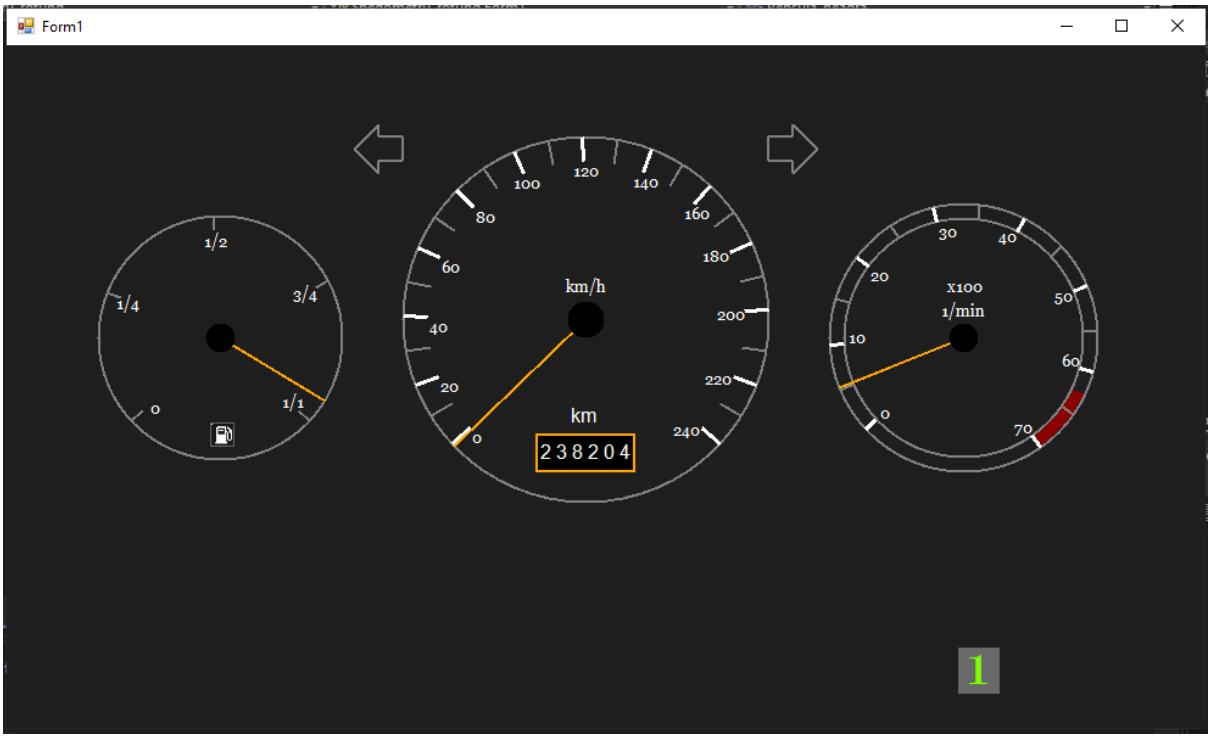
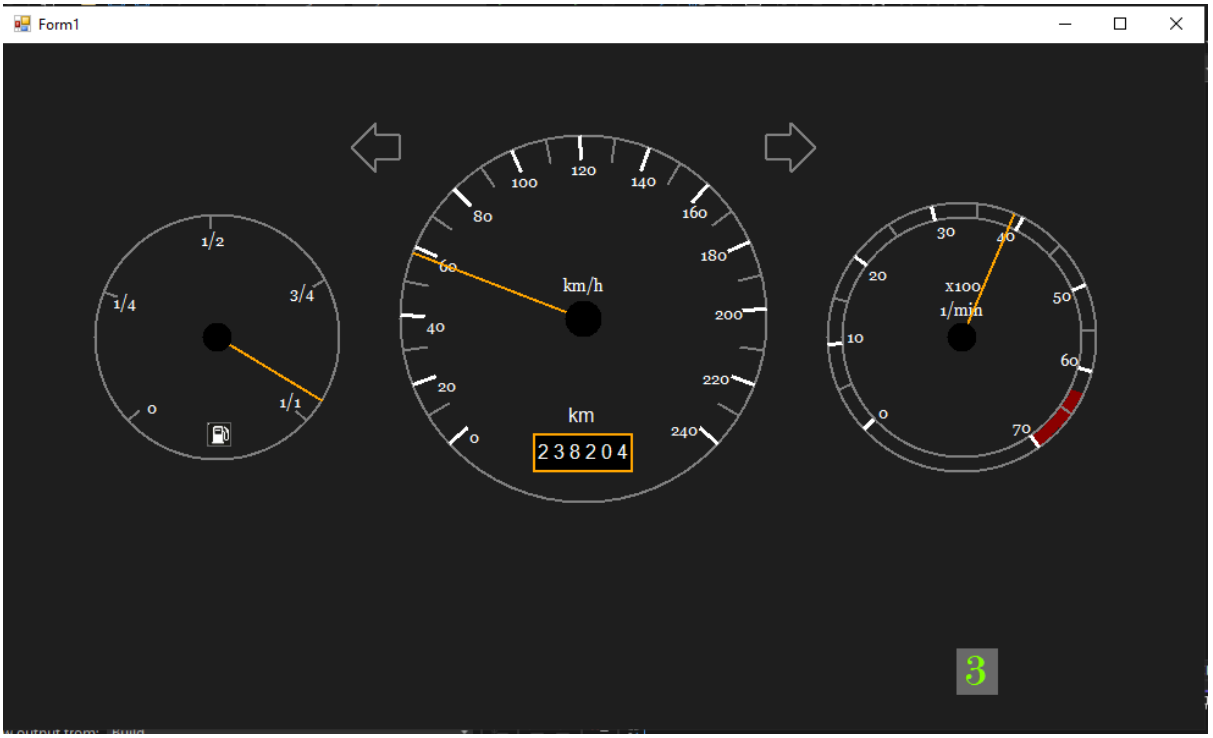
Descriere :

În cadrul cerintei date am realizat o aplicație grafica care arată ca bordul unei masini.



Dacă apasam **tasta W** masina noastra virtuala va accelera. Dacă apasam pe tastele 1, 2, 3, 4, 5, 6 masina își va schimba vitezele pentru a-și continua accelerarea. Pentru a putea opera cu tastele am folosit evenimentul **KeyDown()** și evenimentul **KeyUp()** .Viteza curentă este prezentată în colțul din dreapta jos .



Pentru a desena toate cercurile și pentru a le grada m-am folosit de formulele de la laborator .

Codul sursa:

```
using System;
using System.Collections.Generic;
using System.ComponentModel;
using System.Data;
using System.Drawing;
using System.Linq;
using System.Text;
using System.Threading.Tasks;
using System.Windows.Forms;

namespace Spedometru_rotund
{
    public partial class Form1 : Form
    {
        public Form1()
        {
            InitializeComponent();
            timer1.Start();
            KeyPreview = true;
            timer2.Start();
        }
        int x_in_c1 = 325, y_in_c1 = 75, raza_c1 = 150;
        int x_in_c2 = 325 + 150 * 2 + 50, y_in_c2 = 130,
raza_c2 = 110;
        int x_in_c3 = 325 - (100 + 150), y_in_c3 = 140,
raza_c3 = 100;
        double m_pi = Math.PI/ 180;
        double accel = 160;
        int viteza = 137, v = 1;

        int lungime_grafic = 1000, latime_grafic = 600;
        System.Drawing.Graphics Desen, g;
        System.Drawing.Bitmap img;
```

```
        System.Drawing.Pen Creion_blu, Creion_gri,
Creion_orange, Creion_alb_g;




        int flag = 0;int schimb = 0; int vreme = 0;
        void Form1_KeyDown(object sender, KeyEventArgs e)
        {
            if(e.KeyValue == (char)Keys.W)
            {
                flag = 1;
            }
            if (e.KeyValue == (char)Keys.NumPad1)
            {
                v = 1;schimb = 1;
            }
            if (e.KeyValue == (char)Keys.NumPad2)
            {
                v = 2; schimb = 1;
            }
            if (e.KeyValue == (char)Keys.NumPad3)
            {
                v = 3; schimb = 1;
            }
            if (e.KeyValue == (char)Keys.NumPad4)
            {
                v = 4; schimb = 1;
            }
            if (e.KeyValue == (char)Keys.NumPad5)
            {
                v = 5; schimb = 1;
            }
            if (e.KeyValue == (char)Keys.NumPad6)
            {
                v = 6; schimb = 1;
            }
```

```
}
void Form1_KeyUp(object sender, KeyEventArgs e)
{
    if(e.KeyValue == (char)Keys.W)
    {
        flag = 0;
    }
    if (e.KeyValue == (char)Keys.NumPad1)
    {schimb = 0;
    }
    if (e.KeyValue == (char)Keys.NumPad2)
    {schimb = 0;
    }
    if (e.KeyValue == (char)Keys.NumPad3)
    {schimb = 0;
    }
    if (e.KeyValue == (char)Keys.NumPad4)
    {schimb = 0;
    }
    if (e.KeyValue == (char)Keys.NumPad5)
    {schimb = 0;
    }
    if (e.KeyValue == (char)Keys.NumPad6)
    { schimb = 0;
    }
}

public void timer1_Tick(object sender, EventArgs e)
{
    timer1.Interval = 1;
    g.Clear(BackColor);

    //VITEZA KM/H
    int i = 42, counter = 0;

    System.Drawing.Font font_arial;
```

```
            font_arial=new System.Drawing.Font("Georgia", 10);
            System.Drawing.Font font_sp;
            font_sp=new System.Drawing.Font("Arial", 12);

            g.DrawEllipse(Creion_gri, x_in_c1, y_in_c1,
2*raza_c1, 2*raza_c1);
            int grade = 360 - 0;

            //SEMNALIZARE
            //dreapta
            g.DrawLine(Creion_gri, x_in_c1 + 300, y_in_c1,
x_in_c1 + 320, y_in_c1);
            g.DrawLine(Creion_gri, x_in_c1 + 300, y_in_c1+20,
x_in_c1 + 320, y_in_c1+20);
            g.DrawLine(Creion_gri, x_in_c1 + 300, y_in_c1+20,
x_in_c1 + 300, y_in_c1);
            g.DrawLine(Creion_gri, x_in_c1 + 320, y_in_c1 -
10, x_in_c1 + 320, y_in_c1);
            g.DrawLine(Creion_gri, x_in_c1 + 320, y_in_c1 +
20, x_in_c1 + 320, y_in_c1+ 30);
            g.DrawLine(Creion_gri, x_in_c1 + 320, y_in_c1 -
10, x_in_c1+340, y_in_c1+10);
            g.DrawLine(Creion_gri, x_in_c1 + 320, y_in_c1 +
30, x_in_c1+340, y_in_c1+10);
            //stanga
            g.DrawLine(Creion_gri, x_in_c1, y_in_c1, x_in_c1 -
20, y_in_c1);
            g.DrawLine(Creion_gri, x_in_c1, y_in_c1 + 20,
x_in_c1 - 20, y_in_c1+20);
            g.DrawLine(Creion_gri, x_in_c1, y_in_c1, x_in_c1,
y_in_c1+20);
            g.DrawLine(Creion_gri, x_in_c1 - 20, y_in_c1 - 10,
x_in_c1- 20, y_in_c1);
            g.DrawLine(Creion_gri, x_in_c1 - 20, y_in_c1 + 30,
x_in_c1- 20, y_in_c1 + 20);
            g.DrawLine(Creion_gri, x_in_c1 - 20, y_in_c1 + 30,
x_in_c1 - 40, y_in_c1 + 10);
```

```
            g.DrawLine(Creion_gri, x_in_c1 - 20, y_in_c1 - 10,
x_in_c1 - 40, y_in_c1 + 10);



            g.FillEllipse(Pensula_neagra, x_in_c1 + 135,
y_in_c1 + 135, 30, 30);
            int x = x_in_c1 + System.Convert.ToInt32(raza_c1 *
Math.Cos(0));
            int y = y_in_c1 + System.Convert.ToInt32(raza_c1 *
Math.Sin(0));
            int x_0 = x_in_c1 + raza_c1 +
System.Convert.ToInt32(raza_c1 * Math.Cos(grade * m_pi));
            int y_0 = y_in_c1 + raza_c1 +
System.Convert.ToInt32(raza_c1 * Math.Sin(grade * m_pi));
           // g.DrawLine(Creion_orange, x_in_c1 + raza_c1,
y_in_c1 + raza_c1, x_0, y_0);
            int ajutor = 0;
            g.DrawString("km/h", font_arial, Pensula_alba,
x_in_c1 + 132, y_in_c1 + 115);
            //kilometri parcursi
            g.FillRectangle(Pensula_neagra, x_in_c1 + 110,
y_in_c1 + 245, 80, 30);
            g.DrawString("2 3 8 2 0 4", font_sp, Pensula_alba,
x_in_c1 + 110, y_in_c1 + 250);
            g.DrawRectangle(Creion_orange, x_in_c1 + 110,
y_in_c1 + 245, 80, 30);
            g.DrawString("km", font_sp, Pensula_alba, x_in_c1
+ 135, y_in_c1 + 220);
            //x100
            //1/min
            g.DrawString("x100", font_arial, Pensula_alba,
x_in_c2 + 95, y_in_c2 + 60);
            g.DrawString("1/min", font_arial, Pensula_alba,
x_in_c2 + 90, y_in_c2 + 80);
```

```
            g.FillEllipse(Pensula_neagra, x_in_c1 + 135,
y_in_c1 + 135, 30, 30);
            for (i = 137; i <= 360 ; i+=11)
            {
                x_0 = x_in_c1 + raza_c1 +
System.Convert.ToInt32(raza_c1 * Math.Cos(i* m_pi));
                y_0 = y_in_c1 + raza_c1 +
System.Convert.ToInt32(raza_c1 * Math.Sin(i * m_pi));
                int x_1 = (x_in_c1 + 20) + (raza_c1 - 20) +
System.Convert.ToInt32((raza_c1 - 20) * Math.Cos(i * m_pi));
                int y_1 = (y_in_c1 + 20) + (raza_c1 - 20) +
System.Convert.ToInt32((raza_c1 - 20) * Math.Sin(i * m_pi));

                g.DrawLine(Creion_gri, x_0, y_0, x_1, y_1);
                if(ajutor % 2 == 0) {
                    g.DrawLine(Creion_alb_g, x_0, y_0, x_1,
y_1);
                    if (counter >= 100 && counter <= 160)
                    {
                        g.DrawString(counter.ToString(),
font_arial, Pensula_alba, x_1 - 10, y_1);

                    }
                    else if (counter >= 180)
                    {
                        g.DrawString(counter.ToString(),
font_arial, Pensula_alba, x_1 - 24, y_1 - 5);
                    }
                    else
                    {
                        g.DrawString(counter.ToString(),
font_arial, Pensula_alba, x_1, y_1);
                    }

                        counter+=20;
                }
                ajutor++;
            }
```

```
            counter = 240;
            for (i = 43; i >= 0; i-=11)
            {

                x_0 = x_in_c1 + raza_c1 +
System.Convert.ToInt32(raza_c1 * Math.Cos(i* m_pi));
                y_0 = y_in_c1 + raza_c1 +
System.Convert.ToInt32(raza_c1 * Math.Sin(i * m_pi));
                int x_1 = (x_in_c1 + 20) + (raza_c1 - 20) +
System.Convert.ToInt32((raza_c1 - 20) * Math.Cos(i * m_pi));
                int y_1 = (y_in_c1 + 20) + (raza_c1 - 20) +
System.Convert.ToInt32((raza_c1 - 20) * Math.Sin(i * m_pi));

                g.DrawLine(Creion_gri, x_0, y_0, x_1, y_1);
                if (ajutor % 2 == 1)
                {
                    g.DrawLine(Creion_alb_g, x_0, y_0, x_1 ,
y_1);
                    g.DrawString(counter.ToString(),
font_arial, Pensula_alba, x_1 - 25, y_1 - 6);
                    counter-=20;
                }
                ajutor++;
            }

            //ROTATII PE MINUT


            g.DrawEllipse(Creion_gri,x_in_c2, y_in_c2, 2 *
raza_c2, 2 * raza_c2);
            //

            //cerc orientativ
            g.DrawEllipse(Creion_gri ,x_in_c2 + 12, y_in_c2 +
12, 2 * (raza_c2 - 12), 2 *( raza_c2 - 12));
            //unitati de pe cercul 2

            //Zona rosie
```

```
            for (i = 55; i>=26; i--)
            {
                x_0 = x_in_c2 + raza_c2 +
System.Convert.ToInt32(raza_c2 * Math.Cos(i* m_pi));
                y_0 = y_in_c2 + raza_c2 +
System.Convert.ToInt32(raza_c2 * Math.Sin(i * m_pi));
                int x_1 = (x_in_c2 + 12) + (raza_c2 - 12) +
System.Convert.ToInt32((raza_c2 - 12) * Math.Cos(i * m_pi));
                int y_1 = (y_in_c2 + 12) + (raza_c2 - 12) +
System.Convert.ToInt32((raza_c2 - 12) * Math.Sin(i * m_pi));

                g.DrawLine(Creion_r, x_0-1, y_0-1, x_1+1,
y_1+1);
            }
            ajutor = 0; counter = 0;
            for (i = 137; i <= 360; i+=20)
            {
                x_0 = x_in_c2 + raza_c2 +
System.Convert.ToInt32(raza_c2 * Math.Cos(i* m_pi));
                y_0 = y_in_c2 + raza_c2 +
System.Convert.ToInt32(raza_c2 * Math.Sin(i * m_pi));
                int x_1 = (x_in_c2 + 12) + (raza_c2 - 12) +
System.Convert.ToInt32((raza_c2 - 12) * Math.Cos(i * m_pi));
                int y_1 = (y_in_c2 + 12) + (raza_c2 - 12) +
System.Convert.ToInt32((raza_c2 - 12) * Math.Sin(i * m_pi));

                g.DrawLine(Creion_gri, x_0, y_0, x_1, y_1);
                if (ajutor % 2 == 0)
                {
                    g.DrawLine(Creion_alb_g, x_0, y_0, x_1,
y_1);
                    if (counter >= 40 && counter < 60)
                    {
                        g.DrawString(counter.ToString(),
font_arial, Pensula_alba, x_1 - 17, y_1 - 4);

                    }else if(counter >= 0 && counter <= 10)
```

```
                    g.DrawString(counter.ToString(),
font_arial, Pensula_alba, x_1 + 2, y_1 - 13);
                else
                    g.DrawString(counter.ToString(),
font_arial, Pensula_alba, x_1, y_1);
                counter+=10;
            }
            ajutor++;
        }
        counter = 70;
        for (i = 55; i >= 0; i-=20)
        {

            x_0 = x_in_c2 + raza_c2 +
System.Convert.ToInt32(raza_c2 * Math.Cos(i* m_pi));
            y_0 = y_in_c2 + raza_c2 +
System.Convert.ToInt32(raza_c2 * Math.Sin(i * m_pi));
            int x_1 = (x_in_c2 + 12) + (raza_c2 - 12) +
System.Convert.ToInt32((raza_c2 - 12) * Math.Cos(i * m_pi));
            int y_1 = (y_in_c2 + 12) + (raza_c2 - 12) +
System.Convert.ToInt32((raza_c2 - 12) * Math.Sin(i * m_pi));

            g.DrawLine(Creion_gri, x_0, y_0, x_1, y_1);
            if (ajutor % 2 == 0)
            {
                g.DrawLine(Creion_alb_g, x_0, y_0, x_1,
y_1);
                g.DrawString(counter.ToString(),
font_arial, Pensula_alba, x_1 - 16, y_1 - 14);
                counter-=10;
            }
            ajutor++;
        }
        x_0 = x_in_c2 + raza_c2 +
System.Convert.ToInt32(raza_c2 * Math.Cos(grade * m_pi));
        y_0 = y_in_c2 + raza_c2 +
System.Convert.ToInt32(raza_c2 * Math.Sin(grade * m_pi));
```

```
            //GAZU


                this.label1.Text = v.ToString();
            //ROTATII PE MINUT
            if (schimb == 0)
            {
                x_0 = x_in_c2 + raza_c2 +
System.Convert.ToInt32(raza_c2 * Math.Cos(accel * m_pi));
                y_0 = y_in_c2 + raza_c2 +
System.Convert.ToInt32(raza_c2 * Math.Sin(accel * m_pi));
                g.DrawLine(Creion_orange, x_in_c2 + raza_c2,
y_in_c2 + raza_c2, x_0, y_0);
                g.FillEllipse(Pensula_neagra, x_in_c2 + 98,
y_in_c2 + 98, 2*(raza_c2 - 98), 2*(raza_c2 - 98));

            }
            else
            {
                while (accel >= 220)
                {
                        x_0 = x_in_c2 + raza_c2 +
System.Convert.ToInt32(raza_c2 * Math.Cos(accel * m_pi));
                        y_0 = y_in_c2 + raza_c2 +
System.Convert.ToInt32(raza_c2 * Math.Sin(accel * m_pi));
                        g.DrawLine(Creion_orange, x_in_c2 +
raza_c2, y_in_c2 + raza_c2, x_0, y_0);
                        g.FillEllipse(Pensula_neagra, x_in_c2
+ 98, y_in_c2 + 98, 2*(raza_c2 - 98), 2*(raza_c2 - 98));
                        accel -= 1;

                }

            }
            if (flag == 1)//Daca apasam pe W
            {
                //KM/H
```

```
                int x_1 = x_in_c1 + raza_c1 +
System.Convert.ToInt32(raza_c1 * Math.Cos(viteza * m_pi));
                int y_1 = y_in_c1 + raza_c1 +
System.Convert.ToInt32(raza_c1 * Math.Sin(viteza * m_pi));
                g.DrawLine(Creion_orange, x_in_c1 + raza_c1,
y_in_c1 + raza_c1, x_1, y_1);
                g.FillEllipse(Pensula_neagra, x_in_c1 + 135,
y_in_c1 + 135, 2*(raza_c1 - 135), 2*(raza_c1 - 135));

                if (v == 1)
                {
                    if (viteza >= v * 17 + 140)
                        viteza = v * 17 + 140;

                }
                if (v <= 3 && v > 1)
                {
                    if (viteza >= v * 30 + 140)
                        viteza = v * 30 + 140;
                }
                else
                {
                    if (viteza >= v * 45 + 140)
                        viteza = v * 45 + 140;
                }
                if (accel >= 400)
                    accel = 400;

                viteza+=1;
                accel+=3;

            }
            else//Daca luam de pe W
            {
                //ROTATII PE MINUT
                x_0 = x_in_c2 + raza_c2 +
System.Convert.ToInt32(raza_c2 * Math.Cos(accel * m_pi));
```

```
                y_0 = y_in_c2 + raza_c2 +
System.Convert.ToInt32(raza_c2 * Math.Sin(accel * m_pi));
                g.DrawLine(Creion_orange, x_in_c2 + raza_c2,
y_in_c2 + raza_c2, x_0, y_0);
                g.FillEllipse(Pensula_neagra, x_in_c2 + 98,
y_in_c2 + 98, 2*(raza_c2 - 98), 2*(raza_c2 - 98));
                //KM/H
                int x_1 = x_in_c1 + raza_c1 +
System.Convert.ToInt32(raza_c1 * Math.Cos((viteza) * m_pi));
                int y_1 = y_in_c1 + raza_c1 +
System.Convert.ToInt32(raza_c1 * Math.Sin((viteza) * m_pi));
                g.DrawLine(Creion_orange, x_in_c1 + raza_c1,
y_in_c1 + raza_c1, x_1, y_1);
                g.FillEllipse(Pensula_neagra, x_in_c1 + 135,
y_in_c1 + 135, 2*(raza_c1 - 135), 2*(raza_c1 - 135));



                if (viteza <= 137)
                    viteza = 137;

                if (accel <= 160)
                    accel = 160;
                accel-=2;
                viteza-=1;
            }


            //g.DrawLine(Creion_orange, x_in_c2 + raza_c2,
y_in_c2 + raza_c2, x_0, y_0);
            //cercul din centru
            //g.FillEllipse(Pensula_neagra, x_in_c2 + 98,
y_in_c2 + 98, 2*(raza_c2 - 98), 2*(raza_c2 - 98));

            //CONSUMUL
            int x_in_c3 = x_in_c1 - (100 + raza_c1), y_in_c3 =
140, raza_c3 = 100;
```

```
            g.DrawEllipse(Creion_gri, x_in_c3, y_in_c3, 2 *
raza_c3, 2 * raza_c3);
            counter = 0;


            for (i = 137; i <= 360; i+=65)
            {
                x_0 = x_in_c3 + raza_c3 +
System.Convert.ToInt32(raza_c3 * Math.Cos(i* m_pi));
                y_0 = y_in_c3 + raza_c3 +
System.Convert.ToInt32(raza_c3 * Math.Sin(i * m_pi));
                int x_1 = (x_in_c3 + 12) + (raza_c3 - 12) +
System.Convert.ToInt32((raza_c3 - 12) * Math.Cos(i * m_pi));
                int y_1 = (y_in_c3 + 12) + (raza_c3 - 12) +
System.Convert.ToInt32((raza_c3 - 12) * Math.Sin(i * m_pi));
                g.DrawLine(Creion_gri, x_0, y_0, x_1, y_1);
                if(counter == 0)
                {
                    g.DrawString(counter.ToString(),
font_arial,Pensula_alba ,x_1 + 5, y_1 - 10);
                }else if(counter % 2 == 1)
                {

                    if(counter == 3)
                        g.DrawString(counter.ToString() +
"/4", font_arial, Pensula_alba, x_1 - 20, y_1 - 3);
                    else
                        g.DrawString(counter.ToString() +
"/4", font_arial, Pensula_alba, x_1 - 5, y_1 - 3);
                }
                else
                {
                    g.DrawString("1/2", font_arial,
Pensula_alba, x_1 - 10, y_1 + 1);
                }
                counter++;

            }
```

```
            for (i = 43; i >= 0; i-=65)
            {
                x_0 = x_in_c3 + raza_c3 +
System.Convert.ToInt32(raza_c3 * Math.Cos(i* m_pi));
                y_0 = y_in_c3 + raza_c3 +
System.Convert.ToInt32(raza_c3 * Math.Sin(i * m_pi));
                int x_1 = (x_in_c3 + 12) + (raza_c3 - 12) +
System.Convert.ToInt32((raza_c3 - 12) * Math.Cos(i * m_pi));
                int y_1 = (y_in_c3 + 12) + (raza_c3 - 12) +
System.Convert.ToInt32((raza_c3 - 12) * Math.Sin(i * m_pi));
                g.DrawLine(Creion_gri, x_0, y_0, x_1, y_1);
                g.DrawString("1/1", font_arial, Pensula_alba,
x_1- 15, y_1 - 15);
                counter--;
            }
            //bacul plin
            x_0 = x_in_c3 + raza_c3 +
System.Convert.ToInt32(raza_c3 * Math.Cos(31* m_pi));
            y_0 = y_in_c3 + raza_c3 +
System.Convert.ToInt32(raza_c3 * Math.Sin(31 * m_pi));

            g.DrawLine(Creion_orange, x_in_c3 + raza_c3,
y_in_c3 + raza_c3, x_0, y_0);
            //cercul din centru
            g.FillEllipse(Pensula_neagra, x_in_c3 + 88,
y_in_c3 + 88, 2*(raza_c3 - 88), 2*(raza_c3 - 88));

            Desen.DrawImage(img, 0, 0);

        }


        System.Drawing.SolidBrush Pensula_neagra;
        System.Drawing.SolidBrush Pensula_alba;
        System.Drawing.Pen Creion_r;
        System.Drawing.Pen Creion_v;
        void Form1_Paint(object sender, PaintEventArgs e)
        {
```

```
            this.BackColor = Color.FromArgb(30, 30, 30);

            Desen = this.CreateGraphics();
            Creion_blu = new
System.Drawing.Pen(System.Drawing.Color.Blue, 1);
            Creion_gri = new
System.Drawing.Pen(System.Drawing.Color.Gray, 2);
            Creion_orange = new
System.Drawing.Pen(System.Drawing.Color.Orange, 2);
            Creion_alb_g = new
System.Drawing.Pen(System.Drawing.Color.White, 3);
            Creion_r = new
System.Drawing.Pen(System.Drawing.Color.DarkRed,3);
            Creion_v = new
System.Drawing.Pen(System.Drawing.Color.Green, 2);

            Pensula_neagra = new
System.Drawing.SolidBrush(System.Drawing.Color.Black);
            Pensula_alba = new
System.Drawing.SolidBrush(System.Drawing.Color.White);
            img = new Bitmap(lungime_grafic + 200,
latime_grafic + 200);

            int i = 42;
            g = Graphics.FromImage(img);

        }

    }
}
```