

## LAMPIRAN 2 CODING

### // Login (Form 2)

```
Procedure TForm2.CekLogin;
begin
    DataModule1.ADODataSet1.Active:=False;
    DataModule1.ADODataSet1.CommandText:='Select * from user where
name="'+nama+'" and password="'+pass+'";
    DataModule1.ADODataSet1.Active:=True;
    if DataModule1.ADODataSet1.RecordCount>0 then
    begin
        status_login := True;
    end else
    begin
        status_login := False;
    end;
end;

procedure TForm2.sBitBtn2Click(Sender: TObject);
begin
Form2.Visible:=False;
Form1.Enabled:=True;
Form4.Enabled:=True;
Form5.Enabled:=True;
Form6.Enabled:=True;
Form7.Enabled:=True;
Form8.Enabled:=True;
Form9.Enabled:=True;
Form10.Enabled:=True;
Form12.Enabled:=True;
end;

procedure TForm2.sBitBtn1Click(Sender: TObject);
begin
    nama := sEdit1.Text;
    pass := sEdit2.Text;
    CekLogin;
    if status_login = True then
    begin
        sEdit3.Text:='True';
        Form1.Login1.Caption:='Logout';
        Form2.Visible:=False;
        Form1.Visible:=True;
    end else
    begin
        Form1.Login1.Caption:='Login';
        MessageDlg('User Name atau Password
Salah',mtInformation,[mbOK], 0);
        Form2.Visible:=true;
        sEdit3.Text:='False';
    end;
Form1.Enabled:=True;
Form4.Enabled:=True;
Form5.Enabled:=True;
Form6.Enabled:=True;
Form7.Enabled:=True;
Form8.Enabled:=True;
```

```

Form9.Enabled:=True;
Form10.Enabled:=True;
Form12.Enabled:=True;
end;

procedure TForm2.FormCreate(Sender: TObject);

begin
if sEdit3.Text='True' then
begin
    sEdit3.Text:='';
    sEdit1.Text:='';
    sEdit2.Text:='';
    Form1.Login1.Caption:='Login';
    Form1.Visible:=True;
    Form2.Visible:=False;
end else
begin
    sEdit1.Text:='';
    sEdit2.Text:='';
    sEdit3.Text:='';
end;
end;

procedure TForm2.FormActivate(Sender: TObject);
begin
Form1.Enabled:=False;
Form4.Enabled:=False;
Form5.Enabled:=False;
Form6.Enabled:=False;
Form7.Enabled:=False;
Form8.Enabled:=False;
Form9.Enabled:=False;
Form10.Enabled:=False;
Form12.Enabled:=False;
sEdit1.SetFocus;
if sEdit3.Text='True' then
begin
    sEdit3.Text:='';
    sEdit1.Text:='';
    sEdit2.Text:='';
    Form1.Login1.Caption:='Login';
    status_login:=False;
end else
begin
    sEdit1.Text:='';
    sEdit2.Text:='';
    sEdit3.Text:='';
end;
end;

end.

// Procedure GrayScalling

procedure TForm5.GrayScale;
var
temp:PByteArray;

```

```

i,j : integer;
x : byte;
digit : byte;
begin
gambar := TBitmap.Create;
gambar.LoadFromFile(OpenPictureDialog1.FileName);
if gambar.PixelFormat<>pf24bit then
gambar.PixelFormat := pf24bit;
image1.Picture.Bitmap := gambar;
for j:=0 to gambar.Height-1 do
begin
temp := gambar.ScanLine[j];
i:=0;
repeat
x := round(0.11*temp[i]+0.59*temp[i+1]+0.3*temp[i+2]);
for digit:=0 to 2 do
temp[i+digit]:=x;
inc(i,3);
until i >= 3*gambar.Width-1;
end;
image1.Picture.Bitmap:=gambar;
end;

```

## // Procedure Thresholding

```

Procedure AB;
Begin
gray:= cvCreateImage(cs, 8, 1);
cvCvtColor(src, gray, CV_BGR2GRAY);
bin:= cvCreateImage(cs, gray.Depth, 1);
//cvThreshold(gray, bin, 127, 127, CV_THRESH_BINARY);
cvThreshold(gray,bin,127,127,CV_THRESH_BINARY+CV_THRESH_OTSU);
ImgTmp:= cvCreateImage(Cs, src.Depth, 1);
Cse:= cvCreateStructuringElementEx(15, 15, 10, 10,
CV_SHAPE_ELLIPSE);
cvMorphologyEx(bin, bin, ImgTmp, Cse, CV_MOP_CLOSE, 1);
cvAdaptiveThreshold(bin, bin, 255, CV_ADAPTIVE_THRESH_GAUSSIAN_C,
CV_THRESH_BINARY,75,10);
End;

```

```

procedure TForm5.Threshold;
var
Path,pathh: String;
begin
src:= cvLoadImage(pChar(OpenPictureDialog1.FileName));
cs.Width:= src.Width; cs.Height:= src.Height;
AB;
path:=extractFilePath(paramstr(0));
pathh:=path+'Lembar LJK/pros.bmp';
cvSaveImage(pChar(pathh), bin);
Image1.Picture.Bitmap:=nil;
gambar := TBitmap.Create;
gambar.LoadFromFile(pathh);
image1.Picture.Bitmap:=gambar;
end;

```

### // Procedure untuk Mengidentifikasi Kode Naskah

```
Procedure TForm5.IdentifikasiKodeNaskah;  
var  
i,j,k,l : integer;  
konas : array [1..3] of integer;  
konas1 : array [1..3] of string;  
temp, temp2: integer;  
p:TColor;  
begin  
  for i:=1 to 3 do  
  begin  
    konas[i]:=40;  
    for j:=0 to 9 do  
    begin  
      temp2:=0;  
      for k:=0 to 17 do  
      begin  
        for l:=0 to 16 do  
        begin  
          p:=gambar.Canvas.Pixels[850+(i*25)+k,840+(j*25)+l];  
          temp:= GetRValue(p);  
          if temp > 250 then  
          begin  
            temp2:=temp2+0;  
          end else  
          begin  
            temp2:=temp2+1;  
          end;  
        end;  
      end;  
      if (temp2>80) and (konas[i]>j) then  
      begin  
        konas[i]:=j;  
        temp2:=0;  
      end else  
      begin  
        temp2:=0;  
      end;  
    end;  
  end;  
  konas1[i]:=inttostr(konas[i]);  
end;  
sEdit3.Text:=konas1[1]+konas1[2]+konas1[3];  
end;
```

### // Procedure untuk Mengidentifikasi Nama Siswa

```
Procedure TForm5.IdentifikasiNama;  
var  
i,j,k,l : integer;  
jawab : array [1..30] of integer;  
temp, temp2 : integer;  
nama : array [1..30] of char;  
p:TColor;  
begin  
  for i:=1 to 30 do  
  begin  
    jawab[i]:=40;  
    for j:=1 to 26 do
```

```

begin
temp2:=0;
for k:=0 to 17 do
  begin
    for l:=0 to 16 do
      begin
        p:=gambar.Canvas.Pixels[74+(i*25)+k,416+(j*25)+l];
        temp:= GetRValue(p);
        if temp > 250 then
          begin
            temp2:=temp2+0;
          end else
          begin
            temp2:=temp2+1;
          end;
        end;
      end;
    end;
    if (temp2>110) and (jawab[i]>j) then
      begin
        jawab[i]:=j;
        temp2:=0;
      end else
      begin
        temp2:=0;
      end;
    end;
  end;
  if jawab[i]>26 then
    begin
      nama[i]:= ' ';
    end else
    begin
      nama[i]:=chr(64+jawab[i]);
    end;
  end;
  sEdit1.Text:=nama[1]+nama[2]+nama[3]+nama[4]+nama[5]+nama[6]+nama[
7]+nama[8]+nama[9]+nama[10]

+nama[11]+nama[12]+nama[13]+nama[14]+nama[15]+nama[16]+nama[17]+na
ma[18]+nama[19]+nama[20]

+nama[21]+nama[22]+nama[23]+nama[24]+nama[25]+nama[26]+nama[27]+na
ma[28]+nama[29]+nama[30];
end;

```

### // Procedure untuk Mengidentifikasi Nomor Peserta

```

Procedure TForm5.IdentifikasiNoPeserta;
var
i,j,k,l : integer;
nopes : array [1..11] of integer;
nopes1 : array [1..11] of string;
temp, temp2 : integer;
p:TColor;
begin
for i:=1 to 10 do
begin
nopes[i]:=40;
for j:=0 to 9 do
begin

```

```

temp2:=0;
for k:=0 to 17 do
  begin
    for l:=0 to 16 do
      begin
        p:=gambar.Canvas.Pixels[850+(i*25)+k,415+(j*25)+l];
        temp:= GetRValue(p);
        if temp > 250 then
          begin
            temp2:=temp2+0;
          end else
          begin
            temp2:=temp2+1;
          end;
        end;
      end;
    end;

    if (temp2>80) and (nopes[i]>j) then
      begin
        nopes[i]:=j;
        temp2:=0;
      end else
      begin
        temp2:=0;
      end;
    end;
  end;
  if nopes[i]>9 then
    begin
      nopes1[i]:=' ';
    end else
    begin
      nopes1[i]:=inttostr(nopes[i]);
    end;
  end;
  sEdit2.Text:=nopes1[1]+nopes1[2]+nopes1[3]+nopes1[4]+nopes1[5]+nopes1[6]+nopes1[7]+nopes1[8]+nopes1[9]+nopes1[10]+nopes1[11];
end;

```

### **// Procedure untuk Mengidentifikasi Bubble Jawaban Siswa**

```

procedure TForm5.IdentifikasiBubble;
var
g,h,i,j,k,l,m, jumlah_soal, benar, salah : integer;
jawab: array [1..100] of integer;
jawab1 : array[1..100] of char;
temp1, temp2: integer;
p:TColor;
begin
  for h:=0 to 4 do
    begin
      for i:=1 to 20 do
        begin
          for j:=1 to 5 do
            begin
              temp2:=0;
              for k:=0 to 17 do
                begin
                  for l:=0 to 16 do

```

```

begin
p:=gambar.Canvas.Pixels[100+(h*150)+(j*25)+k,1142+(i*25)+1];
temp1:= GetRValue(p);
if temp1 > 250 then
begin
temp2:=temp2+0;
end else
begin
temp2:=temp2+1;
end;
end;
end;
if temp2>30 then
begin
jawab[(h*20)+i]:=j;
temp2:=0;
end else
begin
temp2:=0;
end;
end;
end;
end;
end;

```

```

for g:=1 to 100 do
begin
if jawab[g] > 5 then
begin
jawab1[g]:=' ';
end else
if jawab[g] < 1 then
begin
jawab1[g]:=' ';
end else
begin
jawab1[g]:=chr(64+jawab[g]);
end;
end;
end;

```

### **// Procedure untuk Membuat Temporary Kunci Jawaban**

```

if Form2.sEdit3.Text='True' then
begin
benar:=0;
salah:=0;
DataModule1.ADODataSet1.Active:=False;
DataModule1.ADODataSet1.CommandText:='select * from
kunci_jawaban where kode_kunci="'+sEdit3.Text+'";
DataModule1.ADODataSet1.Active:=True;
if DataModule1.ADODataSet1.RecordCount>0 then
begin
with DataModule1.ADODataSet1 do
begin
jumlah_soal:=strtoint(FieldByName('jumlah_soal').Value);
StringGrid1.RowCount:=jumlah_soal+3;
StringGrid1.Cells[0,jumlah_soal+1]:='Benar';
StringGrid1.Cells[0,jumlah_soal+2]:='Salah';
for m:=1 to jumlah_soal do

```

```

begin
  if jawab1[m]=FieldByName('no'+inttostr(m)).Value then
  begin
    benar:=benar+1;
  end else
  begin
    salah:=salah+1;
  end;
end;
StringGrid1.Cells[1,jumlah_soal+1]:=inttostr(benar);
StringGrid1.Cells[1,jumlah_soal+2]:=inttostr(salah);
sEdit4.Text:=StringGrid1.Cells[1,jumlah_soal+1];
sEdit5.Text:=StringGrid1.Cells[1,jumlah_soal+2];
end;
end;
end else
begin
  jumlah_soal:=100;
  StringGrid1.RowCount:=101;
end;

for g:=1 to jumlah_soal do
begin
  StringGrid1.Cells[0,0] := 'No';
  StringGrid1.Cells[1,0] := 'Jawaban';
  StringGrid1.Cells[1,g] := (jawab1[g]);
  stringgrid1.Cells[0,g] := inttostr(g);
end;

end;

procedure TForm5.FormCreate(Sender: TObject);
begin
  sButton3.Caption:='&Open File';
  sbutton1.Caption:='&Periksa';
  sButton2.Caption:='&GrayScaling';
  sButton4.Caption:='&Binerisasi';
  sButton5.Caption:='&Identifikasi';
  sButton6.Caption:='&Simpan';
end;

procedure TForm5.sButton3Click(Sender: TObject);
var
  Col, Row, i, j: integer;
begin
  if not openpicturedialog1.Execute then exit else
  begin
    gambar := TBitmap.Create;
    gambar.LoadFromFile(OpenPictureDialog1.FileName);
    Form5.Caption:='Identifikasi LJK Peserta Ujian -
'+extractFileName(OpenPictureDialog1.FileName);
    end;
  Image1.Picture.Bitmap := gambar;
  sButton1.Enabled:=True;
  sButton2.Enabled:=True;
  sButton4.Enabled:=False;
  sButton5.Enabled:=False;
  sButton6.Enabled:=False;
begin

```

```

sEdit1.Text:='';
sEdit2.Text:='';
sEdit3.Text:='';
Col:= StringGrid1.ColCount;
Row:= StringGrid1.RowCount;
for i:=0 to Row do
  for j:=0 to col do begin
    StringGrid1.Cells[j,i]:='';
  end;
end;
end;
end;
procedure TForm5.sButton2Click(Sender: TObject);
begin
GrayScale;
sButton2.Enabled:=False;
sButton1.Enabled:=False;
sButton4.Enabled:=True;
end;

procedure TForm5.sButton4Click(Sender: TObject);
begin
Threshold;
sButton4.Enabled:=False;
sButton5.Enabled:=True;
end;

procedure TForm5.sButton5Click(Sender: TObject);
begin
IdentifikasiNama;
IdentifikasiNoPeserta;
IdentifikasiKodeNaskah;
IdentifikasiBubble;
sButton5.Enabled:=False;
CekLogin;
end;

procedure TForm5.sButton7Click(Sender: TObject);
begin
Form1.Close;
end;

procedure TForm5.FormClose(Sender: TObject; var Action:
TCloseAction);
begin
Form1.Close;
end;

```

### **// Procedure untuk Mengidentifikasi Jawaban Secara Keseluruhan**

```

procedure TForm5.sButton1Click(Sender: TObject);
var
iawal, iakhir, iselisih : real;
begin
iawal:=GetTickCount;
GrayScale;
Threshold;
IdentifikasiNama;

```

```

IdentifikasiNoPeserta;
IdentifikasiKodeNaskah;
IdentifikasiBubble;
iakhir:=GetTickCount;
iselisih := (iakhir-iawal)/1000;
if sCheckBox1.Checked then
    begin
        MessageDlg('Waktu Proses
'+floattostr(iselisih),mtInformation,[mbOk],0);
    end;
CekLogin;
end;

```

### // Procedure untuk Menyimpan Jawaban ke dalam Database

```

procedure TForm5.sButton6Click(Sender: TObject);
var
nama, nopes, konas, SQL, temp_kunci, benar, salah: string;
i,j, jumlah_data, jumlah_benar, ulang : integer;
hasil : double;
Col, Row: integer;
begin
nama := sEdit1.Text;
nopos := sEdit2.Text;
konas := sEdit3.Text;

DataModule1.ADODataSet1.Active:=False;
DataModule1.ADODataSet1.CommandText:='select jumlah_soal from
kunci_jawaban where kode_kunci ='+konas+'';
DataModule1.ADODataSet1.Active:=True;
if DataModule1.ADODataSet1.RecordCount<1 then
begin
    ulang:=100;
end else
begin
    with DataModule1.ADODataSet1 do
        begin
            Ulang:=strtoint(FieldByName('jumlah_soal').Value);
        end;
    end;
    benar:=sEdit4.Text;
    salah:=sEdit5.Text;
    DataModule1.ADODataSet1.Active:=False;
    DataModule1.ADODataSet1.CommandText:='Select * from jawaban where
no_pes='+nopos+' and nama_pes='+nama+' and
kode_naskah='+konas+'';
    DataModule1.ADODataSet1.Active:=True;
if DataModule1.ADODataSet1.RecordCount<1 then
begin
        SQL := 'insert into jawaban
(no_pes,nama_pes,kode_naskah,benar,salah) values
('+nopos+', '+nama+', '+konas+', '+benar+', '+salah+')';
        DataModule1.ADOConnection1.Execute(SQL);
    end;

for i:=1 to ulang do
begin
    if StringGrid1.Cells[1,i] = 'A' then
        begin

```

```

        SQL := 'update jawaban set
no'+inttostr(i)+'=''+StringGrid1.Cells[1,i]+''' where
no_pes=''+nopes+''' and nama_pes=''+nama+''' and
kode_naskah=''+konas+''';
        DataModule1.ADOConnection1.Execute (SQL);
    end else
    if StringGrid1.Cells[1,i] = 'B' then
    begin
        SQL := 'update jawaban set
no'+inttostr(i)+'=''+StringGrid1.Cells[1,i]+''' where
no_pes=''+nopes+''' and nama_pes=''+nama+''' and
kode_naskah=''+konas+''';
        DataModule1.ADOConnection1.Execute (SQL);
    end else
    if StringGrid1.Cells[1,i] = 'C' then
    begin
        SQL := 'update jawaban set
no'+inttostr(i)+'=''+StringGrid1.Cells[1,i]+''' where
no_pes=''+nopes+''' and nama_pes=''+nama+''' and
kode_naskah=''+konas+''';
        DataModule1.ADOConnection1.Execute (SQL);
    end else
    if StringGrid1.Cells[1,i] = 'D' then
    begin
        SQL := 'update jawaban set
no'+inttostr(i)+'=''+StringGrid1.Cells[1,i]+''' where
no_pes=''+nopes+''' and nama_pes=''+nama+''' and
kode_naskah=''+konas+''';
        DataModule1.ADOConnection1.Execute (SQL);
    end else
    if StringGrid1.Cells[1,i] = 'E' then
    begin
        SQL := 'update jawaban set
no'+inttostr(i)+'=''+StringGrid1.Cells[1,i]+''' where
no_pes=''+nopes+''' and nama_pes=''+nama+''' and
kode_naskah=''+konas+''';
        DataModule1.ADOConnection1.Execute (SQL);
    end else
    begin
        SQL := 'update jawaban set no'+inttostr(i)+'=''' where
no_pes=''+nopes+''' and nama_pes=''+nama+''' and
kode_naskah=''+konas+''';
        DataModule1.ADOConnection1.Execute (SQL);
    end;
end;
DataModule1.ADODataSet1.Active:=False;
DataModule1.ADODataSet1.CommandText:='select * from jawaban where
kode_naskah=''+konas+''';
DataModule1.ADODataSet1.Active:=True;
jumlah_data:=DataModule1.ADODataSet1.RecordCount;
DataModule1.ADODataSet1.Active:=False;
DataModule1.ADODataSet1.CommandText:='select * from analisis where
kode_naskah=''+konas+''';
DataModule1.ADODataSet1.Active:=True;
if DataModule1.ADODataSet1.RecordCount<1 then
begin
    SQL := 'insert into analisis (kode_naskah) values
(''+konas+'')';
    DataModule1.ADOConnection1.Execute (SQL);

```

```

end;
for i:=1 to ulang do
begin
  DataModule1.ADODataSet1.Active:=False;
  DataModule1.ADODataSet1.CommandText:='select no'+inttostr(i)+'
from kunci_jawaban where kode_kunci="'+konas+'";
  DataModule1.ADODataSet1.Active:=True;
  with DataModule1.ADODataSet1 do
  begin
    temp_kunci:=FieldByName('no'+inttostr(i)).Value;
  end;
  DataModule1.ADODataSet1.Active:=False;
  DataModule1.ADODataSet1.CommandText:='select * from jawaban
where kode_naskah="'+konas+'" and
no'+inttostr(i)+'="'+temp_kunci+'";
  DataModule1.ADODataSet1.Active:=True;
  jumlah_benar:=DataModule1.ADODataSet1.RecordCount;
  hasil:=jumlah_benar/jumlah_data;

```

### // Procedure Analisis Butir Soal

```

  if hasil<0.31 then
  begin
    SQL := 'update analisis set no'+inttostr(i)+'="Sukar" where
kode_naskah="'+konas+'";
  end else
  begin
    if hasil < 0.71 then
    begin
      SQL := 'update analisis set no'+inttostr(i)+'="Sedang"
where kode_naskah="'+konas+'";
    end else
    begin
      SQL := 'update analisis set no'+inttostr(i)+'="Mudah" where
kode_naskah="'+konas+'";
    end;
  end;
  DataModule1.ADOConnection1.Execute (SQL) ;
end;

MessageDlg('Data Telah Disimpan Ke Database',mtInformation,[mbOK],
0);
begin
sEdit1.Text:='';
sEdit2.Text:='';
sEdit3.Text:='';
Col:= StringGrid1.ColCount;
Row:= StringGrid1.RowCount;
Image1.Picture:=nil;
  for i:=0 to Row do
  for j:=0 to col do begin
    StringGrid1.Cells[j,i]:='';
  end;
end;
end;
end;

```