

LAMPIRAN

Source code sensor DS18B20

```
#define pinsuhu 32

OneWire
oneWire(pinsuhu);
DallasTemperature sensorSuhu(&oneWire);
int suhu;
int dataSuhu() {
    sensorSuhu.requestTemperatures();
    int csuhu = sensorSuhu.getTempCByIndex(0);
    return csuhu;
}
void setup() {
    sensorSuhu.begin();
}
void loop()
{
    suhu = dataSuhu();
    Serial.println("----- Input ----");
    Serial.print("Suhu: ");
    Serial.print(suhu);
    Serial.println("°C");
```

Kode Program 4.1 Program Sensor DS18B20

Source Code Sensor MQ2

```
#define pinasap 33
int rawasap,asap;
void setup() {
  pinMode(pinasap, INPUT);
}
void loop()
{
  rawasap = analogRead(pinasap);
  if(rawasap>4095){
    rawasap=4095;
  }
  else if (rawasap<0){
    rawasap=0;
  }
  else{
    rawasap=rawasap;
  }
  // calibration asap & api to
  (datasheet)
  asap = map(rawasap,0,4095,0,1023);
  Serial.println("----- Input ----");
  Serial.print("Asap: ");
  Serial.println(asap);
```

Kode Program 4.2 Program Sensor MQ2

Source Code Sensor Api

```
#define pinapi 35
int rawapi,api;
void setup() {
  pinMode(pinapi, INPUT);
}
void loop()
{
  rawapi= analogRead(pinapi);
  if(rawapi>4095){
    rawapi=4095;
  }
  else if (rawapi<0){
    rawapi=0;
  }
  else{
    rawapi=rawapi;
  }
  // calibration asap & api to
  (datasheet)
  api = map(rawasap,0,4095,0,1023);
  Serial.println("----- Input ----");
  Serial.print("Api: ");
  Serial.println(api);
}
```

Kode Program 4.3 Program Sensor Api

Source Code Metode Fuzzy

```
//Fuzzyfikasi Suhu
if (suhu <= 30){
    rendah = 1;
    normal = 0;
    panas = 0;
    //condsuhu="RENDAH";
    condsuhu=suhu1;
}else if (suhu >= 45){
    rendah = 0;
    normal = 0;
    panas = 1;
    //condsuhu="TINGGI";
    condsuhu=suhu3;
}else if (suhu == 35){
    rendah = 0;
    normal = 1;
    panas = 0;
    condsuhu=suhu2;
}else if (suhu > 30 && suhu<35){
    rendah1 = (35-suhu);
    rendah=(rendah1/5);
    normal1 = (suhu-30);
    normal=(normal1/5);
    panas = 0;
    //condsuhu="NORMAL";
    condsuhu=suhu2;
}
```



```

else if (suhu > 35 && suhu<45){
    rendah=0;
    normal1 = (45-suhu);
    normal=(normal1/10);
    panas1 = (suhu-35);
    panas = (panas1/10);
    //condsuhu="NORMAL";
   condsuhu=suhu2;
}
//Fuzzyfikasi Asap
if (asap <= 200){
    tdkasap = 1;
    sedang = 0;
    banyak = 0;
    //condasap= "RENGGANG";
    condasap=asap1;
}else if (asap >= 500){
    tdkasap = 0;
    sedang = 0;
    banyak = 1;
    //condasap= "PADAT";
    condasap=asap3;
}else if (asap == 300){
    tdkasap = 0;
    sedang = 1;
    banyak = 0;
    condasap=asap2;
}else if (asap > 200 && asap<300){
    tdkasap1 = (300-asap);
    tdkasap=(tdkasap1/100);
    sedang1 = (asap-200);
    sedang=(sedang1/100);
    banyak = 0;
    //condasap="SEDANG";

```

```

condasap=asap2;
}
else if (asap > 300 && asap<500){
    tdkasap=0;
    sedang1 = (500-asap);
    sedang=(sedang1/200);
    banyak1 = (asap-300);
    banyak = (banyak1/200);
    //condasap="SEDANG";
    condasap=asap2;
}
//Fuzzyfikasi Api
if (api <= 90){
    tdkapi = 0;
    agkdekat = 0;
    dekat = 1;
    //condapi= "DEKAT";
    condapi= api1;
}else if (api >= 750){
    tdkapi = 1;
    agkdekat = 0;
    dekat = 0;
    //condapi= "TIDAKADAAPI";
    condapi=api3;
}else if (api == 350){
    tdkapi = 0;
    agkdekat = 1;
    dekat = 0;
    condapi=api2;
}
else if (api > 90 && api<350){
    dekat1 = (350-api);
    dekat=(dekat1/260);
    agkdekat1 = (api-90);
    agkdekat=(agkdekat1/260);
    tdkapi = 0;
    //condapi="AGAKDEKAT";
    condapi=api2;
}
else if (api > 350 && api<750){
    dekat=0;
    agkdekat1 = (750-api);
    agkdekat=(agkdekat1/400);
    tdkapi1 = (api-350);
    tdkapi = (tdkapi1/400);
    //condapi="AGAKDEKAT";
}

```

```
condapi=api2;
}
Serial.println("----- FUZZYFIKASI -----");
Serial.println("suhu =");
Serial.print("   $\mu$  rendah : ");
Serial.println(rendah);
Serial.print("   $\mu$  normal : ");
Serial.println(normal);
Serial.print("   $\mu$  panas : ");
Serial.println(panas);

Serial.println("asap =");
Serial.print("   $\mu$  tidak ada asap : ");
Serial.println(tdkasap);
Serial.print("   $\mu$  sedang : ");
Serial.println(sedang);
Serial.print("   $\mu$  banyak : ");
Serial.println(banyak);

Serial.println("api =");
Serial.print("   $\mu$  tidak ada api : ");
Serial.println(tdkapi);
Serial.print("   $\mu$  agkdekat : ");
Serial.println(agkdekat);
Serial.print("   $\mu$  dekat : ");
Serial.println(dekat);

//Inferensi
Serial.println("----- INFERENSI -----");
a1=(min(rendah,min(tdkasap,dekat)));
z1=(1);
Serial.print("a1 : ");
Serial.print(a1);
Serial.print(" || z1 : ");
Serial.println(z1);

a2=(min(rendah,min(tdkasap,agkdekat)));
z2=(1);
Serial.print("a2 : ");
Serial.print(a2);
Serial.print(" || z2 : ");
Serial.println(z2);
```

```
a3=(min(rendah,min(tdkasap,tdkapi)));
z3=(1);
Serial.print("a3 : ");
Serial.print(a3);
Serial.print(" || z3 : ");
Serial.println(z3);
a4=(min(rendah,min(sedang,dekat)));
z4=(1);
Serial.print("a4 : ");
Serial.print(a4);
Serial.print(" || z4 : ");
Serial.println(z4);
a5=(min(rendah,min(sedang,agkdekat)))
z5=(1);
Serial.print("a5 : ");
Serial.print(a5);
Serial.print(" || z5 : ");
Serial.println(z5);
a6=(min(rendah,min(sedang,tdkapi)));
z6=(1);
Serial.print("a6 : ");
Serial.print(a6);
Serial.print(" || z6 : ");
Serial.println(z6);
a7=(min(rendah,min(banyak,dekat)));
z7=(2);
Serial.print("a7 : ");
Serial.print(a7);
Serial.print(" || z7 : ");
Serial.println(z7);
```

```
a8=(min(rendah,min(banyak,agkdekat)));
z8=(1);
Serial.print("a8 : ");
Serial.print(a8);
Serial.print(" || z8 : ");
Serial.println(z8);
a9=(min(rendah,min(banyak,tdkapi)));
z9=(1);
Serial.print("a9 : ");
Serial.print(a9);
Serial.print(" || z9 : ");
Serial.println(z9);
a10=(min(normal,min(tdkasap,dekat)));
z10=(1);
Serial.print("a10 : ");
Serial.print(a10);
Serial.print(" || z10 : ");
Serial.println(z10);
a11=(min(normal,min(tdkasap,agkdekat)));
z11=(1);
Serial.print("a11 : ");
Serial.print(a11);
Serial.print(" || z11 : ");
Serial.println(z11);
a12=(min(normal,min(tdkasap,tdkapi)));
z12=(1);
Serial.print("a12 : ");
Serial.print(a12);
Serial.print(" || z12 : ");
Serial.println(z12);
```

```
a13=(min(normal,min(sedang,dekat)));
z13=(2);
Serial.print("a13 : ");
Serial.print(a13);
Serial.print(" || z13 : ");
Serial.println(z13);
a14=(min(normal,min(sedang,agkdekat)));
z14=(1);
Serial.print("a14 : ");
Serial.print(a14);
Serial.print(" || z14 : ");
Serial.println(z14);
a15=(min(normal,min(sedang,tdkapi)));
z15=(1);
Serial.print("a15 : ");
Serial.print(a15);
Serial.print(" || z15 : ");
Serial.println(z1);
a16=(min(normal,min(banyak,dekat)));
z16=(3);
Serial.print("a16 : ");
Serial.print(a16);
Serial.print(" || z16 : ");
Serial.println(z16);
a17=(min(normal,min(banyak,agkdekat)));
z17=(2);
Serial.print("a17 : ");
Serial.print(a17);
Serial.print(" || z17 : ");
Serial.println(z17);
```

```
a18=(min(normal,min(banyak,tdkapi)));
z18=(1);
Serial.print("a18 : ");
Serial.print(a18);
Serial.print(" || z18 : ");
Serial.println(z18);
a19=(min(panas,min(tdkasap,dekat)));
z19=(1);
Serial.print("a19 : ");
Serial.print(a19);
Serial.print(" || z19 : ");
Serial.println(z19);
a20=(min(panas,min(tdkasap,agkdekat)));
z20=(1);
Serial.print("a20 : ");
Serial.print(a20);
Serial.print(" || z20 : ");
Serial.println(z20);
a21=(min(panas,min(tdkasap,tdkapi)));
z21=(1);
Serial.print("a21 : ");
Serial.print(a21);
Serial.print(" || z21 : ");
Serial.println(z21);
a22=(min(panas,min(sedang,dekat)));
z22=(3);
Serial.print("a22 : ");
Serial.print(a22);
Serial.print(" || z22 : ");
Serial.println(z22);
```



```
a23=(min(panas,min(sedang,agkdekat)));
z23=(2);
Serial.print("a23 : ");
Serial.print(a23);
Serial.print(" || z23 : ");
Serial.println(z23);
a24=(min(panas,min(sedang,tdkapi)));
z24=(1);
Serial.print("a24 : ");
Serial.print(a24);
Serial.print(" || z24 : ");
Serial.println(z24);
a25=(min(panas,min(banyak,dekat)));
z25=(3);
Serial.print("a25 : ");
Serial.print(a25);
Serial.print(" || z25 : ");
Serial.println(z25);
a26=(min(panas,min(banyak,agkdekat)));
z26=(3);
Serial.print("a26 : ");
Serial.print(a26);
Serial.print(" || z26 : ");
Serial.println(z26);
a27=(min(panas,min(banyak,tdkapi)));
z27=(1);
Serial.print("a27 : ");
Serial.print(a27);
Serial.print(" || z27 : ");
Serial.println(z27);
```



```

//Defuzzifikasi
Serial.println("----- DEFUZZYFIKASI -----");
bilanganatas=((a1*z1)+(a2*z2)+(a3*z3)+(a4*z4)+(a5*z5)+(a6*z6
)+(a7*z7)+(a8*z8)+(a9*z9)+(a10*z10)+(a11*z11)+(a12*z12)+(a1
3*z13)+(a14*z14)+(a15*z15)+(a16*z16)+(a17*z17)+(a18*z18)+(
a19*z19)+(a20*z20)+(a21*z21)+(a22*z22)+(a23*z23)+(a24*z24)
+(a25*z25)+(a26*z26)+(a27*z27));

bilanganbawah=(a1+a2+a3+a4+a5+a6+a7+a8+a9+a10+a11+a12
+a13+a14+a15+a16+a17+a18+a19+a20+a21+a22+a23+a24+a25
+a26+a27);
hasil=(bilanganatas/bilanganbawah);

Serial.print("Z = ");
Serial.println(hasil);

```

Kode Program 4.4 Program Metode Fuzzy



