Arduino Fan Controller with I2C LCD and LEDs

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Project Overview

This project implements a **smart fan controller** using an **Arduino Uno**. It allows the user to turn a fan ON or OFF using a push button, adjust the fan speed using a potentiometer, and provides visual feedback via an **I2C LCD** and LEDs. The green LED indicates when the fan is running, and the red LED indicates when it is OFF. Additionally, the system prints the fan status and speed to the Serial Monitor.

Features

- Toggle fan ON/OFF with a push button
- Adjustable fan speed using a potentiometer
- Real-time display of fan status and speed on I2C LCD (16x2)
- Green LED: fan ON indicator
- Red LED: fan OFF indicator
- Serial Monitor output for debugging and monitoring

Components

- Arduino Uno
- DC Fan (PWM-capable)
- Push button
- Potentiometer
- I2C LCD (16x2)
- Green and Red LEDs
- Resistors for LEDs and button (as needed)
- Jumper wires and breadboard

Wiring Overview

Arduino Connections

Component	Arduino Pin	Notes
Fan	D9	PWM control
Push Button	D2	INPUT_PULLUP
Potentiometer	A0	Analog input for speed
Green LED	D8	Fan ON indicator
Red LED	D7	Fan OFF indicator
I2C LCD	SDA (A4), SCL (A5)	16x2 LCD with I2C backpack

Operation

1. Press the push button to toggle the fan ON or OFF.
2. When the fan is ON, rotate the potentiometer to adjust the speed (0% to 100%).
3. The LCD displays the fan status and current speed.
4. Green LED lights up when the fan is ON, red LED lights up when the fan is OFF.
5. Fan status and speed are also printed to the Serial Monitor.

Notes

- Ensure proper debouncing for the push button to avoid false triggers.
- The LCD updates only when the speed changes to prevent flickering.
- PWM controls the fan speed; make sure the fan supports PWM input.
- Adjust resistor values for LEDs according to their specifications.

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