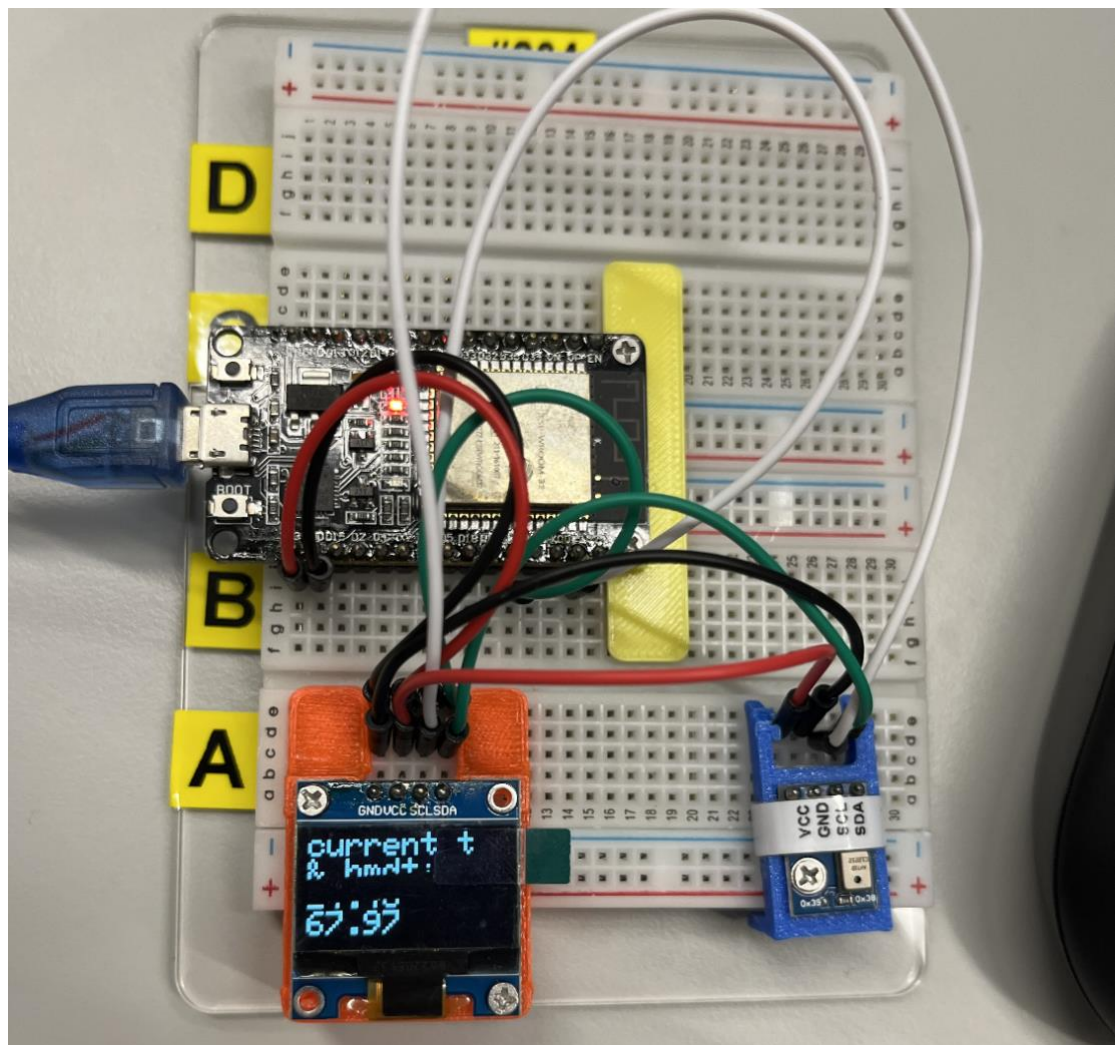


# PROJECT 2 REPORT

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## Abstract

In the project, we used an ESP32 module and wrote some code on Arduino to make a WIFI thermometer on a breadboard.

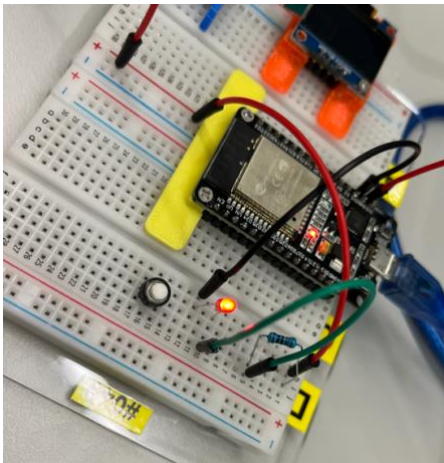
## LAB 1 – breadboard and basic components

### Introduction

In lab1, we learnt about the structure of a breadboard and the basic components of a circuit.

### Results

1. I understood what a breadboard consists of: 4 regions of A, B, C, D and red and blue lines. Different holes are joint together and named hole groups. When trying to build a circuit on it we just plug the pins into the hole groups.
2. The basic components of this lab:  
A LED which can glow only when the pins are plug with the right direction and the voltage is relatively low.  
A resistor which is used to control the voltage of LED to make it low.  
Other modules: ESP32 module, OLED module, thermos-sensor module which will be used later.
3. I built a basic circuit which made the LED emit light.



## Reflection and discussion

### 1. Answer for questions

OLED – GND	A5b, A5c, A5d, A5e
OLED – VCC	A6b, A6c, A6d, A6e
OLED – SCL	A7b, A7c, A7d, A7e
OLED – SDA	A8b, A8c, A8d, A8e
Temperature Sensor – VIN	A25c, A25d, A25e
Temperature Sensor – GND	A25c, A25d, A25e
Temperature Sensor – SCL	A27c, A27d, A27e
Temperature Sensor – SDA	A27c, A27d, A27e
ESP32 – 3V3	B1f, B1g, B1h, B1i
ESP32 – GND	B2f, B2g, B2h, B2i, C2b, C2c, C2d, C2e
ESP32 – D21	B1f, B1g, B1h, B1i
ESP32 – D22	B1f, B1g, B1h, B1i
ESP32 – D34	C12b, C12c, C12d, C12e

. (Challenge Question) How to join hole groups C27a-e to C28f-j?

insert the needles of the wire in the holes of C27a-e ~ C28f-j

2. Reflections: the breadboard made the task of making a circuit more convenient because it uses hole groups and pins to connect wires and components, which is easy and stable.

## LAB 2 – Arduino IDE with ESP32

### Introduction

In lab2, we installed Arduino and controlled the LED on the ESP32 module to make it blink using a button.

### Results

1. I downloaded the software Arduino made some basic set-ups like changing its port and try to set up the environment for ESP32.
2. I modified the samples of Arduino to make the LED on the ESP32 module to blink by itself (with a frequency that I can decide) and try to use a button (which works as a switch in

the circuit to control the voltage of the LED) to control the glow or dim of the LED.

### **Reflection and discussion**

1. The syntax of the language of Arduino is like C language but with some differences. The basic syntax the `#include` and declaring variables are just like C. But as for the structure, it doesn't have a main function as the main part, but instead a "void setup()" and a "void loop()". The first is for doing the basic setups of the board and the second is about what the board should consistently do.
2. It takes a long time to compile the code and send the command to the board unlike writing C language on the computer. We need to be more careful when coding.

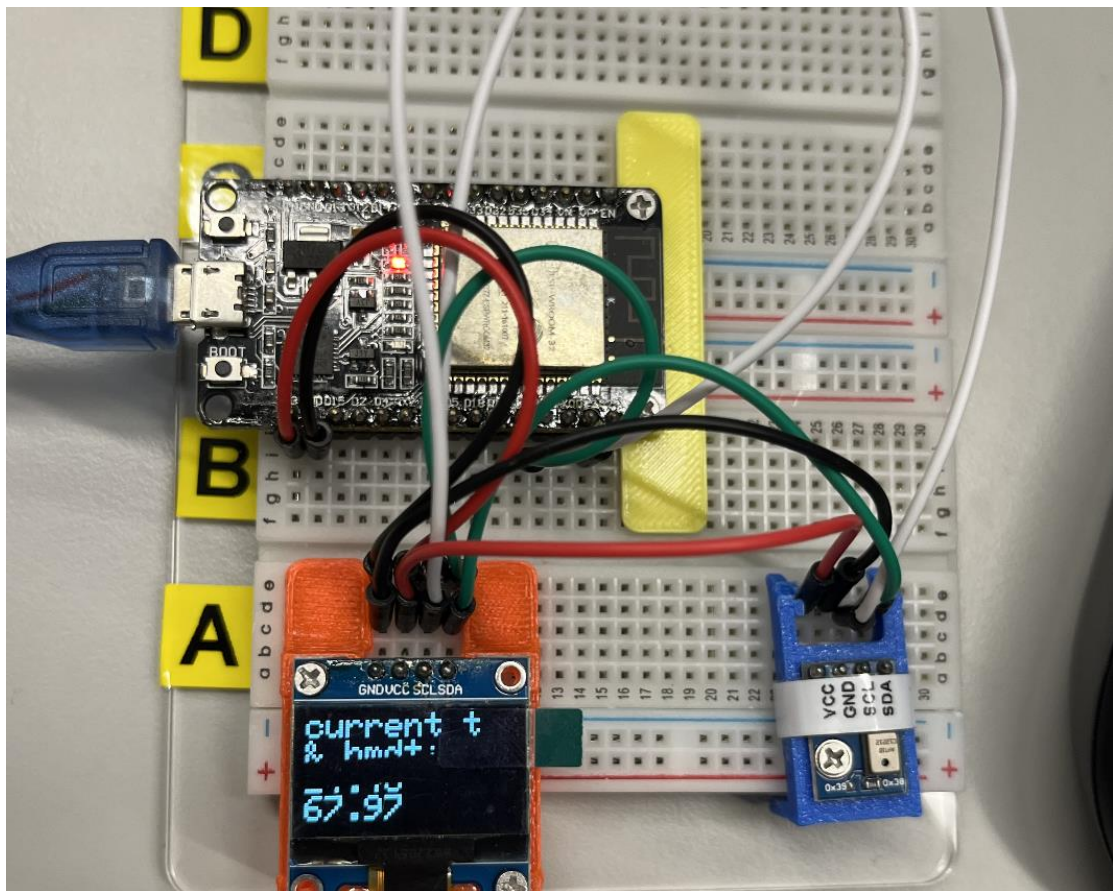
## **LAB 3 – standalone thermometer**

### **Introduction**

In lab3, we used the other 2 modules introduced to build a standalone thermometer.

### **Results**

1. First, we used the examples of Adafruit SSD1306 and tried to display things on the OLED screen.
2. Second, we used the serial monitor to monitor the display of temperature and humidity of the environment on the screen.
3. Third, we combined these two functions together and built a standalone thermometer that can sense the temperature and humidity and display them on a LED screen. (I the picture below).



## Reflection and discussion

1. Just like it is described in the results section, when we try to achieve some project big, we try to divide it into several small parts (for example screen display and data sensing) and the link them together.
2. When connecting the wires and the modules we use different colour to show what the line is for to make things clearer.

## LAB 4 – WIFI thermometer

### Introduction

In lab4, based on the project we did in lab3, we added a WIFI section to the thermometer so that the board can connect to the hotspot on our phone via hotspot.

## Results

1. We modified the example of "hello server" so that the board can recognise the hot spot on my phone and send the password to it and connect.
2. We used the function `server.send()` to send message to a web page and display the temperature and humidity on it. (in the picture below)



```
Hello this is Leo's ESP32!
```

```
current temperture (celcius) is:  
24.70  
current humidity (% rH) is:  
72.66
```

## Reflection and discussion

1. When doing project of information Engineering, it's recommended that we don't use apple devices, for example a mac doesn't have a ESP32 driver and also it's pretty hard for the board to connect to an iPhone hotspot!
2. IOT is a very popular trend right now because it actually makes or life a lot easier for example a standalone thermometer if we connect it with WIFI then the data on it will be a lot easier to access.