

SPRINT-4

Team ID	PNT2022TMID41673
Project Name	Real-Time River Water Quality Monitoring and Control System

CODE FOR ARDUINO

```
#include <OneWire.h>
#include <DallasTemperature.h>
#define ONE_WIRE_BUS 5
OneWire oneWire(ONE_WIRE_BUS);
DallasTemperature sensors(&oneWire);
float Celcius=0;
float Fahrenheit=0;
float voltage=0;
const int analogInPin = A0;
int sensorValue = 0;
unsigned long int avgValue;
float b;
int buf[10],temp;
void setup(void)
{
  Serial.begin(9600);
  sensors.begin();
  int sensorValue = analogRead(A1);
  voltage = sensorValue * (5.0 / 1024.0);
```

```

}
void loop(void)
{
  sensors.requestTemperatures();
  Celcius=sensors.getTempCByIndex(0);
  Fahrenheit=sensors.toFahrenheit(Celcius);
  for(int i=0;i<10;i++)
  {
    buf[i]=analogRead(analogInPin);
    delay(10);
  }
  for(int i=0;i<9;i++)
  {
    for(int j=i+1;j<10;j++)
    {
      if(buf[i]>buf[j])
      {
        temp=buf[i];
        buf[i]=buf[j];
        buf[j]=temp;
      }
    }
  }
  for(int i=2;i<8;i++)
  avgValue+=buf[i];
  float pHVol=(float)avgValue*5.0/1024/6;
  float pHValue = -5.70 * pHVol + 21.34;

```

```
Serial.println(phValue);  
Serial.print("pH");  
Serial.print(" C ");  
Serial.print(Celcius);  
Serial.print(voltage);  
Serial.print("V");  
delay(10000);  
}
```

CODE IMPLEMENTATION

```
import serial  
import time  
import csv  
import numpy as np  
import matplotlib.pyplot as plt  
ser = serial.Serial('/COM6',9600)  
ser_bytes = ser.readline(10)  
print (ser_bytes)  
ser.flushInput()  
while True:  
    try:  
        ser_bytes = ser.readline()  
        decoded_bytes = float(ser_bytes[0:len(ser_bytes)-2].decode("utf-8"))  
        print(decoded_bytes)  
        temp = float(decoded_bytes(1:3))
```

```

turb = float(decoded_bytes(4:6))
pH = float(decoded_bytes(6:8))
with open("test_data.csv","a") as f:
    writer = csv.writer(f,delimiter=",")
    writer.writerow([time.time(),decoded_bytes])
except:
    print("Keyboard Interrupt")
    ser.close()
    break()
t = np.arange(0.0, 2.0, 0.01)
s = 1 + np.sin(2*np.pi*t)
plt.plot(t, s)
plt.xlabel('time (s)')
plt.ylabel('Celsius (C)')
plt.title('Temperature')
plt.grid(True)
plt.savefig("Temperature.png")
plt.show()
Serial.begin(9600);
sensors.begin();
int sensorValue = analogRead(A1);
voltage = sensorValue * (5.0 / 1024.0);
}
void loop(void)
{
    sensors.requestTemperatures();
    Celcius=sensors.getTempCByIndex(0);

```

```

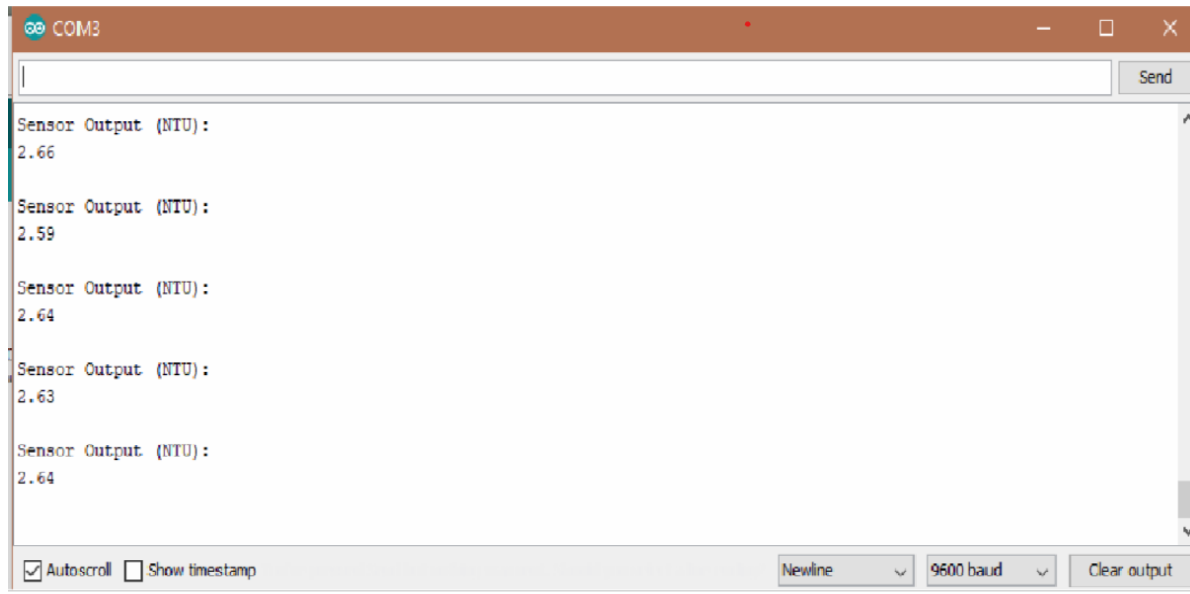
Fahrenheit=sensors.toFahrenheit(Celcius);
for(int i=0;i<10;i++)
{
    buf[i]=analogRead(analogInPin);
    delay(10);
}
for(int i=0;i<9;i++)
{
    for(int j=i+1;j<10;j++)
    {
        if(buf[i]>buf[j])
        {
            temp=buf[i];
            buf[i]=buf[j];
            buf[j]=temp;
        }
    }
}
n = 256
X = np.linspace(-np.pi, np.pi, 256, endpoint=True)
C,S = np.cos(X), np.sin(X)
plt.plot(X, C)
plt.plot(X,S)
plt.show()
print ("Visualization of real time sensor Data.")
print("/n")
while True:
    try:
        ser_bytes = ser.readline()

```

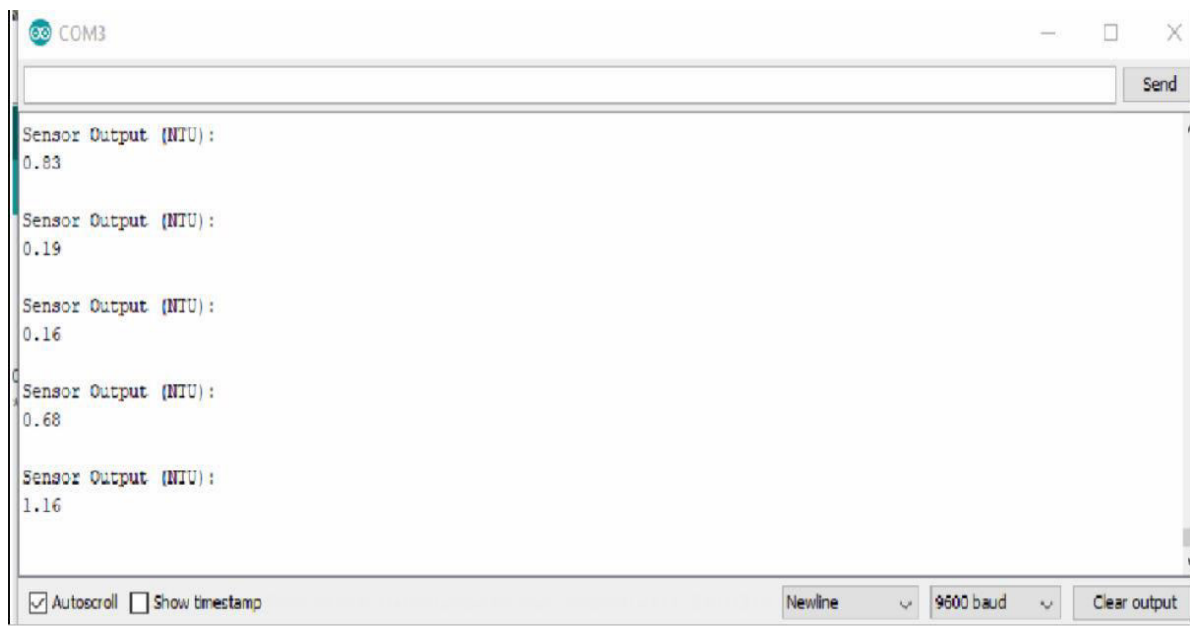
```
decoded_bytes = float(ser_bytes[0:len(ser_bytes)-2].decode("utf-8"))
print(decoded_bytes)
temp = float(decoded_bytes(1:3))
turb = float(decoded_bytes(4:6))
pH = float(decoded_bytes(6:8))
with open("test_data.csv","a") as f:
    writer = csv.writer(f,delimiter=",")
    writer.writerow([time.time(),decoded_bytes])
except:
    print("Keyboard Interrupt")
    ser.close()
    break()
t = np.arange(0.0, 2.0, 0.01)
s = 1 + np.sin(2*np.pi*t)
plt.plot(t, s)
```

OUTPUT:

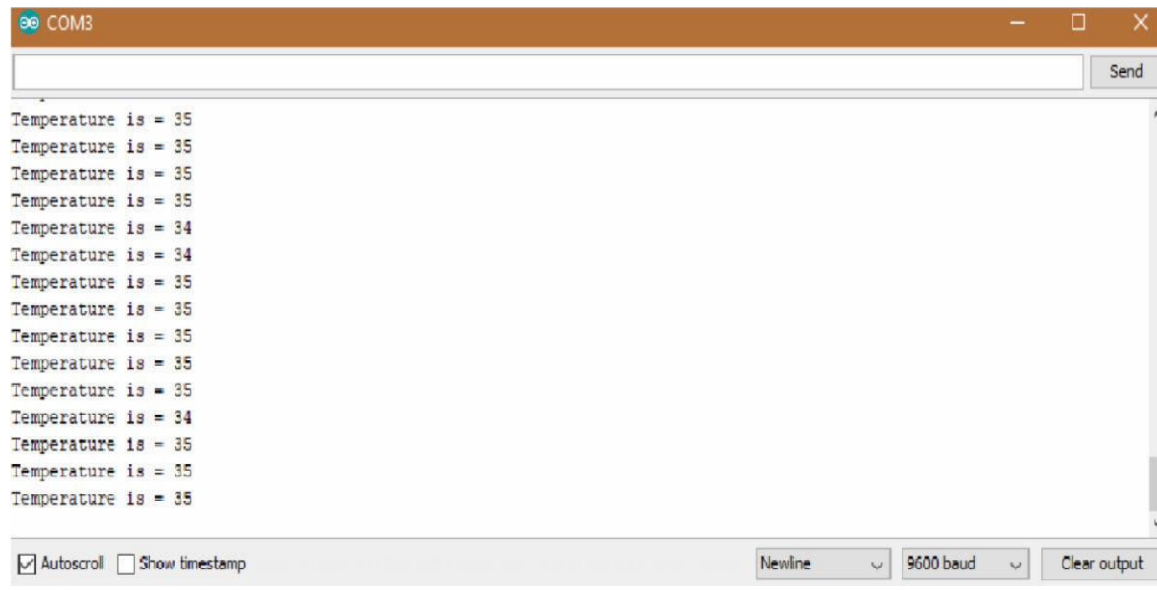
TEST CASE 1:



TEST CASE 2:



FINAL OUTPUT:



The screenshot shows a serial terminal window with a title bar that says 'COM3'. The window contains a list of temperature readings. At the top, there is a text input field and a 'Send' button. The main area of the window displays the following text:

```
Temperature is = 35  
Temperature is = 35  
Temperature is = 35  
Temperature is = 35  
Temperature is = 34  
Temperature is = 34  
Temperature is = 35  
Temperature is = 35  
Temperature is = 35  
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Temperature is = 35  
Temperature is = 34  
Temperature is = 35  
Temperature is = 35  
Temperature is = 35
```

At the bottom of the window, there is a control bar with the following elements:

- ☒ Autoscroll
- ☐ Show timestamp
- Newline (dropdown menu)
- 9600 baud (dropdown menu)
- Clear output (button)