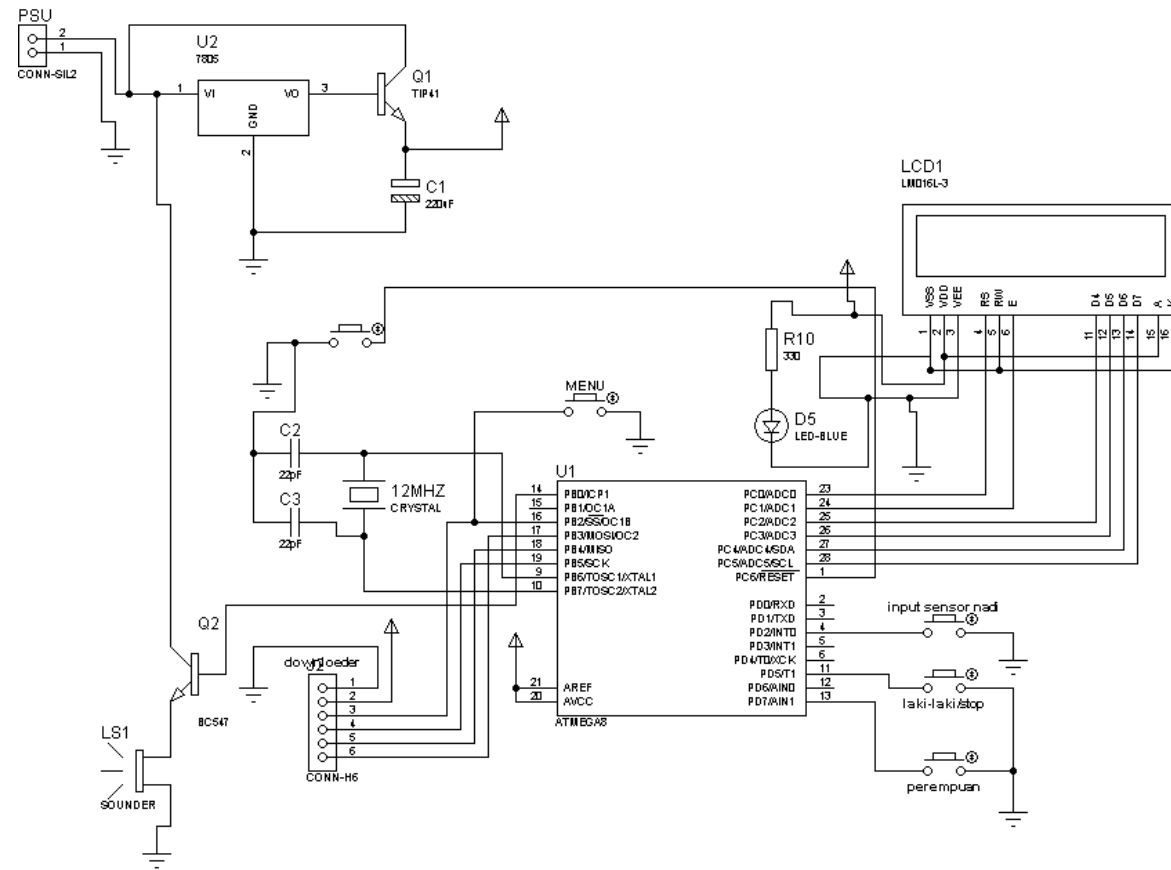
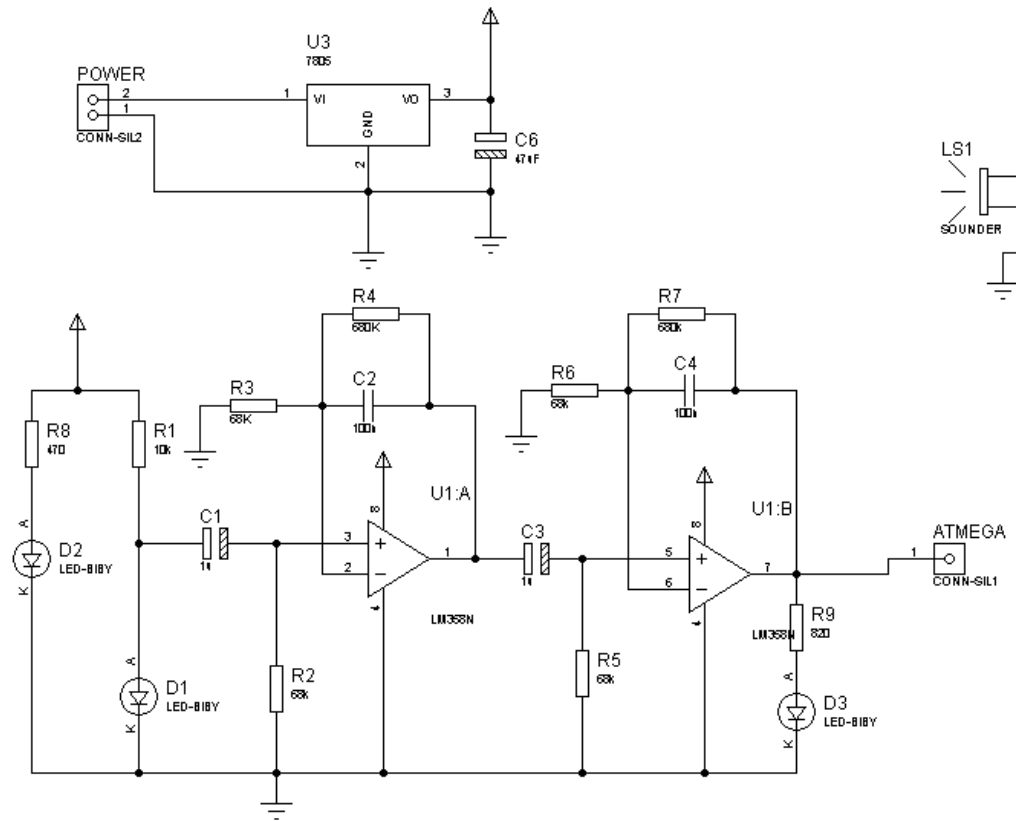


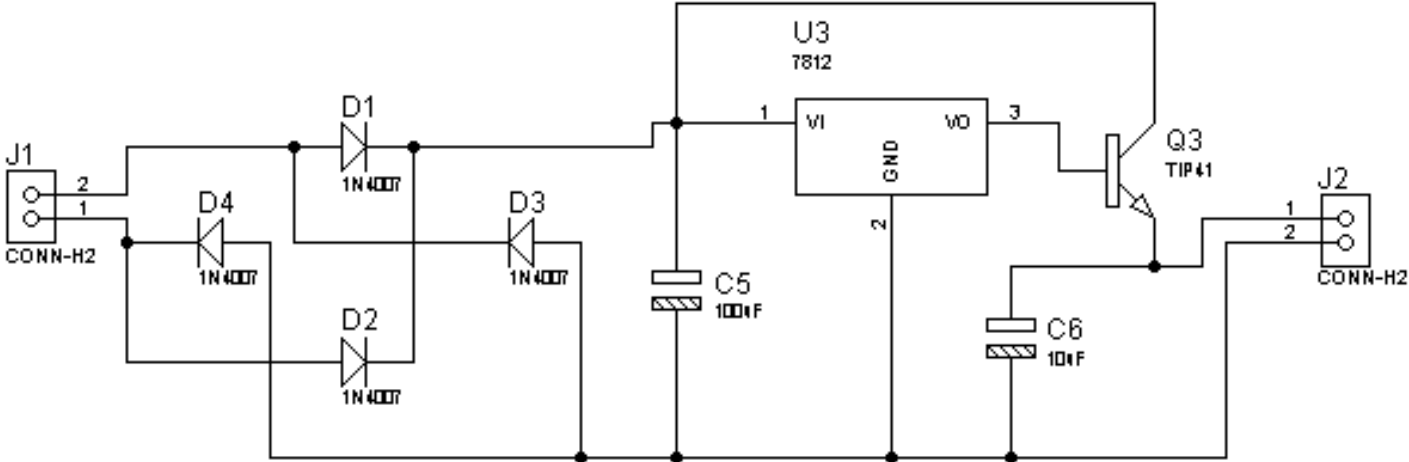
Rangkaian Minimum Sistem



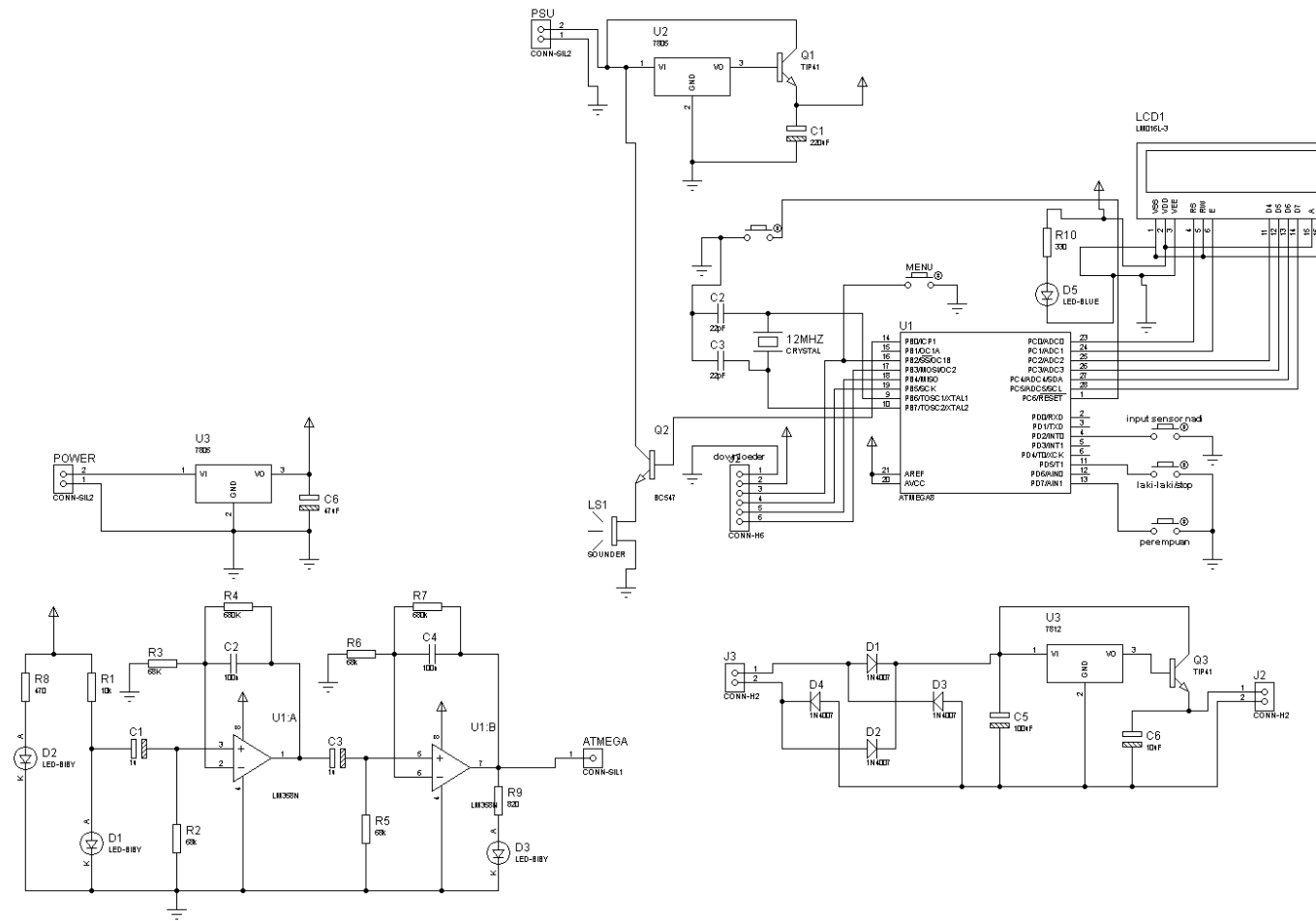
Rangkaian Sensor Nadi



Rangkaian Power Supply



Rangkaian Keseluruhan



Coding Program

```
#include <mega8.h>
#include <stdio.h>
#include <delay.h>
#include <stdlib.h>

// Alphanumeric LCD functions
#include <alcd.h>

int detak1, detak2, detak3, x, a, count, male, female; //int utk bil. bulat
int milisecond, second, minutes, hour;
unsigned char s=0, indeks, buf[33],bufs[33]; //unsigned char utk menyatakan karakter
float ahir, calculate2, calculate1; // bil. koma

// External Interrupt 0 service routine
interrupt [EXT_INT0] void ext_int0_isr(void)
{
// Place your code here
s=s+1;
}

// Timer1 overflow interrupt service routine
interrupt [TIM1_OVF] void timer1_ovf_isr(void)
{
// Place your code here

TCNT1H=0xf8;
TCNT1L=0xad;

{
if (++milisecond >= 1000)
```

```

{
milisecond=0;
count=count+1;
if (++second >= 60)
{
second=0;
if (++minutes >= 60)
{
minutes=0;
if (++hour >= 24)
{hour = 0;}
}
}
}
}

void hitung_mundur()
{
lcd_clear();
lcd_gotoxy(4,0);
lcd_putsf("Bersiap..");
lcd_gotoxy(7,1);
lcd_putsf(" 5");
delay_ms(1000);
lcd_gotoxy(7,1);
lcd_putsf(" 4");
delay_ms(1000);
lcd_gotoxy(7,1);
lcd_putsf(" 3");
}

```

```

delay_ms(1000);
lcd_gotoxy(7,1);
lcd_putsf(" 2");
delay_ms(1000);
lcd_gotoxy(7,1);
lcd_putsf(" 1");
delay_ms(1000);
lcd_gotoxy(4,1);
lcd_putsf("Mulai...");
delay_ms(300);
    second=0;
    milisecond=0;
    minutes=0;
    hour=0;
    count=0;
    lcd_clear();
    indeks=1; //indeks diisi data 1 untuk menandakan timer berjalan
}
// Declare your global variables here
void lcd()
{
lcd_gotoxy(0,0);
sprintf(buf, "  %d : %d : %d", minutes, second, milisecond); //sprintf utk memanggil
variable yg ditentukan.
lcd_puts(buf);

if(male=1 & indeks=1)
{
    lcd_gotoxy(0,1);

```

```

    lcd_putsf(" Laki - Laki");
}
if(female==1 && indeks==1)
{
    lcd_gotoxy(0,1);
    lcd_putsf(" Perempuan");
}

}

void buzzer_bunyi()
{
if (milisecond>=0 && milisecond<=30)
    {
    PORTB.0=1;
    }
else if (milisecond>=0 && milisecond<=2)
    {
    lcd_clear();
    }
else if (milisecond>=31 && milisecond<=50)
    {
    PORTB.0=0;
    }
else if (milisecond>=51 && milisecond<=80)
    {
    PORTB.0=1;
    }
}

```



```
else if (milisecond>=81 && milisecond<=100)
```

```
{  
  PORTB.0=0;  
}  
}
```

```
void kategorimale()
```

```
{  
  if (ahir <91&&male==1)
```

```
{  
  lcd_gotoxy(0,1);  
  lcd_putsf(" KURANG");  
}
```

```
else if (ahir >=91 && ahir <=102&&male==1)
```

```
{  
  lcd_gotoxy(0,1);  
  lcd_putsf(" CUKUP");  
}
```

```
else if (ahir >=103 && ahir <=115&&male==1)
```

```
{  
  lcd_gotoxy(0,1);  
  lcd_putsf(" BAIK");  
}
```

```
else if (ahir > 115&&male==1)
```

```
{  
  lcd_gotoxy(0,1);  
  lcd_putsf(" SANGAT BAIK");  
}
```

```

    }
}
void kategorifemale()
{
if (ahir <77&&female==1)
    {
    lcd_gotoxy(0,1);
    lcd_putsf("  KURANG");
    }
else if (ahir >=77 && ahir <=83&&female==1)
    {
    lcd_gotoxy(0,1);
    lcd_putsf("  CUKUP");
    }
else if (ahir >=84 && ahir <=91&&female==1)
    {
    lcd_gotoxy(0,1);
    lcd_putsf("  BAIK");
    }

else if (ahir > 91&&female==1)
    {
    lcd_gotoxy(0,1);
    lcd_putsf("  SANGAT BAIK");
    }
}
void main(void)
{
// Declare your local variables here

```

```
PORTB=0x04;
DDRB=0x01;

// Port C initialization
// Func6=In Func5=In Func4=In Func3=In Func2=In Func1=In Func0=In
// State6=T State5=T State4=T State3=T State2=T State1=T State0=T
PORTC=0x00;
DDRC=0x00;

// Port D initialization
// Func7=In Func6=Out Func5=In Func4=Out Func3=In Func2=In Func1=In Func0=In
// State7=T State6=0 State5=T State4=0 State3=T State2=T State1=T State0=T
PORTD=0x00;
DDRD=0x50;
PORTD.5=1;
PORTD.7=1;

// Timer/Counter 0 initialization
// Clock source: System Clock
// Clock value: Timer 0 Stopped
TCCR0=0x00;
TCNT0=0x00;

// Timer/Counter 1 initialization
// Clock source: System Clock
// Clock value: 187,500 kHz
// Mode: Normal top=0xFFFF
// OC1A output: Discon.
// OC1B output: Discon.
```

```
// Noise Canceler: Off
// Input Capture on Falling Edge
// Timer1 Overflow Interrupt: On
// Input Capture Interrupt: Off
// Compare A Match Interrupt: Off
// Compare B Match Interrupt: Off
TCCR1A=0x00;
TCCR1B=0x03;
TCNT1H=0xf8;
TCNT1L=0xad;
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=0xFF
// OC2 output: Disconnected
ASSR=0x00;
TCCR2=0x00;
TCNT2=0x00;
OCR2=0x00;

// External Interrupt(s) initialization
// INT0: On
```

```
// INT0 Mode: Falling Edge
// INT1: Off
GICR|=0x40;
MCUCR=0x02;
GIFR=0x40;

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

// USART initialization
// USART disabled
UCSRB=0x00;

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

// ADC initialization
// ADC disabled
ADCSRA=0x00;

// SPI initialization
// SPI disabled
SPCR=0x00;

// TWI initialization
// TWI disabled
```

```
TWCR=0x00;

// Alphanumeric LCD initialization
// Connections are specified in the
// Project | Configure | C Compiler | Libraries | Alphanumeric LCD menu:
// RS - PORTC Bit 5
// RD - PORTB Bit 1
// EN - PORTC Bit 2
// D4 - PORTC Bit 4
// D5 - PORTC Bit 3
// D6 - PORTC Bit 0
// D7 - PORTC Bit 1
// Characters/line: 16
lcd_init(16);
lcd_gotoxy(0,0);
lcd_putsf("Digital Harvard");
lcd_gotoxy(0,1);
lcd_putsf(" Step Test");
delay_ms(2000);
lcd_clear();
lcd_gotoxy(0,0);
lcd_putsf("1. Laki - Laki");
lcd_gotoxy(0,1);
lcd_putsf("2. Perempuan");
// Global enable interrupts
#asm("sei")

while (1)
{
```

```
if (indeks==0)
{
  lcd_gotoxy(0,0);
  lcd_putsf("1. Laki - Laki");
  lcd_gotoxy(0,1);
  lcd_putsf("2. Perempuan");
}
```

```
if (PINB.2==0)
{
  PORTB.0=0;male=0;female=0;
  while (PINB.2==0){} //mngulangi pengekseskuan bbrapa pernyataan
  minutes=0;
  second=0;
  milisecond=0;
  a=count;
  count=0;
  indeks=0;
  delay_us(500);
  lcd_clear();
}
```

```
if (PIND.7==0&&indeks==0)//tombol start ditekan
{
  hitung_mundur();
  male=1;
}
```

```
if (PIND.5==0&&indeks==0)//tombol start ditekan
{
```

```

hitung_mundur();
female=1;
}
if (indeks==1)//saat timer berjalan
{
    buzzer_bunyi();
    lcd();
    if (minutes==5)
    { PORTB.0=0;
      x=minutes;
      minutes=0;
      second=0;
      milisecond=0;
      a = count;
      delay_ms(200);
      lcd_gotoxy(0,0);
      sprintf(buf, "waktu = %d detik", count); //sprintf utk memanggil variable yg
ditentukan.
      lcd_puts(buf);
      delay_ms(1000);
      count=0;
      indeks=2;
      lcd_clear();
    }
    if (PIND.7==0&&indeks==1) //jika pada saat tes berlangsung tombol stop ditekan
    { PORTB.0=0;
      minutes=0;
      second=0;
      milisecond=0;

```



```
a=count;
delay_ms(200);
lcd_gotoxy(0,1);
sprintf(buf, "waktu = %d detik", a); //sprintf utk memanggil variable yg
ditenentukan.
```

```
lcd_puts(buf);
delay_ms(1000);
count=0;
indeks=2; //indeks diisi 2 untuk lanjut ke program istirahat 1 menit
delay_ms(500);
lcd_clear();
}
```

```
}
```

```
if (indeks==2 && second>=1 && second <=29) //istirahat 1 menit
```

```
{
```

```
lcd_gotoxy(0,0);
```

```
lcd_putsf(" Istirahat");
```

```
if (second>=30 && second<=60)
```

```
{
```

```
lcd_gotoxy(0,0);
```

```
lcd_putsf(" Letakkan Jari");
```

```
lcd_gotoxy(0,1);
```

```
lcd_putsf(" Jangan Dilepas");
```

```
}
```

```
if (minutes==1)
```

```
{
```

```
minutes=0;
```

```

second=0;

indeks=3;//indeks diisi 3 untuk lanjut ke program pembacaan nadi

s=0;

lcd_clear();
}
}

if (indeks==3) //pembacaan nadi selama 30 detik
{
    lcd_gotoxy(0,0);
    lcd_putsf(" Membaca Nadi 1");
    lcd_gotoxy(0,1);
    sprintf(bufs, " denyut = %d%",s);
    lcd_puts(bufs);
    if (second==30)
    {
        minutes=0;
        second=0;

        indeks=4; //indeks diisi 4 untuk lanjut ke program istirahat
        detak1=s; //data nadi 1
        lcd_clear();
    }
}

if (indeks==4) // istirahat ke 2 30 detik
{
    lcd();
    lcd_gotoxy(0,1);
    lcd_putsf("Istirahat ke 2");
    if (second==30)
    {

```

```

minutes=0;
second=0;
indeks=5; //indeks diisi 5 untuk lanjut ke baca nadi ke 2
s=0;
lcd_clear();
}
}
if (indeks==5) //pembacaan nadi ke 2
{
lcd_gotoxy(0,0);
lcd_putsf(" Membaca Nadi 2");
lcd_gotoxy(0,1);
sprintf(bufs," denyut = %d",s);
lcd_puts(bufs);
if (second==30)
{
minutes=0;
second=0;
indeks=6; //indeks diisi 6 untuk lanjut ke istirahat ke 3
detak2=s; //data nadi ke 2
lcd_clear();
}
}
if (indeks==6) // istirahat ke 3 30 detik
{
lcd();
lcd_gotoxy(0,1);
lcd_putsf("Istirahat ke 3");
if (second==30)

```

```

{
minutes=0;
second=0;
indeks=7; //indeks diisi 7 untuk lanjut ke baca nadi ke 3
s=0; //ambil
lcd_clear();
}
}
if (indeks==7)//baca nadi ke 3
{
lcd_gotoxy(0,0);
lcd_putsf(" Membaca Nadi 3");
lcd_gotoxy(0,1);
sprintf(bufs," denyut = %d",s); //sprintf utk memanggil variable yg ditentukan.
lcd_puts(bufs);
if (second==30)
{
minutes=0;
second=0;
indeks=8; // indeks diisi 8 untuk lanjut ke program perhitungan
TIMSK=0x00; //timer di matikan
lcd_clear();
detak3=s; //data nadi ke 3
}
}
if (indeks==8) //perhitungan
{
calculate1=2*(detak1+detak2+detak3);
calculate2=(float)100/calculate1;

```

```
    ahir=calculate2*a;
    lcd_gotoxy(1,0);
    sprintf(buf, " nilai = %2.1f ", ahir); //sprintf utk memanggil variable yg
ditenentukan.
    lcd_puts(buf);
    kategorimale();
    kategorifemale();
}
}
}
```

LAMPIRAN