

LAMPIRAN PROGRAM PADA PENGONTROL MIKRO ATMEGA16

List Program pada AVR ATMEGA16:

/******

This program was produced by the

CodeWizardAVR V2.04.6 Evaluation

Automatic Program Generator

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Project :

Version :

Date : 13/02/2013

Author : Freeware, for evaluation and non-commercial use only

Company :

Comments:

Chip type : ATmega16L

Program type : Application

AVR Core Clock frequency: 11,059000 MHz

Memory model : Small

External RAM size : 0

Data Stack size : 256

*****/

/*

PORTA.0->sensor ping

PORTB->LCD

PORTC->ke alamat IC suara

PORTD.0-> untuk play atau stop suara

PORTD.5->mengatur kecepatan motor

PORTD.1-> mengatur arah putaran motor

PORTD.2-> mengatur arah putaran motor

```
#include <mega16.h>
```

```
#include <delay.h>
```

```
#include <stdlib.h>
```

```
#include <stdio.h>
```

```
#define sigout PORTA.0
```

```
#define sign PINA.0
```

```
#define dirsig DDRA.0
```

```
void ambil_data();
```

```
unsigned int data_timer,dataping,dataping_awal,dataping_simpan;
```

```
unsigned char jarak[4],text[32];
```

```
// Alphanumeric LCD Module functions
```

```
#asm
```

```
.equ __lcd_port=0x18 ;PORTB
```

```
#endasm
```

```
#include <lcd.h>
```

```
// Timer1 overflow interrupt service routine
```

```
interrupt [TIM1_OVF] void timer1_ovf_isr(void)
```



```
DDRB=0x00;
```

```
// Port C initialization
```

```
// Func7=Out Func6=Out Func5=Out Func4=Out Func3=Out Func2=Out Func1=Out  
Func0=Out
```

```
// State7=0 State6=0 State5=0 State4=0 State3=0 State2=0 State1=0 State0=0
```

```
PORTC=0x00;
```

```
DDRC=0xFF;
```

```
// Port D initialization
```

```
// Func7=Out Func6=Out Func5=Out Func4=Out Func3=Out Func2=Out Func1=Out  
Func0=Out
```

```
// State7=0 State6=0 State5=0 State4=0 State3=0 State2=0 State1=0 State0=0
```

```
PORTD=0x00;
```

```
DDRD=0xFF;
```

```
// Timer/Counter 0 initialization
```

```
// Clock source: System Clock
```

```
// Clock value: 11059,000 kHz
```

```
// Mode: Fast PWM top=FFh
```

```
// OC0 output: Non-Inverted PWM
```

```
TCCR0=0x69;
```

```
TCNT0=0x00;
```

```
OCR0=0x00;
```

```
// Timer/Counter 1 initialization
```

```
// Clock source: System Clock
```

```
// Clock value: 172.800 kHz
```

```
// Mode: Normal top=FFFFh
// OC1A output: Discon.
// OC1B output: Discon.
// Noise Canceler: Off
// Input Capture on Rising Edge
// Timer1 Overflow Interrupt: On
// Input Capture Interrupt: Off
// Compare A Match Interrupt: Off
// Compare B Match Interrupt: Off
TCCR1A=0x00;
TCCR1B=0x43;
TCNT1H=0x00;
TCNT1L=0x00;
ICR1H=0x00;
ICR1L=0x00;
OCR1AH=0x00;
OCR1AL=0x00;
OCR1BH=0x00;
OCR1BL=0x00;

// Timer/Counter 2 initialization
// Clock source: System Clock
// Clock value: Timer2 Stopped
// Mode: Normal top=FFh
// OC2 output: Disconnected
ASSR=0x00;
TCCR2=0x00;
```

```
TCNT2=0x00;
OCR2=0x00;

// External Interrupt(s) initialization
// INT0: Off
// INT1: Off
// INT2: Off

MCUCR=0x00;
MCUCSR=0x00;

// Timer(s)/Counter(s) Interrupt(s) initialization
TIMSK=0x04;

// Analog Comparator initialization
// Analog Comparator: Off
// Analog Comparator Input Capture by Timer/Counter 1: Off
ACSR=0x80;
SFIOR=0x00;

// LCD module initialization
lcd_init(16);

//PORTD.0=0; // play
//PORTD.4=0;// motor stop
//PORTD.4=1; //motor on
```

```
// Global enable interrupts
#asm("sei")
lcd_gotoxy(0,0);
lcd_putsf("ALAT BANTU");
lcd_gotoxy(0,1);
lcd_putsf("PARKIR");
delay_ms(2000);
lcd_clear();

while (1)
{
    // Place your code here

    ambil_data();
    lcd_clear();
    lcd_gotoxy(0,0);
    sprintf(text,"jarak=%d",dataping) ;
    lcd_puts(text);
    //
    //  if(dataping < 100 )
    //  {
    //  PORTD.1=0;
    //  PORTD.2=1;// Putar motor dc
```



```

//    }
//
//    if(PINA.1==0)
//    {
//        PORTD.1=0;
//        PORTD.2=0;// motor stop
//    }
//
//cek sensor jarak
if(dataping ==300 ) //jarak 300cm
{
    PORTC=0x00; //set alamat suara "jarak"
    PORTD.0=0;    //play
    delay_ms(1000); //delay 1s
    PORTD.0=1;    //stop

    PORTC=0x28; //set alamat suara "tiga"
    PORTD.0=0;    //play
    delay_ms(1000); //delay 1s
    PORTD.0=1;    //stop

    PORTC=0x10; //set alamat suara "nol"
    PORTD.0=0;    //play
    delay_ms(1000); //delay 1s
    PORTD.0=1;    //stop

    PORTC=0x10; //set alamat suara "nol"

```

```

PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x08; //set alamat suara "cm"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop
}

else if(dataping ==290 ) //jarak 290cm
{
PORTC=0x00; //set alamat suara "jarak"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x20; //set alamat suara "dua"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x58; //set alamat suara "sembilan"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

```

```
PORTC=0x10; //set alamat suara "nol"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```
PORTC=0x08; //set alamat suara "cm"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```
}
```

```
else if(dataping ==280 ) //jarak 280cm
```

```
{
```

```
PORTC=0x00; //set alamat suara "jarak"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```
PORTC=0x20; //set alamat suara "dua"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```
PORTC=0x50; //set alamat suara "delapan"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```
PORTC=0x10; //set alamat suara "nol"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x08; //set alamat suara "cm"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop
}
else if(dataping ==270 ) //jarak 270cm
{
PORTC=0x00; //set alamat suara "jarak"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x20; //set alamat suara "dua"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //sto p

PORTC=0x48; //set alamat suara "tujuh"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop
```

```

PORTC=0x10; //set alamat suara "nol"

PORTD.0=0; //play

delay_ms(1000); //delay 1s

PORTD.0=1; //stop

PORTC=0x08; //set alamat suara "cm"

PORTD.0=0; //play

delay_ms(1000); //delay 1s

PORTD.0=1; //stop
}

else if(dataping ==260 ) //jarak 260cm
{

PORTC=0x00; //set alamat suara "jarak"

PORTD.0=0; //play

delay_ms(1000); //delay 1s

PORTD.0=1; //stop

PORTC=0x20; //set alamat suara "dua"

PORTD.0=0; //play

delay_ms(1000); //delay 1s

PORTD.0=1; //sto p

PORTC=0x40; //set alamat suara "enam"

PORTD.0=0; //play

delay_ms(1000); //delay 1s

PORTD.0=1; //stop

```

```
PORTC=0x10; //set alamat suara "nol"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x08; //set alamat suara "cm"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop
}
else if(dataping ==250 ) //jarak 250cm
{
PORTC=0x00; //set alamat suara "jarak"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x20; //set alamat suara "dua"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //sto p

PORTC=0x38; //set alamat suara "lima"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop
```

```
PORTC=0x10; //set alamat suara "nol"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```
PORTC=0x08; //set alamat suara "cm"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```
}
```

```
else if(dataping ==240 ) //jarak 240cm
```

```
{
```

```
PORTC=0x00; //set alamat suara "jarak"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```
PORTC=0x20; //set alamat suara "dua"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```
PORTC=0x30; //set alamat suara "empat"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```
PORTC=0x10; //set alamat suara "nol"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x08; //set alamat suara "cm"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop
}
else if(dataping ==230 ) //jarak 230cm
{
PORTC=0x00; //set alamat suara "jarak"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x20; //set alamat suara "dua"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //sto p

PORTC=0x28; //set alamat suara "tiga"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop
```



```

PORTC=0x10; //set alamat suara "nol"

PORTD.0=0; //play

delay_ms(1000); //delay 1s

PORTD.0=1; //stop

PORTC=0x08; //set alamat suara "cm"

PORTD.0=0; //play

delay_ms(1000); //delay 1s

PORTD.0=1; //stop
}

else if(dataping ==220 ) //jarak 220cm
{

PORTC=0x00; //set alamat suara "jarak"

PORTD.0=0; //play

delay_ms(1000); //delay 1s

PORTD.0=1; //stop

PORTC=0x20; //set alamat suara "dua"

PORTD.0=0; //play

delay_ms(1000); //delay 1s

PORTD.0=1; //sto p

PORTC=0x20; //set alamat suara "dua"

PORTD.0=0; //play

delay_ms(1000); //delay 1s

PORTD.0=1; //stop

```

```
PORTC=0x10; //set alamat suara "nol"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x08; //set alamat suara "cm"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop
}
else if(dataping ==210 ) //jarak 210cm
{
PORTC=0x00; //set alamat suara "jarak"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x20; //set alamat suara "dua"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //sto p

PORTC=0x18; //set alamat suara "satu"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop
```

```
PORTC=0x10; //set alamat suara "nol"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x08; //set alamat suara "cm"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop
}
else if( dataping ==200 ) //jarak 200cm
{
PORTC=0x00; //set alamat suara "jarak"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop
\
PORTC=0x20; //set alamat suara "dua"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x10; //set alamat suara "nol"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop
```

```
PORTC=0x10; //set alamat suara "nol"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```
PORTC=0x08; //set alamat suara "cm"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```
}
```

```
else if( dataping ==190 ) //jarak 190cm
```

```
{
```

```
PORTC=0x00; //set alamat suara "jarak"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```
PORTC=0x18; //set alamat suara "satu"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```
PORTC=0x58; //set alamat suara "sembilan"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```
PORTC=0x10; //set alamat suara "nol"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```
PORTC=0x08; //set alamat suara "cm"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```
}
```

```
else if( dataping ==180 ) //jarak 180cm
```

```
{
```

```
PORTC=0x00; //set alamat suara "jarak"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```
PORTC=0x18; //set alamat suara "satu"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```
PORTC=0x50; //set alamat suara "delapan"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```
PORTC=0x10; //set alamat suara "nol"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x08; //set alamat suara "cm"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop
}
else if( dataping ==170 ) //jarak 170cm
{
PORTC=0x00; //set alamat suara "jarak"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x18; //set alamat suara "satu"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x48; //set alamat suara "tujuh"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop
```

```
PORTC=0x10; //set alamat suara "nol"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x08; //set alamat suara "cm"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop
}
else if( dataping ==160 ) //jarak 160cm
{
PORTC=0x00; //set alamat suara "jarak"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x18; //set alamat suara "satu"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x40; //set alamat suara "enam"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop
```

```
PORTC=0x10; //set alamat suara "nol"  
PORTD.0=0; //play  
delay_ms(1000); //delay 1s  
PORTD.0=1; //stop  
  
PORTC=0x08; //set alamat suara "cm"  
PORTD.0=0; //play  
delay_ms(1000); //delay 1s  
PORTD.0=1; //stop  
}  
else if( dataping ==150 ) //jarak 150cm  
{  
PORTC=0x00; //set alamat suara "jarak"  
PORTD.0=0; //play  
delay_ms(1000); //delay 1s  
PORTD.0=1; //stop  
  
PORTC=0x18; //set alamat suara "satu"  
PORTD.0=0; //play  
delay_ms(1000); //delay 1s  
PORTD.0=1; //stop  
  
PORTC=0x38; //set alamat suara "lima"  
PORTD.0=0; //play  
delay_ms(1000); //delay 1s  
PORTD.0=1; //stop
```



```
PORTC=0x10; //set alamat suara "nol"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```
PORTC=0x08; //set alamat suara "cm"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```
}
```

```
else if( dataping ==140 ) //jarak 140cm
```

```
{
```

```
PORTC=0x00; //set alamat suara "jarak"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```
PORTC=0x18; //set alamat suara "satu"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```
PORTC=0x30; //set alamat suara "empat"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```
PORTC=0x10; //set alamat suara "nol"  
PORTD.0=0; //play  
delay_ms(1000); //delay 1s  
PORTD.0=1; //stop  
  
PORTC=0x08; //set alamat suara "cm"  
PORTD.0=0; //play  
delay_ms(1000); //delay 1s  
PORTD.0=1; //stop  
}  
else if( dataping ==130 ) //jarak 130cm  
{  
PORTC=0x00; //set alamat suara "jarak"  
PORTD.0=0; //play  
delay_ms(1000); //delay 1s  
PORTD.0=1; //stop  
  
PORTC=0x18; //set alamat suara "satu"  
PORTD.0=0; //play  
delay_ms(1000); //delay 1s  
PORTD.0=1; //stop  
  
PORTC=0x28; //set alamat suara "tiga"  
PORTD.0=0; //play  
delay_ms(1000); //delay 1s  
PORTD.0=1; //stop
```

```
PORTC=0x10; //set alamat suara "nol"  
PORTD.0=0; //play  
delay_ms(1000); //delay 1s  
PORTD.0=1; //stop  
  
PORTC=0x08; //set alamat suara "cm"  
PORTD.0=0; //play  
delay_ms(1000); //delay 1s  
PORTD.0=1; //stop  
}  
else if( dataping ==120 ) //jarak 120cm  
{  
PORTC=0x00; //set alamat suara "jarak"  
PORTD.0=0; //play  
delay_ms(1000); //delay 1s  
PORTD.0=1; //stop  
  
PORTC=0x18; //set alamat suara "satu"  
PORTD.0=0; //play  
delay_ms(1000); //delay 1s  
PORTD.0=1; //stop  
  
PORTC=0x20; //set alamat suara "dua"  
PORTD.0=0; //play  
delay_ms(1000); //delay 1s  
PORTD.0=1; //stop
```

```
PORTC=0x10; //set alamat suara "nol"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x08; //set alamat suara "cm"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop
}
else if( dataping ==110 ) //jarak 110cm
{
PORTC=0x00; //set alamat suara "jarak"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x18; //set alamat suara "satu"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x18; //set alamat suara "satu"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop
```

```
PORTC=0x10; //set alamat suara "nol"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x08; //set alamat suara "cm"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop
}
else if( dataping ==100 ) //jarak 100cm
{
PORTC=0x00; //set alamat suara "jarak"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x18; //set alamat suara "satu"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x10; //set alamat suara "nol"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop
```

```
PORTC=0x10; //set alamat suara "nol"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```
PORTC=0x08; //set alamat suara "cm"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```
}
```

```
else if( dataping ==90 ) //jarak 90cm
```

```
{
```

```
PORTC=0x00; //set alamat suara "jarak"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```
PORTC=0x58 ; //set alamat suara "sembilan"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```
PORTC=0x10; //set alamat suara "nol"
```

```
PORTD.0=0; //play
```

```
delay_ms(1000); //delay 1s
```

```
PORTD.0=1; //stop
```

```

PORTC=0x08; //set alamat suara "cm"

PORTD.0=0; //play

delay_ms(1000); //delay 1s

PORTD.0=1; //stop

}

else if( dataping ==80 ) //jarak 80cm

{

PORTC=0x00; //set alamat suara "jarak"

PORTD.0=0; //play

delay_ms(1000); //delay 1s

PORTD.0=1; //stop

PORTC=0x50 ; //set alamat suara "delapan"

PORTD.0=0; //play

delay_ms(1000); //delay 1s

PORTD.0=1; //stop

PORTC=0x10; //set alamat suara "no1"

PORTD.0=0; //play

delay_ms(1000); //delay 1s

PORTD.0=1; //stop

PORTC=0x08; //set alamat suara "cm"

PORTD.0=0; //play

delay_ms(1000); //delay 1s

PORTD.0=1; //stop

}

```

```
else if( dataping ==70 ) //jarak 70cm
{
PORTC=0x00; //set alamat suara "jarak"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x48; //set alamat suara "tujuh"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x10; //set alamat suara "nol"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x08; //set alamat suara "cm"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop
}
else if( dataping ==60 ) //jarak 60cm
{
PORTC=0x00; //set alamat suara "jarak"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
```



```
PORTD.0=1; //stop

PORTC=0x40 ; //set alamat suara "enam"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x10; //set alamat suara "nol"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x08; //set alamat suara "cm"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop
}
else if( dataping ==50 ) //jarak 50cm
{
PORTC=0x00; //set alamat suara "jarak"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x30 ; //set alamat suara "lima"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
```

```

PORTD.0=1; //stop

PORTC=0x10; //set alamat suara "nol"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop

PORTC=0x08; //set alamat suara "cm"
PORTD.0=0; //play
delay_ms(1000); //delay 1s
PORTD.0=1; //stop
}
else if( dataping < 100)
{
//motor mulai bergerak untuk rem
delay_us(100); //tunggu perubahan jarak
ambil_data();
dataping_awal = dataping;
if(dataping - dataping_awal >= 2) // menjauh dari halangan
{
//rem dilepas
PORTD.4=1;
PORTD.0=1;
PORTD.1=0;
}
else if ( dataping - dataping_awal < 2 ) // mendekati halangan
{

```

```
//rem ditarik
OCR0= (100-dataping) *5; // kecepatan mengikuti jarak objek
PORTD.0= 0;//motor menarik rem
PORTD.1= 1;//
}
```

```
//lepas rem bila kondisi jarak < 50 selama 3 detik.
```

```
if(dataping <=50)
{
ambil_data();
dataping_simpan= dataping;
delay_ms(3000);// tunggu
ambil_data();
if( dataping == dataping_simpan)
{
//lepas rem
//rem dilepas
PORTD.4=1; //motor on
PORTD.0=1;
PORTD.1=0;
delay_ms(200);
}
}
}
```

```
    //delay_ms(500);

    }
}

void ambil_data()
{
    dirsig=1;
    sigout=1;
    delay_us(10);
    sigout=0;

    dirsig=0;
    sigout=1;

    while(sigin==0);
    TCNT1=0;
    data_timer=0;

    while(sigin==1);
    data_timer=TCNT1;
    dataping=data_timer/10;
    delay_ms(300);
}
```