Arduino Breath Analyzer (MQ Sensor + OLED)

Project Overview

This project is a **Breath Alcohol Analyzer** made using an Arduino, an MQ-series alcohol sensor, and an OLED display.
The device reads alcohol concentration from breath and shows both the numeric value and a simple message (like sober or drunk) on the screen.

It also includes a **sensor warm-up stage** with a progress bar before taking readings.

Features

- Reads alcohol level using analog input
- Displays output on OLED screen
- Shows warm-up progress bar
- Classifies alcohol level with messages
- Uses average of multiple readings for better accuracy

Hardware Required

- Arduino Uno / Nano
- MQ Alcohol Sensor
- OLED Display (SSD1306, I2C)
- Breadboard
- Jumper Wires

Libraries Used

- SPI
- Wire
- Adafruit GFX
- Adafruit SSD1306

Install these libraries from the Arduino Library Manager before uploading the code.

Working Principle

1. When the device starts, the alcohol sensor needs time to warm up.
2. During warm-up, a loading bar is displayed on the OLED.
3. After warm-up:
   - Sensor reads alcohol level.
   - Multiple readings are averaged.
   - The value is displayed on the screen.
4. Based on value ranges, a message is shown:
   - You are sober
   - You had a beer
   - Two or more beers
   - You are drunk

Pin Configuration

- Alcohol Sensor Output → A0 (Analog Pin)
- OLED connected through I2C (Address: 0x3C)

Main Functions

- `readAlcohol()` — Reads and averages sensor values
- `printTitle()` — Displays project title
- `printWarming()` — Shows warm-up message
- `printAlcohol()` — Displays alcohol reading
- `printAlcoholLevel()` — Shows level interpretation

Applications

- Educational electronics project
- Gas sensor learning
- Embedded systems practice

Future Improvements

- Calibrate sensor for accurate BAC measurement
- Add buzzer alert
- Save readings
- Add Bluetooth connectivity for mobile monitoring