REAL TIME WATER QUALITY MONITORING AND ANALYSIS SYSTEM

TEAM MEMBERS:

1. Subani Sundaram
2. Vaanmathi G
3. Srimathi R
4. Saambhavi K
5. Yuvalakshime S

AIM:

A real-time water quality monitoring system aims to continuously measure water parameters to ensure safety and compliance. It provides instant alerts for contamination, enabling rapid response to water quality issues.

By automating analysis, it reduces manual effort and improves resource management efficiency

COMPONENTS REQUIRED :

1. ESP8266
2. DHT22
3. Turbidity Sensor
4. LED x3
5. OLED

1.ESP8266

A compact Wi-Fi-enabled microcontroller, capable of wireless communication up to 50–100 meters depending on conditions.

Used in IoT projects for real-time data transfer, automation, and remote monitoring.

Range:

Wi-Fi connectivity up to 50 meters indoors and up to 100 meters outdoors depending on physical obstructions and antenna quality.

Application:

Acts as a wireless microcontroller for IoT devices, enabling projects like smart home systems, remote sensing, and data logging where internet access is needed.

2.DHT22

A digital temperature and humidity sensor with a measurement range of -40°C to 80°C for temperature and 0%–99.9% for humidity.

Applied in weather stations, environmental monitoring, and climate control systems.

Range:

Senses temperature from -40°C to 80°C with high accuracy, and measures humidity from 0% to 99.9% relative humidity.

Application:

Used in weather stations, agricultural monitoring, indoor environment sensing, and appliances needing climate control.

3.Turbidity Sensor

Measures water clarity, typically from 0.001 to 4000 NTU, suitable for both clean and murky water.

Used in water quality analysis for labs, treatment plants, and aquaculture.

Range:

Measures water cloudiness from 0.001 to 4000 NTU, covering both clear and murky water samples.

Application:

Monitors water quality in labs, drinking water plants, aquaculture tanks, and wastewater treatment facilities.

4.LED

Standard indicator lights with visible range of a few meters. Used for signaling device status, warnings, and visual feedback in electronics.

Range:

Depends on color and forward voltage; meant for clear visibility and signaling, usually within a few meters.

Application:

Provides visual feedback—such as system status, warnings, or process indicators—in electronic projects and control panels.

5.OLED

Small display modules (0.96"–2.42") readable at short distances. Used to visually present sensor values, menus, and system status in embedded systems.

Range:

Small screens (typically 0.96” to 2.42”) with crisp graphical output; readable at arm’s length.

Application:

Displays real-time sensor data, messages, menus, and status graphics in embedded devices and IoT monitoring solutions.

These components are often combined for smart, automated monitoring systems—such as water quality stations that collect,

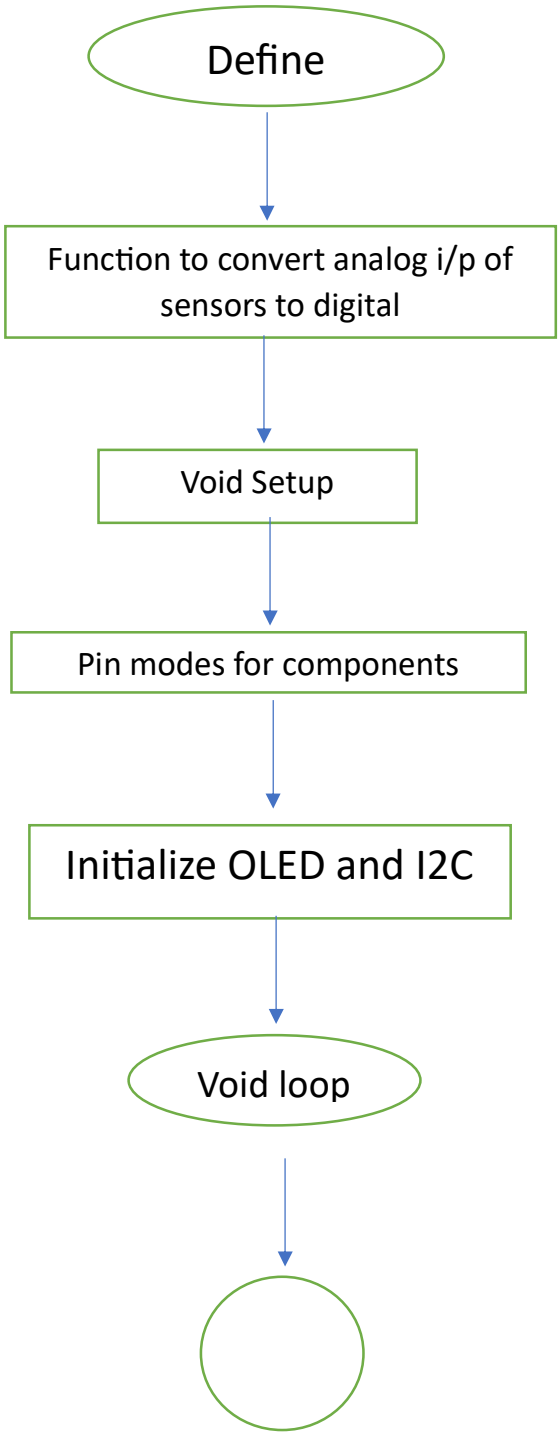
Analyze, and display environmental data while enabling wireless control and alerts.

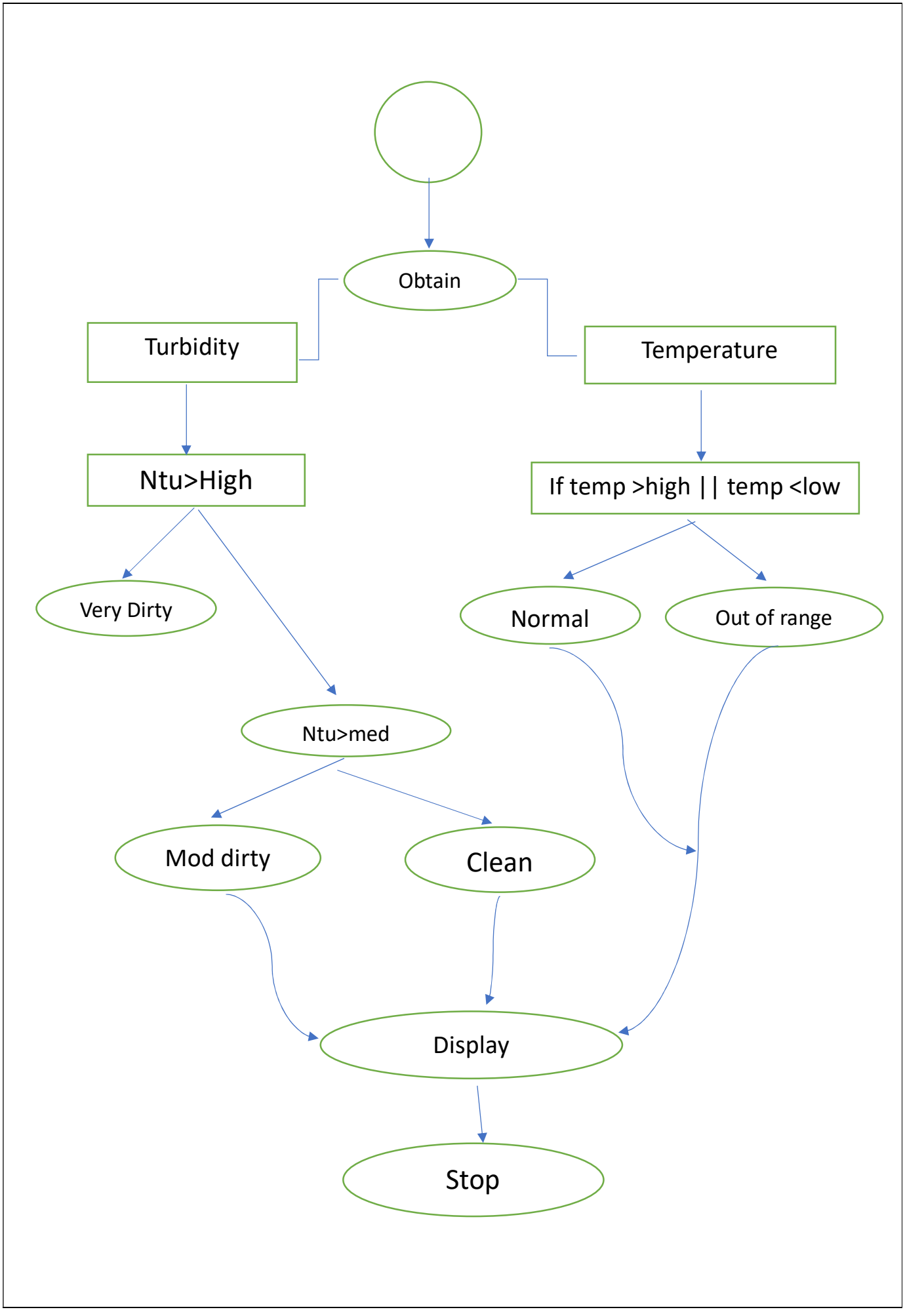
PIN TABLE :

Components	Pin Of Components	Connect To
DHT22	Red	3V
	Yellow	D4
	Black	GND
Turbidity Sensor	VCC	3.3V
	OUT	A0
	GND	GND
LED 1	Anode	D7
	Cathode	GND
LED 2	Anode	D8
	Cathode	GND
LED3	Anode	D0

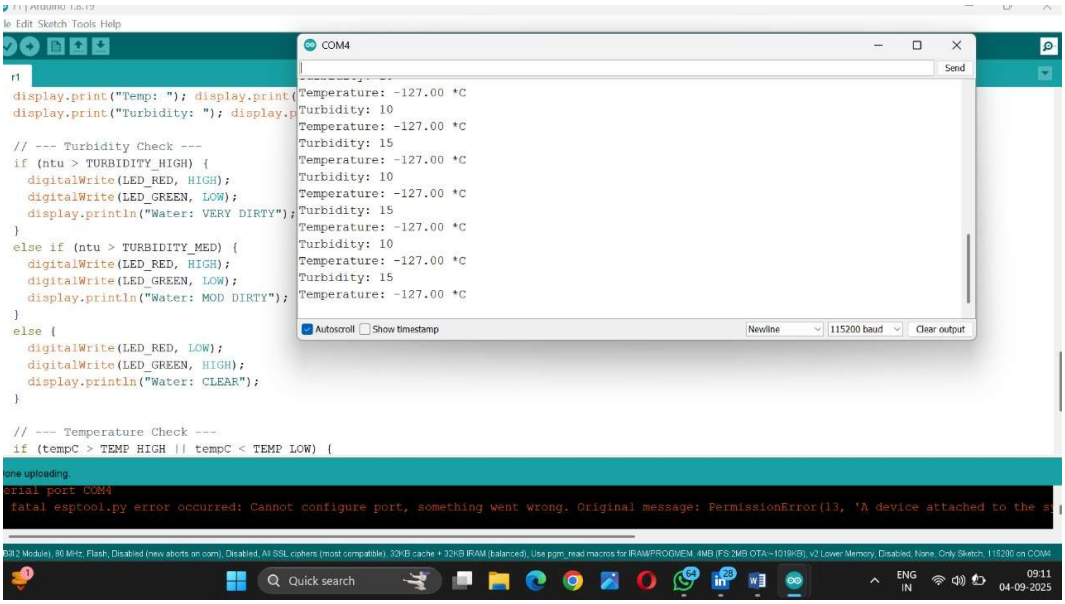
	Cathode	GND
OLED	VCC	3.3V
	SDA	D6
	SCK	D5
	GND	GND

FLOWCHART :


Define
Function to convert analog i/p of sensors to digital
Void Setup
Pin modes for components
Initialize OLED and I2C
Void loop


Obtain
Turbidity
Temperature
Ntu>High
If temp >high || temp <low
Very Dirty
Normal
Out of range
Ntu>med
Mod dirty
Clean
Display
Stop

EXECUTION :


COM4
Send
Temperature: -127.00 *C
Turbidity: 10
Temperature: -127.00 *C
Turbidity: 15
Temperature: -127.00 *C
Turbidity: 10
Temperature: -127.00 *C
Turbidity: 15
Temperature: -127.00 *C
Turbidity: 10
Temperature: -127.00 *C
Turbidity: 15
Temperature: -127.00 *C
Autoscroll
Show timestamp
Newline
115200 baud
Clear output
display.print("Temp: "); display.print(
display.print("Turbidity: "); display.p
// --- Turbidity Check ---
if (ntu > TURBIDITY_HIGH) {
digitalWrite(LED_RED, HIGH);
digitalWrite(LED_GREEN, LOW);
display.println("Water: VERY DIRTY");
}
else if (ntu > TURBIDITY_MED) {
digitalWrite(LED_RED, HIGH);
digitalWrite(LED_GREEN, LOW);
display.println("Water: MOD DIRTY");
}
else {
digitalWrite(LED_RED, LOW);
digitalWrite(LED_GREEN, HIGH);
display.println("Water: CLEAR");
}
// --- Temperature Check ---
if (tempC > TEMP_HIGH || tempC < TEMP_LOW) {
fatal esptool.py error occurred: Cannot configure port, something went wrong. Original message: PermissionError(13, 'A device attached to the
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