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LAMPIRAN A
PROGRAM ALAT

1. Program ESP32 CAM

```
#include <Arduino.h>
#include <WiFi.h>
#include <WiFiClientSecure.h>
#include "soc/soc.h"
#include "soc/rtc_cntl_reg.h"
#include "esp_camera.h"
#include <UniversalTelegramBot.h>
#include <ArduinoJson.h>

const char* ssid = "apa";
const char* password = "qwertyuiop";

String BOTtoken1 =
"7447253172:AAF3qXcF7aAK9L6UpRgUsbg7ysmSp26cNco";  String
CHAT_ID1 = "1203423596";
bool sendPhoto = false;
WiFiClientSecure clientTCP;
UniversalTelegramBot bot1(BOTtoken1, clientTCP);
UniversalTelegramBot bot2(BOTtoken2, clientTCP);

#define FLASH_LED_PIN 4
bool flashState = LOW;

#define TRIG_PIN_1 13
#define ECHO_PIN_1 12
#define TRIG_PIN_2 14
#define ECHO_PIN_2 15
#define BUZZER_PIN 2

int botRequestDelay = 1000;
unsigned long lastTimeBotRan;

unsigned long lastUltrasonicCheck = 0;
unsigned long ultrasonicCheckInterval = 5000; // Check every 5 seconds
long lastDistance1 = -1;
long lastDistance2 = -1;
```

```
const long distanceThreshold = 3;

  for (int i = 0; i < numNewMessages; i++) {
    String chat_id = String(bot1.messages[i].chat_id);
    if (chat_id != CHAT_ID1 && chat_id != CHAT_ID2) {
      bot1.sendMessage(chat_id, "Unauthorized user", "");
      bot2.sendMessage(chat_id, "Unauthorized user", "");
      continue;    }

    String text = bot1.messages[i].text;
    Serial.println(text);

    if (text == "/start") {
      String welcome = "Welcome!\n";
      welcome += "Use the following commands to interact with the
ESP32-CAM:\n";
      welcome += "/photo : take a new photo\n";
      welcome += "/flash : toggle flash LED\n";
      welcome += "/distance1 : show distance from ultrasonic sensor 1\n";
      welcome += "/distance2 : show distance from ultrasonic sensor 2\n";
      bot1.sendMessage(chat_id, welcome, "");
      bot2.sendMessage(chat_id, welcome, "");
    }
    if (text == "/flash") {
      flashState = !flashState;
      digitalWrite(FLASH_LED_PIN, flashState);
      Serial.println("Changed flash LED state");
    }
    if (text == "/photo") {
      sendPhoto = true;
      Serial.println("New photo request");
    }
    if (text == "/distance1") {
      long distance = readUltrasonicDistance1();
```

```
      String distanceMsg = "Distance from Sensor 1: " + String(distance)
+ " cm";
      bot1.sendMessage(chat_id, distanceMsg, "");
      bot2.sendMessage(chat_id, distanceMsg, "");
      Serial.println("Distance 1 sent: " + distanceMsg);
    }
    if (text == "/distance2") {
      long distance = readUltrasonicDistance2();
      String distanceMsg = "Distance from Sensor 2: " + String(distance)
+ " cm";
      bot1.sendMessage(chat_id, distanceMsg, "");
      bot2.sendMessage(chat_id, distanceMsg, "");
      Serial.println("Distance 2 sent: " + distanceMsg);
    }

void setup() {
  Serial.begin(115200);
  pinMode(FLASH_LED_PIN, OUTPUT);
  digitalWrite(FLASH_LED_PIN, flashState);
  pinMode(TRIG_PIN_1, OUTPUT);
  pinMode(ECHO_PIN_1, INPUT);
  pinMode(TRIG_PIN_2, OUTPUT);
  pinMode(ECHO_PIN_2, INPUT);
  pinMode(BUZZER_PIN, OUTPUT);
  digitalWrite(BUZZER_PIN, LOW);
  configInitCamera();

long readUltrasonicDistance1() {
  digitalWrite(TRIG_PIN_1, LOW);
  delayMicroseconds(2);
  digitalWrite(TRIG_PIN_1, HIGH);
  delayMicroseconds(10);
  digitalWrite(TRIG_PIN_1, LOW);
  long duration = pulseIn(ECHO_PIN_1, HIGH);
  long distance = duration * 0.034 / 2; // Convert to distance in cm
  return distance;
}

long readUltrasonicDistance2() {
  digitalWrite(TRIG_PIN_2, LOW);
  delayMicroseconds(2);
```

```
  digitalWrite(TRIG_PIN_2, HIGH);
  delayMicroseconds(10);
  digitalWrite(TRIG_PIN_2, LOW);
  long duration = pulseIn(ECHO_PIN_2, HIGH);
  long distance = duration * 0.034 / 2; // Convert to distance in cm
  return distance;
}

void loop() {
  if (sendPhoto) {
    Serial.println("Preparing photo");
    if (sendPhotoTelegram(BOTtoken1, CHAT_ID1) == "Success" &&
sendPhotoTelegram(BOTtoken2, CHAT_ID2) == "Success") {
      sendPhoto = false;
      delay(2000); }
  }
  if (millis() > lastTimeBotRan + botRequestDelay) {
    int numNewMessages = bot1.getUpdates(bot1.last_message_received
+ 1);
    while (numNewMessages) {
      Serial.println("Received new messages");
      handleNewMessages(numNewMessages);
      numNewMessages = bot1.getUpdates(bot1.last_message_received +
1);
    }
    lastTimeBotRan = millis();
  }

  // Check ultrasonic sensors
  if (millis() - lastUltrasonicCheck >= ultrasonicCheckInterval) {
    long distance1 = readUltrasonicDistance1();
    Serial.print("Distance 1: ");
    Serial.print(distance1);
    Serial.println(" cm");
    if (abs(distance1 - lastDistance1) >= distanceThreshold) {
      sendPhoto = true;
      String distanceMsg = "Distance 1 changed: " + String(distance1)
```

```
+ " cm";
     bot1.sendMessage(CHAT_ID1, distanceMsg, "");
     bot2.sendMessage(CHAT_ID2, distanceMsg, "");
     Serial.println("Distance 1 sent: " + distanceMsg);
     lastDistance1 = distance1;

     // Activate buzzer
     digitalWrite(BUZZER_PIN, HIGH);
     delay(5000);  // Buzzer sound duration
     digitalWrite(BUZZER_PIN, LOW);
    }

   long distance2 = readUltrasonicDistance2();
   Serial.print("Distance 2: ");
   Serial.print(distance2);
   Serial.println(" cm");
   if (distance2 < 20) {
     sendPhoto = true;
     String distanceMsg = "Distance 2 detected less than 20 cm: " +
String(distance2) + " cm";
     bot1.sendMessage(CHAT_ID1, distanceMsg, "");
     bot2.sendMessage(CHAT_ID2, distanceMsg, "");
     Serial.println("Distance 2 sent: " + distanceMsg);
   }
   lastUltrasonicCheck = millis();  }
}
```

2. Program Arduino Uno

```
#include <SPI.h>
#include <MFRC522.h>
#include <LiquidCrystal_I2C.h>
LiquidCrystal_I2C lcd(0x27, 16, 2);

#define SS_PIN 10
#define RST_PIN 9
#define LED_G 4 //define green LED pin
#define LED_R 5 //define red LED
#define RELAY 7 //relay pin
#define BUZZER 2 //buzzer pin
#define ACCESS_DELAY 2000
#define DENIED_DELAY 1000
```

```
MFRC522 mfrc522(SS_PIN, RST_PIN);   // Create MFRC522 instance.

void setup()
{
  lcd.init();
  Serial.begin(9600);   // Initiate a serial communication
  SPI.begin();          // Initiate  SPI bus
  mfrc522.PCD_Init();   // Initiate MFRC522
  pinMode(LED_G, OUTPUT);
  pinMode(LED_R, OUTPUT);
  pinMode(RELAY, OUTPUT);
  pinMode(BUZZER, OUTPUT);
  noTone(BUZZER);
  digitalWrite(RELAY, HIGH);
  Serial.println("Put your card to the reader...");
  Serial.println();
  lcd.backlight();
  lcd.setCursor(1, 0);
  lcd.print("TAP KARTU ANDA");
}

void loop()
{
   // Select one of the cards
  if ( ! mfrc522.PICC_ReadCardSerial())
  {
    return;
  }
  //Show UID on serial monitor
  Serial.print("UID tag :");
  String content = "";
  byte letter;
  for (byte i = 0; i < mfrc522.uid.size; i++)
  {
     Serial.print(mfrc522.uid.uidByte[i] < 0x10 ? " 0" : " ");
     Serial.print(mfrc522.uid.uidByte[i], HEX);
```

```
    content.concat(String(mfrc522.uid.uidByte[i] < 0x10 ? " 0" : " "));
    content.concat(String(mfrc522.uid.uidByte[i], HEX));
  }
  Serial.println();
  Serial.print("Message : ");
  content.toUpperCase();

  if (content.substring(1) == "84 15 B3 72" || content.substring(2) == "05
89 95 F5 5B D1 00")
  {
    Serial.println("Authorized access");
    Serial.println();
    lcd.backlight();
    lcd.setCursor(1, 1);
    lcd.print("AKSES DITERIMA");

    digitalWrite(RELAY, LOW);
    digitalWrite(LED_G, HIGH);
    delay(ACCESS_DELAY);
    digitalWrite(RELAY, HIGH);
    digitalWrite(LED_G, LOW);
  }
  else
  {
    Serial.println("Access denied");
    lcd.backlight();
    lcd.setCursor(1, 1);
    lcd.print("AKSES DITOLAK");

    digitalWrite(LED_R, HIGH);
    tone(BUZZER, 300);
    delay(DENIED_DELAY);
    digitalWrite(LED_R, LOW);
    noTone(BUZZER);  }
}
```

3. Program ESP32

```
#include <WiFi.h>
#include <WiFiClientSecure.h>
#include <UniversalTelegramBot.h>
```

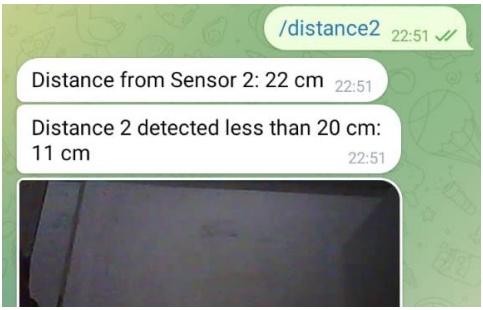
```
#include <ArduinoJson.h>
const char* ssid = "apa";
const char* password = "qwertyuiop";
#define BOTtoken1
"7163693843:AAFjbMm2idR4MSjtOiX3m4M42jinEuEx7F0"
#define CHAT_ID1 "6065623983"

WiFiClientSecure clientTCP;
UniversalTelegramBot bot1(BOTtoken1, clientTCP);
#define RELAY1_PIN 27
#define RELAY2_PIN 26
#define VOLTAGE_SENSOR_PIN 14

bool lastVoltageStatus = HIGH;
void setup() {
  Serial.begin(115200);
  pinMode(RELAY1_PIN, OUTPUT);
  pinMode(RELAY2_PIN, OUTPUT);
  pinMode(VOLTAGE_SENSOR_PIN, INPUT);
  digitalWrite(RELAY1_PIN, HIGH); // Turn off relay 1
  digitalWrite(RELAY2_PIN, HIGH); // Turn off relay 2

  // Serial2 for communication with Arduino (RX=14, TX=15)
  Serial2.begin(9600, SERIAL_8N1, 32, 33);
}

void loop() {
  int voltageStatus = digitalRead(VOLTAGE_SENSOR_PIN);

  if (voltageStatus == HIGH) {
    digitalWrite(RELAY1_PIN, LOW);  // Activate relay 1 (Power
supply)
    digitalWrite(RELAY2_PIN, HIGH); // Deactivate relay 2 (Battery)
    Serial.println("Power supply Connected");

    // Reset lastVoltageStatus
    lastVoltageStatus = HIGH;
  } else if (voltageStatus == LOW) {
    digitalWrite(RELAY1_PIN, HIGH); // Deactivate relay 1 (Power
supply)
    digitalWrite(RELAY2_PIN, LOW);  // Activate relay 2 (Battery)
```

```
    Serial.println("Power supply Disconnected");

    // Send message to Telegram if voltage status changes to LOW
    if (lastVoltageStatus == HIGH) {
      String message = "Warning: Power supply Disconnected, switching
to Battery!";
      bot1.sendMessage(CHAT_ID1, message, "");
      lastVoltageStatus = LOW; }
  }
  if (Serial2.available()) {
    String message = Serial2.readStringUntil('\n');
    Serial.println("Received: " + message);

    if (message.startsWith("AUTHORIZED")) {
      String uid = message.substring(message.indexOf(',') + 1);
      String telegramMessage = "User with UID " + uid + " has
accessed.";
      bot2.sendMessage(CHAT_ID1, telegramMessage, ""); }  }

  delay(1000); // Wait for 1 second
}
```

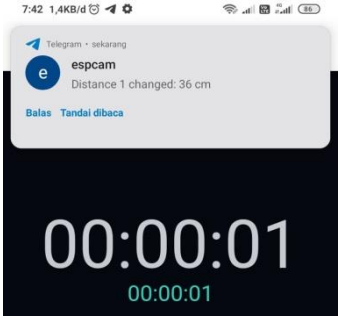
LAMPIRAN B
DOKUMENTASI

1. Pengujian Sensor Ultrasonik 1

2. Pengujian Sensor Ultrasonik 2



3. Pengujian Delay Pengiriman Gambar (sample ke 5)



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1. SD Negeri 1 Bajing Kulon Tahun 2009-2015
2. SMP Negeri 2 Kroya Tahun 2015-2018
3. SMA Negeri 1 Kroya Tahun 2018-2021
4. Politeknik Negeri Cilacap Tahun 2021-2024

Penulis telah mengikuti seminar Tugas Akhir pada tanggal 29 juli 2024 sebagai salah satu persyaratan untuk memperoleh gelar Ahli Madya (A.Md).