#include <LiquidCrystal.h>

// Pin definitions

const int d0 = 2;

const int d1 = 3;

const int d2 = 4;

const int d3 = 5;

const int h = 6;

const int l = 7;

const int m1 = 8;

const int m2 = 9;

const int enable = 10;

// Variables

int count = 0;

int speed = 0;

// LCD object

LiquidCrystal lcd(A0, A1, A2, A3, A4, A5);

void setup() {

  // Initialize pin modes

  pinMode(d0, INPUT\_PULLUP);

  pinMode(d1, INPUT\_PULLUP);

  pinMode(d2, INPUT\_PULLUP);

  pinMode(d3, INPUT\_PULLUP);

  pinMode(h, INPUT\_PULLUP);

  pinMode(l, INPUT\_PULLUP);

  pinMode(m1, OUTPUT);

  pinMode(m2, OUTPUT);

  pinMode(enable, OUTPUT);

  // Initialize LCD

  lcd.begin(16, 2);

  lcd.clear(); // Clear the LCD screen

}

void loop() {

  // Read input states

  int a = digitalRead(d0);

  int b = digitalRead(d1);

  int c = digitalRead(d2);

  int d = digitalRead(d3);

  int e = digitalRead(h);

  int f = digitalRead(l);

  // Adjust count based on input states

  if (e == LOW) {

    count++;

    delay(50); // Debounce delay

  }

  if (f == LOW) {

    count--;

    delay(50); // Debounce delay

  }

  // Ensure count stays within bounds

  count = constrain(count, 0, 4);

  // Determine speed based on count

  if (count == 0) {

    speed = 0;

  } else if (count == 1) {

    speed = 75;

  } else if (count == 2) {

    speed = 150;

  } else if (count == 3) {

    speed = 200;

  } else if (count == 4) {

    speed = 250;

  }

  // Set motor direction

  digitalWrite(m1, HIGH);

  digitalWrite(m2, LOW);

  // Set motor speed

  analogWrite(enable, speed);

  // Display speed on LCD

  lcd.clear(); // Clear previous display

  lcd.setCursor(0, 0);

  lcd.print("Vehicle Speed:");

  lcd.setCursor(0, 1);

  lcd.print("Speed: ");

  lcd.print(speed);

  lcd.print(" rpm");

  // Check speed limits

  checkSpeedLimits(a, b, c);

  // Turn off vehicle if requested

  if (d == LOW) {

    speed = 0;

    analogWrite(enable, speed);

    lcd.clear();

    lcd.print("Vehicle Off");

  }

  delay(100); // Delay for stability

}

// Function to check speed limits and adjust speed if necessary

void checkSpeedLimits(int a, int b, int c) {

  if (a == LOW && speed > 150) {

    speed = 140;

    analogWrite(enable, speed);

    lcd.clear();

    lcd.print("Speed: 140 rpm");

  }

  if (b == LOW && speed > 125) {

    speed = 120;

    analogWrite(enable, speed);

    lcd.clear();

    lcd.print("Speed: 120 rpm");

  }

  if (c == LOW && speed > 90) {

    speed = 85;

    analogWrite(enable, speed);

    lcd.clear();

    lcd.print("Speed: 85 rpm");

  }

}