

6. SOURCE CODE

6.1 Temperature Sensor

```
const int analogPin = A0; // Analog pin connected to the temperature sensor

void setup() {

  pinMode(A0, INPUT);

  pinMode(12, OUTPUT);

  pinMode(8, OUTPUT);

  Serial.begin(9600);    // Initialize serial communication
}

void loop() {

  int sensorValue = analogRead(analogPin); // Read analog value from the temperature sensor

  float voltage = sensorValue * (5.0 / 1023.0); // Convert analog value to voltage

  float temperature = (voltage - 0.5) * 100; // Convert voltage to temperature in degrees celsius

  if (temperature > 30) {

    digitalWrite(12, HIGH);

    digitalWrite(8, LOW);

  } else if (temperature < 25) {

    digitalWrite(12, LOW);

    digitalWrite(8, HIGH);

  } else {
```

```
digitalWrite(12, LOW);  
digitalWrite(8, LOW);  
}  
Serial.print("Analog Value: ");  
Serial.print(sensorValue);  
Serial.print(", Voltage: ");  
Serial.print(voltage);  
Serial.print("V, Temperature: ");  
Serial.print(temperature);  
Serial.println("°C");  
delay(100); // Delay for stability
```

6.2 pH Sensor

```
int sensorValue = 0;  
int outputValue = 0;  
void setup()  
{  
  pinMode(A0, INPUT);  
  pinMode(9, OUTPUT);  
  pinMode(6, OUTPUT);  
  Serial.begin(9600);  
}
```

```

void loop()
{
    sensorValue = analogRead(A0); // read the analog in value

    outputValue = map(sensorValue, 0, 1023, 0, 255); // map it to the range of the analog out

    // change the analog out value:

    if (outputValue > 85) {
        digitalWrite(9, HIGH);
        digitalWrite(6, LOW);
    } else if (outputValue < 65) {
        digitalWrite(9, LOW);
        digitalWrite(6, HIGH);
    } else {
        digitalWrite(9, LOW);
        digitalWrite(6, LOW);
    }

    // print the results to the serial monitor:
    Serial.print("sensor = ");
    Serial.print(sensorValue);
    Serial.print("\t output = ");
    Serial.println(outputValue);

    // wait 2 milliseconds before the next loop for the
    // analog-to-digital converter to settle after the
    // last reading:
    delay(2); // Wait for 2 millisecond(s)}

```

6.3 Dissolved Oxygen Sensor Circuit

```
int currentO2Level = 0;

int wantedO2Level = 0;

void setup()
{
    Serial.begin(9600);
    pinMode(A5, INPUT);
    pinMode(2, OUTPUT);
}

void loop()
{
    wantedO2Level = 155;
    Serial.println(currentO2Level);
    currentO2Level = analogRead(A5);
    if (currentO2Level < wantedO2Level) {
        digitalWrite(2, HIGH);
    } else {
        digitalWrite(2, LOW);
    }
    delay(10); // Delay a little bit to improve simulation performance
}
```

6.4 Turbidity sensor circuit

```
float adc = 0;

float U = 0;
```

```

float a = 0;

float b = 0;

float c = 0;

float Turbidity = 0;

void setup()

{

    pinMode(A0, INPUT);

    Serial.begin(9600);

}

void loop()

{

    adc = analogRead(A0); // How to declare adc

    U = ((5 * adc) / 1023);

    a = (5742.3 * U);

    b = (1120.4 * (U * U));

    c = 4352.9;

    Turbidity = (a - (b + c));

    Serial.println(Turbidity);

    delay(10); // Delay a little bit to improve simulation performance

    if (Turbidity>2000)

    { digitalWrite(8, HIGH);

    }

    else {

        digitalWrite(8, LOW);

    }

}

```