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LAMPIRAN A
Program Arduino IDE

```
//LIBRARY

#include <Arduino.h>
#include <Nextion.h>
#include <SPI.h>

//PIN

#define TURBID_1 A1
#define TURBID_2 A2
#define NEXTION_TX 16
#define NEXTION_RX 17
#define FLOW_1 18 //int3
#define FLOW_2 19 //int2
#define PUMP_1 6
#define PUMP_2 7
#define PUMP_3 8
#define VALVE_1 6
#define VALVE_2 7
#define VALVE_3 8
#define MIXER 9
#define BUZZER 10
```

```
int pinList[] = { VALVE_1, VALVE_2, VALVE_3, PUMP_1,  
PUMP_2, PUMP_3, MIXER, BUZZER};
```

```
#define PUMP_ON 0
```

```
#define PUMP_OFF 1
```

```
#define VALVE_OPEN 0
```

```
#define VALVE_CLOSE 1
```

```
//LIST OBEJK NEXTION
```

```
NexText turbidity_value1 = NexText(1,10,"t6");
```

```
NexText turbidity_value2 = NexText(1,11,"t7");
```

```
NexText flow_value1 = NexText(1,12,"t8");
```

```
NexText flow_value2 = NexText(1,13,"t9");
```

```
NexText run_status = NexText(1,7,"t5");
```

```
NexButton btn_start = NexButton(1,8,"b0");
```

```
NexSlider btn_menu = NexSlider(0,2,"h0");
```

```
NexTouch *nex_listen_list[] = {
```

```
    &btn_start, &btn_menu, NULL
```

```
};
```

```
//VARIABEL
```

```
volatile int flow_freq1; volatile int flow_freq2;
```

```

unsigned long check_routine; unsigned long check_intrvl=1000;
unsigned long flow_intrvl=500; float chem_limit = 1; float
chem_duration= 10000;

float liter_perpulse = 0.125; float volume_limit_dirty = 4.00; float
volume_limit_clean = 4.00;

bool run_flag=false; bool menu_flag=false; bool test_flag=false;

void valveSwitch(int valve_pin, bool valve_status); void
pumpSwitch(int pump_pin, bool pump_status); //FUNGSI RELAY

void runMixer(); void shutMixer(); void mixing(); void dirtyPump();
void cleanPump(); //FUNGSI ALUR

void updateValue(NexText *addNex, float value_set); float
flowRead(int number_of_pulse); void flowPulse1(); void flowPulse2();
float flowSpeed(float water_volume); //FUNGSI PEMBACAAN

float round_to_dp(float in_value, int decimal_place); float
turbidityRead(int ana_pin); void updateTurbid(); void buzzerSound();

void btn_menuCallback(void *ptr); void btn_startCallback(void *ptr);
//FUNGSI TOMBOL NEXTION

bool vh=0; bool nt=0; float t1_high=0.00; float t1_low=5.00; float
t2_high=0.00; float t2_low=5.00;

void setup() {

    Serial.begin(9600);

    nexInit();

    //inisialisasi pin

    for(int i=0; i< sizeof(pinList); i++){ //PIN RELAY

```

```

pinMode(pinList[i], OUTPUT);
digitalWrite(pinList[i], VALVE_CLOSE);
}

pinMode(FLOW_1, INPUT_PULLUP); pinMode(FLOW_2,
INPUT_PULLUP); //PIN FLOWMETER

pinMode(TURBID_1,INPUT); pinMode(TURBID_2,INPUT); //PIN
TURBIDITY

//tombol interupt
attachInterrupt(FLOW_1,flowPulse1,FALLING);

attachInterrupt(digitalPinToInterrupt(FLOW_1),flowPulse1,FALLING);

attachInterrupt(digitalPinToInterrupt(FLOW_2),flowPulse2,RISING);
btn_start.attachPop(btn_startCallback,&btn_start);
btn_menu.attachPop(btn_menuCallback, &btn_menu);
delay(10000); run_flag = true;
}

void loop() {

nexLoop(nex_listen_list); //RESPON PENEKANAN TOMBOL

```



```
if(menu_flag==true){ //SAAT MASUK MENU
    updateValue(&turbidity_value1, 0.00);
    updateValue(&turbidity_value2, 0.00);
    updateValue(&flow_value1, 0.00);
    updateValue(&flow_value2, 0.00);
    run_status.setText("Idle");
    menu_flag=false;
}
```

```
if(run_flag==true){ //SAAT MESIN DIJALANKAN
    dirtyPump();
    mixing();
    cleanPump();
    run_flag=false;
    run_status.setText("Idle");
}
```

```
if(millis()-check_routine > check_intrvl){ //UPDATE NILAI
TURBIDITY
    updateTurbid();
    check_routine = millis();
}
```

```

    delay(1);
}

void valveSwitch(int valve_pin, bool valve_status){ //BUKA/TUTUP
VALVE

    digitalWrite(valve_pin, valve_status);
}

void pumpSwitch(int pump_pin, bool pump_status){
//NYALA/MATIKAN POMPA

    digitalWrite(pump_pin, pump_status);
}

void runMixer(){ //MENYALAKAN MIXER

    digitalWrite(MIXER,LOW);
}

void shutMixer(){ //MEMATIKAN MIXER

    digitalWrite(MIXER,HIGH);
}

void mixing(){ //PENAMBAHAN KIMIA LALU MENJALANKAN
MIXER

    updateTurbid();

    run_status.setText("ADDING CLEANER SUBSTANCE");
//PENAMBAHAN BAHAN KIMIA

```

```

    valveSwitch(VALVE_2, VALVE_OPEN); pumpSwitch(PUMP_2,
PUMP_ON); //NYAALAKAN POMPA

    unsigned long crt_time= millis();
    while(millis() - crt_time < chem_duration){

        delay(1);

    }

    valveSwitch(VALVE_2, VALVE_CLOSE); pumpSwitch(PUMP_2,
PUMP_OFF); //MATIKAN POMPA BAHAN KIMIA

    run_status.setText("MIXING SUBSTANCE"); //MENYALAKAN
PENGADUK

    runMixer();

    crt_time = millis();

    unsigned long mix_duration = 10 * 1000;

    unsigned long mix_wait = 10 * 1000;

    while(millis() - crt_time <= mix_duration){ //DURASI
PENGADUKAN

        //poi read turbid

        delay(1);

    }

    shutMixer(); //MATIKAN PENGADUK

```

```

run_status.setText("SEDIMENTATION PHASE"); //FASE
PENGENDAPAN

crt_time = millis();

while(millis() - crt_time <= mix_wait){ //MENUNGGU BAHAN
TERCAMPUR

    //poi read turbid

    delay(1);

}

}

float flowSpeed(float water_volume){ //MEMBACA FLOWRATE

    float liter_perHour;

    liter_perHour = water_volume * (flow_intrvl/1000.00) * 60 * 60;

    return liter_perHour;

}

float round_to_dp( float in_value, int decimal_place ){
//MEMBULATKAN ANGKA KOMA

    float multiplier = powf( 10.0f, decimal_place );

    in_value = roundf( in_value * multiplier ) / multiplier;

    return in_value;

}

void buzzerSound(){

    digitalWrite(BUZZER,HIGH); delay(500);
    digitalWrite(BUZZER,LOW);
}

```

```

}
void flowPulse1(){ //PENDETEKSI AIR MENGALIR 1
    flow_freq1++;
}
void flowPulse2(){ //PENDETEKSI AIR MENGALIR 2
    flow_freq2++;
}
float turbidityRead(int ana_pin){ //MEMBACA NILAI TURBIDITY
    float _volt = 0;
    float ntu;
    float volt_low;
    float volt_high;
    float vh_ref = 4.2;
    float vl_ref = 2.5;

    for(int i=0; i<800; i++)
    {
        _volt += ((float)analogRead(ana_pin)/1023)*5;
    }

    _volt = _volt/800;
    _volt = round_to_dp(_volt,2);

```

```
Serial.print(_volt); Serial.print(" ");
```

```
if(ana_pin == TURBID_1){  
  volt_high = t1_high; volt_low = t1_low;  
  if(_volt < volt_low){  
    t1_low = _volt;  
    volt_low = t1_low;  
  }  
  if(_volt > volt_high){  
    t1_high = _volt;  
    volt_high = t1_high;  
  }  
}  
else{  
  volt_high = t2_high; volt_low = t2_low;  
  if(_volt < volt_low){  
    t2_low = _volt;  
    volt_low = t2_low;  
  }  
  if(_volt > volt_high){  
    t2_high = _volt;  
    volt_high = t2_high;  
  }  
}
```

```

    }
}

_volt = (_volt - volt_low) * (vh_ref - vl_ref) / (volt_high - volt_low);
_volt+=vl_ref;

if(_volt <= vl_ref){
    ntu = 3000;
}else{
    ntu = -1120.4*square(_volt)+5742.3*_volt-4353.8;
}

Serial.print(volt_low); Serial.print(" "); Serial.println(volt_high);
Serial.print(ana_pin); Serial.print(" = ");
Serial.println(ntu);
Serial.println("----");
return ntu;
}

void updateTurbid(){
    updateValue(&turbidity_value1, turbidityRead(TURBID_1));
    updateValue(&turbidity_value2, turbidityRead(TURBID_2));
}

```

```

}

void updateValue(NexText *addNex, float value_set){ //UPDATE
NILAI DI NEXTION

    static char value_arr[6];

    dtostrf(value_set, 6, 2, value_arr);

    addNex->setText(value_arr);

}

void dirtyPump(){ //MEMOMPA AIR KOTOR KE TANGKI
PEMBERSIHAN

    updateTurbid();

    run_status.setText("Dirty Water Pump"); delay(1000);

    flow_freq1=0;

    valveSwitch(VALVE_1, VALVE_OPEN);
    pumpSwitch(PUMP_1,PUMP_ON); //MENYALAKAN POMPA

    float flow_volume=0;

    unsigned long crt_time= millis();

    int crt_pulse;

    float crt_spd=0;

    float crt_scnd=0.000;

    while(flow_volume < volume_limit_dirty){ //MENUNGGU
SAMPAI VOLUME YANG DIBUTUHKAN TERPENUHI

        if(millis()-crt_time >= flow_intrvl){

            crt_time = millis();

```



```

crt_scnd+=1;
if(flow_freq1>0){
    crt_pulse = flow_freq1;
    Serial.println(crt_pulse);
    flow_freq1 = 0;
    flow_volume +=(crt_pulse * liter_perpulse);
    Serial.println(flow_volume);
    crt_spd = (crt_pulse * liter_perpulse)/crt_scnd;
    crt_scnd =0;
    crt_pulse =0;
    updateValue(&flow_value1, crt_spd);
    Serial.print("Flowrate 1 = "); Serial.println(crt_spd);
}
}
}

pumpSwitch(PUMP_1,PUMP_OFF);
valveSwitch(VALVE_1,VALVE_CLOSE); //MATIKAN POMPA

updateValue(&flow_value1, 0.00); //NILAI FLOWRATE 0
}

void cleanPump(){ //MEMOMPA AIR YANG TELAH
DIBERSIHKAN KE TANGKI AIR BERSIH

updateTurbid();

run_status.setText("Clear Water Pump");

```

```

flow_freq2=0;

valveSwitch(VALVE_3, VALVE_OPEN);
pumpSwitch(PUMP_3,PUMP_ON); //MENYALAKAN POMPA

float flow_volume;

unsigned long crt_time= millis();

int crt_pulse;

float crt_spd=0;

int crt_scnd=0;

while(flow_volume < volume_limit_clean){ //MENUNGGU SAMPAI
VOLUME YANG DIBUTUHKAN TERPENUHI

if(millis()-crt_time >= flow_intrvl){

crt_time = millis();

crt_scnd+=1;

if(flow_freq2>0){

crt_pulse = flow_freq2;

Serial.println(crt_pulse);

flow_freq2 = 0;

flow_volume +=(crt_pulse * liter_perpulse);

Serial.println(flow_volume);

crt_spd = (crt_pulse * liter_perpulse)/crt_scnd;

crt_scnd = 0;

crt_pulse =0;

```

```

        updateValue(&flow_value2, crt_spd);
        Serial.print("Flowrate 2 = "); Serial.println(crt_spd);
    }
}
}

pumpSwitch(PUMP_3,PUMP_OFF);
valveSwitch(VALVE_3,VALVE_CLOSE); //MEMATIKAN POMPA

updateValue(&flow_value2, 0.00); //NILAI FLOWRATE 0
}

//JIKA TOMBOL DITEKAN
void btn_startCallback(void *ptr){
    // Serial.println("G");
    run_flag = true;
}

void btn_menuCallback(void *ptr){
    Serial.println("F");
    menu_flag = true;
}

void btn_testCallback(void *ptr){
    test_flag = true;
}
}

```

LAMPIRAN B

Dokumentasi Kegiatan



BIODATA PENULIS



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Email : Lyanuar478@gmail.com
Telepon/HP : 0813-5925-0722
Hobi : Futsal
Moto : Tetap bermain ketika kita leleh
Riwayat Pendidikan :

- TK Aisyah Sumpiuh Tahun 2006-2007
- SD Negeri 1 Kebokura Tahun 2007-2013
- SMP Negeri 2 Sumpiuh Tahun 2013-2016
- SMK Negeri 2 Banyumas Tahun 2016-2019