

LAMPIRAN

A. Program Delphi

```
unit Unit1;
```

```
interface
```

```
uses
```

```
Windows, Messages, SysUtils, Variants, Classes, Graphics, Controls, Forms,
```

```
Dialogs, ExtCtrls, TeeProcs, TeEngine, Chart, StdCtrls, Strutils, Series,
```

```
jpeg;
```

```
type
```

```
TForm1 = class(TForm)
```

```
    Button1: TButton;
```

```
    Button2: TButton;
```

```
    OpenDialog1: TOpenDialog;
```

```
    Chart1: TChart;
```

```
    Memo1: TMemo;
```

```
    EditFileLoc: TEdit;
```

```
    Label1: TLabel;
```

```
    Label2: TLabel;
```

```
    Button4: TButton;
```

```
    Label3: TLabel;
```

```
    Label4: TLabel;
```

```
    Label5: TLabel;
```

```
    Label6: TLabel;
```

```
    Button3: TButton;
```

```
    Edit1: TEdit;
```

```
    Label7: TLabel;
```

```
    Edit2: TEdit;
```

```
    Label8: TLabel;
```

```
    Label9: TLabel;
```

```
ScrollBar1: TScrollBar;

Button5: TButton;

Label10: TLabel;

Label11: TLabel;

Label12: TLabel;

Label13: TLabel;

Image1: TImage;

Image2: TImage;

Button6: TButton;

Button7: TButton;

SaveDialog1: TSaveDialog;

Series2: TFastLineSeries;

procedure Button2Click(Sender: TObject);

procedure Button1Click(Sender: TObject);

procedure Button3Click(Sender: TObject);

procedure Button4Click(Sender: TObject);

procedure Chart1DragOver(Sender, Source: TObject; X, Y: Integer;
    State: TDragState; var Accept: Boolean);

procedure ScrollBar1Change(Sender: TObject);

procedure Button5Click(Sender: TObject);

procedure Edit1Change(Sender: TObject);

procedure Button6Click(Sender: TObject);

procedure Button7Click(Sender: TObject);

private
    { Private declarations }

public
    { Public declarations }

end;
```

```

var
    Form1: TForm1;
implementation
{$R *.dfm}
procedure TForm1.Button2Click(Sender: TObject);
begin
    Memo1.Lines.LoadFromFile(editfileloc.Text);
    label2.Caption:=inttostr(memo1.Lines.Count);
end;
procedure TForm1.Button1Click(Sender: TObject);
begin
    if OpenFileDialog1.Execute then
        begin
            editfileloc.Text :=OpenDialog1.FileName;
        end;
end;
procedure TForm1.Button3Click(Sender: TObject);
var jumlahdata:integer;
datake,dataasli, adc,tegangan, detak, BPM:double;
stringadcsaatini, stringadcsebelum: string;
adcsaatini, adcsebelum, tegsaatini,tegsebelum:double;
naik : boolean;
bataswaktu:integer;
begin
if strtoint(edit1.Text)<0 then ShowMessage('Minimal Value = 1');
chart1.Series[0].Clear;
detak:=0;
bataswaktu:=strtoint(edit1.Text)*45;//Rumus Menentukan Jumlah Data untuk Input
waktu//

```

```

label2.Caption:=inttostr(bataswaktu);
jumlahdata:=bataswaktu;
scrollbar1.Max:=jumlahdata;
scrollbar1.Min:=1;
for jumlahdata:=1 to jumlahdata-1 do
begin
stringadcsaatini :=memo1.Lines[jumlahdata]; stringadcsebelum
:=memo1.Lines[jumlahdata-1]; adcsaatini:=strtofloat(stringadcsaatini);
adcsebelum:=strtofloat(stringadcsebelum); //menentukan tegangan puncak//
tegsaatini:=adcsaatini*5/1023;
tegsebelum:=adcsebelum*5/1023;
if tegsaatini>tegsebelum then
begin
naik:=true;
end ;
if tegsaatini<tegsebelum then
begin
naik:=false;
end ;
if ((naik=false) and (tegsebelum>strtofloat(edit2.Text))) then //menentukan BPM//
begin
detak:=detak+1;
//BPM:=DETAH*3000/BATASWAKTU;
end;

chart1.Series[0].Add(adcsaatini/1023*5,floattostr(jumlahdata),clred) ;
//if (datake>=300) then

```

```

//begin
// chart1.Series[0].Clear;
// datake:=0;
//end; end;

label5.Caption:=floattostr(DETAK);

end;

procedure TForm1.Button4Click(Sender: TObject);
var jumlahdata:integer;
datake,dataasli, adc,tegangan, detak, waktu:double;
stringadcsaatini, stringadcsebelum: string;
adcsaatini, adcsebelum, tegsaatini,tegsebelum:double;
naik : boolean; begin
chart1.Series[0].Clear;
detak:=0;

jumlahdata:=memo1.Lines.Count;
scrollbar1.Max:=jumlahdata;
scrollbar1.Min:=1;

waktu:=jumlahdata/45;
label8.Caption:=formatfloat('###,0',waktu)+' Detik';
for jumlahdata := 1 to jumlahdata-1 do
begin
stringadcsaatini :=memo1.Lines[jumlahdata];
stringadcsebelum :=memo1.Lines[jumlahdata-1];
adcsaatini:=strtofloat(stringadcsaatini);
adcsebelum:=strtofloat(stringadcsebelum);

```

```

tegsaatini:=adcSaatini*5/1023;
tegsebelum:=adcsebelum*5/1023;
if tegsaatini>tegsebelum then
begin
naik:=true;
end ;
if tegsaatini<tegsebelum then
begin
naik:=false;
end ;
if ((naik=false) and (tegsebelum>strtofloat(edit2.Text))) then
begin
detak:=detak+1; end;
chart1.Series[0].Add(adcsaatini/1023*5,floattostr(jumlahdata),clred) ;
//if (datake>=300) then
//begin
// chart1.Series[0].Clear;
// datake:=0;
//end; end;
label5.Caption:=floattostr(detak);
end;
procedure TForm1.Chart1DragOver(Sender, Source: TObject; X, Y: Integer;
State: TDragState; var Accept: Boolean);
begin
//Chart1.Zoom.Allow:=True;
end;

```

```

procedure TForm1.ScrollBar1Change(Sender: TObject);
var jumlahdata:integer;
datake,dataasli, adc,tegangan, detak, waktu:double;
stringadcsaatini, stringadcsebelum: string;
adcsaatini, adcsebelum, tegsaatini,tegsebelum:double;
naik : boolean; begin
chart1.Series[0].Clear;
detak:=0;
jumlahdata:=scrollbar1.Position;
if jumlahdata>450 then //minimal data scrol barr berfungsi//
begin
for jumlahdata := jumlahdata-450 to jumlahdata-1 do
begin
stringadcsaatini :=memo1.Lines[jumlahdata];
stringadcsebelum :=memo1.Lines[jumlahdata-1];
adcsaatini:=strtofloat(stringadcsaatini);
adcsebelum:=strtofloat(stringadcsebelum);
tegsaatini:=adcsaatini*5/1023;
tegsebelum:=adcsebelum*5/1023;
if tegsaatini>tegsebelum then
begin
naik:=true;
end ;

if tegsaatini<tegsebelum then
begin
naik:=false;

```

```
end ;  
if ((naik=false) and (tegsebelum>strtofloat(edit2.Text))) then  
begin  
detak:=detak+1; end;  
chart1.Series[0].Add(adcsaatini/1023*5,floattostr(jumlahdata),clred) ;  
end;  
label5.Caption:=floattostr(detak);  
end;  
end;  
procedure TForm1.Button5Click(Sender: TObject);  
begin  
EditFileLoc.Text:='EditFileLoc';  
label5.Caption:='0';  
memo1.Clear;  
edit2.Text:='2,1';  
edit1.Text:='0';  
label2.Caption:='0';  
label8.Caption:='0';  
chart1.Series[0].Clear;  
end;  
procedure TForm1.Edit1Change(Sender: TObject);  
begin  
if length(edit1.Text)<1 then ShowMessage('Harus Di isi');  
end;  
procedure TForm1.Button6Click(Sender: TObject);  
var  
DCDesk: HDC;
```



```

bmp:TBitmap; begin
bmp:=Tbitmap.Create;
bmp.Height:=Screen.Height;
bmp.Width:=Screen.Width;
DCDesk:=GetWindowDC(GetDesktopWindow);
BitBlt(bmp.Canvas.Handle,0,0,Screen.Width,Screen.Height,DCDesk,0,0, SRCCOPY);
bmp.SaveToFile('ScreenShoot.bmp');
ReleaseDC(GetDesktopWindow,DCDesk);
bmp.Free;
end;
procedure TForm1.Button7Click(Sender: TObject);
begin
if savedialog1.Execute=true then
begin
chart1.SaveToBitmapFile(savedialog1.FileName+' Grafik.bmp');
end;
end;
end.

```

B. Program Arduino

```

#include <LiquidCrystal.h> //lcd
#include <Wire.h> //jalurnya lcd
#include <TimerOne.h> //timer
#include <SPI.h> //sd card
#include <SD.h> //sd card

#define cs 10 //Output an sd card

```

```
#define buton 8 //tombol start

#define adc  A0

LiquidCrystal lcd(2, 3, 4, 5, 6, 7); //rs,e,d4,d5,d6,d7

File myFile; //nama file

  unsigned int tanda=0,error_sd=0,timer=0,kunci=0,timersample=0;

  char buff[33];

  int bpmh=370,bpml=360,bpm=0,lockbpm=0,bpmfix=0;

  void timerIsr()

  {

  if(error_sd==0) timersample++;

  }

  void setup()

  {

  lcd.begin(16, 2);

  Serial.begin(9600);

  delayMicroseconds(1);

  pinMode(cs, OUTPUT );

  pinMode(buton, INPUT_PULLUP);

  if (!SD.begin(cs))

  {

  error_sd=1;

  lcd.clear();

  lcd.print("MicroSD Error!");

  delay(1000);

  }

  else
```

```

    { lcd.clear();
    lcd.print("MicroSD OK!");
    delay(1000);
    } Timer1.initialize(1000000);
Timer1.attachInterrupt( timerIsr );
lcd.clear();
}
void loop()
{
    int analog=analogRead(adc);
    if(timersample<60 && error_sd==0)
    {
        if(analog>bpmh && lockbpm==0){bpm++;lockbpm=1;} // menganggap sebagai
        denyutan
        if(analog<bpml && lockbpm==1){lockbpm=0;} // menganggap bukan denyutan
    }
    if(timersample>=60 && error_sd==0)
    { bpmfix=bpm;
    timersample=0;
    bpm=0;
    }
    if(digitalRead(buton)==LOW)
    {
        if(tanda==0)tanda=1;
    }
}

```

```
else tanda=0;

if(tanda==1){kunci=1;}

lcd.clear();

delay(200);

}

if(timer>=65535) tanda==0;

if(tanda==1 && error_sd==0)

{

myFile = SD.open("DATALOG.TXT", FILE_WRITE); // buat file

if (myFile)

{

if(kunci==1)

{

} kunci=0;

myFile.println(analog);

myFile.close();

}

}

lcd.setCursor(0,0);

if(error_sd==0)

{

if(tanda==1) lcd.print("Run ");

else lcd.print("Stop ");

}

else
```

```
{  
  lcd.print("Error");  
}  
  
  //lcd.setCursor(5,0);  
  
  //sprintf(buff,"T:%02d",timersample);  
  
  // lcd.print(buff);  
  
  lcd.setCursor(10,0);  
  
  sprintf(buff,"HR:%03d",bpmfix);  
  
  lcd.print(buff);  
  
  Serial.println(analog);  
}
```