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#include <avr/io.h>
#include <util/delay.h>
#include "lcd/lcd.h"

#define SERVO_PIN PD4

void init_servo() {
    DDRD |= (1 << SERVO_PIN);

    TCCR1A |= (1 << COM1B1) | (1 << WGM11);
    TCCR1B |= (1 << WGM13) | (1 << WGM12) | (1 << CS11);

    ICR1 = 19999;
}

void ultrasonic_init()
{
    // trig pin as output
    DDRA |= (1 << PA1);
    DDRA |= (1 << PA0);

    // echo pin as input
    DDRD &= ~(1 << PD7);
    DDRD &= ~(1 << PD6);

    TCCR1B |= (1 << CS11);
}

// Measure distance
float ultrasonic_measure(int sensor)
{
    uint16_t duration;
    float distance;

    if (sensor == 1) {
        PORTA |= (1 << PA1);
        _delay_us(10);
        PORTA &= ~(1 << PA1);

        while (!(PIND & (1 << PD7)));

        TCNT1 = 0;

        while (PIND & (1 << PD7));
    } else {
        PORTA |= (1 << PA0);
        _delay_us(10);
        PORTA &= ~(1 << PA0);

        while (!(PIND & (1 << PD6)));

        TCNT1 = 0;

        while (PIND & (1 << PD6));
    }
}

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    }

    duration = TCNT1 * 8.4;

    distance = duration * 0.034 / 2;

    return distance;
}

int main(void)
{
    lcd_init(LCD_DISP_ON);
    lcd_clrscr();
    lcd_puts("SMART TRASHCAN(TM)");
    float distance;

    ultrasonic_init();
    init_servo();

    // PA2 as output for LED
    DDRA |= (1 << PA2);

    while (1)
    {
        // Check if someone is in front of box
        distance = ultrasonic_measure(1);

        if (distance < 20)
        {
            OCR1B = 150;
        }
        else
        {
            OCR1B = 0;
        }

        // Check how full the box is
        distance = ultrasonic_measure(0);

        if (distance < 8) {
            lcd_gotoxy(0,3);
            lcd_puts("Can is full!    ");
            PORTA |= (1 << PA2);
            while (distance < 8) {
                distance = ultrasonic_measure(0);
            }
            PORTA &= ~(1 << PA2);
        } else if (distance < 18)
        {
            lcd_gotoxy(0,3);
            lcd_puts("Can is half-full!");
        } else {
            lcd_gotoxy(0,3);
            lcd_puts("Can is empty!    ");
        }
    }
}

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        }  
        _delay_ms(500);  
    }  
}
```