micro B Cable.

Step 3: Open use a code editor that supports ESP32 like Upycraft and then write the appropriate python code to do the following:

- To make sure the potentiometer can control the voltage supply.
- LEDs will brighten and dim based on the rotation of the potentiometer.

## 6.2 Project 2

Step 1: Design the circuit based on Figure 2 below using DHT11 and ESP32.

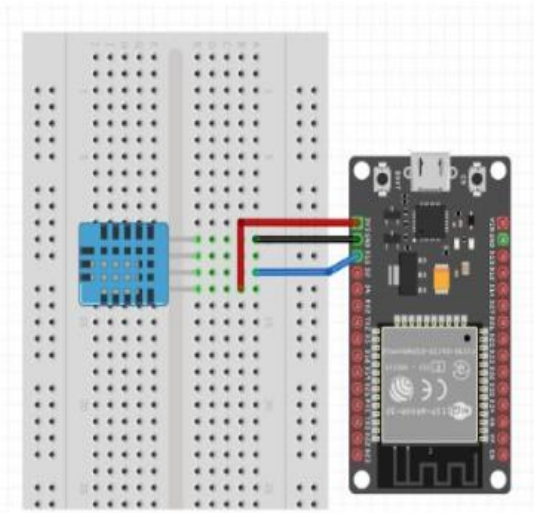


**Figure 2 : Designed circuit**

Component Requirements :

1. ESP32 and USB Micro B cable
2. DHT11/12 (Temperature and Humidity Sensor)
3. FavorIOT free account
4. Wi-Fi Connection

Step 2: Connect your ESP32 to a laptop with a USB Micro B Cable.

Step 3: Open use a code editor that supports ESP32 like Upycraft and then write the appropriate python code to do the following:

- Establish a connection to a WIFI network
- Read the temperature and humidity of current environment by using DHT11 component
- Store the temperature and humidity to favorIOT cloud.

Step 4: Create a favorIOT account and set it up so that it can receive data from the ESP32 component using a data stream.

Step 5: Setting up the rules in favorIOT so that if the temperature exceeds 28 degrees or humidity falls below 68, it will send an SMS/email to the specified user.

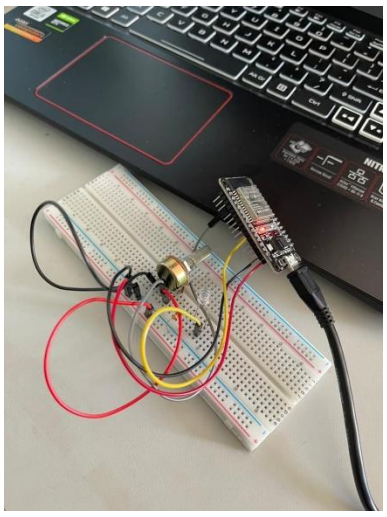
# 7.0 Result and Discussion

This section focuses on results for this project and discussion about it. Further detail discussions are shown for each project as below.

## 7.1 Project 1

Figure 3 below shows design or circuit for the component and result which is the Dim of the LED.

Design of Components :



Dim of LED light :

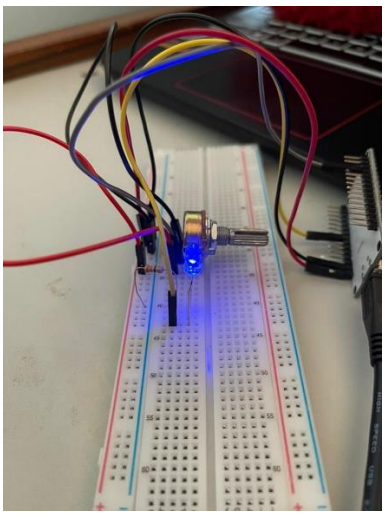


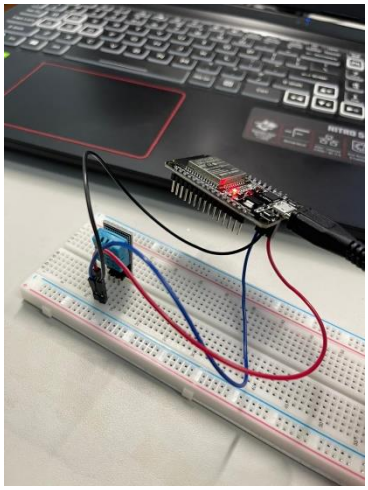
**Figure 3 : circuit of the component and Dim of the LED light**

After the ESP32 successfully connected with the laptop, we used the Upycraft as coding editor to give the instruction ESP32. When the suitable python code is already finished, we push the icon Download and Run to see the output. If you can see, the photo in the column of Design of Components shows that the potentiometer did not rotate. Otherwise, the photo in the column of Dim of LED light shows that the potentiometer already rotates. So in this task, the brightness of the LED light is based on the rotation of the potentiometer.

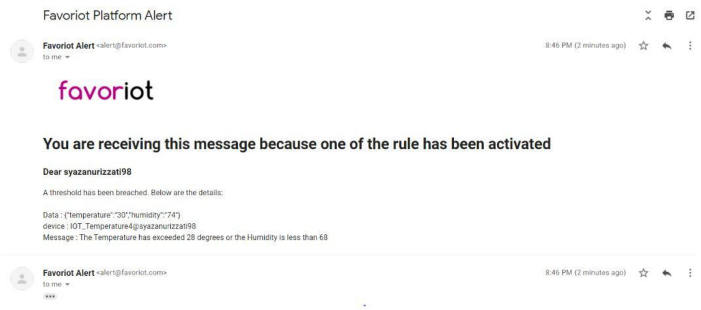
## 7.2 Project 2

Figure 4 below shows results for project 2 which is circuit or design of the components, email received, rules for sending notification message and output in favorIOT.

Design of Components:



SMS/Email after receiving notifications from favorIOT:



Output in data stream:

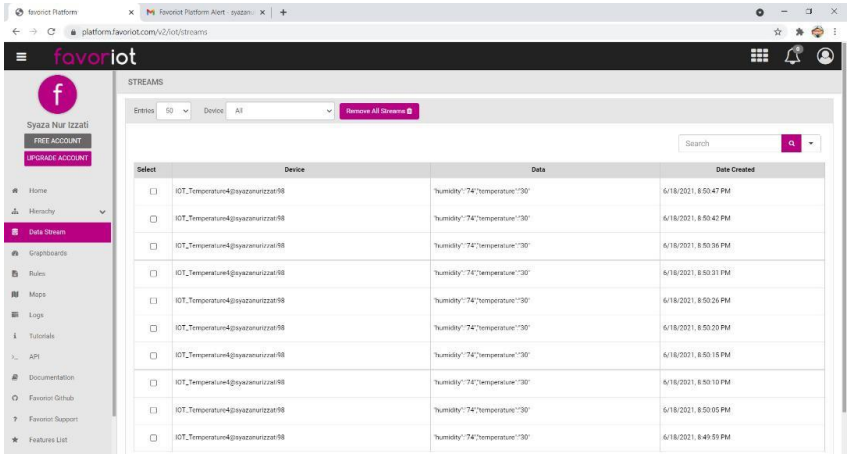



**Figure 4**

After ESP32 is connected, we code the ESP32 to command it to take temperature and humidity from DHT11 and take the data to favorIOT cloud using WIFI Connection. The favorIOT rule is set beforehand to send email/SMS to the specified receiver if temperature exceeds 28 degree or when relative humidity is below than 68.

# 8.0 Conclusion

Because we are in the midst of a technological revolution, the Internet of Things (IoT) can help solve real-world problems quickly. Today, technology components are easier to come by and are becoming more affordable by the day, making it easier to experiment with IoT technologies. This project has provided us with insight and practical expertise on how to handle and solve real-world challenges with the help of IoT.

# 9.0 Appendices

This section focuses on appendices for this project. Further detail about appendices are shown as below.

## 9.1 Appendices : Source code

### 9.1.1 Project 1

Figure 5 below shows coding used to get the result for project 1.

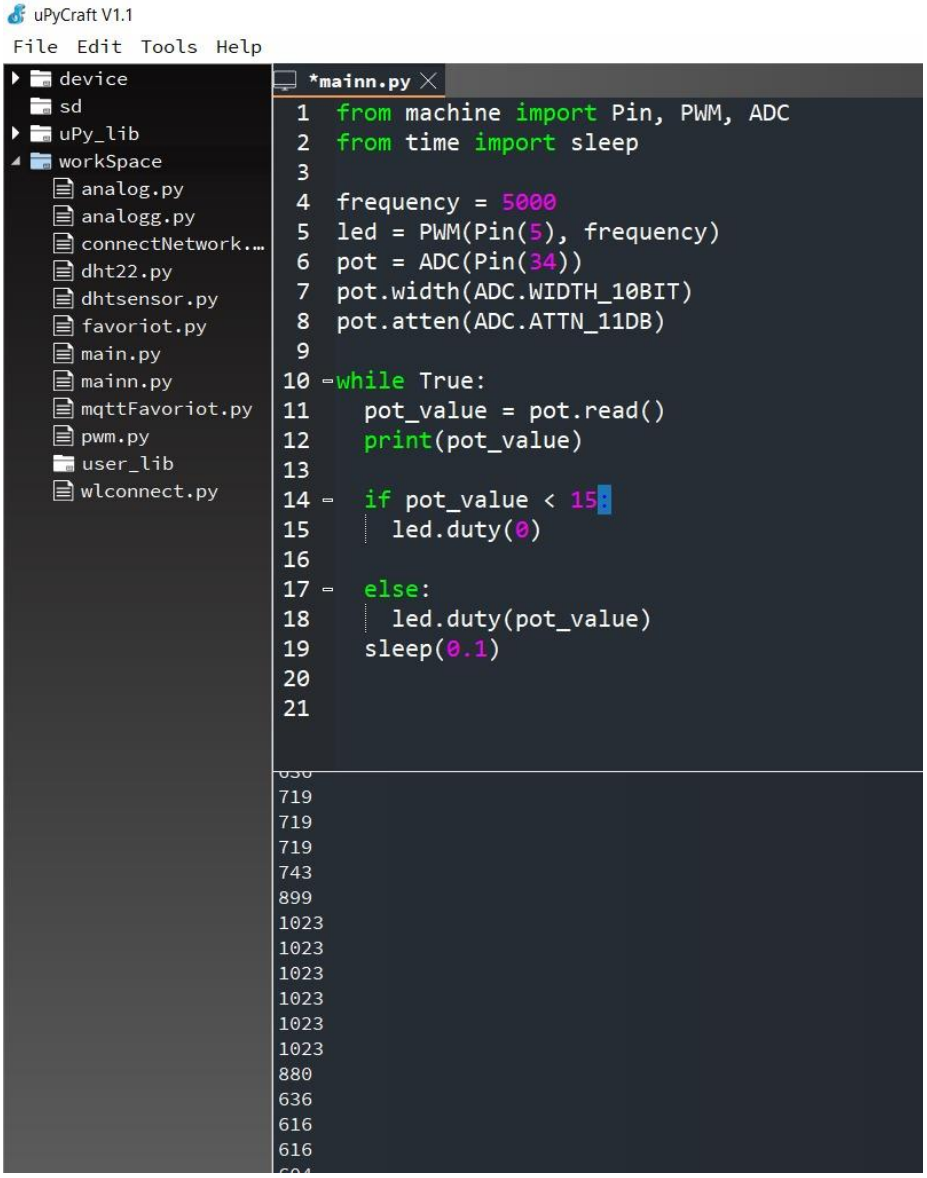



**Figure 5**

## 9.1.2 Project 2

Figure 6 below shows coding used to get the result for project 2.

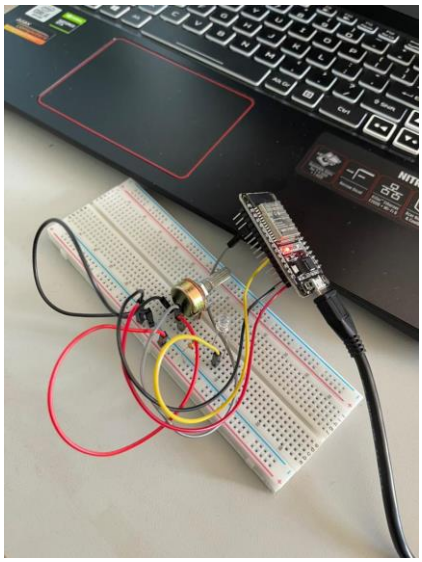

**Figure 6**

## 9.2 Appendices : Screenshots of Output

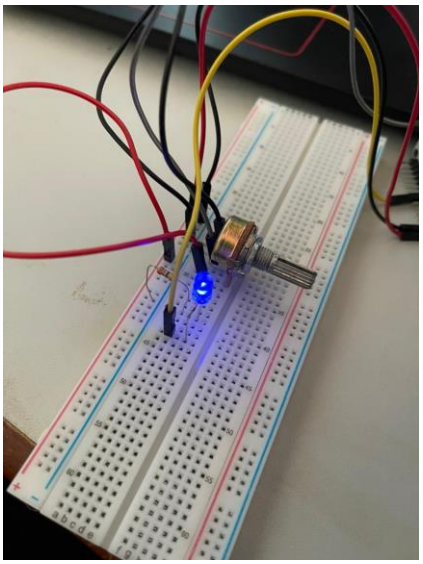
## 9.2.1 Project 1

Figure 7 below shows different results for different levels of potentiometer rotation.

Before rotate Potentiometer:



The Potentiometer is rotated slightly:



The Potentiometer is rotated Fully:

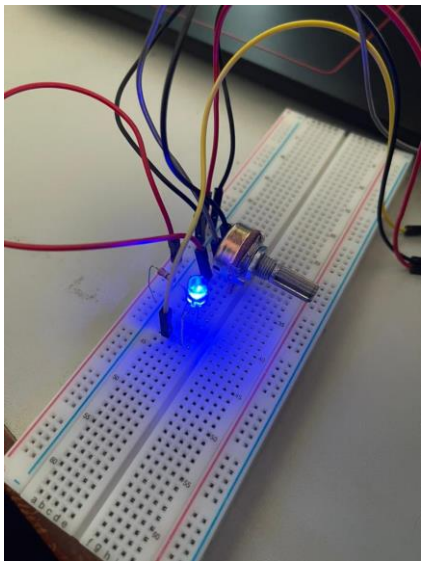
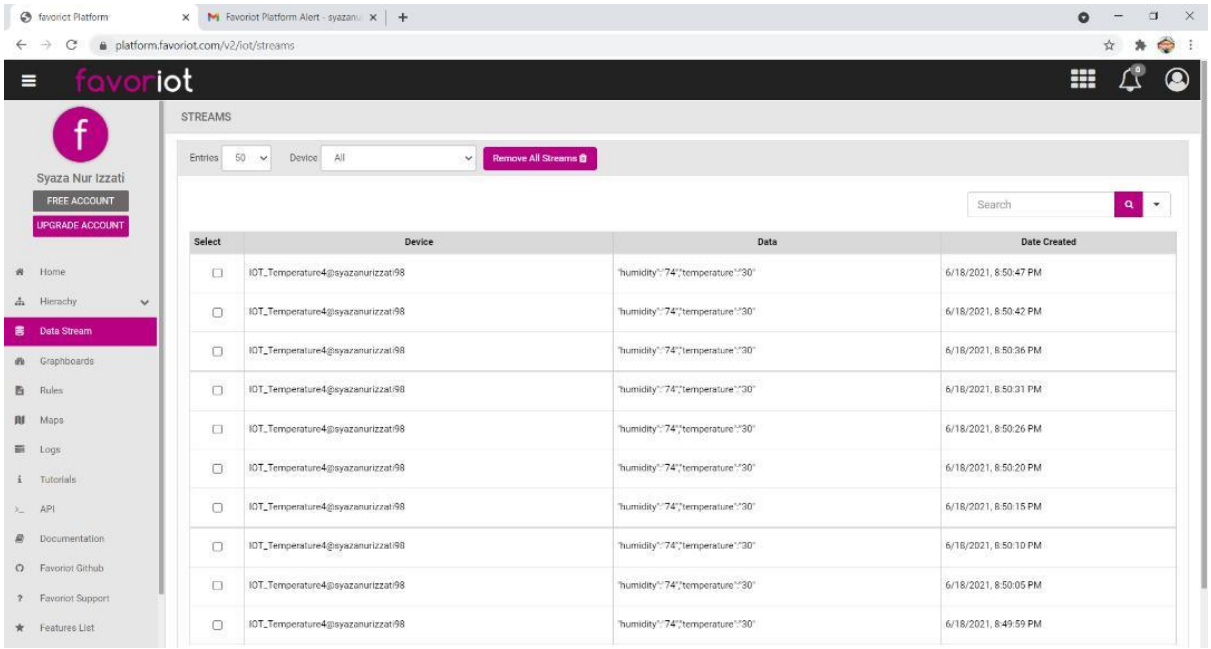


**Figure 7**

## 9.2.2 Project 2

Figure 8 below shows results for project 2 from favorIOT data stream and email received when the humidity achieves a certain level.

The reading is displayed in favorIot data screen:



Temperature that exceed 28 or humidity that is below 68 will be notify by SMS/email to user:

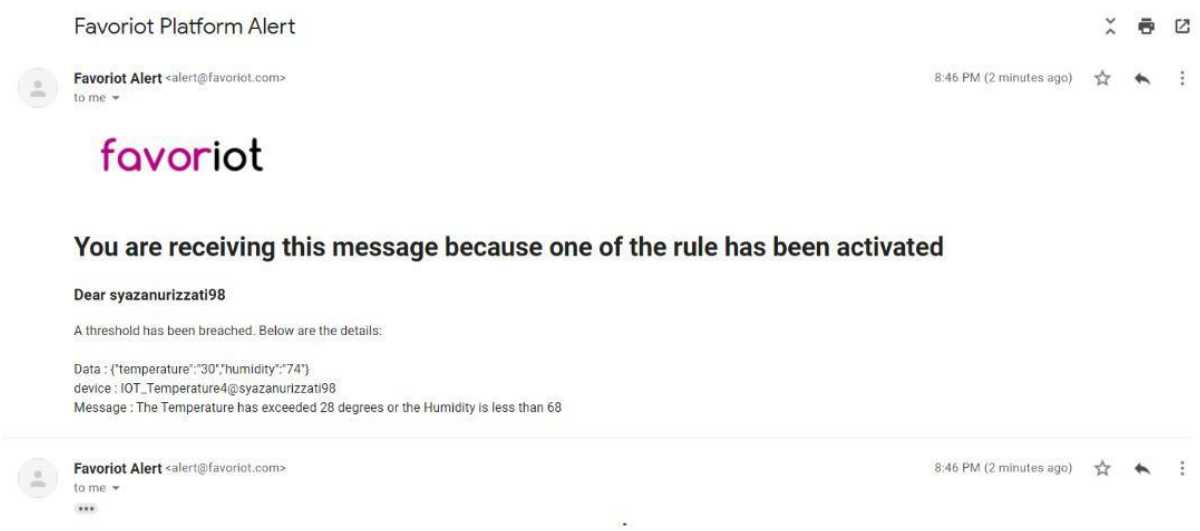
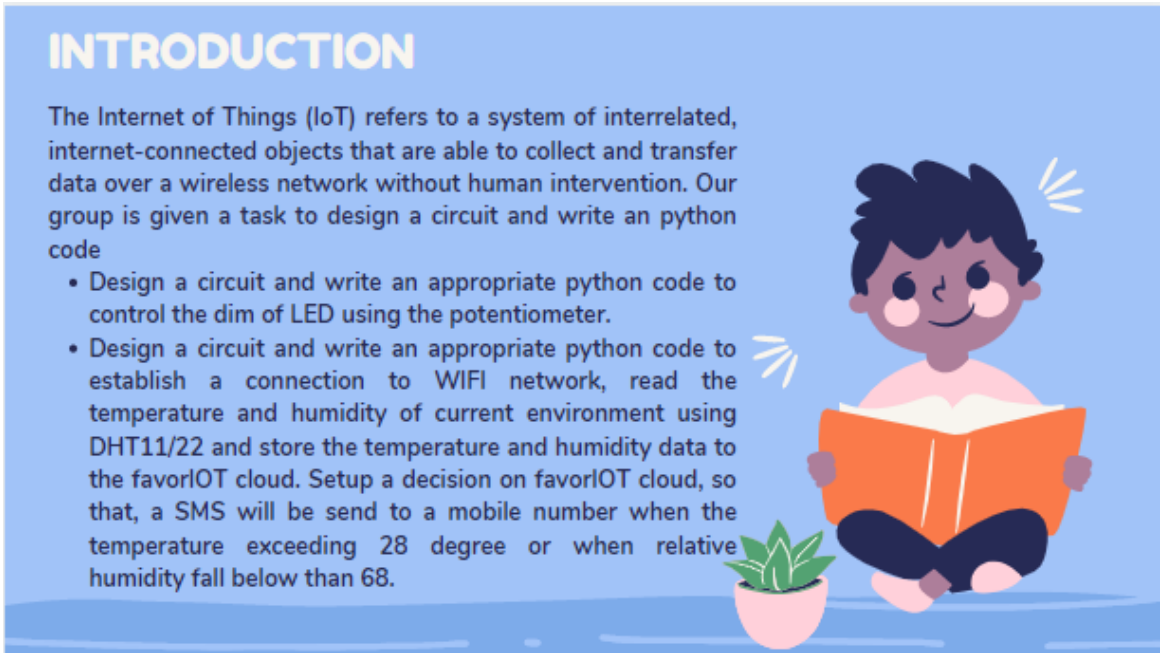


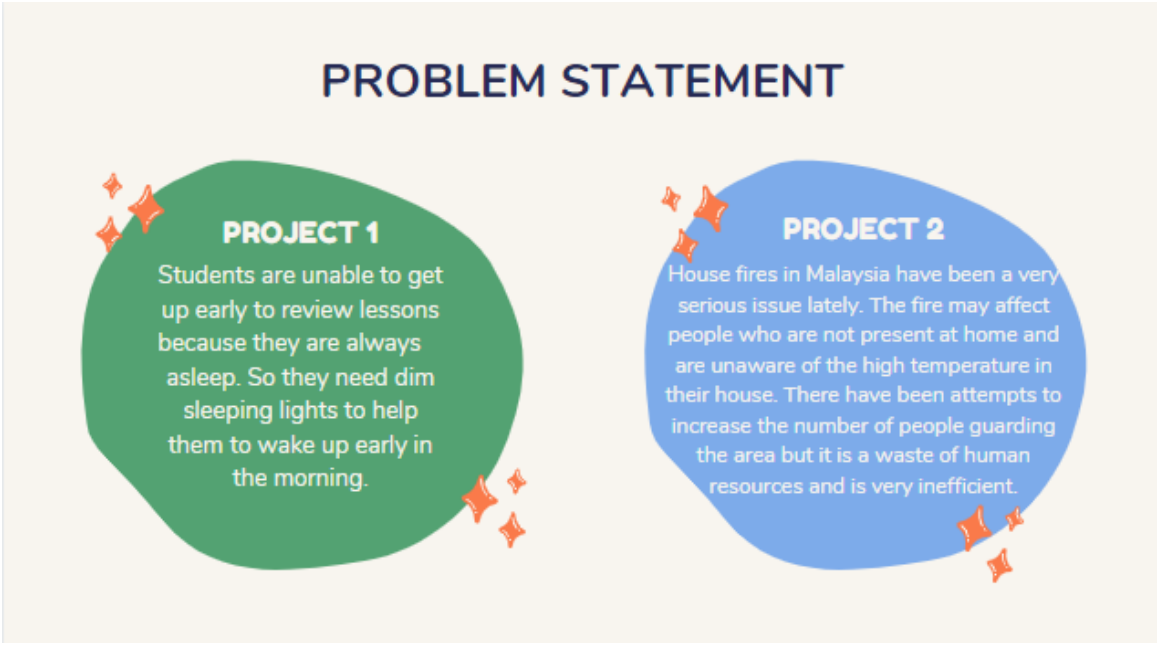

**Figure 8**

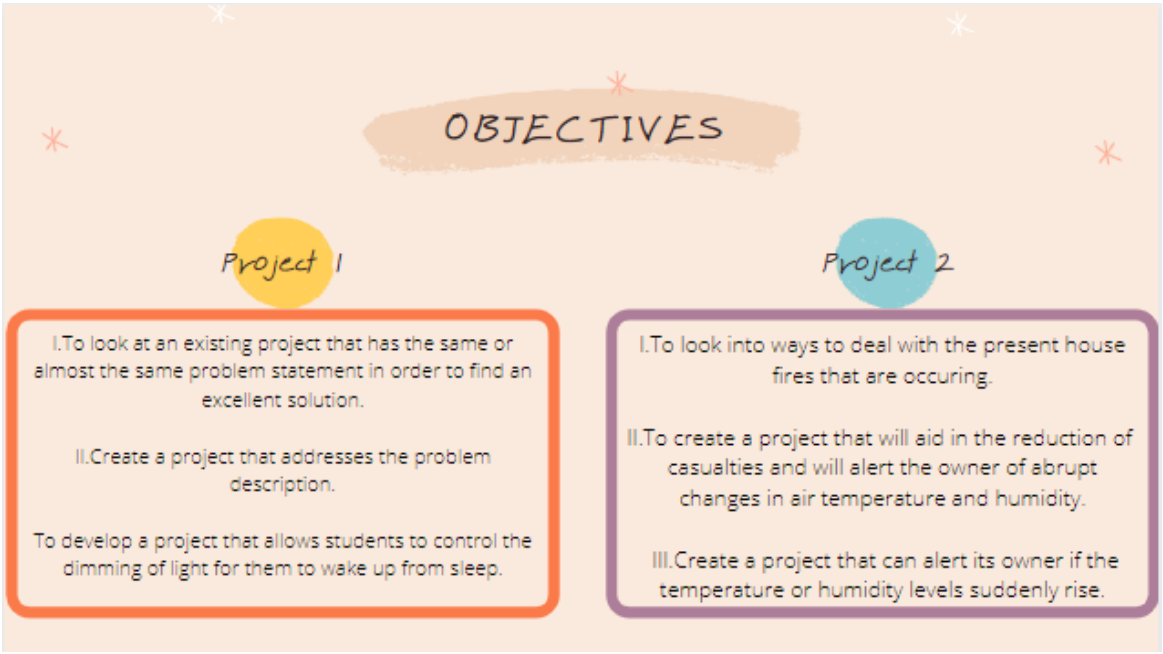
## 9.3 Appendices : Task Distribution Among Members

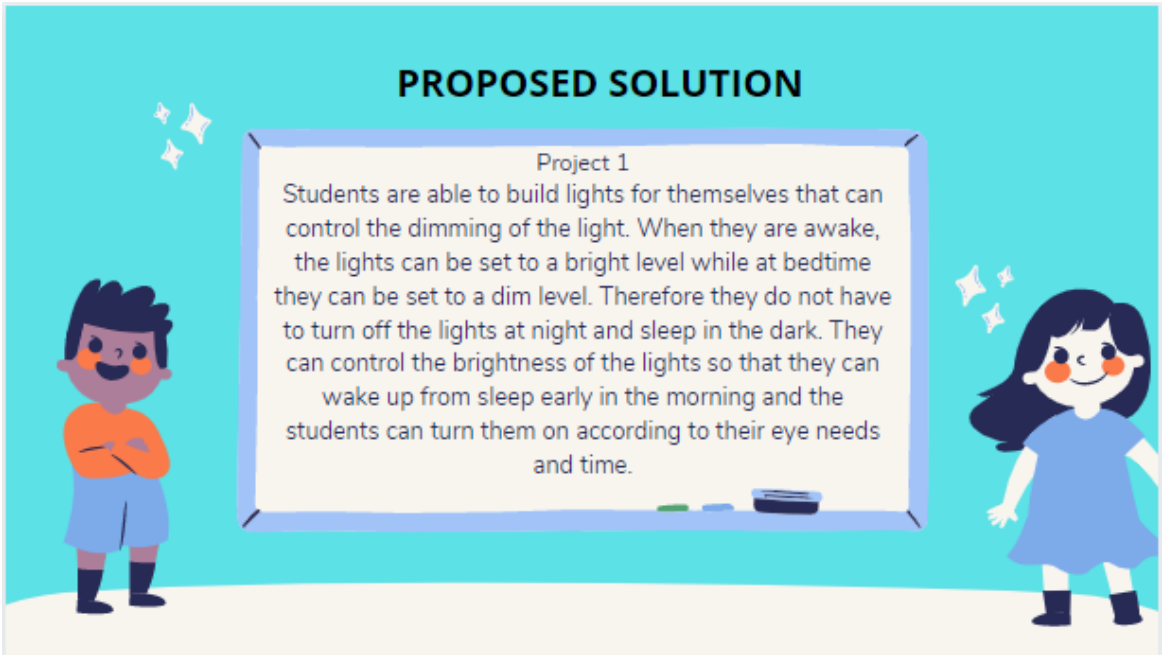
| **Name** | **Task Contributed** |
|---|---|
| Syaza Nur Izzati binti Saharuddin | Project 1, Project 2, Report, Slide & Video Presentation |
| Fatin Nur Fadzilah binti Aziz | Project 1, Project 2, Report, Slide & Video Presentation |
| Noor Shahira binti Sha'ari | Project 1, Project 2, Report, Slide & Video Presentation |

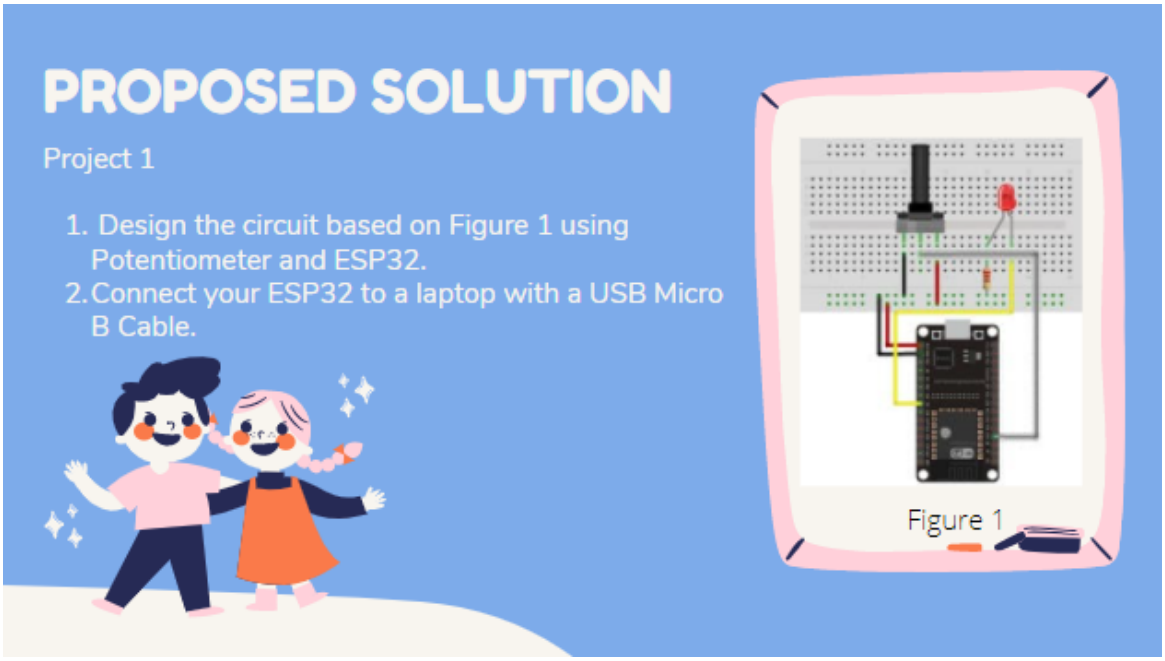
## 9.4 Appendices : Powerpoint Presentation Slide


PROBLEM STATEMENT
PROJECT 1
Students are unable to get up early to review lessons because they are always asleep. So they need dim sleeping lights to help them to wake up early in the morning.
PROJECT 2
House fires in Malaysia have been a very serious issue lately. The fire may affect people who are not present at home and are unaware of the high temperature in their house. There have been attempts to increase the number of people guarding the area but it is a waste of human resources and is very inefficient.


OBJECTIVES
Project 1
I.To look at an existing project that has the same or almost the same problem statement in order to find an excellent solution.
II.Create a project that addresses the problem description.
To develop a project that allows students to control the dimming of light for them to wake up from sleep.
Project 2
I.To look into ways to deal with the present house fires that are occuring.
II.To create a project that will aid in the reduction of casualties and will alert the owner of abrupt changes in air temperature and humidity.
III.Create a project that can alert its owner if the temperature or humidity levels suddenly rise.

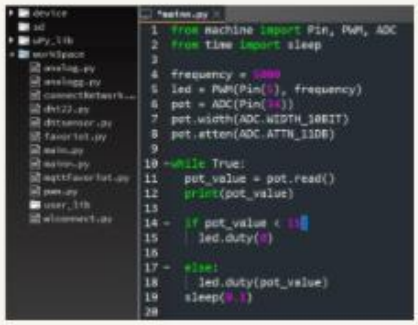

PROPOSED SOLUTION
Project 1
Students are able to build lights for themselves that can control the dimming of the light. When they are awake, the lights can be set to a bright level while at bedtime they can be set to a dim level. Therefore they do not have to turn off the lights at night and sleep in the dark. They can control the brightness of the lights so that they can wake up from sleep early in the morning and the students can turn them on according to their eye needs and time.


PROPOSED SOLUTION
Project 1
1. Design the circuit based on Figure 1 using Potentiometer and ESP32.
2. Connect your ESP32 to a laptop with a USB Micro B Cable.
Figure 1

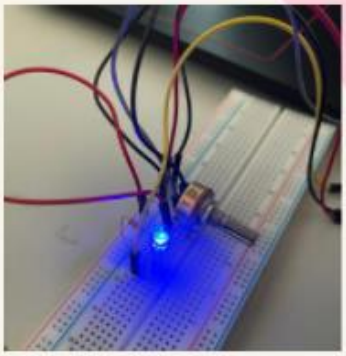
3. Open upycraft and then write the appropriate python code to do the following:

- To make sure the potentiometer can control the voltage supply.

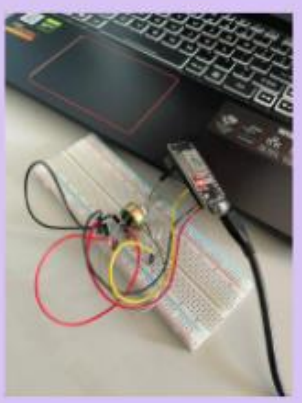
- LEDs will brighten and dim based on the rotation of the potentiometer.



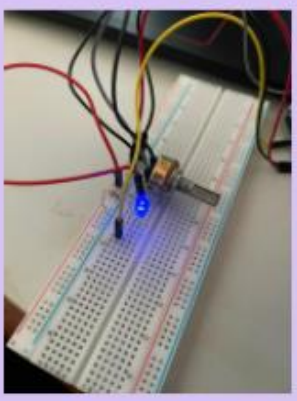
```
from machine import Pin, PWM, ADC
from time import sleep

frequency = 5000
led = PWM(Pin(5), frequency)
pot = ADC(Pin(34))
pot.width(ADC.WIDTH_10BIT)
pot.atten(ADC.ATTN_11DB)

while True:
    pot_value = pot.read()
    print(pot_value)

    if pot_value < 15:
        led.duty(0)

    else:
        led.duty(pot_value)
    sleep(0.1)
```



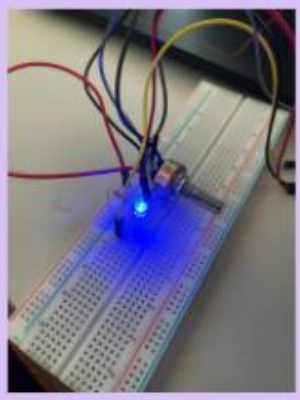
## Result Project 1



**Before rotate Potentiometer**



**The Potentiometer is rotated slightly**



**The Potentiometer is rotated Fully**

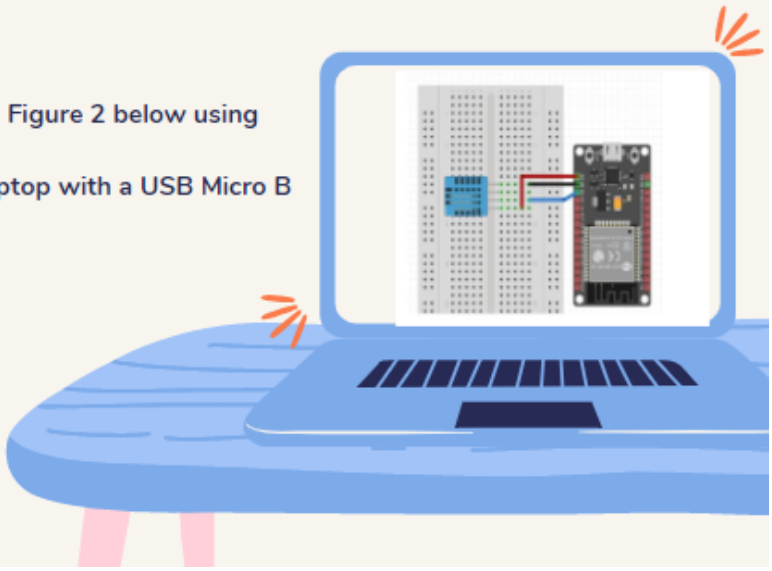
## PROPOSED SOLUTION

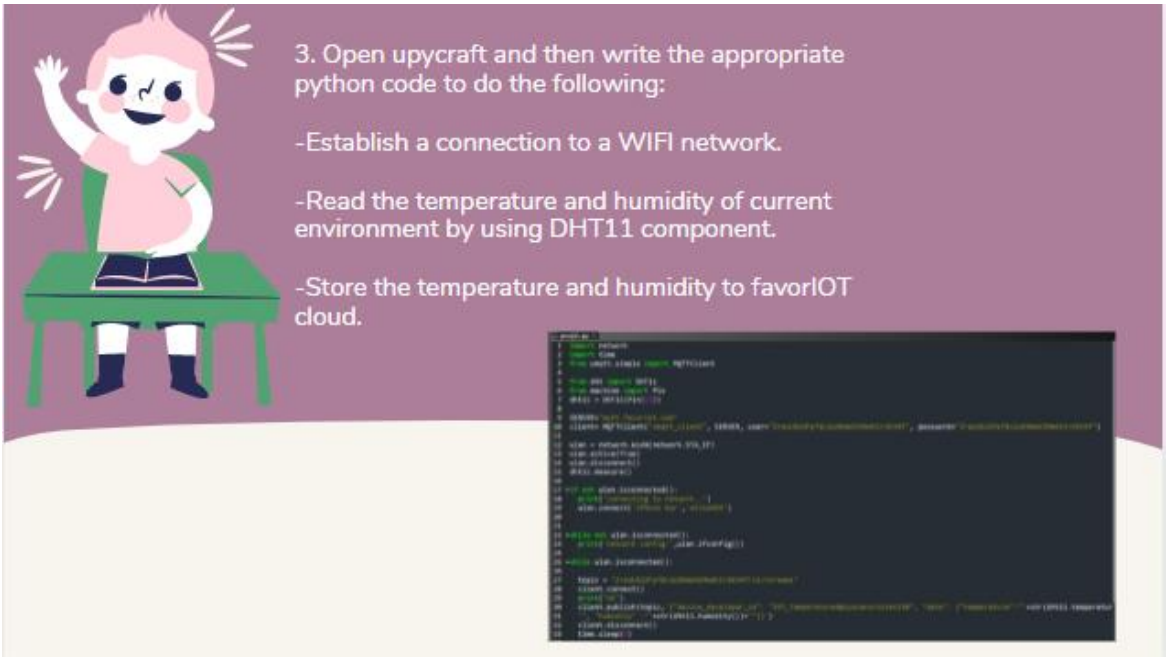
According to the problem description, the issue can be solved by developing a humidity sensor that can alert users when the temperature rises to a given threshold. Users can learn about the humidity in their home and monitor it from afar. This method is also a more cost-effective and energy-efficient option.

## PROPOSED SOLUTION

Project 2

1. Design the circuit based on Figure 2 below using DHT11 and ESP32.
2. Connect your ESP32 to a laptop with a USB Micro B Cable.




3. Open upycraft and then write the appropriate python code to do the following:
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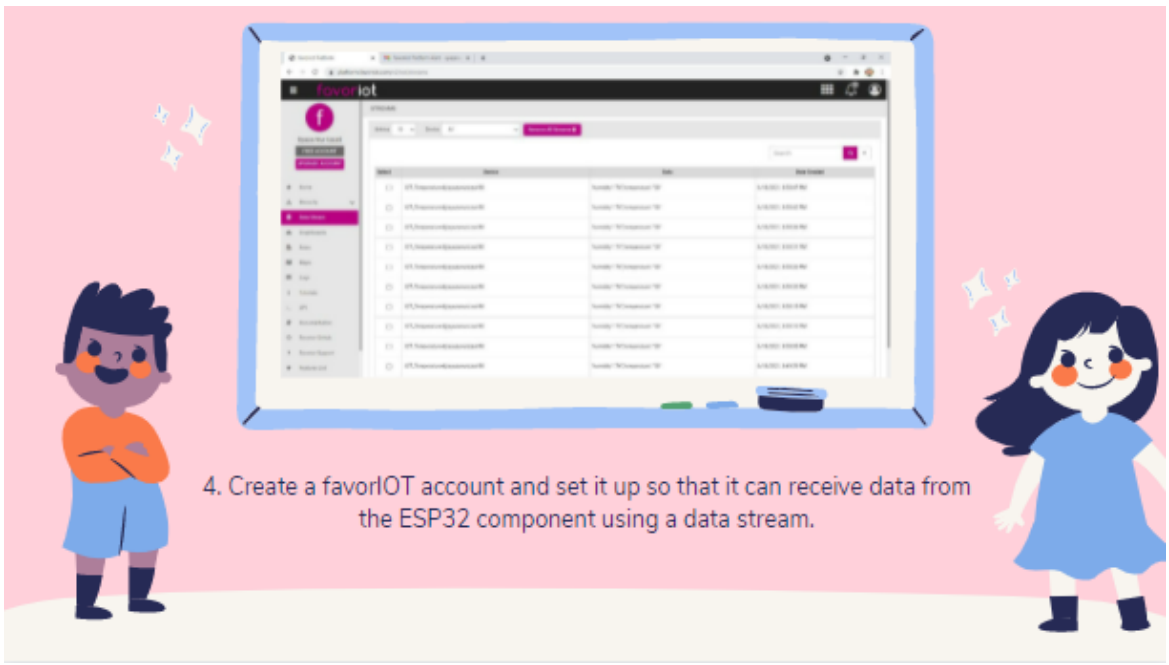
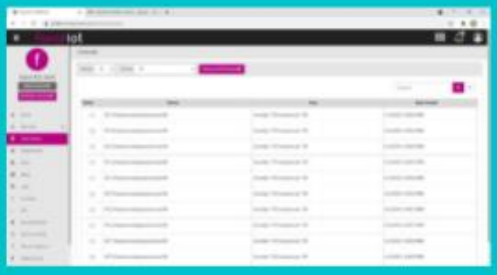
-Read the temperature and humidity of current environment by using DHT11 component.
-Store the temperature and humidity to favorIOT cloud.


favoriot
4. Create a favorIOT account and set it up so that it can receive data from the ESP32 component using a data stream.

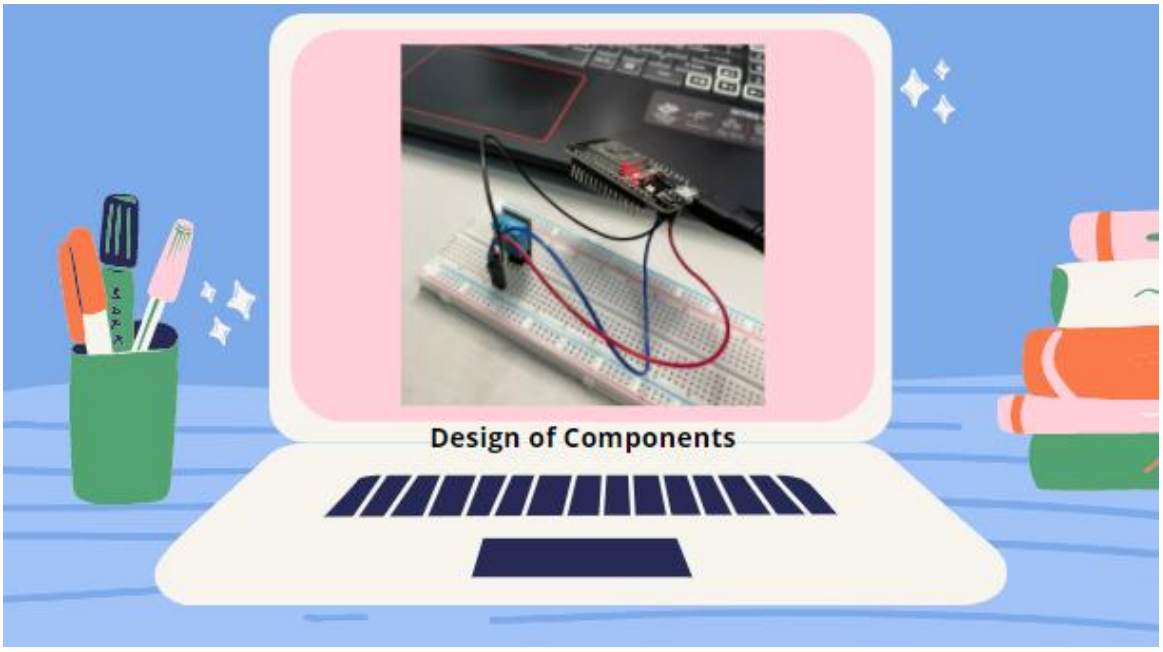

5. Setting up the rules in favorIOT so that if the temperature exceeds 28 degrees or humidity falls below 68, it will send an SMS/email to the specified user.

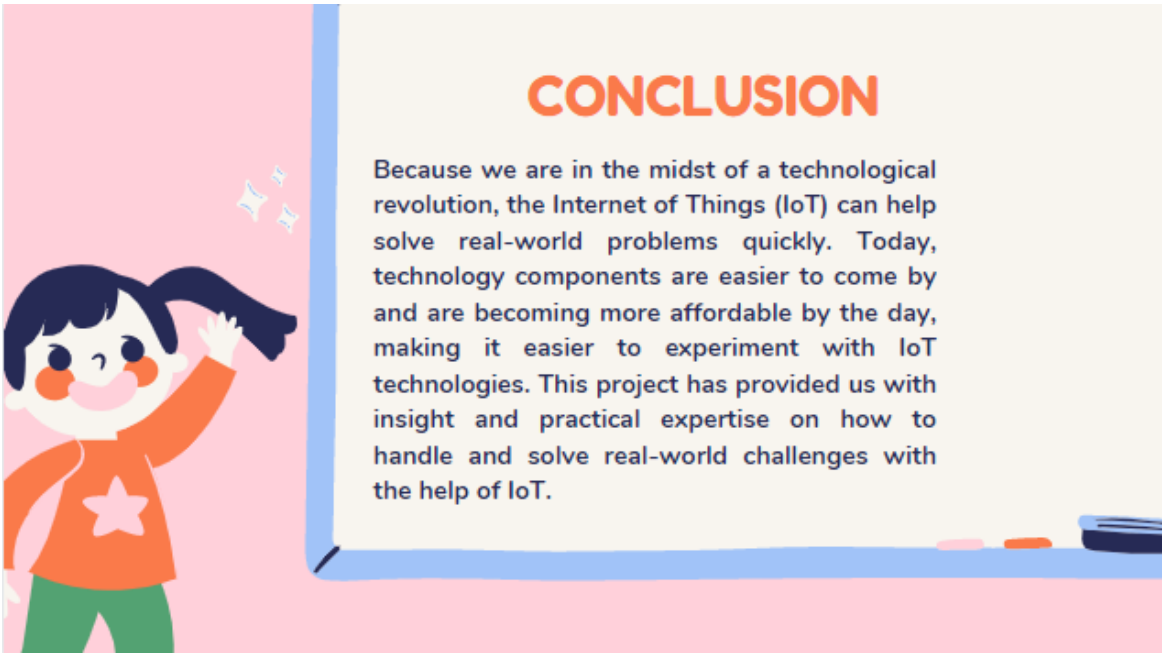
## Result Project 2



**The reading is displayed in favorIot data screen**


**Temperature that exceed 28 or humidity that is below 68 will be notify by SMS/email to user**




Youtube Link Presentation

https://www.youtube.com/watch?v=_m6kbEaRIVo