

LAMPIRAN



Listing Program

```

#include <SD.h>
#include <Wire.h>
#include <SPI.h>

const int pwm = 3 ; //initializing pin3 as pwm
const int in_1 = 4;
const int in_2 = 5;
unsigned long time;
int chipselect=8;
File mySensorData;

float last1_error, last2_error, gerakan;
unsigned char gerak1 = 0;
const float Kp = 2.89, Ki = 0.74, Kd = 2.81;

unsigned long last;
unsigned long now;

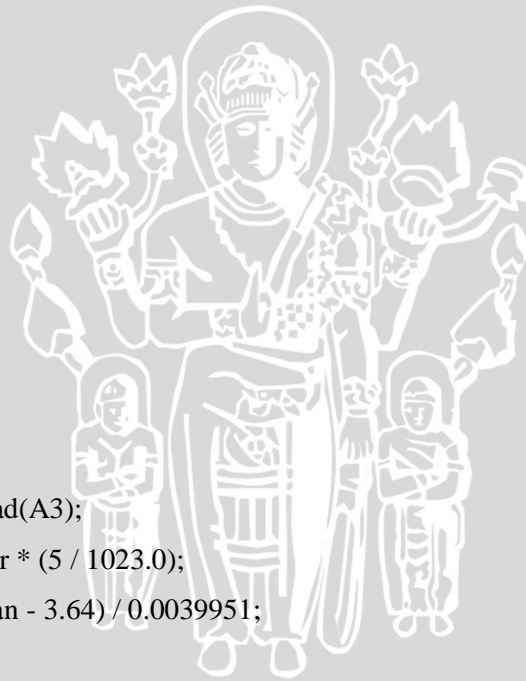
float setpoint = 80; //setpoint lux

void setup()
{
  Serial.begin(9600);
  pinMode(10, OUTPUT);
  SD.begin(chipselect);

  // pinMode(pwm, OUTPUT) ; // Not needed  analogWrite() takes care of this
  pinMode(in_1, OUTPUT) ;
  pinMode(in_2, OUTPUT) ;

```

```
}  
  
void open (byte speed) {  
    digitalWrite(in_1, HIGH) ;  
    digitalWrite(in_2, LOW) ;  
    analogWrite(pwm, speed) ;  
}  
  
void close (byte speed)  
{  
    digitalWrite(in_1, LOW) ;  
    digitalWrite(in_2, HIGH) ;  
    analogWrite(pwm, speed) ;  
}  
  
void stop (void) {  
    digitalWrite(in_1, LOW) ;  
    digitalWrite(in_2, LOW) ;  
    analogWrite(pwm, 0) ;  
}  
  
void loop()  
{  
    int nilaisensor = analogRead(A3);  
    float tegangan = nilaisensor * (5 / 1023.0);  
    float kedalaman = (tegangan - 3.64) / 0.0039951;  
  
    float error_lux = setpoint - kedalaman;  
    float P = Kp * error_lux ;  
    float I = (Ki * (error_lux + last1_error)) / 2;  
    float D = (Kd * (error_lux - 2 * last1_error + last2_error)) ;  
  
    float output = P + I + D;  
  
    gerakan = gerak1 + output;  
  
    last2_error = last1_error;
```




```
last1_error = error_lux ;
mySensorData=SD.open("PTPID.txt", FILE_WRITE);
```

```
if (gerakan > 0) {
  open(constrain(gerakan, 200, 255));
} else {
  close(constrain(-gerakan, 200, 255));
}
```

```
if (gerakan <= 1 && gerakan >= -1)
{
  stop() ;
}
```

```
if (mySensorData)
{
  time = millis();
  time = millis();
  delay(000);
  Serial.print (time);
  Serial.print("\t");
  Serial.print(tegangan);
  Serial.print("\t");
  Serial.println(kedalaman);
  mySensorData.print(tegangan);
  mySensorData.print(",");
  mySensorData.print("\t");
  mySensorData.println(kedalaman);
  mySensorData.close();
  delay(100);
}
}
```

