

## APPENDIX

**Link Youtube:**

<https://youtu.be/yOyvYbFSJrk>

### **PROGRAM CODE FOR SENSOR**

```
void loop() {
//Temperature
  DS18B20.requestTemperatures();
  temperature = DS18B20.getTempCByIndex(0);

//pH
  nilai_analog_PH = analogRead(pHPin);
  TeganganPh = 5 / 1024.0 * nilai_analog_PH;
  PH_step = (PH4 - PH7) / 3;
  pH = 7.00 + ((PH7 - TeganganPh) / PH_step); //pH = 7.00 + ((teganganPh7 -
TeganganPh) / PhStep);

//Turbidity
  int val = analogRead(A0);
  teg = val*(5.0/1024);
  turbidity = 100.00-(teg/4.16)*100.00;
```

### **PROGRAM CODE FOR FUZZIFICATION**

```
void FuzzifikasiSuhu()
{
//===== for cold condition
  if (temperature <=25)
  {
    suhu[0] = 1;
  }
  else if (temperature > 25 && temperature <= 30)
  {
    suhu[0] = (30 - temperature) / (30 - 25);
  }
  else
  {
    suhu[0] = 0;
  }
//===== for normal condition
  if (temperature <= 25)
  {
```

```

    suhu[1] = 0;
}
else if (temperature > 25 && temperature <=30)
{
    suhu[1] = (temperature - 25) / (30 - 25);
}
else if (temperature >30 && temperature <=35)
{
    suhu[1] = (35 - temperature) / (35 - 30);
}
else
{
    suhu[1] = 0;
}
//===== for hot condition
if (temperature <= 30)
{
    suhu[2] = 0;
}
else if (temperature > 30 && temperature <= 35)
{
    suhu[2] = (temperature - 30) / (35 - 30);
}
else
{
    suhu[2] = 1;
}
Serial.print("Dingin= ");
Serial.print(suhu[0]);
Serial.print(", Normal= ");
Serial.print(suhu[1]);
Serial.print(", Panas= ");
Serial.print(suhu[2]);
}

void FuzzifikasipH()
{
    //===== for acid condition
    if (pH <=6)
    {
        pHAir [0] = 1;
    }
}

```

```

else if (pH > 6 && pH <= 6,8)
{
    pHAir [0] = (6,8 - pH) / (6,8 - 6);
}
else if( pH >=6,8)
{
    pHAir [0] = 0;
}
//===== for neutral condition
if (pH <= 6)
{
    pHAir [1] = 0;
}
else if (pH > 6 && pH <= 6,8)
{
    pHAir [1] = (pH - 6) / (6,8 - 6);
}
else if (pH >= 6,8 && pH <=7,5)
{
    pHAir [1] = 1;
}
else if (pH >7,5 && pH <=8)
{
    pHAir [1] = (8 - pH) / (8 - 7,5);
}
else
{
    pHAir [1] = 0;
}
//===== for alkaline condition
if (pH <= 7,5)
{
    pHAir [2] = 0;
}
else if (pH >= 7,5 && pH <= 8)
{
    pHAir [2] = (pH - 7,5) / (8 - 7,5);
}
else if(pH >= 8)
{
    pHAir [2] = 1;
}

```

```

Serial.print("pH Asam= ");
Serial.print(pHAir [0]);
Serial.print(", pH Netral= ");
Serial.print(pHAir [1]);
Serial.print(", pH Basa= ");
Serial.print(pHAir [2]);
}

```

```

void FuzzifikasiKekeruhan()
{
//===== for clean condition
if (turbidity <=2)
{
    keruh [0] = 1;
}
else if (turbidity > 1 && turbidity <= 3)
{
    keruh [0] = (3 - turbidity) / (3 - 1);
}
else
{
    keruh [0] = 0;
}
//===== for cloudy condition
if (turbidity <= 2)
{
    keruh [1] = 0;
}
else if (turbidity > 1 && turbidity <= 3)
{
    keruh [1] = (turbidity - 1) / (3 - 1);
}
else
{
    keruh [1] = 1;
}
Serial.print(" Bersih= ");
Serial.print(keruh [0]);
Serial.print(", Keruh= ");
Serial.print(keruh [1]);
}

```

### **PROGRAM CODE FOR RULE BASE**

```
void Rules(){
  int i, j, k;
  int no=1;
  for ( i=0; i<=2; i=i+1)
  {
    for ( j=0; j<=2; j=j+1)
    {
      for ( k=0; k<=1; k=k+1)
      {
        temp = min(min(suhu[i], pHAir[j]),keruh[k]);
        R [i][j][k] = temp;
        Serial.print("R ke-");
        Serial.print(no++);
        Serial.print(" : ");
        Serial.println( R [i][j][k]);
      }
    }
  }
  R01 = R[0][0][0]; //(Dingin, Asam, Jernih = On)
  R02 = R[0][0][1]; //(Dingin, Asam, Keruh = On)
  R03 = R[0][1][0]; //(Dingin, Netral, Jernih = Off)
  R04 = R[0][1][1]; //(Dingin, Netral, Keruh = On)
  R05 = R[0][2][0]; //(Dingin, Basa, Jernih = On)
  R06 = R[0][2][1]; //(Dingin, Basa, Keruh = On)

  R07 = R[1][0][0]; //(Normal, Asam, Jernih = Off)
  R08 = R[1][0][1]; //(Normal, Asam, Keruh = On)
  R09 = R[1][1][0]; //(Normal, Netral, Jernih = Off)
  R10 = R[1][1][1]; //(Normal, Netral, Keruh = On)
  R11 = R[1][2][0]; //(Normal, Basa, Jernih = Off)
  R12 = R[1][2][1]; //(Normal, Basa, Keruh = On)

  R13 = R[2][0][0]; //(Panas, Asam, Jernih = On)
  R14 = R[2][0][1]; //(Panas, Asam, Keruh = On)
  R15 = R[2][1][0]; //(Panas, Netral, Jernih = On)
  R16 = R[2][1][1]; //(Panas, Netral, Keruh = On)
  R17 = R[2][2][0]; //(Panas, Basa, Jernih = On)
  R18 = R[2][2][1]; //(Panas, Basa, Keruh = On)

}
```

### **PROGRAM CODE FOR DEFUZZIFICATION**

```
void Defuzzifikasi()
{
  Off=1;
  On= 2;
  output = (R01*On) + (R02*On) + (R03*Off) + (R04*On) + (R05*On) + (R06*On) +
  (R07*Off) + (R08*On)+ (R09*Off) + (R10*On) + (R11*Off) + (R12*On) + (R13*On)
  + (R14*On) + (R15*On) + (R16*On)+
  (R17*On) + (R18*On);

  outputY = (R01 + R02 + R03 + R04 + R05 + R06 + R07 + R08 + R09 + R10 + R11 +
  R12 + R13 + R14 + R15 + R16 + R17 + R18);

  hasilDef = outputX / outputY;
  Serial.println(outputX);
  Serial.println(outputY);
  Serial.print("HASIL OUTPUT:");
  Serial.println(hasilDef);

  if(round(hasilDef)<=1) {
    digitalWrite(buzz, LOW);
    Serial.print("Result: ");
    Serial.print(hasilDef);
    Serial.println(" --> Buzzer OFF");
  }
  else if(round(hasilDef)>=2){
    digitalWrite(buzz, HIGH);
    Serial.print("Result : ");
    Serial.print(hasilDef);
    Serial.println(" --> Buzzer ON");
  }
  else{
    Serial.println("Tidak Diketahui");
  }
}
```



**1.97%** PLAGIARISM  
APPROXIMATELY

## Report #14315285

INTRODUCTION Background Fish are widely used in human life, both for consumption and as ornamental fish. One of the hobbies of the Indonesian people is keeping ornamental fish. Ornamental fish are generally kept in ponds or aquariums. One thing that is very important to note in maintaining ornamental fish in an aquarium is water quality. Dirty water quality can inhibit the growth and development of fish. Factors that cause aquarium water to quickly turn dirty include no water filter or water filter not working optimally, food residue that dissolves in water and makes water conditions change. In addition, the owner does not routinely monitor and change the aquarium water. From the above problems, a tool is made to monitor the quality of aquarium water for ornamental fish habitats. This system applies the concept of Internet of Things (IoT) and fuzzy algorithms to process data from sensors into definite output. This aquarium water quality monitoring system uses several sensors that will read parameters that are indicators to