LAMPIRAN A

Program Code Vision AVR A-1

```
/*****************************************************
This program was produced by the
CodeWizardAVR V1.25.3 Standard
Automatic Program Generator
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Project : Robot Biped
Version :
Date    : 7/1/2010
Author  : Yohanes Budi
Company : Maranatha
Comments:


Chip type           : ATmega16
Program type        : Application
Clock frequency     : 11.095200 MHz
Memory model        : Small
External SRAM size  : 0
Data Stack size     : 256
*****************************************************/

#include <mega16.h>
#include <delay.h>
#include <stdio.h>
unsigned int i,t,ta,s,si,a,b,c,z;
unsigned char text[32];

// Alphanumeric LCD Module functions
#asm
.equ __lcd_port=0x15 ;PORTC
#endasm
#include <lcd.h>

#define ADC_VREF_TYPE 0x40

// Read the AD conversion result
unsigned int read_adc(unsigned char adc_input)
{
ADMUX=adc_input | (ADC_VREF_TYPE & 0xff);
// Start the AD conversion
ADCSRA|=0x40;
// Wait for the AD conversion to complete
while ((ADCSRA & 0x10)==0);
ADCSRA|=0x10;
return ADCW;
}

// Declare your global variables here
void tegak(void)
{
    PORTA=255;
    PORTB=255;
    PORTB.3=1;
    delay_us(1300);  //1300
    PORTB.3=0;
```

```
    PORTB.7=1;
    delay_us(50);    //1350
    PORTB.7=0;
    PORTB.2=1;
    delay_us(1);     //1350
    PORTB.2=0;
    PORTB.1=1;
    delay_us(49);    //1400
    PORTB.1=0;
    PORTB.0=1;
    delay_us(100);   //1500
    PORTB.0=0;
    PORTB.4=1;
    delay_us(1);    //1500
    PORTB.4=0;
    PORTB.5=1;
    delay_us(50);    //1550
    PORTB.5=0;
    PORTA.6=1;
    delay_us(100);   //1650
    PORTA.6=0;
    delay_us(8400);

}

void jalan(void)
{
 // LANGKAH KIRI
 if(a==1)
 {
    if(b>400 && c>400)
    {
    //LANGKAH KIRI
    for(i=0;i<200;i++)  //1
    {
    PORTA=255;
    PORTB=255;
    PORTB.3=1;
    delay_us(1300);  //1300
    PORTB.3=0;
    PORTB.7=1;
    delay_us(50);    //1350
    PORTB.7=0;
    PORTB.2=1;
    delay_us(1);     //1350
    PORTB.2=0;
    PORTB.1=1;
    delay_us(49);    //1400
    PORTB.1=0;
    PORTB.0=1;
    delay_us(100);   //1500
    PORTB.0=0;
    PORTB.4=1;
    delay_us(1);    //1500
    PORTB.4=0;
    PORTB.5=1;
    delay_us(50);    //1550
```

```
PORTB.5=0;
PORTA.6=1;
delay_us(100);   //1650
PORTA.6=0;
delay_us(8400);
};


for(i=0;i<200;i++)  //2
{
PORTA=255;
PORTB=255;
PORTB.0=1;
delay_us(1100);   //1500  //1400 //1300 //1200 //1100
PORTB.0=0;
PORTB.7=1;
delay_us(50);    //1350 //1300 //1250  //1200 //1150
PORTB.7=0;
PORTB.3=1;
delay_us(150);  //1300
PORTB.3=0;
PORTB.2=1;
delay_us(50);     //1350
PORTB.2=0;
PORTB.1=1;
delay_us(50);    //1400
PORTB.1=0;
PORTB.4=1;
delay_us(100);    //1500
PORTB.4=0;
PORTB.5=1;
delay_us(50);    //1550
PORTB.5=0;
PORTA.6=1;
delay_us(100);   //1650
PORTA.6=0;
delay_us(9000);
};

for(i=0;i<200;i++)  //3
{
PORTA=255;
PORTB=255;
PORTB.7=1;
delay_us(1150);    //1350 //1300 //1250  //1200 //1150
PORTB.7=0;
PORTB.3=1;
delay_us(50);  //1300 //1200
PORTB.3=0;
PORTB.1=1;
delay_us(100);    //1400 //1300
PORTB.1=0;
PORTB.2=1;
delay_us(50);     //1350
PORTB.2=0;
PORTB.4=1;
```

```
delay_us(150);    //1500
PORTB.4=0;
PORTB.0=1;
delay_us(1);   //1500  //1400 //1300 //1200 //1100 //1500
PORTB.0=0;
PORTB.5=1;
delay_us(50);    //1550
PORTB.5=0;
PORTA.6=1;
delay_us(100);   //1650
PORTA.6=0;
delay_us(9000);
};

for(i=0;i<200;i++)  //4
{
PORTA=255;
PORTB=255;
PORTB.7=1;
delay_us(1150);    //1350 //1300 //1250  //1200 //1150
PORTB.7=0;
PORTB.3=1;
delay_us(50);  //1300 //1200
PORTB.3=0;
PORTB.1=1;
delay_us(100);    //1400 //1300
PORTB.1=0;
PORTB.2=1;
delay_us(50);     //1350
PORTB.2=0;
PORTB.4=1;
delay_us(50);    //1500 //1400
PORTB.4=0;
PORTB.0=1;
delay_us(100);   //1500  //1400 //1300 //1200 //1100 //1500
PORTB.0=0;
PORTB.5=1;
delay_us(50);    //1550
PORTB.5=0;
PORTA.6=1;
delay_us(1);   //1650 //1550
PORTA.6=0;
delay_us(9000);
};

for(i=0;i<200;i++)  //5
{
PORTA=255;
PORTB=255;
PORTB.7=1;
delay_us(1200);    //1350 //1300 //1250  //1200 //1150 //1200
PORTB.7=0;
PORTB.3=1;
delay_us(1);  //1300 //1200
PORTB.3=0;
PORTB.1=1;
delay_us(100);    //1400 //1300
```

```
PORTB.1=0;
PORTB.2=1;
delay_us(50);     //1350
PORTB.2=0;
PORTB.4=1;
delay_us(50);    //1500 //1400
PORTB.4=0;
PORTB.0=1;
delay_us(100);   //1500  //1400 //1300 //1200 //1100 //1500
PORTB.0=0;
PORTB.5=1;
delay_us(50);    //1550
PORTB.5=0;
PORTA.6=1;
delay_us(1);   //1650 //1550
PORTA.6=0;
delay_us(9000);
};

for(i=0;i<200;i++)  //6
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(1200);  //1300 //1200
PORTB.3=0;
PORTB.7=1;
delay_us(50);    //1350 //1300 //1250  //1200 //1150 //1200 //1250
PORTB.7=0;
PORTB.1=1;
delay_us(50);    //1400 //1300
PORTB.1=0;
PORTB.2=1;
delay_us(50);     //1350
PORTB.2=0;
PORTB.4=1;
delay_us(50);    //1500 //1400
PORTB.4=0;
PORTB.0=1;
delay_us(100);   //1500  //1400 //1300 //1200 //1100 //1500
PORTB.0=0;
PORTB.5=1;
delay_us(50);    //1550
PORTB.5=0;
PORTA.6=1;
delay_us(1);   //1650 //1550
PORTA.6=0;
delay_us(9000);
};

for(i=0;i<200;i++)  //7
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(1200);  //1300 //1200
PORTB.3=0;
```

```
PORTB.7=1;
delay_us(100);    //1350 //1300 //1250  //1200 //1150 //1200 //1250  //1300
PORTB.7=0;
PORTB.1=1;
delay_us(1);    //1400 //1300
PORTB.1=0;
PORTB.2=1;
delay_us(50);     //1350
PORTB.2=0;
PORTB.4=1;
delay_us(50);    //1500 //1400
PORTB.4=0;
PORTB.0=1;
delay_us(100);   //1500  //1400 //1300 //1200 //1100 //1500
PORTB.0=0;
PORTB.5=1;
delay_us(50);    //1550
PORTB.5=0;
PORTA.6=1;
delay_us(1);   //1650 //1550
PORTA.6=0;
delay_us(9000);
};

for(i=0;i<200;i++)  //8
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(1200);  //1300 //1200
PORTB.3=0;
PORTB.1=1;
delay_us(100);    //1400 //1300
PORTB.1=0;
PORTB.2=1;
delay_us(50);     //1350
PORTB.2=0;
PORTB.7=1;
delay_us(1);    //1350 //1300 //1250  //1200 //1150 //1200 //1250  //1300 //1350
PORTB.7=0;
PORTB.4=1;
delay_us(50);    //1500 //1400
PORTB.4=0;
PORTB.0=1;
delay_us(100);   //1500  //1400 //1300 //1200 //1100 //1500
PORTB.0=0;
PORTB.5=1;
delay_us(50);    //1550
PORTB.5=0;
PORTA.6=1;
delay_us(1);   //1650 //1550
PORTA.6=0;
delay_us(9000);
};

for(i=0;i<200;i++)  //9
{
```

```
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(1200);  //1300 //1200
PORTB.3=0;
PORTB.1=1;
delay_us(100);    //1400 //1300
PORTB.1=0;
PORTB.2=1;
delay_us(50);     //1350
PORTB.2=0;
PORTB.4=1;
delay_us(50);    //1500 //1400
PORTB.4=0;
PORTB.5=1;
delay_us(150);    //1550
PORTB.5=0;
PORTA.6=1;
delay_us(1);   //1650 //1550
PORTA.6=0;
PORTB.0=1;
delay_us(150);   //1500  //1400 //1300 //1200 //1100 //1500 //1700
PORTB.0=0;
PORTB.7=1;
delay_us(50);    //1350 //1300 //1250  //1200 //1150 //1200 //1250  //1300 //1350 //1750
PORTB.7=0;
delay_us(9000);
};

for(i=0;i<200;i++)  //10
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(1300);  //1300 //1200 //1300
PORTB.3=0;
PORTB.2=1;
delay_us(50);     //1350
PORTB.2=0;
PORTB.4=1;
delay_us(50);    //1500 //1400
PORTB.4=0;
PORTB.1=1;
delay_us(1);    //1400 //1300 //1400
PORTB.1=0;
PORTB.5=1;
delay_us(150);    //1550
PORTB.5=0;
PORTA.6=1;
delay_us(1);   //1650 //1550
PORTA.6=0;
PORTB.0=1;
delay_us(150);   //1500  //1400 //1300 //1200 //1100 //1500 //1700
PORTB.0=0;
PORTB.7=1;
delay_us(50);    //1350 //1300 //1250  //1200 //1150 //1200 //1250  //1300 //1350 //1750
PORTB.7=0;
```

```
delay_us(9000);
};

for(i=0;i<200;i++)  //11
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(1300);  //1300 //1200 //1300
PORTB.3=0;
PORTB.2=1;
delay_us(50);     //1350
PORTB.2=0;
PORTB.1=1;
delay_us(1);    //1400 //1300 //1400
PORTB.1=0;
PORTB.4=1;
delay_us(100);    //1500 //1400  //1500
PORTB.4=0;
PORTB.5=1;
delay_us(50);    //1550
PORTB.5=0;
PORTA.6=1;
delay_us(100);   //1650 //1550 //1650
PORTA.6=0;
PORTB.0=1;
delay_us(50);   //1500  //1400 //1300 //1200 //1100 //1500 //1700
PORTB.0=0;
PORTB.7=1;
delay_us(50);    //1350 //1300 //1250  //1200 //1150 //1200 //1250  //1300 //1350 //1750
PORTB.7=0;
delay_us(9000);
};

for(i=0;i<200;i++)  //12
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(1300);  //1300 //1200 //1300
PORTB.3=0;
PORTB.2=1;
delay_us(50);     //1350
PORTB.2=0;
PORTB.1=1;
delay_us(1);    //1400 //1300 //1400
PORTB.1=0;
PORTB.4=1;
delay_us(100);    //1500 //1400  //1500
PORTB.4=0;
PORTB.5=1;
delay_us(50);    //1550
PORTB.5=0;
PORTA.6=1;
delay_us(100);   //1650 //1550 //1650
PORTA.6=0;
PORTB.0=1;
```

```
delay_us(1);   //1500  //1400 //1300 //1200 //1100 //1500 //1700 //1650
PORTB.0=0;
PORTB.7=1;
delay_us(1);    //1350 //1300 //1250  //1200 //1150 //1200 //1250  //1300 //1350 //1750 //1650
PORTB.7=0;
delay_us(9000);
};

for(i=0;i<200;i++)  //13
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(1300);  //1300 //1200 //1300
PORTB.3=0;
PORTB.2=1;
delay_us(50);     //1350
PORTB.2=0;
PORTB.1=1;
delay_us(1);    //1400 //1300 //1400
PORTB.1=0;
PORTB.4=1;
delay_us(100);    //1500 //1400  //1500
PORTB.4=0;
PORTB.5=1;
delay_us(50);    //1550
PORTB.5=0;
PORTB.7=1;
delay_us(1);    //1350 //1300 //1250  //1200 //1150 //1200 //1250  //1300 //1350 //1750 //1650 //1550
PORTB.7=0;
PORTB.0=1;
delay_us(50);   //1500  //1400 //1300 //1200 //1100 //1500 //1700 //1650 //1600
PORTB.0=0;
PORTA.6=1;
delay_us(50);   //1650 //1550 //1650
PORTA.6=0;
delay_us(9000);
};

for(i=0;i<200;i++)  //14
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(1300);  //1300 //1200 //1300
PORTB.3=0;
PORTB.2=1;
delay_us(50);     //1350
PORTB.2=0;
PORTB.1=1;
delay_us(1);    //1400 //1300 //1400
PORTB.1=0;
PORTB.7=1;
delay_us(50);    //1350 //1300 //1250  //1200 //1150 //1200 //1250  //1300 //1350 //1750 //1650 //1550 //1450
PORTB.7=0;
PORTB.4=1;
delay_us(50);    //1500 //1400  //1500
```

```
    PORTB.4=0;
    PORTB.5=1;
    delay_us(50);    //1550
    PORTB.5=0;
    PORTB.0=1;
    delay_us(1);   //1500  //1400 //1300 //1200 //1100 //1500 //1700 //1650 //1600 //1550
    PORTB.0=0;
    PORTA.6=1;
    delay_us(100);   //1650 //1550 //1650
    PORTA.6=0;
    delay_us(9000);
    };

    for(i=0;i<200;i++)  //15
    {
    PORTA=255;
    PORTB=255;
    PORTB.3=1;
    delay_us(1300);  //1300 //1200 //1300
    PORTB.3=0;
    PORTB.2=1;
    delay_us(50);     //1350
    PORTB.2=0;
    PORTB.7=1;
    delay_us(1);    //1350 //1300 //1250  //1200 //1150 //1200 //1250  //1300 //1350 //1750 //1650 //1550 //1450
//1350
    PORTB.7=0;
    PORTB.1=1;
    delay_us(50);    //1400 //1300 //1400
    PORTB.1=0;
    PORTB.4=1;
    delay_us(50);    //1500 //1400  //1500
    PORTB.4=0;
    PORTB.0=1;
    delay_us(1);   //1500  //1400 //1300 //1200 //1100 //1500 //1700 //1650 //1600 //1550 //1500
    PORTB.0=0;
    PORTB.5=1;
    delay_us(50);    //1550
    PORTB.5=0;
    PORTA.6=1;
    delay_us(100);   //1650 //1550 //1650
    PORTA.6=0;
    delay_us(9000);
    };


    }
}
else
{
    if(b>200 && c>200)
    {
    //LANGKAH KANAN
    for(i=0;i<200;i++)  //1
    {
    PORTA=255;
    PORTB=255;
```

```
PORTB.3=1;
delay_us(1300);  //1300
PORTB.3=0;
PORTB.7=1;
delay_us(50);    //1350
PORTB.7=0;
PORTB.2=1;
delay_us(1);     //1350
PORTB.2=0;
PORTB.1=1;
delay_us(49);    //1400
PORTB.1=0;
PORTB.0=1;
delay_us(100);   //1500
PORTB.0=0;
PORTB.4=1;
delay_us(1);    //1500
PORTB.4=0;
PORTB.5=1;
delay_us(50);    //1550
PORTB.5=0;
PORTA.6=1;
delay_us(100);   //1650
PORTA.6=0;
delay_us(8400);
};


for(i=0;i<200;i++)  //2
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(1300);     //1300
PORTB.3=0;
PORTB.2=1;
delay_us(50);     //1350
PORTB.2=0;
PORTB.1=1;
delay_us(50);    //1400
PORTB.1=0;
PORTB.4=1;
delay_us(100);    //1500
PORTB.4=0;
PORTB.5=1;
delay_us(50);    //1550
PORTB.5=0;
PORTA.6=1;
delay_us(100);   //1650
PORTA.6=0;
PORTB.0=1;
delay_us(50);   //1500 //1550 //1600  //1650  //1700
PORTB.0=0;
PORTB.7=1;
delay_us(50);    //1350 //1750
PORTB.7=0;
delay_us(8400);
```

```
};

for(i=0;i<200;i++)  //3
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(1300);     //1300
PORTB.3=0;
PORTB.2=1;
delay_us(50);     //1350
PORTB.2=0;
PORTB.7=1;
delay_us(1);    //1350 //1750 //1350
PORTB.7=0;
PORTB.1=1;
delay_us(50);    //1400
PORTB.1=0;
PORTB.5=1;
delay_us(150);    //1550
PORTB.5=0;
PORTB.4=1;
delay_us(50);    //1500 //1600
PORTB.4=0;
PORTB.0=1;
delay_us(100);   //1500 //1550 //1600  //1650  //1700
PORTB.0=0;
PORTA.6=1;
delay_us(1);   //1650 //1700
PORTA.6=0;
delay_us(8400);
};

for(i=0;i<200;i++)  //4
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(1300);     //1300
PORTB.3=0;
PORTB.2=1;
delay_us(50);     //1350
PORTB.2=0;
PORTB.7=1;
delay_us(1);    //1350 //1750 //1350
PORTB.7=0;
PORTB.1=1;
delay_us(100);    //1400  //1450
PORTB.1=0;
PORTB.5=1;
delay_us(100);    //1550
PORTB.5=0;
PORTB.4=1;
delay_us(50);    //1500 //1600
PORTB.4=0;
PORTB.0=1;
delay_us(100);   //1500 //1550 //1600  //1650  //1700
```

```
PORTB.0=0;
PORTA.6=1;
delay_us(1);   //1650 //1700
PORTA.6=0;
delay_us(8400);
};

for(i=0;i<200;i++)  //5
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(1300);     //1300
PORTB.3=0;
PORTB.2=1;
delay_us(50);     //1350
PORTB.2=0;
PORTB.7=1;
delay_us(1);    //1350 //1750 //1350
PORTB.7=0;
PORTB.1=1;
delay_us(150);    //1400  //1450 //1500
PORTB.1=0;
PORTB.5=1;
delay_us(50);    //1550
PORTB.5=0;
PORTB.4=1;
delay_us(50);    //1500 //1600
PORTB.4=0;
PORTB.0=1;
delay_us(100);   //1500 //1550 //1600  //1650  //1700
PORTB.0=0;
PORTA.6=1;
delay_us(1);   //1650 //1700
PORTA.6=0;
delay_us(8400);
};



for(i=0;i<200;i++)  //6
{
PORTA=255;
PORTB=255;
PORTB.2=1;
delay_us(1350);     //1350
PORTB.2=0;
PORTB.7=1;
delay_us(1);    //1350 //1750 //1350
PORTB.7=0;
PORTB.3=1;
delay_us(50);     //1300 //1400
PORTB.3=0;
PORTB.1=1;
delay_us(100);    //1400 //1500
PORTB.1=0;
PORTB.5=1;
```

```
delay_us(50);    //1550
PORTB.5=0;
PORTB.4=1;
delay_us(50);    //1500 //1600
PORTB.4=0;
PORTB.0=1;
delay_us(100);   //1500 //1550 //1600  //1650  //1700
PORTB.0=0;
PORTA.6=1;
delay_us(1);   //1650 //1700
PORTA.6=0;
delay_us(8400);
};

for(i=0;i<200;i++)  //7
{
PORTA=255;
PORTB=255;
PORTB.2=1;
delay_us(1350);     //1350
PORTB.2=0;
PORTB.7=1;
delay_us(1);    //1350 //1750 //1350
PORTB.7=0;
PORTB.3=1;
delay_us(50);     //1300 //1400
PORTB.3=0;
PORTB.1=1;
delay_us(100);    //1400 //1500
PORTB.1=0;
PORTB.5=1;
delay_us(50);    //1550
PORTB.5=0;
PORTB.4=1;
delay_us(50);    //1500 //1600
PORTB.4=0;
PORTB.0=1;
delay_us(50);   //1500 //1550 //1600  //1650  //1700 //1650
PORTB.0=0;
PORTA.6=1;
delay_us(50);   //1650 //1700
PORTA.6=0;
delay_us(8400);
};

for(i=0;i<200;i++)  //8
{
PORTA=255;
PORTB=255;
PORTB.2=1;
delay_us(1350);     //1350
PORTB.2=0;
PORTB.7=1;
delay_us(1);    //1350 //1750 //1350
PORTB.7=0;
PORTB.3=1;
delay_us(50);     //1300 //1400
```

```
PORTB.3=0;
PORTB.1=1;
delay_us(100);    //1400 //1500
PORTB.1=0;
PORTB.5=1;
delay_us(50);    //1550
PORTB.5=0;
PORTB.4=1;
delay_us(50);    //1500 //1600
PORTB.4=0;
PORTB.0=1;
delay_us(1);   //1500 //1550 //1600  //1650  //1700 //1650 //1600
PORTB.0=0;
PORTA.6=1;
delay_us(100);   //1650 //1700
PORTA.6=0;
delay_us(8400);
};

for(i=0;i<200;i++)  //9
{
PORTA=255;
PORTB=255;
PORTB.2=1;
delay_us(1350);     //1350
PORTB.2=0;
PORTB.7=1;
delay_us(1);    //1350 //1750 //1350
PORTB.7=0;
PORTB.3=1;
delay_us(50);     //1300 //1400
PORTB.3=0;
PORTB.1=1;
delay_us(100);    //1400 //1500
PORTB.1=0;
PORTB.5=1;
delay_us(50);    //1550
PORTB.5=0;
PORTB.0=1;
delay_us(1);   //1500 //1550 //1600  //1650  //1700 //1650 //1600 //1550
PORTB.0=0;
PORTB.4=1;
delay_us(50);    //1500 //1600
PORTB.4=0;
PORTA.6=1;
delay_us(100);   //1650 //1700
PORTA.6=0;
delay_us(8400);
};

for(i=0;i<200;i++)  //10
{
PORTA=255;
PORTB=255;
PORTB.2=1;
delay_us(1350);     //1350
PORTB.2=0;
```

```
PORTB.7=1;
delay_us(1);    //1350 //1750 //1350
PORTB.7=0;
PORTB.3=1;
delay_us(50);     //1300 //1400
PORTB.3=0;
PORTB.1=1;
delay_us(100);    //1400 //1500
PORTB.1=0;
PORTB.0=1;
delay_us(1);   //1500 //1550 //1600  //1650  //1700 //1650 //1600 //1550 //1500
PORTB.0=0;
PORTB.5=1;
delay_us(50);    //1550
PORTB.5=0;
PORTB.4=1;
delay_us(50);    //1500 //1600
PORTB.4=0;
PORTA.6=1;
delay_us(100);   //1650 //1700
PORTA.6=0;
delay_us(8400);
};

for(i=0;i<200;i++)  //11
{
PORTA=255;
PORTB=255;
PORTB.0=1;
delay_us(1100);   //1500 //1550 //1600  //1650  //1700 //1650 //1600 //1550 //1500 //1100
PORTB.0=0;
PORTB.7=1;
delay_us(50);    //1350 //1750 //1350 //1150
PORTB.7=0;
PORTB.2=1;
delay_us(200);     //1350
PORTB.2=0;
PORTB.3=1;
delay_us(50);     //1300 //1400
PORTB.3=0;
PORTB.1=1;
delay_us(100);    //1400 //1500
PORTB.1=0;
PORTB.5=1;
delay_us(50);    //1550
PORTB.5=0;
PORTB.4=1;
delay_us(50);    //1500 //1600
PORTB.4=0;
PORTA.6=1;
delay_us(100);   //1650 //1700
PORTA.6=0;
delay_us(8400);
};

for(i=0;i<200;i++)  //12
{
```

```
PORTA=255;
PORTB=255;
PORTB.0=1;
delay_us(1100);   //1500 //1550 //1600  //1650  //1700 //1650 //1600 //1550 //1500 //1100
PORTB.0=0;
PORTB.7=1;
delay_us(50);    //1350 //1750 //1350 //1150
PORTB.7=0;
PORTB.2=1;
delay_us(200);     //1350
PORTB.2=0;
PORTB.3=1;
delay_us(50);     //1300 //1400
PORTB.3=0;
PORTB.1=1;
delay_us(100);    //1400 //1500
PORTB.1=0;
PORTB.4=1;
delay_us(1);    //1500 //1600 //1500
PORTB.4=0;
PORTB.5=1;
delay_us(50);    //1550
PORTB.5=0;
PORTA.6=1;
delay_us(100);   //1650 //1750 //1650
PORTA.6=0;
delay_us(8400);
};

for(i=0;i<200;i++)  //13
{
PORTA=255;
PORTB=255;
PORTB.0=1;
delay_us(1100);   //1500 //1550 //1600  //1650  //1700 //1650 //1600 //1550 //1500 //1100
PORTB.0=0;
PORTB.7=1;
delay_us(50);    //1350 //1750 //1350 //1150
PORTB.7=0;
PORTB.3=1;
delay_us(150);     //1300 //1400 //1300
PORTB.3=0;
PORTB.2=1;
delay_us(50);     //1350
PORTB.2=0;
PORTB.1=1;
delay_us(50);    //1400 //1500 //1400
PORTB.1=0;
PORTB.4=1;
delay_us(100);    //1500 //1600 //1500
PORTB.4=0;
PORTB.5=1;
delay_us(50);    //1550
PORTB.5=0;
PORTA.6=1;
delay_us(100);   //1650 //1750 //1650
PORTA.6=0;
```

```
delay_us(8400);
};

for(i=0;i<200;i++)  //14
{
PORTA=255;
PORTB=255;
PORTB.0=1;
delay_us(1200);   //1500 //1550 //1600  //1650  //1700 //1650 //1600 //1550 //1500 //1100 //1200
PORTB.0=0;
PORTB.7=1;
delay_us(1);    //1350 //1750 //1350 //1150 //1200
PORTB.7=0;
PORTB.3=1;
delay_us(100);     //1300 //1400 //1300
PORTB.3=0;
PORTB.2=1;
delay_us(50);     //1350
PORTB.2=0;
PORTB.1=1;
delay_us(50);    //1400 //1500 //1400
PORTB.1=0;
PORTB.4=1;
delay_us(100);    //1500 //1600 //1500
PORTB.4=0;
PORTB.5=1;
delay_us(50);    //1550
PORTB.5=0;
PORTA.6=1;
delay_us(100);   //1650 //1750 //1650
PORTA.6=0;
delay_us(8400);
};

for(i=0;i<200;i++)  //15
{
PORTA=255;
PORTB=255;
PORTB.7=1;
delay_us(1300);    //1350 //1750 //1350 //1150 //1200 //1250 //1300
PORTB.7=0;
PORTB.3=1;
delay_us(1);     //1300 //1400 //1300
PORTB.3=0;
PORTB.2=1;
delay_us(50);     //1350
PORTB.2=0;
PORTB.1=1;
delay_us(50);    //1400 //1500 //1400
PORTB.1=0;
PORTB.0=1;
delay_us(1);   //1500 //1550 //1600  //1650  //1700 //1650 //1600 //1550 //1500 //1100 //1200 //1300 //1400
PORTB.0=0;
PORTB.4=1;
delay_us(100);    //1500 //1600 //1500
PORTB.4=0;
PORTB.5=1;
```

```
    delay_us(50);    //1550
    PORTB.5=0;
    PORTA.6=1;
    delay_us(100);   //1650 //1750 //1650
    PORTA.6=0;
    delay_us(8400);
    };

    for(i=0;i<200;i++)  //16
    {
    PORTA=255;
    PORTB=255;
    PORTB.3=1;
    delay_us(1300);     //1300 //1400 //1300
    PORTB.3=0;
    PORTB.7=1;
    delay_us(50);    //1350 //1750 //1350 //1150 //1200 //1250 //1300 //1350
    PORTB.7=0;
    PORTB.2=1;
    delay_us(1);     //1350
    PORTB.2=0;
    PORTB.1=1;
    delay_us(50);    //1400 //1500 //1400
    PORTB.1=0;
    PORTB.0=1;
    delay_us(100);   //1500 //1550 //1600  //1650  //1700 //1650 //1600 //1550 //1500 //1100 //1200 //1300 //1400
//1500
    PORTB.0=0;
    PORTB.4=1;
    delay_us(1);    //1500 //1600 //1500
    PORTB.4=0;
    PORTB.5=1;
    delay_us(50);    //1550
    PORTB.5=0;
    PORTA.6=1;
    delay_us(100);   //1650 //1750 //1650
    PORTA.6=0;
    delay_us(8400);
    };




    }
}
     }
void tangga(void)
{
    for(i=0;i<300;i++)   //1
    {
    PORTA=255;
    PORTB=255;
    PORTB.3=1;
    delay_us(1300); //1300
    PORTB.3=0;
    PORTB.7=1;
    delay_us(50);   //1350
```

```
PORTB.7=0;
PORTB.2=1;
delay_us(1);    //1350
PORTB.2=0;
PORTB.1=1;
delay_us(50);   //1400
PORTB.1=0;
PORTB.4=1;
delay_us(100);   //1500
PORTB.4=0;
PORTB.0=1;
delay_us(1);   //1500
PORTB.0=0;
PORTB.5=1;
delay_us(50);   //1550
PORTB.5=0;
PORTA.6=1;
delay_us(100);  //1650
PORTA.6=0;
delay_us(8450);
};

for(i=0;i<300;i++)  //2
{
PORTA=255;
PORTB=255;
PORTB.0=1;
delay_us(1050);    //1050
PORTB.0=0;
PORTB.7=1;
delay_us(50); //1150  //1100
PORTB.7=0;
PORTB.3=1;
delay_us(200);  //1300
PORTB.3=0;
PORTB.2=1;
delay_us(50);   //1350
PORTB.2=0;
PORTB.1=1;
delay_us(50);   //1400
PORTB.1=0;
PORTB.4=1;
delay_us(50);   //1450
PORTB.4=0;
PORTB.5=1;
delay_us(100);  //1550
PORTB.5=0;
PORTA.6=1;
delay_us(100);  //1650
PORTA.6=0;
delay_us(9100);
};

for(i=0;i<300;i++)   //3
{
PORTA=255;
PORTB=255;
```

```
PORTB.2=1;
delay_us(750);  //750
PORTB.2=0;
PORTB.7=1;
delay_us(350); //1100
PORTB.7=0;
PORTB.3=1;
delay_us(200);  //600  //1300
PORTB.3=0;
PORTB.4=1;
delay_us(150);   //1450
PORTB.4=0;
PORTB.0=1;
delay_us(50);  //1500
PORTB.0=0;
PORTB.5=1;
delay_us(50);  //1550
PORTB.5=0;
PORTA.6=1;
delay_us(100);  //1650
PORTA.6=0;
PORTB.1=1;
delay_us(50);  //1400  //1700
PORTB.1=0;
delay_us(8950);
};
```

```
for(i=0;i<300;i++) //4
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(500);  //500
PORTB.3=0;
PORTB.2=1;
delay_us(250);  //750  //650  //750
PORTB.2=0;
PORTB.7=1;
delay_us(350); //1150 //1100
PORTB.7=0;
PORTB.4=1;
delay_us(350);   //1450
PORTB.4=0;
PORTB.0=1;
delay_us(50);  //1500
PORTB.0=0;
PORTB.5=1;
delay_us(50);  //1550
PORTB.5=0;
PORTB.1=1;
delay_us(150);  //1400  //1700
PORTB.1=0;
```

```
PORTA.6=1;
delay_us(50);  //1750
PORTA.6=0;
delay_us(9650);

};

for(i=0;i<300;i++) //5
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(500);  //500
PORTB.3=0;
PORTB.2=1;
delay_us(250);  //750  //650  //750
PORTB.2=0;
PORTB.7=1;
delay_us(400); //1150
PORTB.7=0;
PORTB.1=1;
delay_us(250);  //1400  //1700  //1400
PORTB.1=0;
PORTB.4=1;
delay_us(50);   //1450
PORTB.4=0;
PORTB.0=1;
delay_us(50);  //1500
PORTB.0=0;
PORTB.5=1;
delay_us(50);  //1550
PORTB.5=0;
PORTA.6=1;
delay_us(200);  //1750
PORTA.6=0;
delay_us(9950);
};



for(i=0;i<300;i++) //6
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(500);  //500
PORTB.3=0;
PORTB.2=1;
delay_us(250);  //750  //650  //750
PORTB.2=0;
PORTB.7=1;
delay_us(400); //1150
PORTB.7=0;
PORTB.1=1;
delay_us(250);  //1400  //1700  //1400
PORTB.1=0;
PORTB.4=1;
```

```
delay_us(50);   //1450
PORTB.4=0;
PORTB.0=1;
delay_us(50);  //1500
PORTB.0=0;
PORTB.5=1;
delay_us(50);  //1550
PORTB.5=0;
PORTA.6=1;
delay_us(150);  //1750 //1700
PORTA.6=0;
delay_us(10000);
};

for(i=0;i<300;i++)    //7
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(500);  //500
PORTB.3=0;
PORTB.2=1;
delay_us(150);  //750  //650
PORTB.2=0;
PORTB.7=1;
delay_us(500); //1150
PORTB.7=0;
PORTB.1=1;
delay_us(250);  //1400
PORTB.1=0;
PORTB.4=1;
delay_us(50);   //1450
PORTB.4=0;
PORTB.0=1;
delay_us(50);  //1500
PORTB.0=0;
PORTB.5=1;
delay_us(50);  //1550
PORTB.5=0;
PORTA.6=1;
delay_us(100);  //1750   //1700  //1650
PORTA.6=0;
delay_us(10150);

};



for(i=0;i<300;i++) //8
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(500);  //500
PORTB.3=0;
PORTB.2=1;
delay_us(150);  //750  //650
```

```
PORTB.2=0;
PORTB.7=1;
delay_us(500); //1150
PORTB.7=0;
PORTB.1=1;
delay_us(250);  //1400
PORTB.1=0;
PORTB.4=1;
delay_us(50);   //1450
PORTB.4=0;
PORTB.0=1;
delay_us(50);  //1500
PORTB.0=0;
PORTB.5=1;
delay_us(50);  //1550
PORTB.5=0;
PORTA.6=1;
delay_us(50);  //1750   //1650  //1600
PORTA.6=0;
delay_us(10200);
};

for(i=0;i<300;i++)      //9
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(500);  //500
PORTB.3=0;
PORTB.2=1;
delay_us(150);  //750  //650
PORTB.2=0;
PORTB.7=1;
delay_us(500); //1150
PORTB.7=0;
PORTB.1=1;
delay_us(250);  //1400
PORTB.1=0;
PORTB.4=1;
delay_us(50);   //1450
PORTB.4=0;
PORTB.0=1;
delay_us(50);  //1500
PORTB.0=0;
PORTB.5=1;
delay_us(50);  //1550
PORTB.5=0;
PORTA.6=1;
delay_us(1);  //1750   //1650  //1550
PORTA.6=0;
delay_us(10250);
};

for(i=0;i<300;i++)    //10
{
PORTA=255;
PORTB=255;
```

```
PORTB.3=1;
delay_us(500);  //500
PORTB.3=0;
PORTB.2=1;
delay_us(150);  //750  //650
PORTB.2=0;
PORTB.7=1;
delay_us(500); //1150
PORTB.7=0;
PORTB.4=1;
delay_us(200);   //1450 //1350
PORTB.4=0;
PORTB.1=1;
delay_us(50);  //1400
PORTB.1=0;
PORTB.0=1;
delay_us(100);  //1500
PORTB.0=0;
PORTB.5=1;
delay_us(50);  //1550
PORTB.5=0;
PORTA.6=1;
delay_us(1);  //1750   //1650  //1550
PORTA.6=0;
delay_us(10350);
};



for(i=0;i<300;i++) //11
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(600);  //500 //600
PORTB.3=0;
PORTB.2=1;
delay_us(50);  //750  //650
PORTB.2=0;
PORTB.7=1;
delay_us(500); //1150
PORTB.7=0;
PORTB.4=1;
delay_us(200);   //1450 //1350
PORTB.4=0;
PORTB.1=1;
delay_us(50);  //1400
PORTB.1=0;
PORTB.0=1;
delay_us(100);  //1500
PORTB.0=0;
PORTA.6=1;
delay_us(1);  //1750   //1650  //1550 //1500
PORTA.6=0;
PORTB.5=1;
delay_us(49);  //1550
PORTB.5=0;
```

```
delay_us(10300);
};

for(i=0;i<200;i++) //12
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(600);  //500 //600
PORTB.3=0;
PORTB.2=1;
delay_us(50);  //750  //650
PORTB.2=0;
PORTB.7=1;
delay_us(500); //1150
PORTB.7=0;
PORTB.4=1;
delay_us(200);   //1450 //1350
PORTB.4=0;
PORTB.1=1;
delay_us(50);  //1400
PORTB.1=0;
PORTA.6=1;
delay_us(50);  //1750   //1650  //1550 //1500 //1450
PORTA.6=0;
PORTB.0=1;
delay_us(50);  //1500
PORTB.0=0;
PORTB.5=1;
delay_us(50);  //1550
PORTB.5=0;
delay_us(10350);
};

for(i=0;i<300;i++)      //13    eng ing eng
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(600);  //500 //600
PORTB.3=0;
PORTB.2=1;
delay_us(50);  //750  //650
PORTB.2=0;
PORTB.7=1;
delay_us(500); //1150
PORTB.7=0;
PORTB.4=1;
delay_us(100);   //1450 //1350  //1250
PORTB.4=0;
PORTB.1=1;
delay_us(150);  //1400
PORTB.1=0;
PORTA.6=1;
delay_us(50);  //1750   //1650  //1550 //1500 //1450
PORTA.6=0;
PORTB.0=1;
```

```
delay_us(50);  //1500
PORTB.0=0;
PORTB.5=1;
delay_us(50);  //1550
PORTB.5=0;
delay_us(10450);
};

for(i=0;i<200;i++)    //14 *awal
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(600);  //500 //600
PORTB.3=0;
PORTB.2=1;
delay_us(50);  //750  //650
PORTB.2=0;
PORTB.7=1;
delay_us(500); //1150
PORTB.7=0;
PORTB.4=1;
delay_us(100);   //1450 //1350  //1250
PORTB.4=0;
PORTA.6=1;
delay_us(200);  //1750   //1650  //1550 //1500 //1450
PORTA.6=0;
PORTB.0=1;
delay_us(50);  //1500
PORTB.0=0;
PORTB.5=1;
delay_us(50);  //1550
PORTB.5=0;
PORTB.1=1;
delay_us(50);  //1400  //1600
PORTB.1=0;
delay_us(10250);
};

for(i=0;i<200;i++)    //15
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(600);  //500 //600
PORTB.3=0;
PORTB.2=1;
delay_us(50);  //750  //650
PORTB.2=0;
PORTB.7=1;
delay_us(550); //1150 //1200
PORTB.7=0;
PORTB.4=1;
delay_us(50);   //1450 //1350  //1250
PORTB.4=0;
PORTA.6=1;
delay_us(200);  //1750   //1650  //1550 //1500 //1450
```

```
PORTA.6=0;
PORTB.0=1;
delay_us(50);  //1500
PORTB.0=0;
PORTB.5=1;
delay_us(50);  //1550
PORTB.5=0;
PORTB.1=1;
delay_us(50);  //1400  //1600
PORTB.1=0;
delay_us(10250);
};

for(i=0;i<200;i++)    //16
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(600);  //500 //600
PORTB.3=0;
PORTB.2=1;
delay_us(50);  //750  //650
PORTB.2=0;
PORTB.7=1;
delay_us(600); //1150 //1200 //1250
PORTB.7=0;
PORTB.4=1;
delay_us(1);   //1450 //1350  //1250
PORTB.4=0;
PORTA.6=1;
delay_us(200);  //1750   //1650  //1550 //1500 //1450
PORTA.6=0;
PORTB.0=1;
delay_us(50);  //1500
PORTB.0=0;
PORTB.5=1;
delay_us(50);  //1550
PORTB.5=0;
PORTB.1=1;
delay_us(50);  //1400  //1600
PORTB.1=0;
delay_us(10250);
};

for(i=0;i<200;i++)    //17
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(600);  //500 //600
PORTB.3=0;
PORTB.2=1;
delay_us(50);  //750  //650
PORTB.2=0;
PORTB.4=1;
delay_us(600);   //1450 //1350  //1250
PORTB.4=0;
```

```
PORTB.7=1;
delay_us(50); //1150 //1200 //1250 //1300
PORTB.7=0;
PORTA.6=1;
delay_us(150);  //1750   //1650  //1550 //1500 //1450
PORTA.6=0;
PORTB.0=1;
delay_us(50);  //1500
PORTB.0=0;
PORTB.5=1;
delay_us(50);  //1550
PORTB.5=0;
PORTB.1=1;
delay_us(50);  //1400  //1600
PORTB.1=0;
delay_us(10250);
};

for(i=0;i<200;i++)    //18
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(600);  //500 //600
PORTB.3=0;
PORTB.2=1;
delay_us(50);  //750  //650
PORTB.2=0;
PORTB.4=1;
delay_us(600);   //1450 //1350  //1250
PORTB.4=0;
PORTB.7=1;
delay_us(100); //1150 //1200 //1250 //1300 //1350
PORTB.7=0;
PORTA.6=1;
delay_us(100);  //1750   //1650  //1550 //1500 //1450
PORTA.6=0;
PORTB.0=1;
delay_us(50);  //1500
PORTB.0=0;
PORTB.5=1;
delay_us(50);  //1550
PORTB.5=0;
PORTB.1=1;
delay_us(50);  //1400  //1600
PORTB.1=0;
delay_us(10250);
};

for(i=0;i<300;i++)       //19  -- miring di tangga ...
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(400);  //400
PORTB.3=0;
PORTB.2=1;
```

```
delay_us(1);  //400
PORTB.2=0;
PORTB.7=1;
delay_us(949);   //1350
PORTB.7=0;
PORTB.4=1;
delay_us(100);   //1450
PORTB.4=0;
PORTB.5=1;
delay_us(100);  //1550
PORTB.5=0;
PORTB.0=1;
delay_us(150);   //1700
PORTB.0=0;
PORTB.1=1;
delay_us(200);  //1600 //1900
PORTB.1=0;
PORTA.6=1;
delay_us(100);  //2000
PORTA.6=0;
delay_us(9250);
};

for(i=0;i<300;i++)     //20
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(400);  //400
PORTB.3=0;
PORTB.2=1;
delay_us(1);  //400
PORTB.2=0;
PORTB.7=1;
delay_us(950);   //1350
PORTB.7=0;
PORTB.0=1;
delay_us(350);   //1700
PORTB.0=0;
PORTB.1=1;
delay_us(300);  //1600  // 1900  //2000
PORTB.1=0;
PORTA.6=1;
delay_us(1);  //2000
PORTA.6=0;
PORTB.5=1;
delay_us(400);  //1550  //1800    //2000  //2400
PORTB.5=0;
PORTB.4=1;
delay_us(1);   //1450    //2400
PORTB.4=0;
delay_us(7350);
};

for(i=0;i<300;i++)   //21
{
PORTA=255;
```

```
PORTB=255;
PORTB.3=1;
delay_us(400);  //400
PORTB.3=0;
PORTB.2=1;
delay_us(100);  //400 //500
PORTB.2=0;
PORTB.7=1;
delay_us(850);   //1350
PORTB.7=0;
PORTB.0=1;
delay_us(350);   //1700
PORTB.0=0;
PORTB.1=1;
delay_us(200);  //1600  // 1900  //2000  //1900
PORTB.1=0;
PORTA.6=1;
delay_us(100);  //2000
PORTA.6=0;
PORTB.5=1;
delay_us(400);  //1550  //1800    //2000  //2400
PORTB.5=0;
PORTB.4=1;
delay_us(1);   //1450    //2400
PORTB.4=0;
delay_us(7350);
};

for(i=0;i<300;i++)    //22
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(400);  //400
PORTB.3=0;
PORTB.2=1;
delay_us(200);  //400 //500  //600
PORTB.2=0;
PORTB.7=1;
delay_us(750);   //1350
PORTB.7=0;
PORTB.0=1;
delay_us(350);   //1700
PORTB.0=0;
PORTB.1=1;
delay_us(100);  //1600  // 1900  //2000  //1900  //1800
PORTB.1=0;
PORTA.6=1;
delay_us(200);  //2000
PORTA.6=0;
PORTB.5=1;
delay_us(400);  //1550  //1800    //2000  //2400
PORTB.5=0;
PORTB.4=1;
delay_us(1);   //1450    //2400
PORTB.4=0;
delay_us(7350);
```

```
};

for(i=0;i<200;i++) //23
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(400);  //400
PORTB.3=0;
PORTB.2=1;
delay_us(300);  //400 //500  //600 //700
PORTB.2=0;
PORTB.7=1;
delay_us(650);   //1350
PORTB.7=0;
PORTB.0=1;
delay_us(350);   //1700
PORTB.0=0;
PORTB.1=1;
delay_us(1);  //1600  // 1900  //2000  //1900  //1800  //1700
PORTB.1=0;
PORTA.6=1;
delay_us(300);  //2000
PORTA.6=0;
PORTB.5=1;
delay_us(400);  //1550  //1800    //2000  //2400
PORTB.5=0;
PORTB.4=1;
delay_us(1);   //1450    //2400
PORTB.4=0;
delay_us(7350);
};

for(i=0;i<300;i++)     //24
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(400);  //400
PORTB.3=0;
PORTB.2=1;
delay_us(500);  //400 //500  //600 //700 //800  //900
PORTB.2=0;
PORTB.7=1;
delay_us(450);   //1350
PORTB.7=0;
PORTB.1=1;
delay_us(250);  //1600  // 1900  //2000  //1900  //1800  //1700 //1600
PORTB.1=0;
PORTB.0=1;
delay_us(100);   //1700
PORTB.0=0;
PORTA.6=1;
delay_us(300);  //2000
PORTA.6=0;
PORTB.5=1;
delay_us(400);  //1550  //1800    //2000  //2400
```

```
PORTB.5=0;
PORTB.4=1;
delay_us(1);   //1450    //2400
PORTB.4=0;
delay_us(7250);
};

for(i=0;i<300;i++)       //25
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(400);  //400
PORTB.3=0;
PORTB.2=1;
delay_us(950);  //400  //900  //1350
PORTB.2=0;
PORTB.7=1;
delay_us(1);   //1350
PORTB.7=0;
PORTB.1=1;
delay_us(49);  //1600  //1400
PORTB.1=0;
PORTB.0=1;
delay_us(300);   //1700
PORTB.0=0;
PORTA.6=1;
delay_us(300);  //2000
PORTA.6=0;
PORTB.5=1;
delay_us(400);  //2400
PORTB.5=0;
PORTB.4=1;
delay_us(1);   //2400
PORTB.4=0;
delay_us(7000);
};


for(i=0;i<300;i++)       //26
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(450);  //450
PORTB.3=0;
PORTB.2=1;
delay_us(900);  //400  //900  //1350
PORTB.2=0;
PORTB.7=1;
delay_us(1);   //1350
PORTB.7=0;
PORTB.1=1;
delay_us(49);  //1600  //1400
PORTB.1=0;
PORTB.0=1;
delay_us(300);   //1700
```

```
PORTB.0=0;
PORTA.6=1;
delay_us(1);  //2000   //1700
PORTA.6=0;
PORTB.5=1;
delay_us(699);  //2400
PORTB.5=0;
PORTB.4=1;
delay_us(1);   //2400
PORTB.4=0;
delay_us(7250);


};


for(i=0;i<300;i++)      //27
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(450);  //400 //450
PORTB.3=0;
PORTB.2=1;
delay_us(900);  //400  //900  //1350
PORTB.2=0;
PORTB.7=1;
delay_us(1);   //1350
PORTB.7=0;
PORTB.1=1;
delay_us(49);  //1600  //1400
PORTB.1=0;
PORTB.5=1;
delay_us(150);  //2400  //1550
PORTB.5=0;
PORTB.0=1;
delay_us(150);   //1700
PORTB.0=0;
PORTA.6=1;
delay_us(1);  //2000   //1700
PORTA.6=0;
PORTB.4=1;
delay_us(699);   //2400
PORTB.4=0;
delay_us(8100);
};

for(i=0;i<300;i++)      //28
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(450);  //400 //450
PORTB.3=0;
PORTB.2=1;
delay_us(900);  //400  //900  //1350
PORTB.2=0;
```

```
PORTB.7=1;
delay_us(1);   //1350
PORTB.7=0;
PORTB.1=1;
delay_us(49);  //1600  //1400
PORTB.1=0;
PORTB.5=1;
delay_us(150);  //2400  //1550
PORTB.5=0;
PORTB.0=1;
delay_us(100);   //1700 //1650
PORTB.0=0;
PORTA.6=1;
delay_us(50);  //2000   //1700
PORTA.6=0;
PORTB.4=1;
delay_us(699);   //2400
PORTB.4=0;
delay_us(8100);
};

for(i=0;i<300;i++)      //29
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(450);  //400 //450
PORTB.3=0;
PORTB.2=1;
delay_us(900);  //400  //900  //1350
PORTB.2=0;
PORTB.7=1;
delay_us(1);   //1350
PORTB.7=0;
PORTB.1=1;
delay_us(49);  //1600  //1400
PORTB.1=0;
PORTB.5=1;
delay_us(150);  //2400  //1550
PORTB.5=0;
PORTB.0=1;
delay_us(50);   //1700 //1650 //1600
PORTB.0=0;
PORTA.6=1;
delay_us(100);  //2000   //1700
PORTA.6=0;
PORTB.4=1;
delay_us(699);   //2400
PORTB.4=0;
delay_us(8100);
};

for(i=0;i<300;i++)      //30
{
PORTA=255;
PORTB=255;
PORTB.3=1;
```

```
delay_us(450);  //400 //450
PORTB.3=0;
PORTB.2=1;
delay_us(900);  //400  //900  //1350
PORTB.2=0;
PORTB.7=1;
delay_us(1);   //1350
PORTB.7=0;
PORTB.1=1;
delay_us(49);  //1600  //1400
PORTB.1=0;
PORTB.5=1;
delay_us(150);  //2400  //1550
PORTB.5=0;
PORTB.0=1;
delay_us(1);   //1700 //1650 //1600 //1550
PORTB.0=0;
PORTA.6=1;
delay_us(150);  //2000   //1700
PORTA.6=0;
PORTB.4=1;
delay_us(699);   //2400
PORTB.4=0;
delay_us(8100);
};


for(i=0;i<300;i++)        //31
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(450); //1300 //400  //450
PORTB.3=0;
PORTB.7=1;
delay_us(900);   //1350
PORTB.7=0;
PORTB.2=1;
delay_us(1);    //1350
PORTB.2=0;
PORTB.1=1;
delay_us(49);   //1400
PORTB.1=0;
PORTB.0=1;
delay_us(100);   //1500
PORTB.0=0;
PORTB.5=1;
delay_us(50);   //1550
PORTB.5=0;
PORTA.6=1;
delay_us(100);  //1650
PORTA.6=0;
PORTB.4=1;
delay_us(750);   //1450  //2400
PORTB.4=0;
delay_us(8350);
};
```

```
    for(i=0;i<300;i++)     //32
    {
    PORTA=255;
    PORTB=255;
    PORTB.3=1;
    delay_us(1300); //1300
    PORTB.3=0;
    PORTB.7=1;
    delay_us(50);   //1350
    PORTB.7=0;
    PORTB.2=1;
    delay_us(1);    //1350
    PORTB.2=0;
    PORTB.1=1;
    delay_us(50);   //1400
    PORTB.1=0;
    PORTB.4=1;
    delay_us(100);   //1500
    PORTB.4=0;
    PORTB.0=1;
    delay_us(1);   //1500
    PORTB.0=0;
    PORTB.5=1;
    delay_us(49);   //1550
    PORTB.5=0;
    PORTA.6=1;
    delay_us(100);  //1650
    PORTA.6=0;
    delay_us(8400);
    };


}

void turun(void)
{
    for(i=0;i<300;i++)     //1
    {
    PORTA=255;
    PORTB=255;
    PORTB.3=1;
    delay_us(1300); //1300
    PORTB.3=0;
    PORTB.7=1;
    delay_us(50);   //1350
    PORTB.7=0;
    PORTB.2=1;
    delay_us(1);    //1350
    PORTB.2=0;
    PORTB.1=1;
    delay_us(50);   //1400
    PORTB.1=0;
    PORTB.4=1;
    delay_us(100);   //1500
    PORTB.4=0;
    PORTB.0=1;
```

```
delay_us(1);   //1500
PORTB.0=0;
PORTB.5=1;
delay_us(49);   //1550
PORTB.5=0;
PORTA.6=1;
delay_us(100);  //1650
PORTA.6=0;
delay_us(8400);
};

for(i=0;i<300;i++)        //2
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(450); //1300 //400  //450
PORTB.3=0;
PORTB.7=1;
delay_us(900);   //1350
PORTB.7=0;
PORTB.2=1;
delay_us(1);    //1350
PORTB.2=0;
PORTB.1=1;
delay_us(49);   //1400
PORTB.1=0;
PORTB.0=1;
delay_us(100);   //1500
PORTB.0=0;
PORTB.5=1;
delay_us(50);   //1550
PORTB.5=0;
PORTA.6=1;
delay_us(100);  //1650
PORTA.6=0;
PORTB.4=1;
delay_us(650);   //1450  //2300
PORTB.4=0;
delay_us(8350);
};

for(i=0;i<300;i++)      //3
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(450);  //400 //450
PORTB.3=0;
PORTB.2=1;
delay_us(900);  //400  //900  //1350
PORTB.2=0;
PORTB.1=1;
delay_us(50);  //1600  //1400
PORTB.1=0;
PORTB.5=1;
delay_us(150);  //2400  //1550
```

```
PORTB.5=0;
PORTB.0=1;
delay_us(150);   //1700
PORTB.0=0;
PORTA.6=1;
delay_us(1);  //2000   //1700
PORTA.6=0;
PORTB.7=1;
delay_us(49);   //1350 //1750
PORTB.7=0;
PORTB.4=1;
delay_us(550);   //2300
PORTB.4=0;
delay_us(8100);
};

for(i=0;i<300;i++)        //4
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(450);  //450
PORTB.3=0;
PORTB.2=1;
delay_us(900);  //400  //900  //1350
PORTB.2=0;
PORTB.7=1;
delay_us(1);   //1350
PORTB.7=0;
PORTB.1=1;
delay_us(49);  //1600  //1400
PORTB.1=0;
PORTB.0=1;
delay_us(300);   //1700
PORTB.0=0;
PORTA.6=1;
delay_us(1);  //2000   //1700
PORTA.6=0;
PORTB.4=1;
delay_us(600);   //2300
PORTB.4=0;
PORTB.5=1;
delay_us(100);  //2400
PORTB.5=0;
delay_us(7250);
};

for(i=0;i<300;i++)       //5
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(400);  //400
PORTB.3=0;
PORTB.2=1;
delay_us(950);  //400  //900  //1350
PORTB.2=0;
```

```
PORTB.7=1;
delay_us(1);   //1350
PORTB.7=0;
PORTB.1=1;
delay_us(49);  //1600  //1400
PORTB.1=0;
PORTB.0=1;
delay_us(300);   //1700
PORTB.0=0;
PORTA.6=1;
delay_us(300);  //2000
PORTA.6=0;
PORTB.4=1;
delay_us(300);   //2300
PORTB.4=0;
PORTB.5=1;
delay_us(100);  //2400
PORTB.5=0;
delay_us(7000);
};

for(i=0;i<300;i++)     //6
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(400);  //400
PORTB.3=0;
PORTB.2=1;
delay_us(500);  //400 //500  //600 //700 //800  //900
PORTB.2=0;
PORTB.7=1;
delay_us(450);   //1350
PORTB.7=0;
PORTB.1=1;
delay_us(250);  //1600  // 1900  //2000  //1900  //1800  //1700 //1600
PORTB.1=0;
PORTB.0=1;
delay_us(100);   //1700
PORTB.0=0;
PORTA.6=1;
delay_us(300);  //2000
PORTA.6=0;
PORTB.4=1;
delay_us(300);   //1450    //2300
PORTB.4=0;
PORTB.5=1;
delay_us(100);  //1550  //1800    //2000  //2400
PORTB.5=0;
delay_us(7250);
};

for(i=0;i<200;i++) //7
{
PORTA=255;
PORTB=255;
PORTB.3=1;
```

```
delay_us(400);  //400
PORTB.3=0;
PORTB.2=1;
delay_us(300);  //400 //500  //600 //700
PORTB.2=0;
PORTB.7=1;
delay_us(650);   //1350
PORTB.7=0;
PORTB.0=1;
delay_us(350);   //1700
PORTB.0=0;
PORTB.1=1;
delay_us(1);  //1600  // 1900  //2000  //1900  //1800  //1700
PORTB.1=0;
PORTA.6=1;
delay_us(300);  //2000
PORTA.6=0;
PORTB.4=1;
delay_us(300);   //1450    //2300
PORTB.4=0;
PORTB.5=1;
delay_us(100);  //1550  //1800    //2000  //2400
PORTB.5=0;
delay_us(7350);
};

for(i=0;i<300;i++)    //8
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(400);  //400
PORTB.3=0;
PORTB.2=1;
delay_us(200);  //400 //500  //600
PORTB.2=0;
PORTB.7=1;
delay_us(750);   //1350
PORTB.7=0;
PORTB.0=1;
delay_us(350);   //1700
PORTB.0=0;
PORTB.1=1;
delay_us(100);  //1600  // 1900  //2000  //1900  //1800
PORTB.1=0;
PORTA.6=1;
delay_us(200);  //2000
PORTA.6=0;
PORTB.4=1;
delay_us(300);   //1450    //2400
PORTB.4=0;
PORTB.5=1;
delay_us(100);  //1550  //1800    //2000  //2400
PORTB.5=0;
delay_us(7350);
};
```

```
for(i=0;i<300;i++)   //9
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(400);  //400
PORTB.3=0;
PORTB.2=1;
delay_us(100);  //400 //500
PORTB.2=0;
PORTB.7=1;
delay_us(850);   //1350
PORTB.7=0;
PORTB.0=1;
delay_us(350);   //1700
PORTB.0=0;
PORTB.1=1;
delay_us(200);  //1600  // 1900  //2000  //1900
PORTB.1=0;
PORTA.6=1;
delay_us(100);  //2000
PORTA.6=0;
PORTB.4=1;
delay_us(300);   //1450    //2300
PORTB.4=0;
PORTB.5=1;
delay_us(100);  //1550  //1800    //2000  //2400
PORTB.5=0;
delay_us(7350);
};

for(i=0;i<300;i++)     //10
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(400);  //400
PORTB.3=0;
PORTB.2=1;
delay_us(1);  //400
PORTB.2=0;
PORTB.7=1;
delay_us(950);   //1350
PORTB.7=0;
PORTB.0=1;
delay_us(350);   //1700
PORTB.0=0;
PORTB.1=1;
delay_us(300);  //1600  // 1900  //2000
PORTB.1=0;
PORTA.6=1;
delay_us(1);  //2000
PORTA.6=0;
PORTB.4=1;
delay_us(300);   //1450    //2300
PORTB.4=0;
PORTB.5=1;
```

```
delay_us(100);  //1550  //1800    //2000  //2400
PORTB.5=0;
delay_us(7350);
};

for(i=0;i<300;i++)       //11  -- miring di tangga ...
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(400);  //400
PORTB.3=0;
PORTB.2=1;
delay_us(1);  //400
PORTB.2=0;
PORTB.7=1;
delay_us(949);   //1350
PORTB.7=0;
PORTB.4=1;
delay_us(100);   //1450
PORTB.4=0;
PORTB.5=1;
delay_us(100);  //1550
PORTB.5=0;
PORTB.0=1;
delay_us(150);   //1700
PORTB.0=0;
PORTB.1=1;
delay_us(200);  //1600 //1900
PORTB.1=0;
PORTA.6=1;
delay_us(100);  //2000
PORTA.6=0;
delay_us(9250);
};

for(i=0;i<300;i++)       //12  -- miring di tangga ...
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(400);  //400
PORTB.3=0;
PORTB.2=1;
delay_us(1);  //400
PORTB.2=0;
PORTB.4=1;
delay_us(899);   //1450 //1250 //1300
PORTB.4=0;
PORTB.7=1;
delay_us(50);   //1350
PORTB.7=0;
PORTB.5=1;
delay_us(200);  //1550
PORTB.5=0;
PORTA.6=1;
delay_us(100);  //2000 //1650
```

```
PORTA.6=0;
PORTB.0=1;
delay_us(50);   //1700
PORTB.0=0;
PORTB.1=1;
delay_us(200);  //1600 //1900
PORTB.1=0;
delay_us(9250);
};

for(i=0;i<300;i++)       //13  -- miring di tangga ...
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(400);  //400
PORTB.3=0;
PORTB.2=1;
delay_us(1);  //400
PORTB.2=0;
PORTB.4=1;
delay_us(899);   //1450  //1250 //1300
PORTB.4=0;
PORTB.7=1;
delay_us(50);   //1350
PORTB.7=0;
PORTB.5=1;
delay_us(200);  //1550
PORTB.5=0;
PORTA.6=1;
delay_us(100);  //2000 //1650
PORTA.6=0;
PORTB.0=1;
delay_us(50);   //1700
PORTB.0=0;
PORTB.1=1;
delay_us(150);  //1600 //1900 //1850
PORTB.1=0;
delay_us(9250);
};

for(i=0;i<300;i++)       //14  -- miring di tangga ...
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(400);  //400
PORTB.3=0;
PORTB.2=1;
delay_us(1);  //400
PORTB.2=0;
PORTB.4=1;
delay_us(899);   //1450  //1250 //1300
PORTB.4=0;
PORTB.7=1;
delay_us(50);   //1350
PORTB.7=0;
```

```
PORTB.5=1;
delay_us(200);  //1550
PORTB.5=0;
PORTA.6=1;
delay_us(100);  //2000 //1650
PORTA.6=0;
PORTB.0=1;
delay_us(50);   //1700
PORTB.0=0;
PORTB.1=1;
delay_us(100);  //1600 //1900 //1850//1800
PORTB.1=0;
delay_us(9250);
};

for(i=0;i<300;i++)       //15  -- miring di tangga ...
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(400);  //400
PORTB.3=0;
PORTB.2=1;
delay_us(1);  //400
PORTB.2=0;
PORTB.4=1;
delay_us(899);   //1450 //1250  //1300
PORTB.4=0;
PORTB.7=1;
delay_us(50);   //1350
PORTB.7=0;
PORTB.5=1;
delay_us(200);  //1550
PORTB.5=0;
PORTA.6=1;
delay_us(100);  //2000 //1650
PORTA.6=0;
PORTB.0=1;
delay_us(50);   //1700
PORTB.0=0;
PORTB.1=1;
delay_us(50);  //1600 //1900 //1850//1800 //1750
PORTB.1=0;
delay_us(9250);
};

for(i=0;i<300;i++)       //16  -- miring di tangga ...
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(400);  //400
PORTB.3=0;
PORTB.2=1;
delay_us(1);  //400
PORTB.2=0;
PORTB.4=1;
```

```
delay_us(899);   //1450  //1250 //1300
PORTB.4=0;
PORTB.7=1;
delay_us(50);   //1350
PORTB.7=0;
PORTB.5=1;
delay_us(200);  //1550
PORTB.5=0;
PORTA.6=1;
delay_us(100);  //2000 //1650
PORTA.6=0;
PORTB.0=1;
delay_us(50);   //1700
PORTB.0=0;
PORTB.1=1;
delay_us(1);  //1600 //1900 //1850//1800 //1750 //1700
PORTB.1=0;
delay_us(9250);
};

for(i=0;i<300;i++)       //17  -- miring di tangga ...
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(400);  //400
PORTB.3=0;
PORTB.2=1;
delay_us(1);  //400
PORTB.2=0;
PORTB.4=1;
delay_us(900);   //1450  //1250 //1300
PORTB.4=0;
PORTB.7=1;
delay_us(50);   //1350
PORTB.7=0;
PORTA.6=1;
delay_us(1);  //2000 //1650 //1450  //1350
PORTA.6=0;
PORTB.5=1;
delay_us(200);  //1550
PORTB.5=0;
PORTB.0=1;
delay_us(150);   //1700
PORTB.0=0;
PORTB.1=1;
delay_us(1);  //1600 //1900 //1850//1800 //1750 //1700
PORTB.1=0;
delay_us(9250);
};


for(i=0;i<300;i++)       //18  -- miring di tangga ...
{
PORTA=255;
PORTB=255;
PORTB.3=1;
```

```
delay_us(400);  //400
PORTB.3=0;
PORTB.2=1;
delay_us(1);  //400
PORTB.2=0;
PORTB.4=1;
delay_us(900);   //1450  //1250 //1300
PORTB.4=0;
PORTB.7=1;
delay_us(50);   //1350
PORTB.7=0;
PORTA.6=1;
delay_us(1);  //2000 //1650 //1450  //1350
PORTA.6=0;
PORTB.5=1;
delay_us(200);  //1550
PORTB.5=0;
PORTB.1=1;
delay_us(100);  //1600 //1900 //1850//1800 //1750 //1700 //1650
PORTB.1=0;
PORTB.0=1;
delay_us(50);   //1700
PORTB.0=0;
delay_us(9250);
};

for(i=0;i<300;i++)       //19  -- miring di tangga ...
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(400);  //400
PORTB.3=0;
PORTB.2=1;
delay_us(1);  //400
PORTB.2=0;
PORTB.4=1;
delay_us(900);   //1450  //1250 //1300
PORTB.4=0;
PORTB.7=1;
delay_us(50);   //1350
PORTB.7=0;
PORTA.6=1;
delay_us(1);  //2000 //1650 //1450  //1350
PORTA.6=0;
PORTB.5=1;
delay_us(200);  //1550
PORTB.5=0;
PORTB.1=1;
delay_us(50);  //1600 //1900 //1850//1800 //1750 //1700 //1650 //1600
PORTB.1=0;
PORTB.0=1;
delay_us(100);   //1700
PORTB.0=0;
delay_us(9250);
};
```

```
for(i=0;i<300;i++)       //20  -- miring di tangga ...
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(400);  //400
PORTB.3=0;
PORTB.2=1;
delay_us(1);  //400
PORTB.2=0;
PORTB.4=1;
delay_us(900);   //1450  //1250 //1300
PORTB.4=0;
PORTB.7=1;
delay_us(50);   //1350
PORTB.7=0;
PORTA.6=1;
delay_us(1);  //2000 //1650 //1450  //1350
PORTA.6=0;
PORTB.1=1;
delay_us(150);  //1600 //1900 //1850//1800 //1750 //1700 //1650 //1600 //1550 //1500
PORTB.1=0;
PORTB.5=1;
delay_us(50);  //1550
PORTB.5=0;
PORTB.0=1;
delay_us(150);   //1700
PORTB.0=0;
delay_us(9250);
};

for(i=0;i<300;i++)       //21  -- miring di tangga ...
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(400);  //400
PORTB.3=0;
PORTB.2=1;
delay_us(1);  //400
PORTB.2=0;
PORTB.4=1;
delay_us(900);   //1450  //1250 //1300
PORTB.4=0;
PORTB.7=1;
delay_us(50);   //1350
PORTB.7=0;
PORTA.6=1;
delay_us(1);  //2000 //1650 //1450  //1350
PORTA.6=0;
PORTB.1=1;
delay_us(150);  //1600 //1900 //1850//1800 //1750 //1700 //1650 //1600 //1550 //1500
PORTB.1=0;
PORTB.0=1;
delay_us(1);   //1700  //1500
PORTB.0=0;
PORTB.5=1;
```

```
delay_us(50);  //1550
PORTB.5=0;
delay_us(9250);
};

for(i=0;i<300;i++)       //22  -- miring di tangga ...
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(400);  //400
PORTB.3=0;
PORTB.2=1;
delay_us(1);  //400
PORTB.2=0;
PORTB.4=1;
delay_us(900);   //1450  //1250 //1300
PORTB.4=0;
PORTB.7=1;
delay_us(1);   //1350 //1300
PORTB.7=0;
PORTA.6=1;
delay_us(50);  //2000 //1650 //1450  //1350
PORTA.6=0;
PORTB.0=1;
delay_us(100);   //1700  //1500 //1450
PORTB.0=0;
PORTB.1=1;
delay_us(50);  //1600 //1900 //1850//1800 //1750 //1700 //1650 //1600 //1550 //1500
PORTB.1=0;
PORTB.5=1;
delay_us(50);  //1550
PORTB.5=0;
delay_us(9250);
};

for(i=0;i<300;i++)       //23  -- miring di tangga ...
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(400);  //400
PORTB.3=0;
PORTB.2=1;
delay_us(1);  //400
PORTB.2=0;
PORTB.7=1;
delay_us(850);   //1350 //1300 //1250
PORTB.7=0;
PORTB.4=1;
delay_us(50);   //1450  //1250 //1300
PORTB.4=0;
PORTA.6=1;
delay_us(50);  //2000 //1650 //1450  //1350
PORTA.6=0;
PORTB.0=1;
delay_us(50);   //1700  //1500//1450 //1400
```

```
PORTB.0=0;
PORTB.1=1;
delay_us(1);  //1600 //1900 //1850//1800 //1750 //1700 //1650 //1600 //1550 //1500 //1400
PORTB.1=0;
PORTB.5=1;
delay_us(150);  //1550
PORTB.5=0;
delay_us(9250);
};

for(i=0;i<300;i++)       //24  -- miring di tangga ...
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(400);  //400
PORTB.3=0;
PORTB.2=1;
delay_us(1);  //400
PORTB.2=0;
PORTB.7=1;
delay_us(850);   //1350 //1300 //1250
PORTB.7=0;
PORTA.6=1;
delay_us(50);  //2000 //1650 //1450  //1350
PORTA.6=0;
PORTB.0=1;
delay_us(50);   //1700  //1500//1450 //1400
PORTB.0=0;
PORTB.4=1;
delay_us(1);   //1450  //1250 //1300 //1400
PORTB.4=0;
PORTB.1=1;
delay_us(1);  //1600 //1900 //1850//1800 //1750 //1700 //1650 //1600 //1550 //1500 //1400
PORTB.1=0;
PORTB.5=1;
delay_us(150);  //1550
PORTB.5=0;
delay_us(9250);
};



for(i=0;i<300;i++)    //25
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(500);  //500
PORTB.3=0;
PORTB.2=1;
delay_us(150);  //750  //650
PORTB.2=0;
PORTB.7=1;
delay_us(500); //1150
PORTB.7=0;
PORTB.0=1;
```

```
delay_us(1);  //1500 //1150
PORTB.0=0;
PORTB.1=1;
delay_us(250);  //1400
PORTB.1=0;
PORTB.4=1;
delay_us(50);   //1450
PORTB.4=0;
PORTB.5=1;
delay_us(100);  //1550
PORTB.5=0;
PORTA.6=1;
delay_us(100);  //1750   //1700  //1650
PORTA.6=0;
delay_us(10150);

};

for(i=0;i<300;i++) //26
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(500);  //500
PORTB.3=0;
PORTB.2=1;
delay_us(250);  //750  //650  //750
PORTB.2=0;
PORTB.7=1;
delay_us(400); //1150
PORTB.7=0;
PORTB.1=1;
delay_us(250);  //1400  //1700  //1400
PORTB.1=0;
PORTB.4=1;
delay_us(50);   //1450
PORTB.4=0;
PORTB.0=1;
delay_us(50);  //1500
PORTB.0=0;
PORTB.5=1;
delay_us(50);  //1550
PORTB.5=0;
PORTA.6=1;
delay_us(150);  //1750 //1700
PORTA.6=0;
delay_us(10000);
};

for(i=0;i<300;i++) //27
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(500);  //500
PORTB.3=0;
PORTB.2=1;
```

```
delay_us(250);  //750  //650  //750
PORTB.2=0;
PORTB.7=1;
delay_us(400); //1150
PORTB.7=0;
PORTB.1=1;
delay_us(250);  //1400  //1700  //1400
PORTB.1=0;
PORTB.4=1;
delay_us(50);   //1450
PORTB.4=0;
PORTB.0=1;
delay_us(50);  //1500
PORTB.0=0;
PORTB.5=1;
delay_us(50);  //1550
PORTB.5=0;
PORTA.6=1;
delay_us(200);  //1750
PORTA.6=0;
delay_us(9950);
};


for(i=0;i<300;i++)   //28
{
PORTA=255;
PORTB=255;
PORTB.2=1;
delay_us(750);  //750
PORTB.2=0;
PORTB.7=1;
delay_us(400); //1150
PORTB.7=0;
PORTB.3=1;
delay_us(150);  //600  //1300
PORTB.3=0;
PORTB.4=1;
delay_us(150);   //1450
PORTB.4=0;
PORTB.0=1;
delay_us(50);  //1500
PORTB.0=0;
PORTB.5=1;
delay_us(50);  //1550
PORTB.5=0;
PORTA.6=1;
delay_us(100);  //1650
PORTA.6=0;
PORTB.1=1;
delay_us(50);  //1400  //1700
PORTB.1=0;
delay_us(8950);
};

for(i=0;i<300;i++)  //29
```

```
{
PORTA=255;
PORTB=255;
PORTB.0=1;
delay_us(1050);    //1050
PORTB.0=0;
PORTB.7=1;
delay_us(100); //1150
PORTB.7=0;
PORTB.3=1;
delay_us(150);  //1300
PORTB.3=0;
PORTB.2=1;
delay_us(50);   //1350
PORTB.2=0;
PORTB.1=1;
delay_us(50);   //1400
PORTB.1=0;
PORTB.4=1;
delay_us(50);   //1450
PORTB.4=0;
PORTB.5=1;
delay_us(100);  //1550
PORTB.5=0;
PORTA.6=1;
delay_us(100);  //1650
PORTA.6=0;
delay_us(9100);
};

for(i=0;i<300;i++)  //30
{
PORTA=255;
PORTB=255;
PORTB.0=1;
delay_us(1150);    //1050 //1150
PORTB.0=0;
PORTB.7=1;
delay_us(50); //1150 //1200
PORTB.7=0;
PORTB.3=1;
delay_us(100);  //1300
PORTB.3=0;
PORTB.2=1;
delay_us(50);   //1350
PORTB.2=0;
PORTB.1=1;
delay_us(50);   //1400
PORTB.1=0;
PORTB.4=1;
delay_us(50);   //1450
PORTB.4=0;
PORTB.5=1;
delay_us(100);  //1550
PORTB.5=0;
PORTA.6=1;
delay_us(100);  //1650
```

```
PORTA.6=0;
delay_us(9100);
};

for(i=0;i<300;i++)  //31
{
PORTA=255;
PORTB=255;
PORTB.0=1;
delay_us(1250);    //1050 //1150 //1250
PORTB.0=0;
PORTB.7=1;
delay_us(1); //1150 //1200 //1250
PORTB.7=0;
PORTB.3=1;
delay_us(50);  //1300
PORTB.3=0;
PORTB.2=1;
delay_us(50);   //1350
PORTB.2=0;
PORTB.1=1;
delay_us(50);   //1400
PORTB.1=0;
PORTB.4=1;
delay_us(50);   //1450
PORTB.4=0;
PORTB.5=1;
delay_us(100);  //1550
PORTB.5=0;
PORTA.6=1;
delay_us(100);  //1650
PORTA.6=0;
delay_us(9100);
};

for(i=0;i<300;i++)  //32
{
PORTA=255;
PORTB=255;
PORTB.7=1;
delay_us(1300); //1150 //1200 //1250 //1300
PORTB.7=0;
PORTB.3=1;
delay_us(1);  //1300
PORTB.3=0;
PORTB.2=1;
delay_us(50);   //1350
PORTB.2=0;
PORTB.0=1;
delay_us(1);    //1050 //1150 //1250 //1350
PORTB.0=0;
PORTB.1=1;
delay_us(50);   //1400
PORTB.1=0;
PORTB.4=1;
delay_us(50);   //1450
PORTB.4=0;
```

```
PORTB.5=1;
delay_us(100);  //1550
PORTB.5=0;
PORTA.6=1;
delay_us(100);  //1650
PORTA.6=0;
delay_us(9100);
};

for(i=0;i<300;i++)  //33
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(1300);  //1300
PORTB.3=0;
PORTB.2=1;
delay_us(50);   //1350
PORTB.2=0;
PORTB.7=1;
delay_us(1); //1150 //1200 //1250 //1300  //1350
PORTB.7=0;
PORTB.1=1;
delay_us(50);   //1400
PORTB.1=0;
PORTB.4=1;
delay_us(100);   //1500
PORTB.4=0;
PORTB.0=1;
delay_us(1);    //1050 //1150 //1250 //1350 //1500
PORTB.0=0;
PORTB.5=1;
delay_us(50);  //1550
PORTB.5=0;
PORTA.6=1;
delay_us(100);  //1650
PORTA.6=0;
delay_us(9100);
};

for(i=0;i<300;i++)   //34
{
PORTA=255;
PORTB=255;
PORTB.3=1;
delay_us(1300); //1300
PORTB.3=0;
PORTB.7=1;
delay_us(50);   //1350
PORTB.7=0;
PORTB.2=1;
delay_us(1);    //1350
PORTB.2=0;
PORTB.1=1;
delay_us(50);   //1400
PORTB.1=0;
PORTB.4=1;
```

```
    delay_us(100);   //1500
    PORTB.4=0;
    PORTB.0=1;
    delay_us(1);   //1500
    PORTB.0=0;
    PORTB.5=1;
    delay_us(50);   //1550
    PORTB.5=0;
    PORTA.6=1;
    delay_us(100);  //1650
    PORTA.6=0;
    delay_us(8450);
    };
}
void sensor(void)
{
    PORTA.0=1;  //triger
    delay_us(10);
    PORTA.0=0;   //off triger
    PORTA.1=1;   //input echo pullup
    delay_us(20);
    while(PINA.1==0)
    {
    delay_us(2);
    }
    while(PINA.1==1)
    {
    t++;
    delay_us(1);
    }
    delay_ms(1000);

    PORTA.2=1;  //triger
    delay_us(10);
    PORTA.2=0;   //off triger
    PORTA.3=1;   //input echo pullup
    delay_us(20);
    while(PINA.3==0)
    {
    delay_us(2);
    }
    while(PINA.3==1)
    {
    ta++;
    delay_us(1);
    }
}

void main(void)
{
// Declare your local variables here

// Input/Output Ports initialization
// Port A initialization
// Func7=In Func6=Out Func5=In Func4=In Func3=In Func2=Out Func1=In Func0=Out
// State7=T State6=0 State5=T State4=T State3=T State2=0 State1=T State0=0
PORTA=0x00;
```

```
DDRA=0x45;


// Port B 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
PORTB=0x00;
DDRB=0xFF;

// 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=0x00;

// 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: Timer 0 Stopped
// Mode: Normal top=FFh
// OC0 output: Disconnected
TCCR0=0x00;
TCNT0=0x00;
OCR0=0x00;

// Timer/Counter 1 initialization
// Clock source: System Clock
// Clock value: Timer 1 Stopped
// Mode: Normal top=FFFFh
// OC1A output: Discon.
// OC1B output: Discon.
// Noise Canceler: Off
// Input Capture on Falling Edge
// Timer 1 Overflow Interrupt: Off
// Input Capture Interrupt: Off
// Compare A Match Interrupt: Off
// Compare B Match Interrupt: Off
TCCR1A=0x00;
TCCR1B=0x00;
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: Timer 2 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=0x00;

// 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);

// ADC initialization
// ADC Clock frequency: 86.681 kHz
// ADC Voltage Reference: AVCC pin
// ADC Auto Trigger Source: None
ADMUX=ADC_VREF_TYPE & 0xff;
ADCSRA=0x87;

while (1)
      {
      // Place your code here
       tegak();
       sensor();
       lcd_clear();
       s=0.034*t;
       si=0.034*ta;
       b=read_adc(4);
       c=read_adc(5);
       sprintf(text,"t=%dus t1=%dus %d %d %d %d",t,ta,s,si,b,c);
       lcd_puts(text);
       delay_ms(200);

       t=0;ta=0;


        if(s>3 || si>3)
        {
              if(a==0)
              {
                    jalan();
                    a++;
              }
              else
```

```
            {
                jalan();
                a=0;
            }
        }

        if(s<=3 || si<=3)
        {
        while (s<10 || si<10)
        {
        z++;
        if(z<=5)
        {
        tangga();
        sensor();
        delay_ms(200);
        }
        else
        {
        //z++;
        turun();
        sensor();
        delay_ms(200);

        z++;
        if(z<=5)
        {  tegak();
        }
        }



        };
        }

      };
}
```

LAMPIRAN B

FOTO ROBOT TAMPAK DEPAN B-1

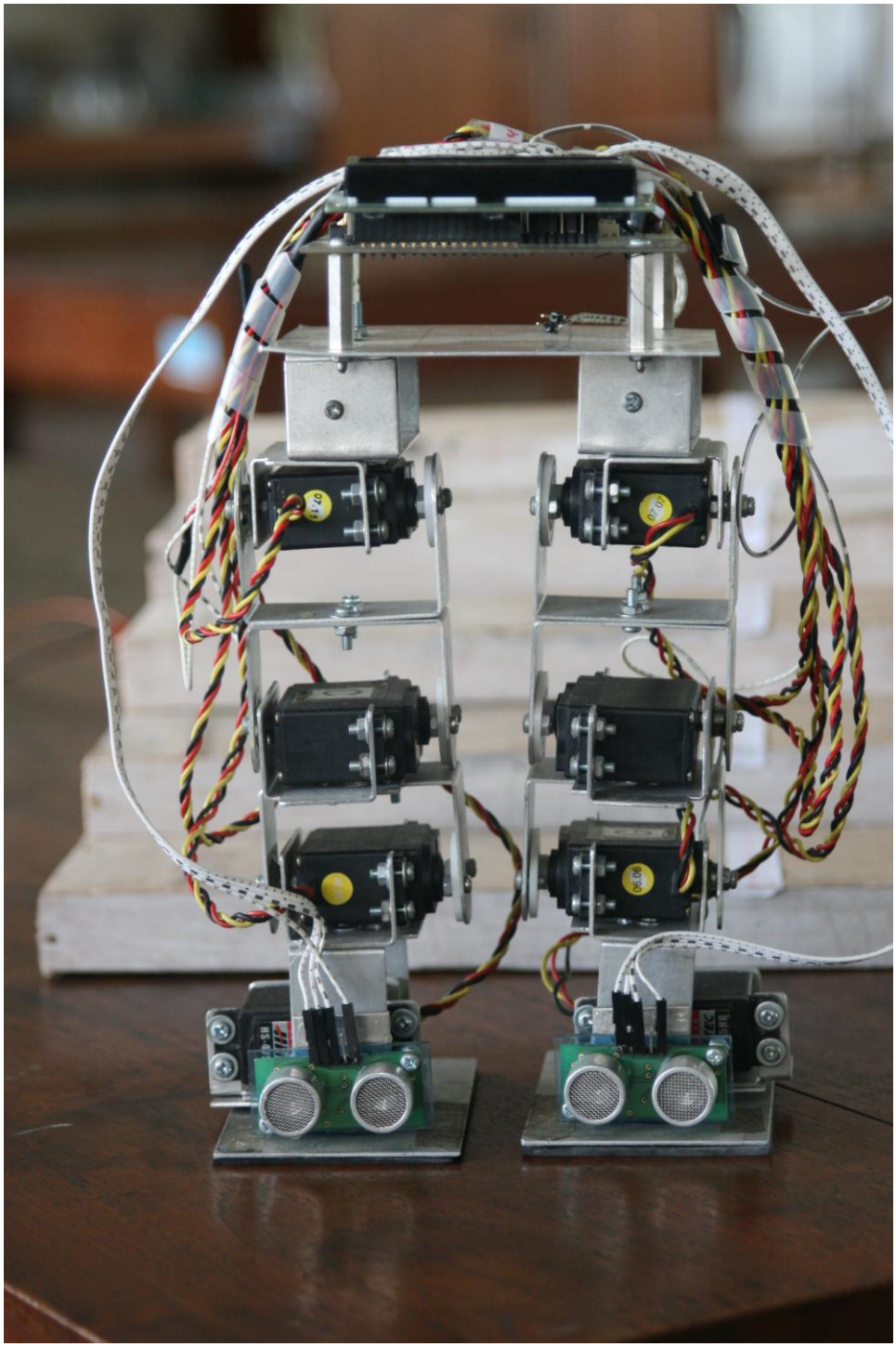
FOTO ROBOT TAMPAK BELAKANG B-2

FOTO ROBOT TAMPAK KANAN.....B-3

FOTO ROBOT TAMPAK KIRI B-4

FOTO ROBOT TAMPAK ATAS.....B-5

FOTO ROBOT TAMPAK BAWAH.....B-6



ROBOT BIPEDAL TAMPAK DEPAN

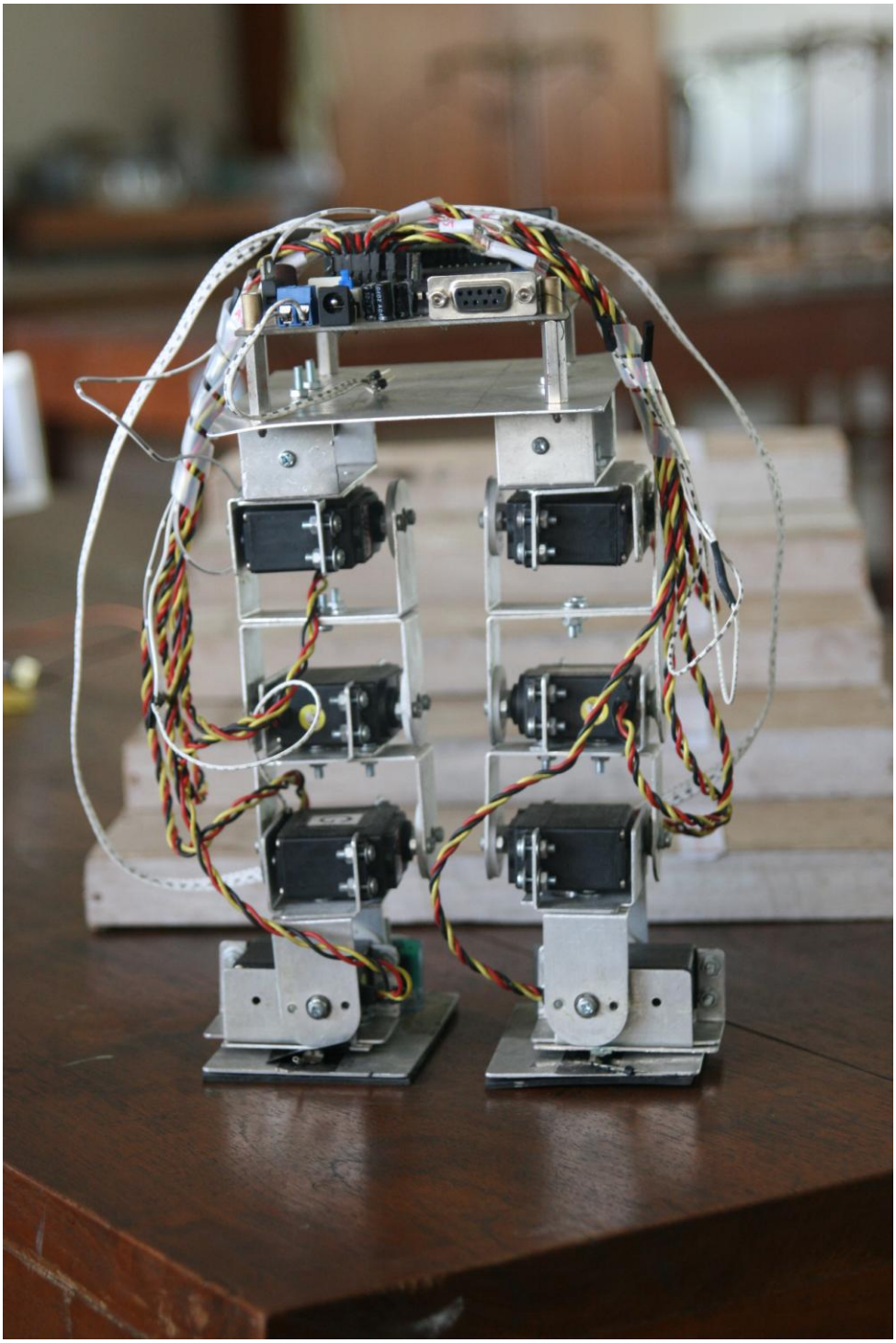


FOTO ROBOT BIPEDAL TAMPAK BELAKANG

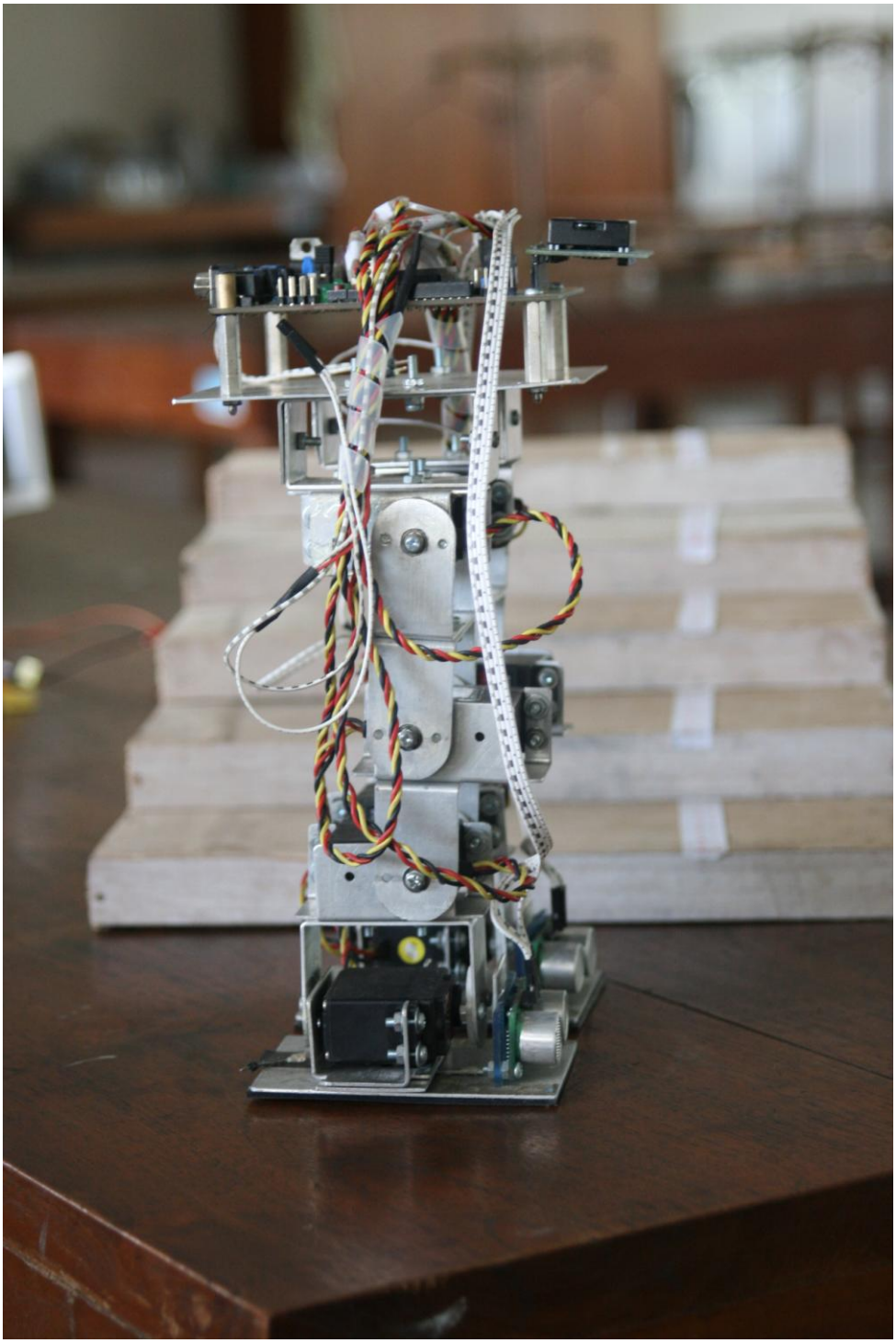


FOTO ROBOT BIPEDAL TAMPAK SAMPING KANAN

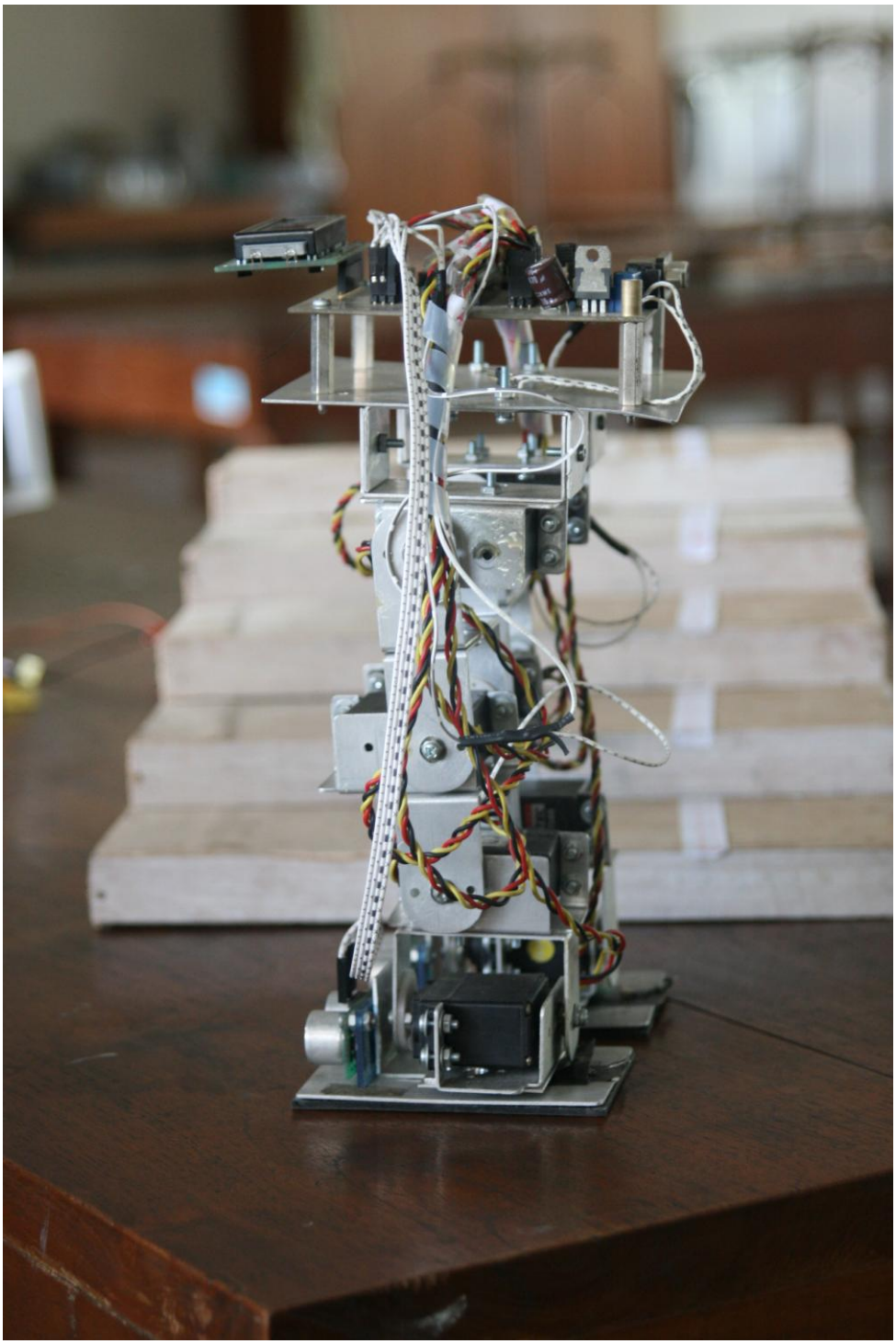


FOTO ROBOT BIPEDAL TAMPAK SAMPING KIRI

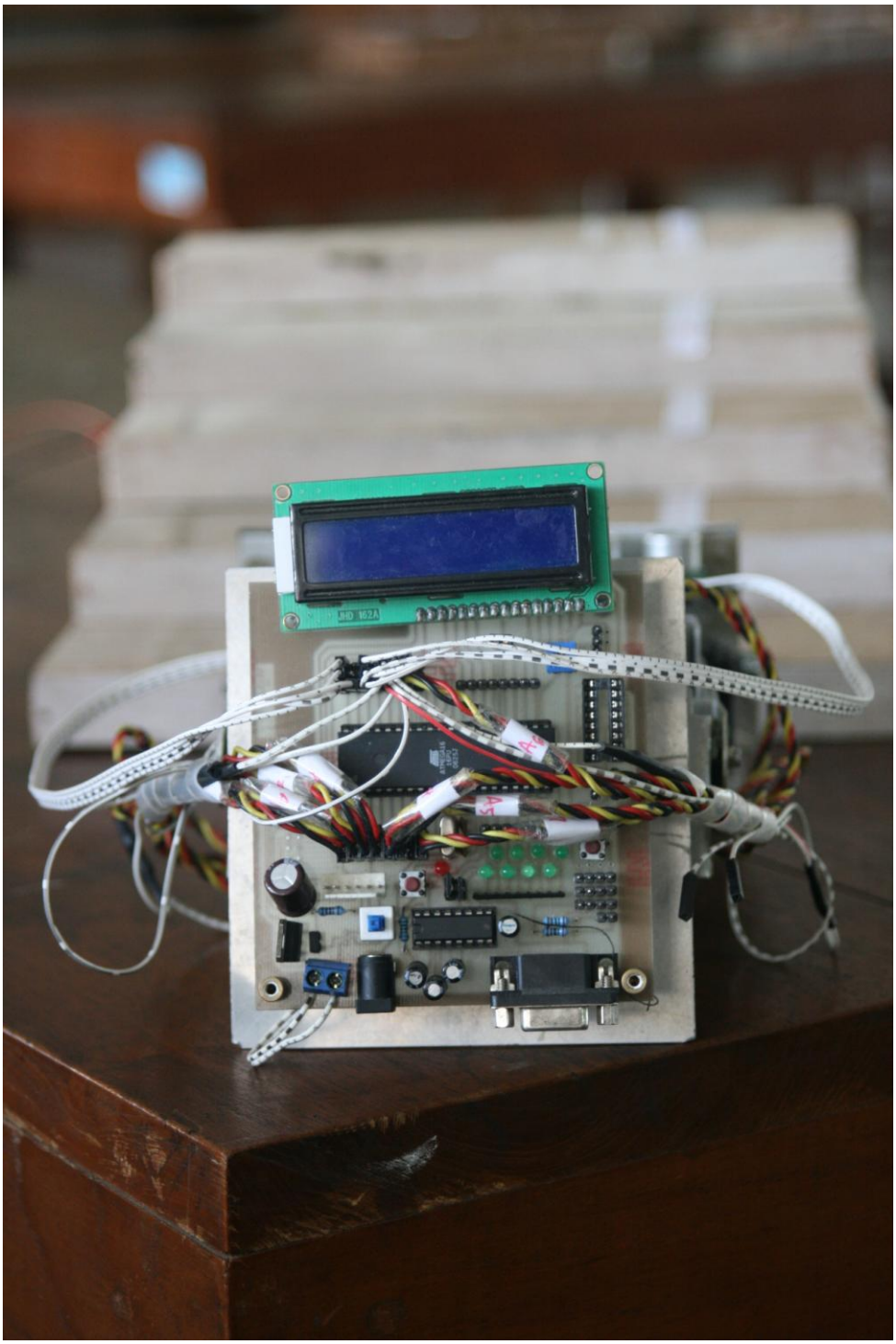


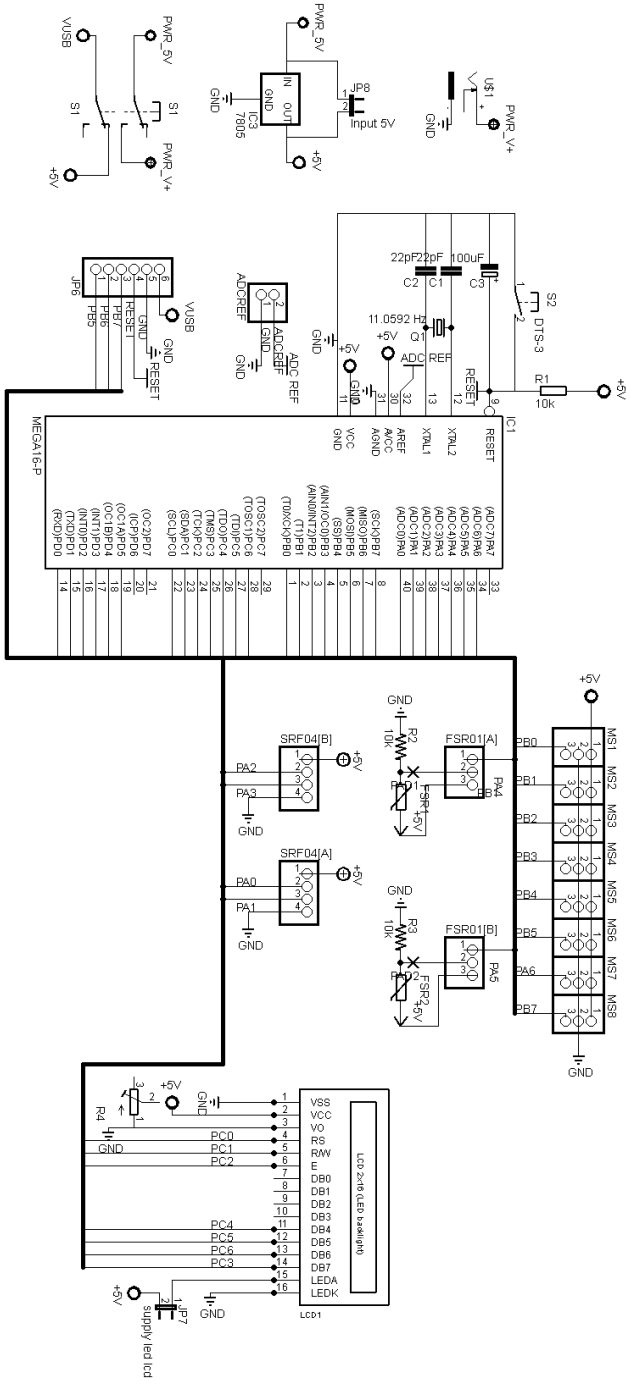
FOTO ROBOT BIPEDAL TAMPAK ATAS

FOTO ROBOT BIPEDAL TAMPAK BAWAH

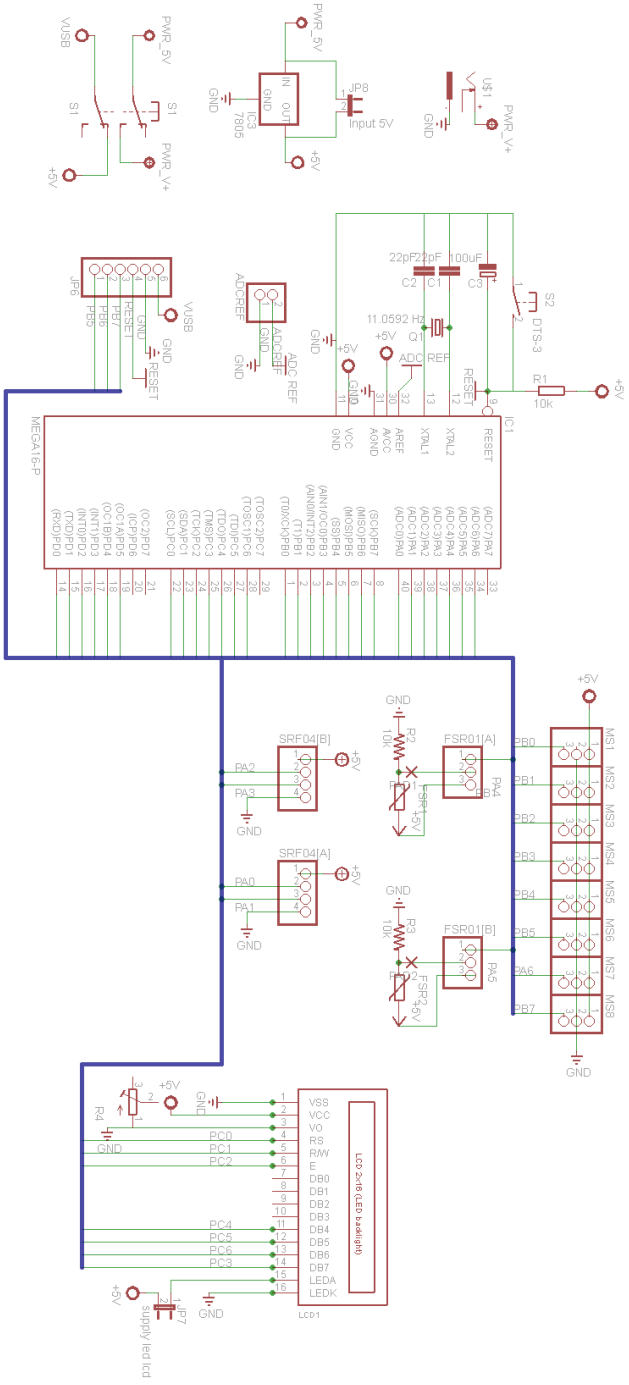
LAMPIRAN C

SKEMATIK PENGONTROL MIKRO C-1

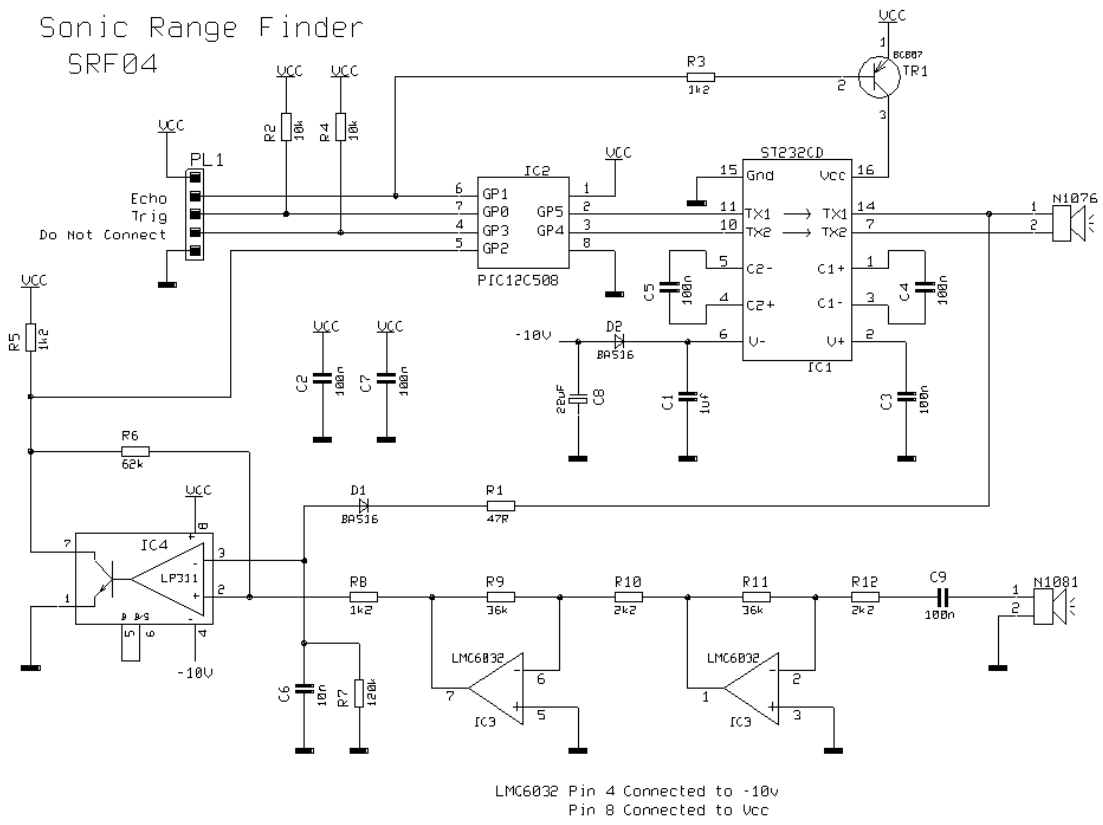
SKEMATIK SENSOR ULTRASONIK C-3



SKEMATIK PENGONTROL MIKRO



SKEMATIK PENGONTROL MIKRO



LMC6032 Pin 4 Connected to -10v
Pin 8 Connected to Vcc

SKEMATIK SENSOR ULTRASONIK (SRF 04)

LAMPIRAN D

DIAGRAM WAKTU SENSOR ULTRASONIK . D-1

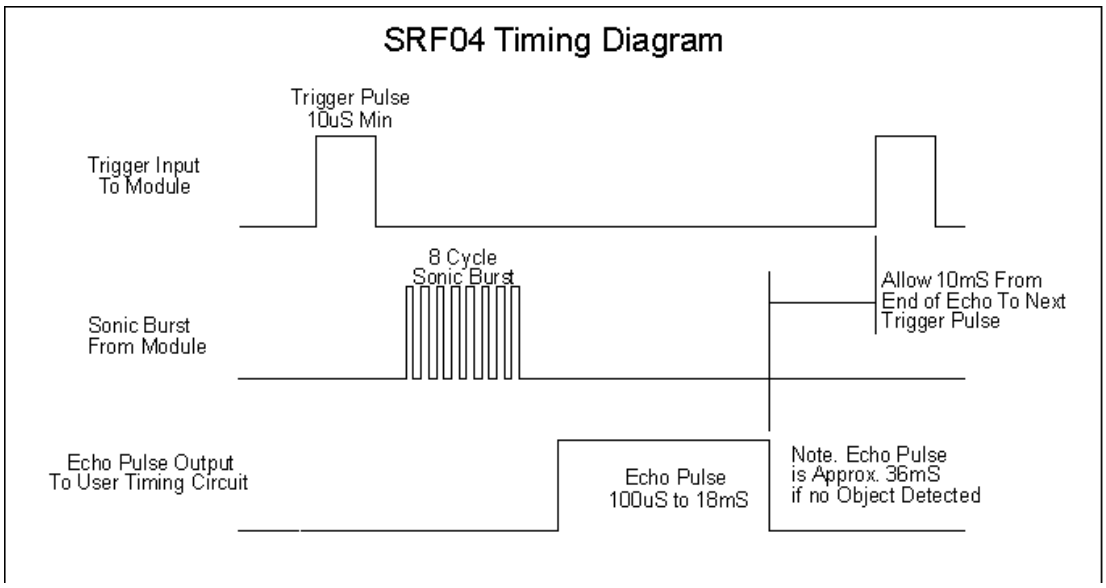


DIAGRAM WAKTU SENSOR ULTRASONIK

(SRF 04)