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/*
 * UTS_NO_2.c
 * Created: 26/10/2022 04.07.59
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 */

#define F_CPU 16000000L
#include <avr/io.h>
#include <util/delay.h>

int main(void)
{
    // Variabel konversi biner desimal
    int nilaiBawah;
    int nilaiAtas;
    int nilaiSensor;

    DDRD = 0xff;    // PORTD ouput
    PORTD=0x00;    // Pull LOW

    ADCSRA |= (1 << 7);           // ADC enable ADEN bit 7
    ADCSRA |= (1 << 2)|(1 << 1)|(1 << 0); // ADPS prescaler 128, 16000000/128 = 125000
    ADMUX = (1<<REFS0);           // Tegangan referensi AREF=AVCC + kapasitor eksternal

    // Pilih channel input analog ADC1 (PA1), Single ended
    ADMUX |= (1 << 0);
    // Mode free running, bit 7,6,5 = 0
    SFIOR &= ~(1 << 7) &~ (1 << 6) &~ (1 << 5);

    while(1)
    {
        ADCSRA |= (1 << 6); // ADSC, ADC start conversion, free running 25 clock

        if (ADCSRA & (1 << 6)) // Tunggu hingga ADC selesai
        {
            nilaiBawah = (int)ADCL;    // Nilai bawah output ADC 8 bit Biner
            nilaiAtas = (int)ADCH*256; // Nilai atas output ADC 2 bit Biner

            /* 2 bit atas nilai maksimum = 11(2) = 3(10)
             * Misal nilaiAtas = (3 x 256 = 768)
             * nilaiSensor = 768 + 256 = 1024
             * ADC = (Vin (input analog) x 1024) / Vref
             */

            nilaiSensor = nilaiAtas+nilaiBawah;

            if (nilaiSensor>768)        // Nilai ADC lebih dari 768 Trigger Triac
            { PORTD = 0x01; } // PD0 HIGH
            else if (nilaiSensor>511)
            {
                PORTD = 0x02;
            }else if (nilaiSensor>255)
            {
                PORTD = 0x04;
            }else if (nilaiSensor>1)
            {
                PORTD = 0x08;
            }
        }
    }
}
```