HOW TO DEPLOY CODE IN ESP

1. Install Arduino IDE:

- Download the latest version from Arduino's official website.
- Install the IDE.

2. Install ESP Board in Arduino IDE:

- Open Arduino IDE → File → Preferences.

In the Additional Boards Manager URLs field, add:

`http://arduino.esp8266.com/stable/package_esp8266com_index.json`

- Then go to Tools → Boards → Boards Manager → Search for ESP8266 or ESP32, and install it.

3. Select the ESP Board:

- Go to Tools → Board → Select your ESP board (e.g., ESP8266 or ESP32).

4. Select the Correct Port:

- Connect the ESP board to your PC via USB.
- Go to Tools → Port → Select the correct COM port for your ESP.

5. Write the Code:

- Open a new sketch in Arduino IDE.

Example code for connecting ESP to Wi-Fi:

cpp

```
#include <ESP8266WiFi.h>  // For ESP8266
// #include <WiFi.h>      // For ESP32
const char* ssid = "Your_SSID";
const char* password = "Your_PASSWORD";

void setup() {
  Serial.begin(115200);
  WiFi.begin(ssid, password);

  while (WiFi.status() != WL_CONNECTED) {
    delay(1000);
    Serial.println("Connecting to WiFi...");
  }
  Serial.println("Connected to WiFi!");
}

void loop() {
  // Your logic here
```

```
}
```

- Replace `"Your_SSID"` and `"Your_PASSWORD"` with your Wi-Fi credentials.

6. Upload Code:

- **Click the Upload button in Arduino IDE.**
- **Wait for the code to compile and upload to the ESP board.**

7. Check Serial Monitor:

- Open Tools → Serial Monitor.
- Set the baud rate to 115200 (or according to your board).
- You should see "Connected to WiFi!" in the Serial Monitor**.**

8. Troubleshooting:

- Ensure the correct drivers are installed for your ESP board.
- Make sure the correct COM port is selected.
- If using ESP32, make sure to select the proper board from the Board Manager.

7th : Real Time Log Register using python

GCP Setup:

1. Go to Google Cloud Console → New Project.
2. Name the project (e.g., "IoT123").
3. Go to APIs & Services → Library → Enable "Google Sheets API" and "Google Drive API".
4. Go to APIs & S
5. ervices → Credentials → Create Credentials → Service Account.
6. Assign a name and role (Editor).
7. Create a Key → Choose JSON → Download JSON file.

Google Sheet Setup:

7. Go to Google Sheets → Create a new sheet (e.g., "IoT123").
8. Upload the JSON file to your working folder.
9. Share the sheet → Add the service account email (from JSON) → Give Editor access.

Colab Setup:

10. Open Google Colab → New notebook.
11. Upload the JSON file to Colab.
12. Paste and run the code → Values will update on the sheet.

Code(google colab)

```
!pip install gspread oauth2client

import gspread
import random
```

```
from oauth2client.service_account import ServiceAccountCredentials
from datetime import datetime
import time

# Define the scope
scope = [
    "https://spreadsheets.google.com/feeds",
    "https://www.googleapis.com/auth/drive"
]

# Load creds and authorize
creds =
ServiceAccountCredentials.from_json_keyfile_name("Iot123.json", scope)
client = gspread.authorize(creds)

# Open your spreadsheet
spreadsheet = client.open("IoT123")
sheet = spreadsheet.sheet1

# Add headers (only once if not already there)
headers = ["Date", "Time", "Temperature (°C)", "Humidity (%)"]
sheet.append_row(headers)

# Simulate real-time data logging
for i in range(10):
    date = datetime.now().strftime("%Y-%m-%d")
    time_now = datetime.now().strftime("%H:%M:%S")
    temperature = round(random.uniform(20.0, 35.0), 2)
    humidity = round(random.uniform(30.0, 70.0), 2)
    sheet.append_row([date, time_now, temperature, humidity])
    print(f"Logged: {date} {time_now} | Temp: {temperature} |
Humidity: {humidity}")
    time.sleep(1)

print("✅ Data uploaded successfully!")
```


Exp 6 – Node-RED & Mosquitto

Download Process

Install Node.js and Node-RED:

1. Download Node.js from nodejs.org.
2. Open CMD and run: npm install -g --unsafe -perm node-red

   3
3. After installing in the same command prompt enter command : node-red

4. open Chrome and in url section : localhost:1880

Install Mosquitto Broker (Windows) (if not installed in your pc then only do this)

Before that go to c drive > program files > mosquitto (if h tho nhi karna)

Steps:

1. Go to the official website:
   https://mosquitto.org/download/
2. Download the latest **Windows Installer** (.exe file).
3. Run the installer: During installation, make sure to select **Service Installation** if prompted (optional).
4. After installation:

Mosquitto is installed typically in: `C:\Program Files\mosquitto`

5. Add Mosquitto to system PATH (optional but recommended):
   Open **System Properties** → **Environment Variables** → Edit **Path** → Add:

   ```
   C:\Program Files\mosquitto
   ```

6. Verify installation by running in CMD: `mosquitto -v`
7. You should see Mosquitto starting successfully.

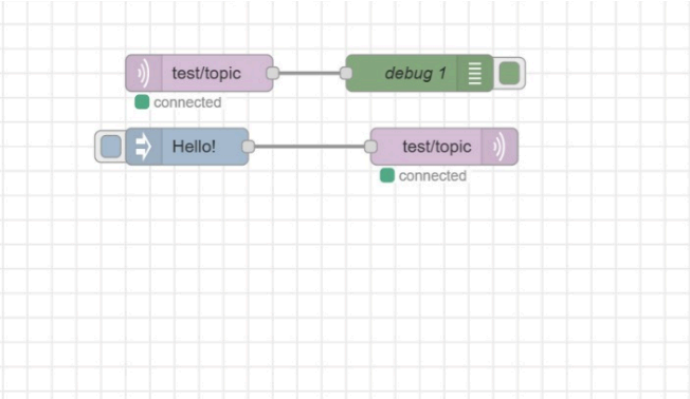
Iske baad open 2 different command prompt from mosquitto only and then

In first : mosquitto_sub -t test/topic

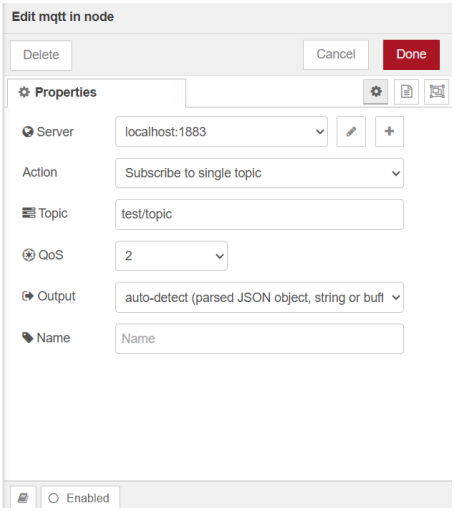
In second : mosquitto_pub -t test/topic -m "Hi

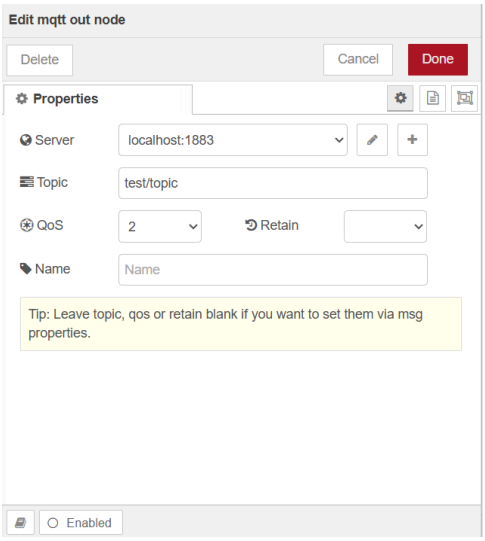
Then in node red :

- **Inject Node** → ("Hello!" button)
- **MQTT OUT Node** → (Publisher node to `test/topic`)
- **MQTT IN Node** → (Subscriber node to `test/topic`)
- **Debug Node** → (To show output)



(DO SET UP LIKE THIS : BLUE IS INJECT , PURPLE IS IN OUT AND GREEN IS DEBUG)





2. Configure MQTT Nodes:

MQTT OUT Node (Publisher):

- Double-click it.
- Server: **localhost**
- Port: **1883**
- Topic: **test/topic**
- QoS: Default (0)
- Click **Done**.

MQTT IN Node (Subscriber):

- Double-click it.
- Server: **localhost**

- Port: **1883**
- Topic: **test/topic**
- QoS: Default (0)
- Click **Done**.

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3. Wire the nodes like this:

- Connect **Inject Node** → **MQTT OUT Node**.
- Connect **MQTT IN Node** → **Debug Node**.

---

4. Deploy:

- Click the **Deploy** button (top right).
- Click the blue button on the **Inject Node** ("Hello!") to send message.
- Messages will appear in the **Debug Window**!

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5. MQTT FOR MAHAKUMBH MANAGEMENT SYSTEM

Broker

Command 1: mosquitto

Command 2:mosquitto -v

Publisher

Command 1 :mosquitto_pub -h localhost -t "Kumbhmela/lostfound" -m "Missing 10 years old girl"

Dont press enter first write and run subscribers (command 1)

Command 2: mosquitto_pub -h localhost -t "Kumbhmela/parking" -m "10 cars are parked"

Dont press enter first write and run subscribers (command 2)

Subscriber

Command 1: mosquitto_sub -h localhost -t "Kumbhmela/lostfound"

(After this run command 1 of publisher)

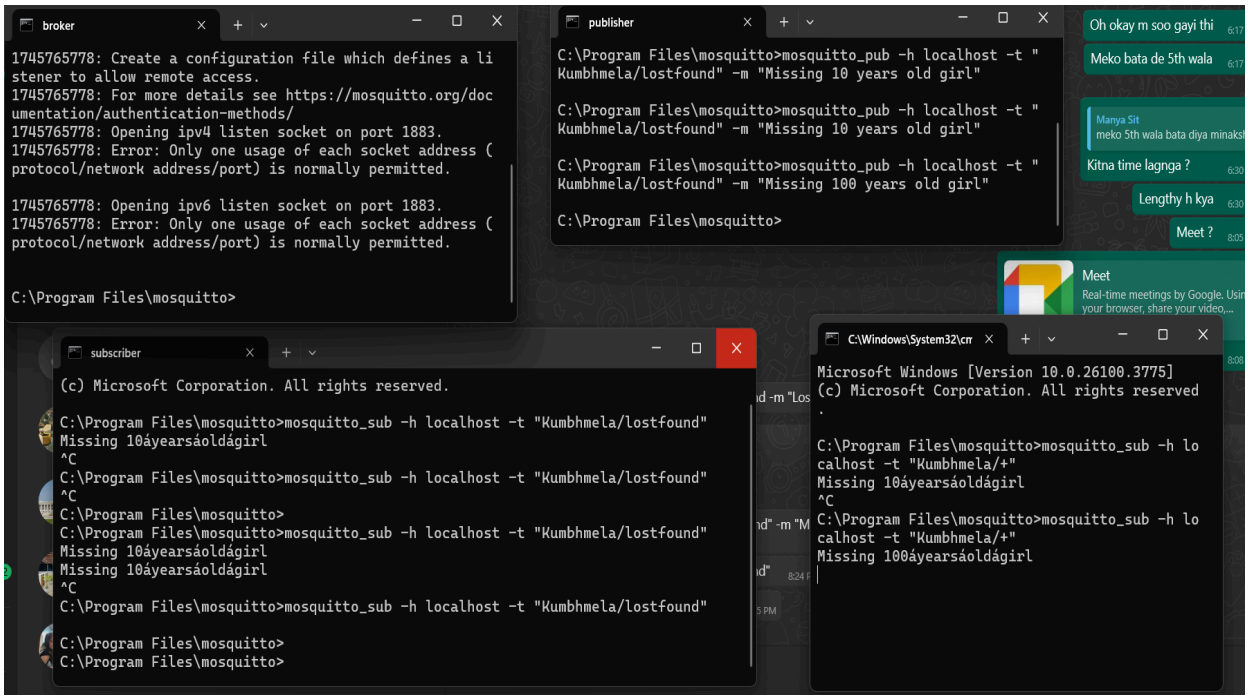
Command 2: mosquitto_sub -h localhost -t "Kumbhmela/parking"

10 cars are parked

(After this run command 2 of publisher)

4th Unkknown

Command 1 : mosquitto_sub -h localhost -t "Kumbhmela/+"


broker
1745765778: Create a configuration file which defines a li
stener to allow remote access.
1745765778: For more details see https://mosquitto.org/doc
umentation/authentication-methods/
1745765778: Opening ipv4 listen socket on port 1883.
1745765778: Error: Only one usage of each socket address (
protocol/network address/port) is normally permitted.
1745765778: Opening ipv6 listen socket on port 1883.
1745765778: Error: Only one usage of each socket address (
protocol/network address/port) is normally permitted.
C:\Program Files\mosquitto>
publisher
C:\Program Files\mosquitto>mosquitto_pub -h localhost -t "
Kumbhmela/lostfound" -m "Missing 10 years old girl"
C:\Program Files\mosquitto>mosquitto_pub -h localhost -t "
Kumbhmela/lostfound" -m "Missing 10 years old girl"
C:\Program Files\mosquitto>mosquitto_pub -h localhost -t "
Kumbhmela/lostfound" -m "Missing 100 years old girl"
C:\Program Files\mosquitto>
Oh okay m soo gayi thi
Meko bata de 5th wala
Manya Sit
meko 5th wala bata diya minaksh
Kitna time lagnga ?
Lengthy h kya
Meet ?
Meet
Real-time meetings by Google. Usin
your browser, share your video,...
subscriber
(c) Microsoft Corporation. All rights reserved.
C:\Program Files\mosquitto>mosquitto_sub -h localhost -t "Kumbhmela/lostfound"
Missing 10áyearsáoldágirl
^C
C:\Program Files\mosquitto>mosquitto_sub -h localhost -t "Kumbhmela/lostfound"
^C
C:\Program Files\mosquitto>
C:\Program Files\mosquitto>mosquitto_sub -h localhost -t "Kumbhmela/lostfound"
Missing 10áyearsáoldágirl
Missing 10áyearsáoldágirl
^C
C:\Program Files\mosquitto>mosquitto_sub -h localhost -t "Kumbhmela/lostfound"
C:\Program Files\mosquitto>
C:\Program Files\mosquitto>
C:\Windows\System32\cm
Microsoft Windows [Version 10.0.26100.3775]
(c) Microsoft Corporation. All rights reserved
.
C:\Program Files\mosquitto>mosquitto_sub -h lo
calhost -t "Kumbhmela/+"
Missing 10áyearsáoldágirl
^C
C:\Program Files\mosquitto>mosquitto_sub -h lo
calhost -t "Kumbhmela/+"
Missing 100áyearsáoldágirl