



НАЦІОНАЛЬНИЙ ТЕХНІЧНИЙ УНІВЕРСИТЕТ УКРАЇНИ
“КИЇВСЬКИЙ ПОЛІТЕХНІЧНИЙ ІНСТИТУТ
імені ІГОРЯ СІКОРСЬКОГО”

Факультет прикладної математики

Кафедра системного програмування і спеціалізованих комп’ютерних систем

Лабораторна робота № 6

з дисципліни «Периферійні пристрої»

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Перевірив(ла): _____

- ## Паралельна передача даних в режимі 0

Алгоритм функціонування системи

- 1.Ініціалізація I8255-1.
- 2.Ініціалізація I8255-2.
- 3.Ініціалізація I8253 Сч0.
- 4.Запис константи в лічильник 0 (64h).
- 5.Очікування сигналу ГП-П.=1
- 6.Формування сигналу ГП-П = 1.
7. Очікування сигналу ЗП-П.=1
- 8.Видача байта на канал РА(I8255-1).
- 9.Формування сигналу СТР-П =1.
- 10.Чекання скидання сигналу ЗП-П=0
- 11.Скидання сигналу СТР-П=0
- 12.Перевірка виходу Out Сч0, якщо Out Сч0 = 0, то перехід до пункту 7, інакше до п.13.
- 13.Перезапуск Сч0.
- 14.Скидання сигналу ГИ-П.
- 15.Чекання сигналу ГП-І=1
- 16.Формування сигналу ГП- І = 1.
- 17.Формування сигналу ЗП- І = 1.
- 18.Чекання сигналу СТР- І =1
- 19.Зчитування байта з каналу РВ (I8255-2).
- 20.Скидання сигналу ЗП- І =0
- 21.Чекання скидання сигналу СТР- І =0
- 22.Перевірка виходу Out Сч0, якщо Out Сч0 = 0, то перехід до пункту 17, інакше – п.23.
- 23 Перевірка чи не виключена система, якщо ні – то чекання, інакше – перехід до п. 24.
24. Кінець.

Програма керування на асемблері

Базові адреси:

MC I18255-1 PУC-1FH

MC I18255-2 PУC-1BH

MC I18253 - PУC-17H

SI – указатель адреса переданого байта

DI - указатель адреса пам'яті, куди міститься отриманий байт

```
start:
MOV
OUT
AL , 81h ;Ініціалізація I8255-1.
lFh, AL

MOV
OUT
AL , 83h ;Ініціалізація I8255-2.
lBh, AL
MOV
OUT
AL , 10h ;ініціалізація MC I8253

17h, AL
MOV
OUT
AL , 64h ;запис константи 64h у Сч0
14h, AL
a1 :
IN
TEST Z
AL , lEh ;Очікування сигналу ГП-П=1
AL, 04h
a1

MOV AL, 09h ;Формування сигналу ГІ-П = 1
OUT lFh, AL
a2:
IN AL , lEh ;Очікування сигналу ЗП-П=1
TEST AL, 08h
JZ a2
MOV AL, [SI] ;Видача байта на канал РА(I8255-1).
INC SI
OUT lCh,AL
MOV AL , 0Fh ;Формування сигналу СТР-П =1.
OUT lFh, AL
a3:
IN AL , lEh ; Чекання скидання
сигналу ЗП-П=0

TEST AL, 08h
JNZ a3
MOV AL, 0Eh ;Скидання сигналу СТР-
```

```

П=0
OUT 1Fh, AL
IN AL, 1Ah ;Перевірка сигналу Out

Сч0 = 0

TEST AL, 04h
JZ a2
MOV AL, 10h ;Перезапуск Сч0.
OUT 17h, AL
MOV AL, 08h ; Скидання сигналу ГІ-П
OUT 1Fh, AL
b1:

IN AL, 1Ah ; Чекання сигналу ГІ-І
TEST AL, 02h
JZ b1
MOV AL, 0Bh ;Формування сигналу ГП-І

I
OUT 1Bh, AL
B4:MOV AL, 0Dh ;Формування сигналу ЗП- І
OUT 1Bh, AL
b2:
IN AL, 1Ah ;Чекання сигналу СТР- І
TEST AL, 01h
JZ b2
IN AL, 19h ;Зчитування байта з каналу

PB
MOV [DI], AL
INC DI
MOV AL, 0Ch ;Скидання сигналу ЗО-І
OUT 1Bh, AL
b3:
IN AL, 1Ah ;Чекання скидання сигналу

СТР- І

TEST AL, 01h
JNZ b3
IN AL, 1Ah ;Перевірка чи не
виключена система, якщо
ні - то чекання, інакше -
перехід до п. 24.

TEST AL, 04h
JZ b4
B5:
IN AL, 1Ah
TEST AL, 02H
JNZ B5
end ;кінець

```

Код основного модуля моделирующей программы, реализованной на Delphi10:

```
unit Unit1;

interface

uses
  Windows, Messages, SysUtils, Variants, Classes, Graphics, Controls,
  Forms,
  Dialogs, ExtCtrls, StdCtrls;

type
  TForm1 = class(TForm)
    Shape1: TShape;
    Shape2: TShape;
    Shape3: TShape;
    Shape4: TShape;
    Shape5: TShape;
    Label1: TLabel;
    Label2: TLabel;
    Label3: TLabel;
    Label4: TLabel;
    Shape6: TShape;
    Label5: TLabel;
    Label6: TLabel;
    Label7: TLabel;
    pb1: TPaintBox;
    pb2: TPaintBox;
    pb3: TPaintBox;
    pb4: TPaintBox;
    pb5: TPaintBox;
    pb6: TPaintBox;
    pb7: TPaintBox;
    pb8: TPaintBox;
    pb9: TPaintBox;
    pb10: TPaintBox;
    Shape7: TShape;
    pb11: TPaintBox;
    pb12: TPaintBox;
    pb13: TPaintBox;
    Label8: TLabel;
    pb14: TPaintBox;
    pb15: TPaintBox;
    pb16: TPaintBox;
    pb17: TPaintBox;
    pb18: TPaintBox;
    Shape8: TShape;
    Shape9: TShape;
    Shape10: TShape;
    pb22: TPaintBox;
    pb23: TPaintBox;
    pb24: TPaintBox;
    pb19: TPaintBox;
    pb20: TPaintBox;
    pb21: TPaintBox;
    pb25: TPaintBox;
    Label9: TLabel;
    Label10: TLabel;
```

Label11: TLabel;
Label12: TLabel;
Label13: TLabel;
Label14: TLabel;
Label15: TLabel;
Label16: TLabel;
Label18: TLabel;
Label19: TLabel;
Label20: TLabel;
Label21: TLabel;
Label22: TLabel;
Label23: TLabel;
Label24: TLabel;
Label25: TLabel;
Label26: TLabel;
Label27: TLabel;
Label28: TLabel;
Label29: TLabel;
Label30: TLabel;
Label31: TLabel;
Label32: TLabel;
Label33: TLabel;
Label34: TLabel;
Label35: TLabel;
Label36: TLabel;
Label37: TLabel;
Label38: TLabel;
Label39: TLabel;
Label40: TLabel;
Label41: TLabel;
Label42: TLabel;
Label43: TLabel;
Label44: TLabel;
Label45: TLabel;
Label46: TLabel;
Label47: TLabel;
Label48: TLabel;
Label49: TLabel;
Label50: TLabel;
Label51: TLabel;
Label52: TLabel;
Label53: TLabel;
Label54: TLabel;
Label55: TLabel;
Label56: TLabel;
Label57: TLabel;
Label58: TLabel;
Label59: TLabel;
Label60: TLabel;
Label61: TLabel;
Label62: TLabel;
Label63: TLabel;
Label64: TLabel;
Label65: TLabel;
Label66: TLabel;
Label67: TLabel;
Label68: TLabel;
Label69: TLabel;
Label70: TLabel;
Label71: TLabel;
Label72: TLabel;

```

Label173: TLabel;
Label174: TLabel;
Label175: TLabel;
Label176: TLabel;
Label177: TLabel;
Label178: TLabel;
Edit1: TEdit;
Edit2: TEdit;
Edit3: TEdit;
Button1: TButton;
Button2: TButton;
Timer3: TTimer;
Timer4: TTimer;
Timer5: TTimer;
Timer6: TTimer;
Timer7: TTimer;
Timer8: TTimer;
Timer1: TTimer;
Timer2: TTimer;
Timer9: TTimer;
Label117: TLabel;
Label179: TLabel;
Label180: TLabel;
Label181: TLabel;
Label182: TLabel;
PaintBox1: TPaintBox;
Label183: TLabel;
Label184: TLabel;
procedure pb1Paint(Sender: TObject);
procedure pb3Paint(Sender: TObject);
procedure pb5Paint(Sender: TObject);
procedure pb2Paint(Sender: TObject);
procedure pb4Paint(Sender: TObject);
procedure pb6Paint(Sender: TObject);
procedure pb7Paint(Sender: TObject);
procedure pb10Paint(Sender: TObject);
procedure pb8Paint(Sender: TObject);
procedure pb9Paint(Sender: TObject);
procedure pb11Paint(Sender: TObject);
procedure pb12Paint(Sender: TObject);
procedure pb13Paint(Sender: TObject);
procedure pb14Paint(Sender: TObject);
procedure pb15Paint(Sender: TObject);
procedure pb16Paint(Sender: TObject);
procedure pb17Paint(Sender: TObject);
procedure pb18Paint(Sender: TObject);
procedure pb22Paint(Sender: TObject);
procedure pb23Paint(Sender: TObject);
procedure pb24Paint(Sender: TObject);
procedure pb19Paint(Sender: TObject);
procedure pb20Paint(Sender: TObject);
procedure pb21Paint(Sender: TObject);
procedure pb25Paint(Sender: TObject);
procedure Button1Click(Sender: TObject);
procedure Timer3Timer(Sender: TObject);
procedure Timer4Timer(Sender: TObject);
procedure Timer5Timer(Sender: TObject);
procedure Timer6Timer(Sender: TObject);
procedure Timer7Timer(Sender: TObject);
procedure Timer8Timer(Sender: TObject);
procedure Button2Click(Sender: TObject);

```



```

    procedure Timer1Timer(Sender: TObject);
    procedure Timer2Timer(Sender: TObject);
    procedure Timer9Timer(Sender: TObject);

private
    { Private declarations }
public
    { Public declarations }
end;

var
    Form1: TForm1;
    k,l,a,b,i,j:byte;
    p1,p2,s1,s5,s2,s3,t,s4,tm,s6,f,fm,g,v,s1e,s3e,s4e:boolean;
implementation

{$R *.dfm}

procedure TForm1.pb1Paint(Sender: TObject);
begin
    with pb1.Canvas do
        begin
            Pen.Width:=4;
            MoveTo(1,6);
            LineTo(169,6);
            LineTo(159,1);
            MoveTo(169,6);
            LineTo(159,11);
            MoveTo(85,10);
            LineTo(90,1);
            Label79.Caption := '8';
        end;
    end;

procedure TForm1.pb3Paint(Sender: TObject);
begin
    with pb3.Canvas do
        begin
            Pen.Width:=2;
            MoveTo(1,6);
            LineTo(169,6);
            LineTo(159,1);
            MoveTo(169,6);
            LineTo(159,11)
        end;
    end;

procedure TForm1.pb5Paint(Sender: TObject);
begin
    with pb5.Canvas do
        begin
            Label80.Caption := 'I8255';
            Pen.Width:=2;
            MoveTo(1,6);
            LineTo(169,6);
            LineTo(159,1);
            MoveTo(169,6);
            LineTo(159,11);

            Pen.Width:=4;

```

```

        MoveTo(115,4);
        LineTo(115,8);
        MoveTo(119,4);
        LineTo(119,8);
        Pen.Width:=2;
    end;
end;

procedure TForm1.pb2Paint(Sender: TObject);
begin
    with pb2.Canvas do
    begin
        Pen.Width:=2;
        MoveTo(169,6);
        LineTo(1,6);
        LineTo(10,1);
        MoveTo(1,6);
        LineTo(10,11)
    end;
end;

procedure TForm1.pb4Paint(Sender: TObject);
begin
    with pb4.Canvas do
    begin
        Pen.Width:=2;
        MoveTo(169,6);
        LineTo(1,6);
        LineTo(10,1);
        MoveTo(1,6);
        LineTo(10,11)
    end;
end;

procedure TForm1.pb6Paint(Sender: TObject);
begin
    with pb6.Canvas do
    begin
        Pen.Width:=4;
        MoveTo(169,6);
        LineTo(1,6);
        LineTo(10,1);
        MoveTo(1,6);
        LineTo(10,11);
        MoveTo(85,10);
        LineTo(90,1);
        Label79.Caption := '8';
    end;
end;

procedure TForm1.pb7Paint(Sender: TObject);
begin
    with pb7.Canvas do
    begin
        Pen.Width:=2;
        MoveTo(169,6);
        LineTo(1,6);
        LineTo(10,1);
        MoveTo(1,6);
        LineTo(10,11)
    end;
end;

```

```

        end;
    end;

    procedure TForm1.pb10Paint(Sender: TObject);
    begin
        with pb10.Canvas do
            begin
                Pen.Width:=2;
                MoveTo(169,6);
                LineTo(1,6);
                LineTo(10,1);
                MoveTo(1,6);
                LineTo(10,11)
            end;
        end;
    end;

    procedure TForm1.pb8Paint(Sender: TObject);
    begin
        with pb8.Canvas do
            begin
                Pen.Width:=2;
                MoveTo(1,6);
                LineTo(169,6);
                LineTo(159,1);
                MoveTo(169,6);
                LineTo(159,11)
            end;
        end;
    end;

    procedure TForm1.pb9Paint(Sender: TObject);
    begin
        with pb9.Canvas do
            begin
                Pen.Width:=2;
                MoveTo(1,6);
                LineTo(169,6);
                LineTo(159,1);
                MoveTo(169,6);
                LineTo(159,11)
            end;
        end;
    end;

    procedure TForm1.pb11Paint(Sender: TObject);
    begin
        with pb11.Canvas do
            begin
                Pen.Width:=2;
                MoveTo(1,6);
                LineTo(60,6);
                LineTo(60,260);
                LineTo(1,260);
                MoveTo(1,6);
                LineTo(10,11);
                MoveTo(1,6);
                LineTo(10,1);
            end;
        end;
    end;

    procedure TForm1.pb12Paint(Sender: TObject);
    begin
        with pb12.Canvas do

```

```

    begin
        Pen.Width:=2;
        MoveTo(1,6);
        LineTo(35,6);
        LineTo(35,200);
        LineTo(1,200);
        LineTo(10,205);
        MoveTo(1,200);
        LineTo(10,195);
    end;
end;

procedure TForm1.pb13Paint(Sender: TObject);
begin
    with pb13.Canvas do
        begin
            Pen.Width:=2;
            MoveTo(57,6);
            LineTo(1,6);
            LineTo(10,1);
            MoveTo(1,6);
            LineTo(10,11);
        end;
    end;

procedure TForm1.pb14Paint(Sender: TObject);
begin
    with pb14.Canvas do
        begin
            Pen.Width:=2;
            MoveTo(1,6);
            LineTo(30,6);
            LineTo(30,590);
            LineTo(1,590);
            LineTo(10,595);
            MoveTo(1,590);
            LineTo(10,585);
        end;
    end;

procedure TForm1.pb15Paint(Sender: TObject);
begin
    with pb15.Canvas do
        begin
            Pen.Width:=2;
            MoveTo(1,6);
            LineTo(60,6);
            LineTo(60,365);
            LineTo(1,365);
            LineTo(10,360);
            MoveTo(1,365);
            LineTo(10,370);
        end;
    end;

procedure TForm1.pb16Paint(Sender: TObject);
begin
    with pb16.Canvas do
        begin
            Pen.Width:=4;
            MoveTo(1,6);

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```

        LineTo(217,6);
        LineTo(207,1);
        MoveTo(217,6);
        LineTo(207,11);
        MoveTo(1,6);
        LineTo(10,1);
        MoveTo(1,6);
        LineTo(10,11);
        MoveTo(110,10);
        LineTo(115,0);
        Label17.Caption:= '8';
    end;
end;

procedure TForm1.pb17Paint(Sender: TObject);
begin
    with pb17.Canvas do
    begin
        Pen.Width:=4;
        MoveTo(1,6);
        LineTo(217,6);
        LineTo(207,1);
        MoveTo(217,6);
        LineTo(207,11);
    end;
end;

procedure TForm1.pb18Paint(Sender: TObject);
begin
    with pb18.Canvas do
    begin
        Pen.Width:=4;
        MoveTo(1,6);
        LineTo(217,6);
        LineTo(207,1);
        MoveTo(217,6);
        LineTo(207,11);
    end;
end;

procedure TForm1.pb22Paint(Sender: TObject);
begin
    with pb22.Canvas do
    begin
        Pen.Width:=2;
        MoveTo(1,6);
        LineTo(137,6);
        LineTo(127,1);
        MoveTo(137,6);
        LineTo(127,11);
    end;
end;

procedure TForm1.pb23Paint(Sender: TObject);
begin
    with pb23.Canvas do
    begin
        Pen.Width:=2;
        MoveTo(1,6);
        LineTo(137,6);
        LineTo(127,1);
    end;
end;

```

```

        MoveTo(137,6);
        LineTo(127,11);
    end;
end;

procedure TForm1.pb24Paint(Sender: TObject);
begin
    with pb24.Canvas do
    begin
        Pen.Width:=2;
        MoveTo(1,6);
        LineTo(137,6);
        LineTo(127,1);
        MoveTo(137,6);
        LineTo(127,11);
    end;
end;

procedure TForm1.pb19Paint(Sender: TObject);
begin
    with pb19.Canvas do
    begin
        Pen.Width:=2;
        MoveTo(2,6);
        LineTo(2,620);
        MoveTo(2,590);
        LineTo(33,590);
        LineTo(23,585);
        MoveTo(33,590);
        LineTo(23,595);
        MoveTo(2,620);
        LineTo(2,620);
        LineTo(33,620);
        LineTo(23,615);
        MoveTo(33,620);
        LineTo(23,625);
        MoveTo(2,28);
        LineTo(33,28);
        LineTo(23,23);
        MoveTo(33,28);
        LineTo(23,33);
        MoveTo(2,313);
        LineTo(33,313);
        LineTo(23,308);
        MoveTo(33,313);
        LineTo(23,318);
        MoveTo(2,283);
        LineTo(33,283);
        LineTo(23,278);
        MoveTo(33,283);
        LineTo(23,288);
    end;
end;

procedure TForm1.pb20Paint(Sender: TObject);
begin
    with pb20.Canvas do
    begin
        Pen.Width:=2;

```

```

        MoveTo (2, 6);
        LineTo (2, 620);
        MoveTo (2, 590);
        LineTo (57, 590);
        LineTo (47, 585);
        MoveTo (57, 590);
        LineTo (47, 595);
        MoveTo (2, 620);
        LineTo (2, 620);
        LineTo (57, 620);
        LineTo (47, 615);
        MoveTo (57, 620);
        LineTo (47, 625);
        MoveTo (2, 28);
        LineTo (57, 28);
        LineTo (47, 23);
        MoveTo (57, 28);
        LineTo (47, 33);
        MoveTo (2, 313);
        LineTo (57, 313);
        LineTo (47, 308);
        MoveTo (57, 313);
        LineTo (47, 318);
        MoveTo (2, 283);
        LineTo (57, 283);
        LineTo (47, 278);
        MoveTo (57, 283);
        LineTo (47, 288);
    end;
end;

procedure TForm1.pb21Paint(Sender: TObject);
begin
    with pb21.Canvas do
        begin
            Pen.Width:=2;
            MoveTo (2, 6);
            LineTo (2, 740);
            MoveTo (2, 740);
            LineTo (41, 740);
            LineTo (31, 735);
            MoveTo (41, 740);
            LineTo (31, 745);
            MoveTo (2, 710);
            LineTo (41, 710);
            LineTo (31, 705);
            MoveTo (41, 710);
            LineTo (31, 715);
            MoveTo (2, 476);
            LineTo (41, 476);
            LineTo (31, 471);
            MoveTo (41, 476);
            LineTo (31, 481);
            MoveTo (2, 446);
            LineTo (41, 446);
            LineTo (31, 451);
            MoveTo (41, 446);
            LineTo (31, 441);
            MoveTo (2, 158);
            LineTo (41, 158);
            LineTo (31, 153);
        end;
    end;
end;

```

```

        MoveTo(41,158);
        LineTo(31,163);
        MoveTo(2,125);
        LineTo(41,125);
        LineTo(31,120);
        MoveTo(41,125);
        LineTo(31,130);
    end;
end;

procedure TForm1.pb25Paint(Sender: TObject);
begin
    with pb25.Canvas do
        begin
            Pen.Width:=2;
            MoveTo(2,6);
            LineTo(2,600);
            LineTo(89,600);
            LineTo(79,595);
            MoveTo(89,600);
            LineTo(79,605);
            MoveTo(2,290);
            LineTo(89,290);
            LineTo(79,285);
            MoveTo(89,290);
            LineTo(79,295);
        end;
    end;

procedure TForm1.Button1Click(Sender: TObject);
begin
    i:=0;
    j:=100;
    a:=0;
    b:=100;
    g:=false;
    v:=false;
    p1:=true;
    p2:=false;
    s1:=true;
    f:=true;
    fm:=true;
    t:=true;
    tm:=true;
    timer3.Enabled:=true;
end;

procedure TForm1.Timer3Timer(Sender: TObject);
begin
    if s1 then
        begin
            pb12.Canvas.Pen.Color:=clRed;
            pb12Paint(pb12);
            s1:=not s1;
        end
    else
        begin
            pb12.Canvas.Pen.Color:=clBlack;
            pb12Paint(pb12);
            s2:=true;
            timer4.Enabled:=true;
        end
    end;
end;

```



```

        timer3.Enabled:=false;
    end;
end;

procedure TForm1.Timer4Timer(Sender: TObject);
begin
    if s2 then
    begin
        pb16.Canvas.Pen.Color:=clRed;
        pb16Paint(pb16);
        pb17.Canvas.Pen.Color:=clRed;
        pb17Paint(pb17);
        pb18.Canvas.Pen.Color:=clRed;
        pb18Paint(pb18);
        pb21.Canvas.Pen.Color:=clRed;
        pb21Paint(pb21);
        pb22.Canvas.Pen.Color:=clRed;
        pb22Paint(pb22);
        pb23.Canvas.Pen.Color:=clRed;
        pb23Paint(pb23);
        pb24.Canvas.Pen.Color:=clRed;
        pb24Paint(pb24);
        pb19.Canvas.Pen.Color:=clRed;
        pb19Paint(pb19);
        pb20.Canvas.Pen.Color:=clRed;
        pb20Paint(pb20);
        pb25.Canvas.Pen.Color:=clRed;
        pb25Paint(pb25);
        s2:=not s2;
    end
    else
    begin
        pb16.Canvas.Pen.Color:=clRed;
        pb16Paint(pb16);
        pb17.Canvas.Pen.Color:=clRed;
        pb17Paint(pb17);
        pb18.Canvas.Pen.Color:=clRed;
        pb18Paint(pb18);
        pb21.Canvas.Pen.Color:=clRed;
        pb21Paint(pb21);
        pb22.Canvas.Pen.Color:=clRed;
        pb22Paint(pb22);
        pb23.Canvas.Pen.Color:=clRed;
        pb23Paint(pb23);
        pb24.Canvas.Pen.Color:=clRed;
        pb24Paint(pb24);
        pb19.Canvas.Pen.Color:=clRed;
        pb19Paint(pb19);
        pb20.Canvas.Pen.Color:=clRed;
        pb20Paint(pb20);
        pb25.Canvas.Pen.Color:=clRed;
        pb25Paint(pb25);
        if p1 then
        begin
            s3:=true;
            timer5.Enabled:=true;
            p1:=not p1;
        end;
        if p2 then
        begin
            s3e:=true;

```

```

        timer2.Enabled:=true;
        p2:=not p2;
    end;
    timer4.Enabled:=false;
end;
end;

procedure TForm1.Timer5Timer(Sender: TObject);
begin
    if s3 then
    begin
        pb7.Canvas.Pen.Color:=clRed;
        pb7Paint(pb7);
        s3:=not s3;
    end
    else
    begin
        pb7.Canvas.Pen.Color:=clBlack;
        pb7Paint(pb7);
        s4:=true;
        timer6.Enabled:=true;
        timer5.Enabled:=false;
    end;
end;

procedure TForm1.Timer6Timer(Sender: TObject);
begin
    if s4 then
    begin
        pb8.Canvas.Pen.Color:=clRed;
        pb8Paint(pb8);
        s4:=not s4;
    end
    else
    begin
        pb8.Canvas.Pen.Color:=clBlack;
        pb8Paint(pb8);
        s5:=true;
        t:=true;
        tm:=true;
        timer7.Enabled:=true;
        timer6.Enabled:=false;
    end;
end;

procedure TForm1.Timer7Timer(Sender: TObject);
begin
    if (a<=99) and (b>=1) then
    begin
        if s5 then
        begin
            if t then
            begin
                pb15.Canvas.Pen.Color:=clBlack;
                pb15Paint(pb15);
                pb6.Canvas.Pen.Color:=clBlack;
                pb6Paint(pb6);
                pb10.Canvas.Pen.Color:=clBlack;
                pb10Paint(pb10);
                pb9.Canvas.Pen.Color:=clRed;
                pb9Paint(pb9);
                pb13.Canvas.Pen.Color:=clBlack;

```

```

        pb13Paint(pb13);
        t:=not t;
    end
else
    begin
        pb6.Canvas.Pen.Color:=clRed;
        pb6Paint(pb6);
        pb10.Canvas.Pen.Color:=clRed;
        pb10Paint(pb10);
        pb9.Canvas.Pen.Color:=clRed;
        pb9Paint(pb9);
        pb15.Canvas.Pen.Color:=clRed;
        pb15Paint(pb15);
        pb13.Canvas.Pen.Color:=clRed;
        pb13Paint(pb13);
        s5:=not s5;
        t:=not t;
        g:=true;
    end
else
    if tm then
        begin
            pb6.Canvas.Pen.Color:=clRed;
            pb6Paint(pb6);
            pb10.Canvas.Pen.Color:=clRed;
            pb10Paint(pb10);
            pb15.Canvas.Pen.Color:=clRed;
            pb15Paint(pb15);
            pb9.Canvas.Pen.Color:=clBlack;
            pb9Paint(pb9);
            pb13.Canvas.Pen.Color:=clRed;
            pb13Paint(pb13);
            tm:=not tm;
        end
    else
        begin
            if (g) and ((a<99) and (b>1)) then
                begin
                    a:=a+1;
                    b:=b-1;
                    edit3.Text:=IntToStr(a);

                    edit2.Text:=IntToStr(b);
                    pb6.Canvas.Pen.Color:=clBlack;
                    pb6Paint(pb6);
                    pb10.Canvas.Pen.Color:=clBlack;
                    pb10Paint(pb10);
                    pb15.Canvas.Pen.Color:=clBlack;
                    pb15Paint(pb15);
                    pb9.Canvas.Pen.Color:=clBlack;
                    pb9Paint(pb9);
                    pb13.Canvas.Pen.Color:=clBlack;
                    pb13Paint(pb13);
                    s5:=not s5;
                    tm:=not tm;
                end
            else
                begin
                    a:=a+1;
                    b:=b-1;
                    edit3.Text:=IntToStr(a);

```

```

        edit2.Text:=IntToStr(b);
        pb6.Canvas.Pen.Color:=clBlack;
        pb6Paint(pb6);
        pb10.Canvas.Pen.Color:=clBlack;
        pb10Paint(pb10);
        pb15.Canvas.Pen.Color:=clBlack;
        pb15Paint(pb15);
        pb9.Canvas.Pen.Color:=clBlack;
        pb9Paint(pb9);
        pb13.Canvas.Pen.Color:=clBlack;
        pb13Paint(pb13);
        sle:=true;
        timer1.Enabled:=true;
        p2:=true;
        timer7.Enabled:=false;
    end;
end;
end;
end;

procedure TForm1.Timer8Timer(Sender: TObject);
begin
    if (i<=99) and (j>=1) then
    begin
        if s6 then
        begin
            if f then
            begin
                pb5.Canvas.Pen.Color:=clBlack;
                pb5Paint(pb5);
                pb14.Canvas.Pen.Color:=clBlack;
                pb14Paint(pb14);
                pb1.Canvas.Pen.Color:=clBlack;
                pb1Paint(pb1);
                pb4.Canvas.Pen.Color:=clRed;
                pb4Paint(pb4);
                pb13.Canvas.Pen.Color:=clBlack;
                pb13Paint(pb13);
                f:=not f;
            end
        else
        begin
            pb4.Canvas.Pen.Color:=clRed;
            pb4Paint(pb4);
            pb14.Canvas.Pen.Color:=clRed;
            pb14Paint(pb14);
            pb5.Canvas.Pen.Color:=clRed;
            pb5Paint(pb5);
            pb1.Canvas.Pen.Color:=clRed;
            pb1Paint(pb1);
            pb13.Canvas.Pen.Color:=clRed;
            pb13Paint(pb13);
            s6:=not s6;
            f:=not f;
            v:=true;
        end
    else
    begin
        if fm then
        begin
            pb5.Canvas.Pen.Color:=clRed;
            pb5Paint(pb5);

```

```

pb14.Canvas.Pen.Color:=clRed;
pb14Paint(pb14);
pb1.Canvas.Pen.Color:=clRed;
pb1Paint(pb1);
pb4.Canvas.Pen.Color:=clBlack;
pb4Paint(pb4);
pb13.Canvas.Pen.Color:=clRed;
pb13Paint(pb13);
fm:=not fm;
end
else
  if (v) and ((i<99) and (j>1)) then
    begin
      i:=i+1;
      j:=j-1;
      edit3.Text:=IntToStr(j);

      edit1.Text:=IntToStr(i);
      pb5.Canvas.Pen.Color:=clBlack;
      pb5Paint(pb5);
      pb14.Canvas.Pen.Color:=clBlack;
      pb14Paint(pb14);
      pb4.Canvas.Pen.Color:=clBlack;
      pb4Paint(pb4);
      pb1.Canvas.Pen.Color:=clBlack;
      pb1Paint(pb1);
      pb13.Canvas.Pen.Color:=clBlack;
      pb13Paint(pb13);
      s6:=not s6;
      fm:=not fm;
    end
  else
    begin
      i:=i+1;
      j:=j-1;
      edit3.Text:=IntToStr(j);

      edit1.Text:=IntToStr(i);
      pb5.Canvas.Pen.Color:=clBlack;
      pb5Paint(pb5);
      pb14.Canvas.Pen.Color:=clBlack;
      pb14Paint(pb14);
      pb4.Canvas.Pen.Color:=clBlack;
      pb4Paint(pb4);
      pb1.Canvas.Pen.Color:=clBlack;
      pb1Paint(pb1);
      pb13.Canvas.Pen.Color:=clBlack;
      pb13Paint(pb13);
      pb16.Canvas.Pen.Color:=clBlack;
      pb16Paint(pb16);
      pb17.Canvas.Pen.Color:=clBlack;
      pb17Paint(pb17);
      pb18.Canvas.Pen.Color:=clBlack;
      pb18Paint(pb18);
      pb21.Canvas.Pen.Color:=clBlack;
      pb21Paint(pb21);
      pb22.Canvas.Pen.Color:=clBlack;
      pb22Paint(pb22);
      pb23.Canvas.Pen.Color:=clBlack;
      pb23Paint(pb23);
      pb24.Canvas.Pen.Color:=clBlack;

```

```

        pb24Paint(pb24);
        pb19.Canvas.Pen.Color:=clBlack;
        pb19Paint(pb19);
        pb20.Canvas.Pen.Color:=clBlack;
        pb20Paint(pb20);
        pb25.Canvas.Pen.Color:=clBlack;
        pb25Paint(pb25);
        K:=100;
        l:=0;
        edit3.Text:=IntToStr(l);

        edit1.Text:=IntToStr(l);
        edit2.Text:=IntToStr(k);
        timer8.Enabled:=false;
    end;
end;

procedure TForm1.Button2Click(Sender: TObject);
begin
    timer8.Enabled:=false;
    timer1.Enabled:=false;
    timer2.Enabled:=false;
    timer9.Enabled:=false;
    timer3.Enabled:=false;
    timer4.Enabled:=false;
    timer5.Enabled:=false;
    timer6.Enabled:=false;
    timer7.Enabled:=false;
    K:=100;
    l:=0;
    edit3.Text:=IntToStr(l);

    edit1.Text:=IntToStr(l);
    edit2.Text:=IntToStr(k);
    pb13.Canvas.Pen.Color:=clBlack;
    pb13Paint(pb13);
    pb5.Canvas.Pen.Color:=clBlack;
    pb5Paint(pb5);
    pb14.Canvas.Pen.Color:=clBlack;
    pb14Paint(pb14);
    pb4.Canvas.Pen.Color:=clBlack;
    pb4Paint(pb4);
    pb1.Canvas.Pen.Color:=clBlack;
    pb1Paint(pb1);
    pb16.Canvas.Pen.Color:=clBlack;
    pb16Paint(pb16);
    pb17.Canvas.Pen.Color:=clBlack;
    pb17Paint(pb17);
    pb18.Canvas.Pen.Color:=clBlack;
    pb18Paint(pb18);
    pb21.Canvas.Pen.Color:=clBlack;
    pb21Paint(pb21);
    pb22.Canvas.Pen.Color:=clBlack;
    pb22Paint(pb22);
    pb23.Canvas.Pen.Color:=clBlack;
    pb23Paint(pb23);
    pb24.Canvas.Pen.Color:=clBlack;
    pb24Paint(pb24);
    pb19.Canvas.Pen.Color:=clBlack;
    pb19Paint(pb19);

```

```

pb20.Canvas.Pen.Color:=clBlack;
pb20Paint(pb20);
pb25.Canvas.Pen.Color:=clBlack;
pb25Paint(pb25);
pb12.Canvas.Pen.Color:=clBlack;
pb12Paint(pb12);
pb7.Canvas.Pen.Color:=clBlack;
pb7Paint(pb7);
pb8.Canvas.Pen.Color:=clBlack;
pb8Paint(pb8);
pb6.Canvas.Pen.Color:=clBlack;
pb6Paint(pb6);
pb10.Canvas.Pen.Color:=clBlack;
pb10Paint(pb10);
pb15.Canvas.Pen.Color:=clBlack;
pb15Paint(pb15);
pb9.Canvas.Pen.Color:=clBlack;
pb9Paint(pb9);
end;

procedure TForm1.Timer1Timer(Sender: TObject);
begin
    if sle then
    begin
        pb11.Canvas.Pen.Color:=clRed;
        pb11Paint(pb11);
        sle:=not sle;
    end
    else
    begin
        pb11.Canvas.Pen.Color:=clBlack;
        pb11Paint(pb11);
        s2:=true;
        timer4.Enabled:=true;
        timer1.Enabled:=false;
    end;
end;

procedure TForm1.Timer2Timer(Sender: TObject);
begin
    if s3e then
    begin
        pb3.Canvas.Pen.Color:=clRed;
        pb3Paint(pb3);
        s3e:=not s3e;
    end
    else
    begin
        pb3.Canvas.Pen.Color:=clBlack;
        pb3Paint(pb3);
        s4e:=true;
        timer9.Enabled:=true;
        timer2.Enabled:=false;
    end;
end;

procedure TForm1.Timer9Timer(Sender: TObject);
begin
    if s4e then
    begin

```

```
        pb2.Canvas.Pen.Color:=clRed;
        pb2Paint(pb2);
        s4e:=not s4e;
    end
else
    begin
        pb2.Canvas.Pen.Color:=clBlack;
        pb2Paint(pb2);
        s6:=true;
        f:=true;
        fm:=true;
        timer8.Enabled:=true;
        timer9.Enabled:=false;
    end;
end;

end.
```


