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LAMPIRAN

LAMPIRAN 1 CODING AWLR

```
#include <Wire.h>
#include <LiquidCrystal_I2C.h>
#include <DS3231.h>
#include <SPI.h>
#include <SD.h>
#include "LowPower.h"

LiquidCrystal_I2C LCD (0x27, 16, 2);
DS3231 rtc (SDA, SCL);

String hari;
String waktu;
String tanggal;

int TRIG = 7;
int ECHO = 8; // sensor ultrasonic

int durasi;
int jarak;
```

```
int mode;
int i = 0;
File myFile;

//int relay = A0;

//--------------------------------------------------------------------------//

void setup() {
  // put your setup code here, to run once:
   rtc.begin ();
   LCD.begin ();
   LCD.backlight ();
   LCD.setCursor (2, 0);
   LCD.print ("Sensor AWLR");
   LCD.setCursor (4, 1);
   LCD.print ("INSTIPER");
   delay (2000);
   LCD.clear();
   LCD.setCursor (0,0);
   LCD.print ("W. I. Hutagalung");
   LCD.setCursor (4, 1);
```

```
  LCD.print ("STIK 18");
  delay (2000);
  LCD.clear ();
  pinMode (TRIG, OUTPUT);
  pinMode (ECHO, INPUT);

   //pinMode(relay, OUTPUT);
   //digitalWrite(relay, HIGH);

 Serial.begin (9600);
 delay (10);
 if (!SD.begin (4)) {
   return;
 }
}

//----------------------------------------------------------------------//

void loop() {
 // put your main code here, to run repeatedly:
 myFile = SD.open ("jarak.txt, FILE_WRITE");
 hari = rtc.getDOWStr ();
```

```
waktu = rtc.getTimeStr ();
tanggal = rtc.getDateStr ();
//--------------------------//

hcsr ();
LCD.setCursor (0, 0);
LCD.print ("Jarak = ");
LCD.setCursor (8, 0);
LCD.print (" ");
LCD.setCursor (11, 0);
LCD.print (jarak);
LCD.print (" cm       ");
LCD.setCursor (0, 1);
LCD.print (waktu);
LCD.print (", ");
LCD.print (hari);

if (myFile) {
 myFile.print (jarak);
  myFile.print (" cm ");
  myFile.print (waktu);
  myFile.print ("  ");
```

```
  myFile.print (hari);
  myFile.print ("  ");
  myFile.print (tanggal);
  myFile.close ();
     // delay (1000); // menyimpan
  }

 // Power Down 2 Menit
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
```

```
LCD.noBacklight ();

// Power Down 4 Menit
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);

// Power Down 6 Menit
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
```

```
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);

// Power Down 8 Menit
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
```

```
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);

// Power Down 10 Menit
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
LowPower.powerDown(SLEEP_4S, ADC_OFF, BOD_OFF);
delay (3750) ;
```

```
}


//--------------------------------------------------------------------//

void hcsr () {
   digitalWrite (TRIG, HIGH);
  delayMicroseconds (10);
  digitalWrite (TRIG, LOW);

  durasi = pulseIn (ECHO, HIGH);

  jarak = durasi/2*0.0340;
  delay (500);

  }
```

LAMPIRAN 2 CODING RTC

```
#include <DS3231.h>
DS3231 rtc(SDA,SCL);
```

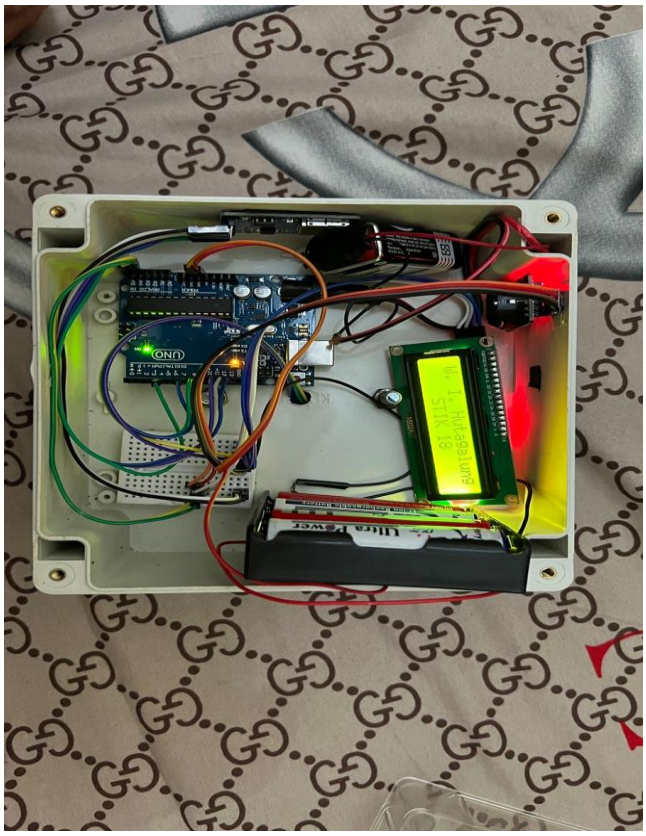
```
String hari;
String waktu;
String tanggal;

void setup() {
  rtc.begin();
  Serial.begin(9600);
  //rtc.setDOW(FRIDAY);
  //rtc.setTime(16,43,0);
  //rtc.setDate(8,7,2022);
}

void loop() {
  hari=rtc.getDOWStr();
  waktu=rtc.getTimeStr();
  tanggal=rtc.getDateStr();
  Serial.println(waktu);

  delay(1000);
}
```

LAMPIRAN 3 HASIL RANGKAIAN ALAT



Tampak atas AWLR yang telah selesai dirakit. Rangkaian yang telah dipasang didalam *box*

Tampak samping AWLR yang telah dirakit dan terlihat tutup pralon sebagai penyangga AWLR dan pelindung sensor

Tampak bawah dari AWLR trelihat sensor yang terpasang di bagian dalam dari tutup pipa paralon

LAMPIRAN 4 KOMPONEN PADA AWLR

Tinggi : 9cm

Lebar : 16cm

Tinggi Parallon : 3cm

No	Nama Komponen	Fungsi
1	*Arduino uno*	Berbasis mikrokontroller Atmeg 328 sebagai pusat kendali dari komponen elektronika
2	Sensor HC-SR 04	Sebagai pengukur jarak berbasis ultrasonic dengan mengukur cepat rambat suara antara objek dan sensor
3	RTC (*Real Time Clock*) DS3231	Sebagai modul pewaktuan digital secara *real time*
4	LCD (*Liquid Crystal Display*) 16x2 i2c	Sebagai media tampilan data yang dibaca olelh sensor
5	Modul *SD Card*	Sebagai pengakses *SD Card* untuk membaca dan penulisan data menggunakan system SPI (*Serial Parallel Interfce*)
6	Baterai Lithium 18650	Sebagai sumber daya listrik untuk pengoperasian alat

LAMPIRAN 5 PEMASANGAN ALAT DAN PENGAMBILAN DATA

Pemasangan AWLR diatas permukaan embung tanpa terhalang objek agar alat dapat merekam

Melakukan pengambilkan data jarak actual antara sensor dan muka air

LAMPIRAN 6 FORMAT YANG TELAH TERSIMPAN DI *SD CARD*

Berikut merupakan format yang telah tersimpan pada *SD Card*

78 cm	13:55	14/9/22
77 cm	13:55	14/9/22
79 cm	13:56	14/9/22
79 cm	13:56	14/9/22
78 cm	14:6	14/9/22
78 cm	14:16	14/9/22
78 cm	14:26	14/9/22
85 cm	14:36	14/9/22
79 cm	14:46	14/9/22
79 cm	14:56	14/9/22
79 cm	15:6	14/9/22
80 cm	15:16	14/9/22
81 cm	15:26	14/9/22