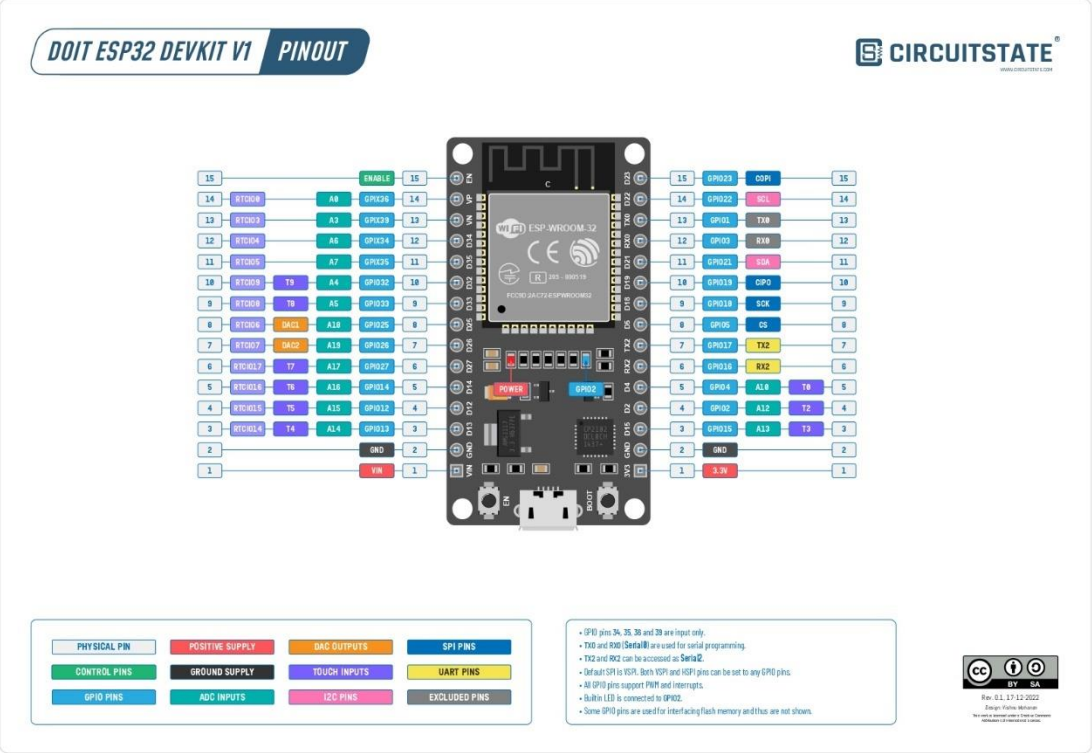
LAMPIRAN

Lampiran 1 ESP32 Pinout



Lampiran 2 AMG8833 *Datasheet*

https://www.alldatasheet.com/datasheet-pdf/pdf/1222322/PANASONICBATTERY/AMG8833.html

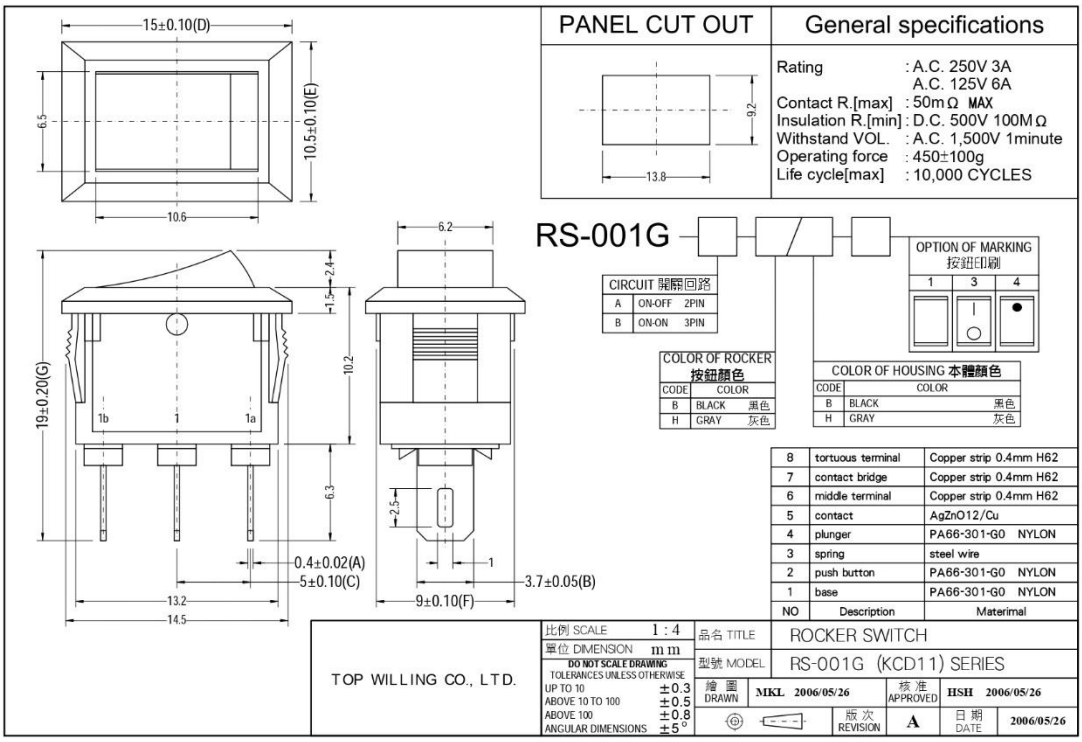
Lampiran 3 TP4056 *Datasheet*

https://pdf1.alldatasheet.com/datasheet-pdf/download/1487471/ETC2/TP4056.html
https://www.alldatasheet.com/datasheet-pdf/pdf/1487471/ETC2/TP4056.html

Lampiran 4 MP1584 *Datasheet*

https://html.alldatasheet.com/html-pdf/551592/MPS/MP1584/53/1/MP1584.html

Lampiran 5 Switch KCD11



Lampiran 6 Kode Pemrograman

```
#include <WiFi.h>
#include <Wire.h>
#include <Adafruit_AMG88xx.h>

#include <Arduino.h>
#include <Firebase_ESP_Client.h>
#include <ThingsBoard.h>
#include <Arduino_MQTT_Client.h>
#include <Ticker.h>
#include <time.h>

#define FIREBASE_AUTH
"HHbQMAgSIS69lgn9yNWK2CE4nZvZ95NG7uZSCfmW"
#define FIREBASE_HOST "https://skripsi-4f51a-default-rtdb.asia-
southeast1.firebasedatabase.app/"
// Define Firebase Data object
```

```
// device
#define LEDIjo 18
#define buzzer 5

// tb
#define UPDATE_DATA_INTERVAL_KONDISI_REALTIME 6000
#define THINGSBOARD_ACCESS_TOKEN "6eloY9a9iR8uH0zxZp17"
#define THINGSBOARD_SERVER "demo.thingsboard.io"

// wifi manager
#define WIFI_SSID "pengen ya?"
#define WIFI_PASSWORD "gatauuuu"

// time
//  String ntpServer = "pool.ntp.org";
const int gmtOffset_sec = 21600;
const int daylightOffset_sec = 3600;

// global rtdb
FirebaseData fbdo;
FirebaseAuth fbAuth;
FirebaseConfig fbConfig;
// FirebaseData fbdoStream;
unsigned long sendDataPrevMillis = 0;

// amg8833
Adafruit_AMG88xx amg;
float pixels[AMG88xx_PIXEL_ARRAY_SIZE];

// Initialize ThingsBoard client
WiFiClient espClient;
Arduino_MQTT_Client mqttClient(espClient);
// Initialize ThingsBoard instance
ThingsBoard tb(mqttClient);
Ticker timersendData;

// parameter int
int K = 0; // jika kondisi = 0, maka tidak ada orang. Dan sebaliknya.
int buzzerKondisi = 0;
```

```
int bendaPanas = 0;
int adaKasir = 0;
int tidakAdaKasir = 0;
bool booleanKasir = false;
int intKasir = 0;
int counter = 0;
String Kasir = "Cashier left";
struct tm timeinfo;

void Firebase_Init();
void thingsboardSensorRealtime();
// void thingsboardSensorKondisi();
void Counting();
void jamOperationalKasir(bool time);
void sendDataToRTDB(bool reset);

void setup()
{
 Serial.begin(115200);
 Serial.println(F("AMG88xx pixels"));
 bool AMGstatus;
 // default settings amg8833
 AMGstatus = amg.begin();
 if (!AMGstatus)
 {
  Serial.println("Could not find a valid AMG88xx sensor, check wiring!");
  while (1)
   ;
 }
 Serial.println("-- Pixels Test --");
 Serial.println();
 delay(100); // let sensor boot up
 // buzzer
 pinMode(buzzer, OUTPUT);
 // LED
 pinMode(LEDIjo, OUTPUT);
 // wifi
 WiFi.begin(WIFI_SSID, WIFI_PASSWORD);
 Serial.print("Connecting to Wi-Fi");
 while (WiFi.status() != WL_CONNECTED)
```

```
  {
    Serial.print(".");
    delay(300);
  }
  Serial.println();
  Serial.print("Connected with IP: ");
  Serial.println(WiFi.localIP());
  Serial.println();
  // Init and get the time
  configTime(gmtOffset_sec, daylightOffset_sec, "pool.ntp.org");

  // tb
  timersendData.attach_ms(UPDATE_DATA_INTERVAL_KONDISI_REALTIME,
thingsboardSensorRealtime);

  Firebase_Init();
}

void loop()
{
  Counting();
  if (!tb.connected())
  {
    if (tb.connect(THINGSBOARD_SERVER, THINGSBOARD_ACCESS_TOKEN))
      Serial.println("Connected to thingsboard");
  else
    {
    Serial.println("Error connected to thingsboard");
    delay(100);
    }
  }
  tb.loop();

  int suhupixelManusiaTile1 = 0;
  bool waktuOperasional = false;
  // read all the pixels
  amg.readPixels(pixels);
  Serial.print("[");
  Serial.println();
```

```
 // for loop
 for (int i = 1; i <= AMG88xx_PIXEL_ARRAY_SIZE; i++)
 {
  Serial.print(pixels[i - 1]);
  Serial.print(", ");
    if (pixels[i - 1] >= 24.5 && pixels[i - 1] < 40)
    {                       // kondisi suhu ruangan 20 celcius
      suhupixelManusiaTile1++;
    }
  if (pixels[i - 1] >= 40)
  { // amg 8833 >= 40 (suhu benda)
    bendaPanas++;
  }
  if (i % 8 == 0){
    Serial.println();
 } // for loop
 }
 Serial.println("]");
 if (timeinfo.tm_hour < 23 && timeinfo.tm_hour >= 8)
 {
  waktuOperasional = true;
    // cegah curang objek panas selain manusia
 if (bendaPanas >= 6 && !K) // logic detect benda panas
 {
  digitalWrite(buzzer, HIGH);
  digitalWrite(LEDIjo, LOW);
  buzzerKondisi = 1;
 }
 if (suhupixelManusiaTile1 >= 3){
    K = 1;
    adaKasir++;
    digitalWrite(LEDIjo, HIGH);
    digitalWrite(buzzer, LOW);
    Kasir = "Cashier present";
  } else{
    buzzerKondisi = 0;
    K = 0;
    tidakAdaKasir++;
    digitalWrite(LEDIjo, LOW);
    // digitalWrite(buzzer, HIGH);
```

```
      Kasir = "Cashier left";
      Firebase.RTDB.setInt(&fbdo, "/activeBuzzer/Alarm", buzzerKondisi);
    }
  }
  else
  {
    waktuOperasional = false;
    // Serial.println("false");
  }

  jamOperationalKasir(waktuOperasional);
  // suhupixelManusiaTile1 = 0;
  counter++;
  Serial.println(counter);
  bendaPanas = 0;
  delay(6000);
}//loop

void jamOperationalKasir(bool time)
{
  bool timer = time;
  if (!getLocalTime(&timeinfo))
  {
    Serial.println("Failed to obtain time");
    return;
  }
  sendDataToRTDB(timer);
}

void Counting()
{
  // int count;
  if (K == 0 && adaKasir < tidakAdaKasir && counter == 30)
  {
    Kasir = "Cashier left";
    booleanKasir = false;
    Serial.println(booleanKasir);
    intKasir = 0;
    Serial.println(intKasir);
    for (int alarmTime = 1; alarmTime < 6; alarmTime++)
```

```
    {
      digitalWrite(buzzer, HIGH);
      delay(500);
      digitalWrite(buzzer, LOW);
      delay(500);
      buzzerKondisi = 1;
      Firebase.RTDB.setInt(&fbdo, "/activeBuzzer/Alarm", buzzerKondisi);
    }
    // count = 0;
  } else if ((K == 1 || K == 0) && adaKasir > tidakAdaKasir && counter == 30){
    booleanKasir = true;
    Serial.println(booleanKasir);
    intKasir = 1;
    Serial.println(intKasir);
    digitalWrite(buzzer, LOW);
    buzzerKondisi = 0;
    Firebase.RTDB.setInt(&fbdo, "/activeBuzzer/Alarm", buzzerKondisi);
    Kasir = "Cashier present";
  }
  else{
    digitalWrite(buzzer, LOW);
    buzzerKondisi = 0;
    Firebase.RTDB.setInt(&fbdo, "/activeBuzzer/Alarm", buzzerKondisi);
    Kasir = "Cashier present";
  }
  delay(50);

  if (counter == 30)//reset
  {
    counter = 1; //setiap 6 detik
    // kasir
    adaKasir = 0;
    tidakAdaKasir = 0;
  }
}

void thingsboardSensorRealtime()
{
  if (tb.connected())
  {
```

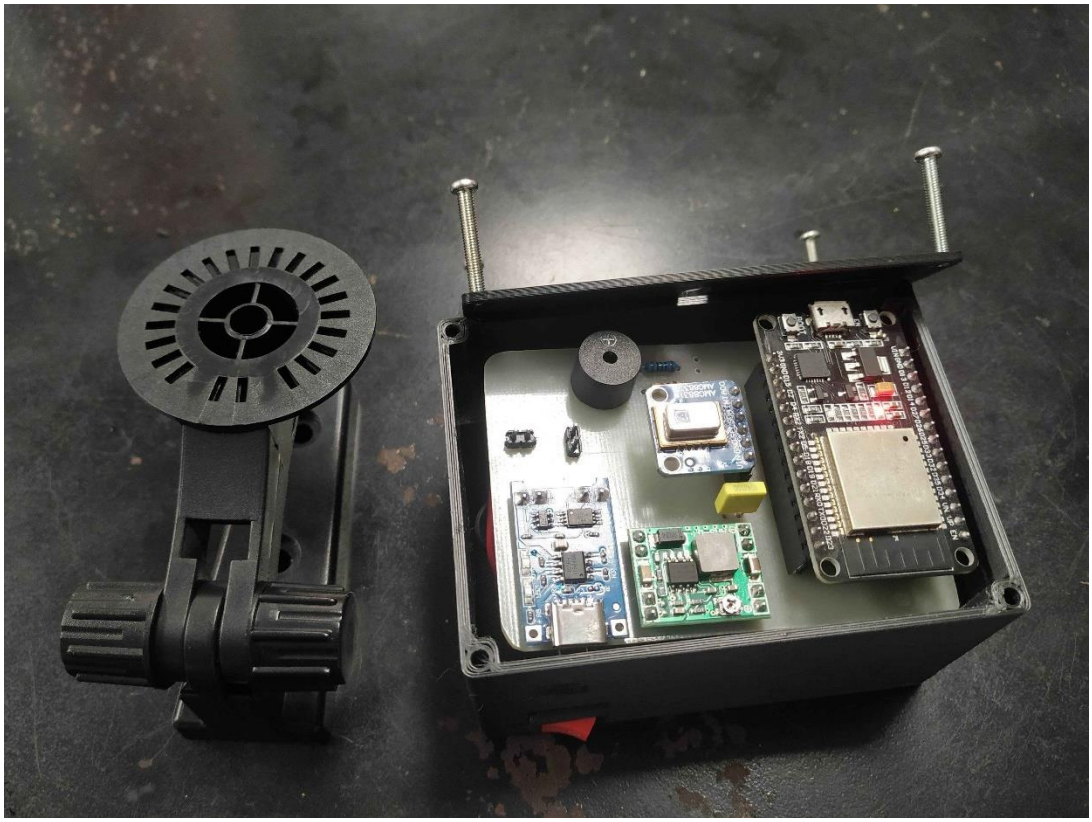
```
    tb.sendTelemetryData("Cashier present", adaKasir);
    tb.sendTelemetryData("Cashier left", tidakAdaKasir);
    tb.sendTelemetryData("Cashier Condition", intKasir);
    if(counter >=30){
    tb.sendTelemetryData("Condition", booleanKasir);
    }
  }
}
void Firebase_Init()
{
  fbConfig.host = FIREBASE_HOST;
  fbConfig.signer.tokens.legacy_token = FIREBASE_AUTH;
  Firebase.begin(&fbConfig, &fbAuth);
  Firebase.reconnectWiFi(true);
  Firebase.RTDB.setwriteSizeLimit(&fbdo, "tiny");
  fbdo.setBSSLBufferSize(512 /* Rx buffer size in bytes from 512 - 16384 */, 512 /* Tx
buffer size in bytes from 512 - 16384 */);
}

void sendDataToRTDB(bool reset)
{
  bool resetRTDB = reset;
  if (Firebase.ready() && (millis() - sendDataPrevMillis > 6000 || sendDataPrevMillis
== 0))
  {
    sendDataPrevMillis = millis();
    if (resetRTDB == true)
    {
      if (!Firebase.RTDB.setString(&fbdo, "/Store/Cashier condition/", Kasir) ||
!Firebase.RTDB.setInt(&fbdo, "/Store/Presence Value/", K))
      {
        Serial.println("reason: ");
        Serial.print(fbdo.errorReason());
      }
      Firebase.RTDB.setInt(&fbdo, "/Manager/Cashier/Cashier Present every 6 seconds",
adaKasir);
      Firebase.RTDB.setInt(&fbdo, "/Manager/Cashier/Cashier left every 6 seconds",
tidakAdaKasir);
    }
    else
```

```
   {
     Kasir = "tutup";
     adaKasir = 0;
     tidakAdaKasir = 0;
     Firebase.RTDB.setString(&fbdo, "/Store/Cashier condition/", Kasir);
     Firebase.RTDB.setInt(&fbdo, "/Store/Value of Presence/", K);
     Firebase.RTDB.setInt(&fbdo, "/Manager/Cashier/Cashier Present every 6 seconds",
adaKasir);
     Firebase.RTDB.setInt(&fbdo, "/Manager/Cashier/Cashier left every 6 seconds",
tidakAdaKasir);
   }
  }
}
```

Library

```
[env:esp32doit-devkit-v1]
platform = espressif32
board = esp32doit-devkit-v1
framework = arduino
monitor_speed = 115200
upload_speed = 230400
lib_deps =
        adafruit/Adafruit AMG88xx Library@^1.3.2
        mobizt/Firebase Arduino Client Library for ESP8266 and ESP32@^4.0.0
        knolleary/PubSubClient@^2.8
        thingsboard/ThingsBoard@^0.12.2
```

Lampiran 7 Foto Alat



Lampiran 8 Data Mentah

send data per 6 detik	Interval Pengambilan Data Dalam Waktu 1 Menit							
	Suhu Ada Pegawai Kasir (Celcius °C)							
1	23,25	24,5	25,5	25,25	23,5	23,75	23	23
	22,75	24,75	26,5	24,5	23,25	23,5	23,25	23
	22,5	22,75	24,75	24,75	23	23	23,5	23,5
	22,5	22,75	22,5	22,5	22,5	22,75	23	23,75
	22,25	22,25	22	22,25	22	22	22,75	23,5
	22,25	22,75	22,25	21,75	22	22	22,75	22,75
	22,25	21,75	21,75	22	22	22,5	23	23,5
	22,25	22	21,75	22	22,25	22,75	23,25	24
2	24,25	25,5	26,25	24,75	23,75	24,5	23,5	23,5
	23,25	26	26,75	23,75	23	23,75	23,75	23,25
	23	24,25	27	24,25	22,5	23	24	24,25
	22,5	23	23,75	23,25	23	23	23,25	23,25
	22,75	22,25	22,75	22,5	23	22,5	23,5	23,25
	22	22,5	22,25	22	22,75	22,5	23,25	23
	22,5	22,25	22,25	22,25	23	22,75	23,25	24
	22	22,5	22	22	22,75	23	23,75	23,5
3	24,25	25	26	25,25	23,75	24,75	23,75	23
	23,75	26	26,75	24,25	23,5	23,75	24	24
	23	24	26,75	24,5	23,25	23	24	24
	22,5	23	23,5	23,25	23	23,25	23,5	23,75
	23	23	22,5	22,25	23,25	23	23,25	24
	22,25	22,25	22,75	22,75	23	22,5	23,25	23,75
	22,25	22,75	22	21,75	22,5	23,25	23,5	23,25
	21,75	22,75	21,75	22,5	23	23,25	24	23,75
4	21,75	23	25,75	25,25	25,75	26	25	24,75
	22	23,25	25,25	26	25,5	25,25	24,75	25,5
	22,25	22,75	25	26,5	25,5	22,75	24	24
	22,25	22,75	22,75	26,25	26	23	23,5	23,75
	22,75	22,25	22,75	23,25	24	22,75	23	23,75
	22	22,75	22	22	22,75	22,5	23	23,5
	22	21,75	22,5	21,75	23	22,5	22,75	23,25
	21,75	22,5	22,25	22,25	22,25	22,5	23,25	23
5	22,5	22,75	25,75	25,5	26	25	25,5	24
	21,75	23,75	25	26,25	26	25,75	25,5	24,75
	22,75	22,5	25,25	27	26,25	23,5	23,75	24,25

	22,25	23,25	23	26,75	27	23,25	23,5	23,75
	22,75	23	22,75	24	24	23	23,75	23,75
	22,25	23	22,75	22	23,25	22,75	23,25	23,75
	22,25	22,25	22,5	22,5	22,75	22,75	23,5	23
	22,25	22,5	22,5	22,5	22,5	23	23,5	23
6	21,75	23	25,25	25	25,75	25,5	25,5	24,25
	22	23,25	25,25	25,75	25,5	25	25	24,75
	22,5	22,25	25,25	27	25,75	23,25	23,5	24,25
	22,25	22,5	22,75	26	26,75	23	23	23,75
	22,75	22,5	22,5	23,25	24,5	23	23,5	23,25
	22,25	22,25	22,5	22,25	23	22,5	23	23
	21,75	22,25	21,75	22	22	22,5	22,75	23
	21,75	22	21,75	21,75	22,25	22,25	23	23,5
7	21,5	22,5	25,25	24,75	25,75	25	25	23,75
	21,75	22,5	24,75	25,5	25,5	24,75	24,5	24,75
	22	22,5	24,75	26,25	25,5	23	23,5	24,25
	21,75	22,5	22	24,5	26,5	23	22,5	23,5
	22,75	22,5	22,5	22,5	24	22,25	23,25	23,25
	22,5	22,25	22	21,75	22	22,25	23	22,75
	22	22	22	21,5	22	21,75	21,75	23
	21,75	22	21,75	22	22,25	22	22,75	23
8	21,25	22,75	25	25	25	24,75	25	24
	21,75	22,5	24,5	25,75	25	24,75	24,25	24
	22,25	22,5	25	26,5	26,25	23,25	24	24,75
	21,75	22,5	22,75	25	26,75	23,5	23	23,5
	22	21,75	22,25	22,5	23,5	22,5	23,25	23
	22	22,25	22	21,75	22,25	22,25	22,75	23,5
	22	21,5	21,25	21,75	22	22	22,75	23
	21,75	22,5	21,75	22	22,25	22,75	23	23,25
9	21,75	23,5	26,5	25,75	25,5	24,75	24,5	24,5
	22,25	23,5	26	26,25	26,5	24,5	24,25	23,5
	23	22,5	25	26,25	25,5	23,25	24,25	24,25
	22,75	23	22,75	25,75	26,5	23,25	23,5	23,5
	22,75	22,25	22,75	23	24	22,75	23,25	23,5
	22,25	22,75	22,5	22,5	22,75	22,5	23,75	23,75
	22,75	21,75	22,25	22,5	22,75	22,5	23,25	23,75
	22	22,75	22	22,25	22,25	22,75	23,25	23,5
10	22	22,75	25,5	25,25	23,75	24,5	25,25	23,5
	22,25	23,5	25,75	26	26	25,75	25,5	24,25
	22,75	22,5	24,75	26,5	26	23,25	24,25	24

	22,25	22,25	22,75	25	26,75	23,25	23,5	23,5
	22,5	22	22,75	23	24,5	22,75	23	23,5
	22	22,75	22,25	22	22,75	22,25	23	23,25
	22	22,5	22	21,75	22	22,25	22,75	23,25
	21,25	22,25	21,25	22	22	22	23	23

data per 6 detik	Interval Pengambilan Data Dalam Waktu 1 Menit							
	Suhu Tidak Ada Pegawai Kasir (Celcius °C)							
1	21	21	21,75	21,25	21,25	22,25	22	22,5
	21,25	21,25	21,25	21	21,75	22,25	22,25	22,5
	21,25	21,5	21,5	21	21,25	21,75	22,75	23
	21,25	21,75	21	21,75	22	22,5	22,25	22,75
	21,25	22	21,75	21,75	22,25	22	22,75	23,5
	21,5	21,75	21,75	21,25	22	21,75	22,5	22,5
	22	21,25	21,25	21	21,75	21,75	22,25	22,75
	21,25	21,5	21,5	21,5	22	21,75	22,25	22,25
2	21	21	21,75	21,25	21,25	22,25	22	22,5
	21,25	21,25	21,25	21	21,75	22,25	22,25	22,5
	21,25	21,5	21,5	21	21,25	21,75	22,75	23
	21,25	21,75	21	21,75	22	22,5	22,25	22,75
	21,25	22	21,75	21,75	22,25	22	22,75	23,5
	21,5	21,75	21,75	21,25	22	21,75	22,5	22,5
	22	21,25	21,25	21	21,75	21,75	22,25	22,75
	21,25	21,5	21,5	21,5	22	21,75	22,25	22,25
3	20,5	21,25	21,75	21,5	22,25	22,25	22,5	22,5
	21,5	21,75	21,5	21,25	22,25	22,5	22,5	23
	21,75	21,25	21,5	20,75	21,5	22	22,5	23,25
	22	22	21,25	22	22,5	22,75	22,5	23,25
	21,75	22,25	22	22	22,25	22,5	23,25	23,5
	21,75	22,5	21,75	22,25	22,25	22	23	23,25
	22,25	21,75	21,75	21,5	21,75	22,25	22,75	23,75
	21,25	22	21,5	21,75	22,25	22,25	22,75	22,75
4	21,75	21,5	22	21,75	22,25	22,75	22,5	22,5
	21,25	22	21,75	21,75	22,25	23	23	22,75
	22	21,5	21,75	21,25	22,25	22	23,25	22,75
	22	22,25	21,75	22,75	22,75	22,75	22,75	23
	22,25	22,25	22,75	22,25	22,5	22,75	24	24
	21,75	22,75	22	22	23	22,5	22,75	23,75

	21,75	22,25	21,75	22,25	22	22	22,75	23,75
	21,25	22,25	21,5	22	22	22,5	23	22,75
5	20,5	21,75	22,25	21,5	22	22,5	22,25	22
	21,5	21,75	22	21,5	22,25	22,75	23	22,75
	21,75	21,75	21,5	21,5	21,75	21,75	22,75	22,75
	21,75	22	21,75	22	22,5	22,5	22,5	23
	21,75	21,75	22,25	22	21,75	22,75	23,25	23,75
	22	22	22,25	21,75	22,25	22,5	22,75	23
	21,25	22,25	22	21,75	22	22,25	23	23,75
	21,5	22,25	21,5	21,5	22	21,75	23	22,5
6	21,25	21,75	22	21,75	22,25	22,5	22,5	22,75
	21,25	21,75	21,5	21,75	22,75	22,5	23	22,75
	21,75	21,75	22	22	22	22	23	23,25
	22,25	22	22	22,5	23	22,75	22,5	23,75
	22,25	22,75	22,5	22,5	22,5	23	23,75	23,5
	22,25	22,75	22,25	22	22,5	23	23,25	24
	22,25	22,25	22	21,75	22,5	22	23,25	24
	22,5	22,25	21,5	21,75	22,5	22,75	23,25	23,5
7	20,5	21,5	21,25	21	21,75	22,25	22,5	23
	21	21	21,25	21,25	21,75	22,5	22	22,25
	21,5	21,5	21,5	21,5	21,25	22,25	22,75	23,25
	21,25	21,5	21	21,5	22	22,25	22,5	22,25
	21,25	21,75	21,75	21,5	22	22,5	23	23,25
	21,5	22	21,5	21,5	22	21,75	22,5	22,75
	21	21,5	21,25	21,5	21,75	22	21,75	23,25
	21,25	21,75	21,25	21,5	21,75	21,75	22,25	22,25
8	21,5	20,75	21	20,75	22	21,75	22	21,75
	20,25	21,75	20,75	21,75	21,5	22	22,5	22,75
	21,25	21	20,75	21	21	21,5	21,75	22,5
	21,25	21,5	21	21,5	21,75	22	22,25	23
	21,5	21,5	21,75	21,25	21,75	22,5	22,75	23,25
	21,25	21,75	21,75	21,25	21,75	21,25	22,25	22,5
	21	21,25	21,25	21,25	21,5	21,25	21,75	22,5
	21,25	21,5	20,75	20,75	21,75	21,75	21,75	22
9	21,75	21,75	22,75	21,75	22,5	22,5	23	23,25
	21,5	22,25	21,75	22,5	22,5	23	22,75	23,25
	22,25	21,75	22	21,75	22	22,5	23,25	23,75
	22,25	22	22	22,75	23	22,75	23,25	23,25
	22	22	22,75	22,5	22,5	22,75	23,25	24,25
	22,25	22,5	22,25	22,25	22,25	22,25	23,25	23,5

	22	22,25	22,75	22	22,25	22,25	23	23,75
	22,25	22,5	21,75	22	22,75	22,5	22,75	23
10	22	21,25	22	21,25	22,25	22,5	22,5	22,5
	21,5	21,75	22	21,75	22,25	22,25	23	23,25
	21,75	21,75	22,25	21,5	22,25	22	23	23,25
	22	22,5	21,75	22,5	22	23	22,5	23,25
	21,75	22	22,5	22	22,25	22,75	23,25	23,5
	21,75	22,5	22	22	22,5	22,25	23	23,5
	21,75	22,25	22	21,5	22,25	22	22,75	23,75
	21,5	22,75	21,5	21,5	22,5	22,25	22,75	23,25

send data per 6 detik	Interval Pengambilan Data Dalam Waktu 1 Menit								Piksel
	Suhu Ada Pegawai Kasir (Celcius °C)								
1	23,25	24,5	25,5	25,25	23,5	23,75	23	23	3
	22,75	24,75	26,5	24,5	23,25	23,5	23,25	23	
	22,5	22,75	24,75	24,75	23	23	23,5	23,5	
	22,5	22,75	22,5	22,5	22,5	22,75	23	23,75	
	22,25	22,25	22	22,25	22	22	22,75	23,5	
	22,25	22,75	22,25	21,75	22	22	22,75	22,75	
	22,25	21,75	21,75	22	22	22,5	23	23,5	
	22,25	22	21,75	22	22,25	22,75	23,25	24	
2	24,25	25,5	26,25	24,75	23,75	24,5	23,5	23,5	5
	23,25	26	26,75	23,75	23	23,75	23,75	23,25	
	23	24,25	27	24,25	22,5	23	24	24,25	
	22,5	23	23,75	23,25	23	23	23,25	23,25	
	22,75	22,25	22,75	22,5	23	22,5	23,5	23,25	
	22	22,5	22,25	22	22,75	22,5	23,25	23	
	22,5	22,25	22,25	22,25	23	22,75	23,25	24	
	22	22,5	22	22	22,75	23	23,75	23,5	
3	24,25	25	26	25,25	23,75	24,75	23,75	23	5
	23,75	26	26,75	24,25	23,5	23,75	24	24	
	23	24	26,75	24,5	23,25	23	24	24	
	22,5	23	23,5	23,25	23	23,25	23,5	23,75	
	23	23	22,5	22,25	23,25	23	23,25	24	
	22,25	22,25	22,75	22,75	23	22,5	23,25	23,75	
	22,25	22,75	22	21,75	22,5	23,25	23,5	23,25	
	21,75	22,75	21,75	22,5	23	23,25	24	23,75	
4	21,75	23	25,75	25,25	25,75	26	25	24,75	13
	22	23,25	25,25	26	25,5	25,25	24,75	25,5	
	22,25	22,75	25	26,5	25,5	22,75	24	24	
	22,25	22,75	22,75	26,25	26	23	23,5	23,75	
	22,75	22,25	22,75	23,25	24	22,75	23	23,75	
	22	22,75	22	22	22,75	22,5	23	23,5	
	22	21,75	22,5	21,75	23	22,5	22,75	23,25	
	21,75	22,5	22,25	22,25	22,25	22,5	23,25	23	
5	22,5	22,75	25,75	25,5	26	25	25,5	24	13
	21,75	23,75	25	26,25	26	25,75	25,5	24,75	
	22,75	22,5	25,25	27	26,25	23,5	23,75	24,25	
	22,25	23,25	23	26,75	27	23,25	23,5	23,75	
	22,75	23	22,75	24	24	23	23,75	23,75	
	22,25	23	22,75	22	23,25	22,75	23,25	23,75	
	22,25	22,25	22,5	22,5	22,75	22,75	23,5	23	
	22,25	22,5	22,5	22,5	22,5	23	23,5	23	

send data per 6 detik	Interval Pengambilan Data Dalam Waktu 1 Menit								Piksel
	Suhu Ada Pegawai Kasir (Celcius °C)								
6	21,75	23	25,25	25	25,75	25,5	25,5	24,25	12
	22	23,25	25,25	25,75	25,5	25	25	24,75	
	22,5	22,25	25,25	27	25,75	23,25	23,5	24,25	
	22,25	22,5	22,75	26	26,75	23	23	23,75	
	22,75	22,5	22,5	23,25	24,5	23	23,5	23,25	
	22,25	22,25	22,5	22,25	23	22,5	23	23	
	21,75	22,25	21,75	22	22	22,5	22,75	23	
	21,75	22	21,75	21,75	22,25	22,25	23	23,5	
7	21,5	22,5	25,25	24,75	25,75	25	25	23,75	7
	21,75	22,5	24,75	25,5	25,5	24,75	24,5	24,75	
	22	22,5	24,75	26,25	25,5	23	23,5	24,25	
	21,75	22,5	22	24,5	26,5	23	22,5	23,5	
	22,75	22,5	22,5	22,5	24	22,25	23,25	23,25	
	22,5	22,25	22	21,75	22	22,25	23	22,75	
	22	22	22	21,5	22	21,75	21,75	23	
	21,75	22	21,75	22	22,25	22	22,75	23	
8	21,25	22,75	25	25	25	24,75	25	24	4
	21,75	22,5	24,5	25,75	25	24,75	24,25	24	
	22,25	22,5	25	26,5	26,25	23,25	24	24,75	
	21,75	22,5	22,75	25	26,75	23,5	23	23,5	
	22	21,75	22,25	22,5	23,5	22,5	23,25	23	
	22	22,25	22	21,75	22,25	22,25	22,75	23,5	
	22	21,5	21,25	21,75	22	22	22,75	23	
	21,75	22,5	21,75	22	22,25	22,75	23	23,25	
9	21,75	23,5	26,5	25,75	25,5	24,75	24,5	24,5	10
	22,25	23,5	26	26,25	26,5	24,5	24,25	23,5	
	23	22,5	25	26,25	25,5	23,25	24,25	24,25	
	22,75	23	22,75	25,75	26,5	23,25	23,5	23,5	
	22,75	22,25	22,75	23	24	22,75	23,25	23,5	
	22,25	22,75	22,5	22,5	22,75	22,5	23,75	23,75	
	22,75	21,75	22,25	22,5	22,75	22,5	23,25	23,75	
	22	22,75	22	22,25	22,25	22,75	23,25	23,5	
10	22	22,75	25,5	25,25	23,75	24,5	25,25	23,5	11
	22,25	23,5	25,75	26	26	25,75	25,5	24,25	
	22,75	22,5	24,75	26,5	26	23,25	24,25	24	
	22,25	22,25	22,75	25	26,75	23,25	23,5	23,5	
	22,5	22	22,75	23	24,5	22,75	23	23,5	
	22	22,75	22,25	22	22,75	22,25	23	23,25	
	22	22,5	22	21,75	22	22,25	22,75	23,25	
	21,25	22,25	21,25	22	22	22	23	23	

Lampiran 9 Surat Keterangan Survey

SURAT KETERANGAN SURVEY

No. : 025/FET-CPE/JKT/VI/2024

Saya yang bertanda tangan di bawah ini menyatakan bahwa Mahasiswa jurusan Sistem Komputer dengan :

Nama : Tegar Fadhillah Nugroho Putra

NIM : 2440097045

Nama : Yohanes Tulangow

NIM : 2440097902

Melakukan penulisan skripsi dan penelitian pada Semester Genap 2023/2024 dengan menggunakan data eksperimental, dengan demikian yang bersangkutan tidak melakukan survey dari perusahaan

Hormat saya,

Daniel Patricko Hutabarat S.T., M.T.

Ketua Jurusan Sistem Komputer

Universitas Bina Nusantara

Lampiran 10 Riwayat Hidup

PERSONAL INFORMATION

Binusian ID	2440097045
Full Name	Tegar Fadhillah Nugroho Putra
Email	tegar.putra001@binus.ac.id
Address	**Current** Jl. Lembah Hijau Blok MX 03 RT 01 RW 23 Bojonggede, Kab. Bogor, Indonesia, 16922 **Permanent** Jl. Lembah Hijau Blok MX 03 RT 01 RW 23 Bojonggede, Kab. Bogor, Indonesia, 16922
Phone Numbers	Mobile: +62 81213749554
Gender	Male
Birthplace/ Date	Jakarta, 01 Maret 1999

Nationality	Indonesian
Martial Status	Single
Religion	Islam

FORMAL EDUCATION

University 2020 – Present, expected graduation 2024.

Bina Nusantara University

- Bachelor of Computer Engineering

High School 2014 – 2017

SMA Negeri 9 Bogor

- Natural Science Program

PERSONAL CERTIFICATION

2022	Cloud Computing Alibaba Cloud Certificate
2024	Google Analytics For Beginners

ORGANIZATION EXPERIENCE

2020-2024 Anggota Himpunan Mahasiswa Sistem Komputer (HIMTEK)

WORKING EXPERIENCE

Feb 2023 – Feb 2024 IT Support (Internship)

PT Maybak Indonesia Finance

Job Description:

- Troubleshooting, diagnosing and resolving, hardware, software, network and security issues and other systems.
- Install, configure, and support network equipment including routers, servers, Firewalls, proxies, WAN, DNS, and DHCP.
- Configure firewalls, routing and switching to maximize network efficiency and security
- Maximize network performance through ongoing maintenance, monitoring and troubleshooting

RIWAYAT HIDUP

PERSONAL INFORMATION

Binusian ID	2440097902
Full Name	Yohanes Tulangow
Email	Yohanes.tulangow@binus.ac.id
Address	**Current** Jl. Rawa Belong 2 No.26 RT03/RW011, 11480, Palmerah, Jakarta Barat. **Permanent** Jl. Bina Tirta Kavling Bina Marga Bekasi
Phone Numbers	Mobile: 081398275041
Gender	Male
Birthplace/ Date	Bekasi, 17 Mei 2002

Nationality	Indonesian
Martial Status	Single
Religion	Kristen

FORMAL EDUCATION

University	2020 – Present, expected graduation 2024. Bina Nusantara University • Bachelor of Computer Engineering
High School	2017 – 2020 SMA Mahanaim • Natural Science Program

PERSONAL CERTIFICATION

2022	Huawei Certification HCIA
2022	Python Programming Basic Certificate
2022	Apsara Clouder – Cloud Computing Alibaba Cloud Certificate

ORGANIZATION EXPERIENCE

2020-2024	Anggota Himpunan Mahasiswa Sistem Komputer (HIMTEK)

WORKING EXPERIENCE

Feb 2023 – Feb 2024 Engineering Specialist (Intern)

PROGRAM STUDI SISTEM KOMPUTER
UNIVERSITAS BINA NUSANTARA

Job Description:

- Developed products or tools and created learning methods.
- Assisted in creating theories for educational materials for lab assistants and students.
- Prepared materials for Trial Class activities and high school extracurricular activities.
- Documenting events that are held.
- Organizing exhibitions at specific locations.