

**LAPORAN PRAKTIKUM INTERNET OF THINGS (IoT)**  
**Praktik Simulasi ESP32 & Sensor Suhu Kelembaban**



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## Abstract (Abstrak)

In this practicum, a simulation of using ESP32 with the DHT22 temperature and humidity sensor was conducted using the Wokwi platform. The purpose of this simulation is to understand how to connect the sensor to ESP32 and read temperature and humidity data using C++ code in PlatformIO. The experiment results show that the sensor data can be displayed through the serial monitor with temperature values in Celsius and Fahrenheit and humidity values in percentage.

*Keywords: Internet of Things, ESP32, DHT22, temperature sensor, humidity sensor, Wokwi, PlatformIO*

## Introduction

### 1.1 Background

The Internet of Things (IoT) enables devices to connect and exchange data over the internet. One implementation is environmental monitoring, such as temperature and humidity measurement using the DHT22 sensor and ESP32 microcontroller. This practicum uses the Wokwi platform to simulate the sensor's functionality without physical hardware.

### 1.2 Objectives

- Understand how to connect the DHT22 sensor to ESP32.
- Learn how to read temperature and humidity data from the sensor.
- Use PlatformIO to manage code and perform simulations.
- Display sensor readings in the Serial Monitor.

## Methodology

### 2.1 Tools & Materials

- Wokwi IoT Simulator (<https://wokwi.com/>)
- ESP32 Devkit V1 (simulation)
- DHT22 sensor (simulation)
- PlatformIO as the development environment
- Adafruit DHT sensor library

### 2.2 Implementation Steps

Step 1: Creating a Circuit Diagram in Wokwi

- Open <https://wokwi.com/>
- Add ESP32 Devkit V1 and DHT22 sensor components.
- Connect the DHT22 sensor to ESP32:
  1. VCC → 3.3V
  2. GND → GND
  3. Data → GPIO27

Step 2: Writing and Uploading Code

The following code is used to read data from the sensor:

```
#include <Arduino.h>
#include "DHT.h"

#define DHTPIN 27
#define DHTTYPE DHT22

DHT dht(DHTPIN, DHTTYPE);

void setup() {
  Serial.begin(115200);
  dht.begin();
}

void loop() {
  delay(2000);
  float humidity = dht.readHumidity();
  float temperature = dht.readTemperature();

  if (isnan(humidity) || isnan(temperature)) {
    Serial.println("Failed to read sensor!");
    return;
  }

  Serial.print("Humidity: ");
  Serial.print(humidity);
  Serial.print(" %\tTemperature: ");
  Serial.print(temperature);
  Serial.println(" °C");
}
```

### Step 3: Configuring PlatformIO

- Create a new PlatformIO project for ESP32 Devkit V1.
- Modify platformio.ini file as follows:

```
[env:esp32doit-devkit-v1]
platform = espressif32
board = esp32doit-devkit-v1
framework = arduino
lib_deps =
  adafruit/DHT sensor library
```

### Step 4: Creating diagram.json for Wokwi Simulation

- Define the virtual circuit configuration:

```
{
  "version": 1,
  "author": "vokasi",
  "editor": "wokwi",
  "parts": [
```

```

{ "type": "board-esp32-devkit-c-v4", "id": "esp", "top": 86.4, "left": 24.04, "attrs": {} },
{ "type": "wokwi-dht22", "id": "dht1", "top": 19.5, "left": -91.8, "attrs": {} }
],
"connections": [
[ "esp:TX", "$serialMonitor:RX", "", [] ],
[ "esp:RX", "$serialMonitor:TX", "", [] ],
[ "dht1:VCC", "esp:3V3", "red", [] ],
[ "esp:GND.1", "dht1:GND", "black", [] ],
[ "dht1:SDA", "esp:27", "green", [] ]
],
"dependencies": {}
}

```

## Results and Discussion

### 3.1 Experimental Results (Hasil Eksperimen)

The ESP32 successfully reads and displays sensor data in the Serial Monitor.

Sample Output:

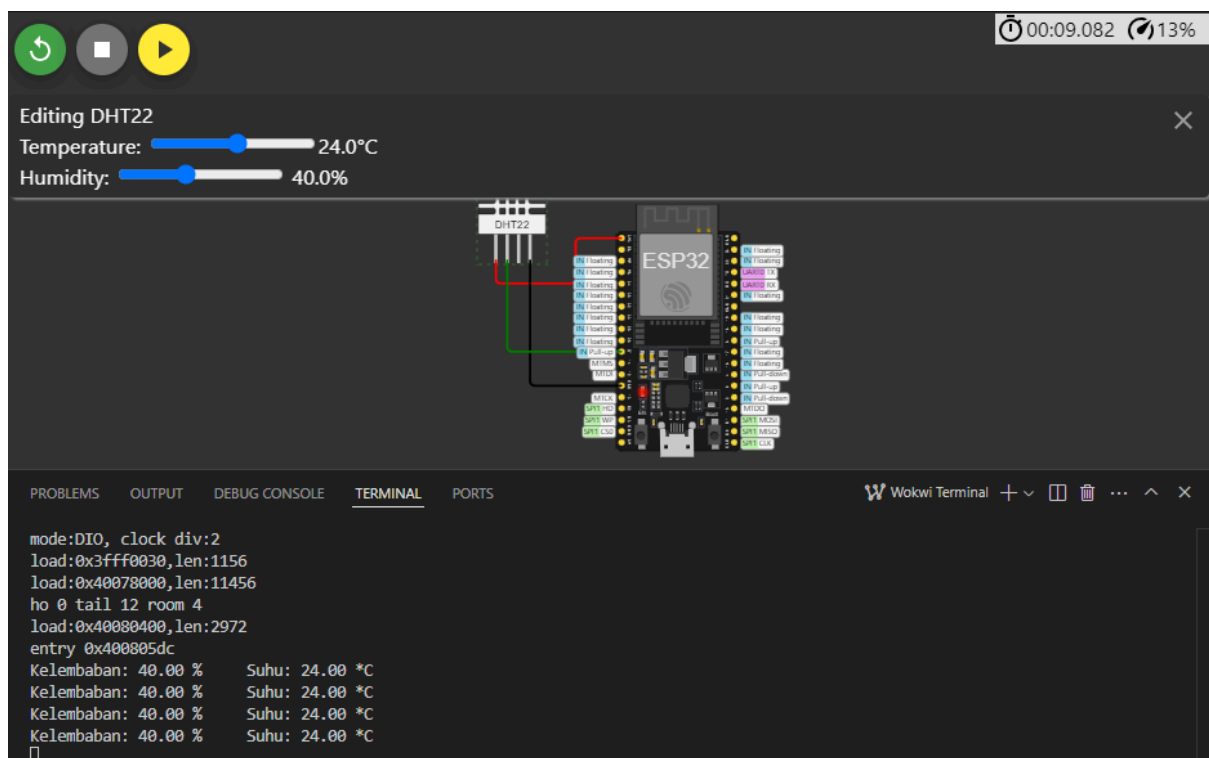


Editing DHT22

Temperature: 24.0°C

Humidity: 40.0%

## 4. Appendix (Lampiran, jika diperlukan)



The screenshot shows the Wokwi IDE interface. At the top, there's a toolbar with a refresh button, a stop button, and a play button. The top right corner shows a timer at 00:09.082 and a battery level at 13%. Below the toolbar, there's a window titled 'Editing DHT22' showing the sensor's configuration: Temperature: 24.0°C and Humidity: 40.0%. The main workspace displays a breadboard simulation with an ESP32 board and a DHT22 sensor connected. The terminal window at the bottom shows the following output:

```

mode:DIO, clock div:2
load:0x3fff0030,len:1156
load:0x40078000,len:11456
ho 0 tail 12 room 4
load:0x40080400,len:2972
entry 0x400805dc
Kelembaban: 40.00 %   Suhu: 24.00 *C
Kelembaban: 40.00 %   Suhu: 24.00 *C
Kelembaban: 40.00 %   Suhu: 24.00 *C
Kelembaban: 40.00 %   Suhu: 24.00 *C

```