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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 Ex_2D
{
    public partial class Form1 : Form
    {
        class Punct
        {
            public double x, y;
            public Punct(double X, double Y) { x = X; y = Y; }
        }

        int u1, v1, u2, v2; // ViewPort - Fereastra Ecran
        double a, b, c, d; // Window - Fereastra Reala
        int u(double x) { return (int)((x - a) / (b - a) * (u2 - u1) + u1); }
        int v(double y) { return (int)((y - d) / (c - d) * (v2 - v1) + v1); }
        double u_1(int u) { return (u - u1) * (b - a) / (u2 - u1) + a; }
        double v_1(int v) { return (v - v1) * (c - d) / (v2 - v1) + d; }
        void ViewPort (int x1, int y1, int x2, int y2) { u1 = x1; v1 = y1; u2 = x2; v2 = y2; }
        void Window (double x1, double y1, double x2, double y2) { a = x1; d = y1; b = x2; c = y2; }
        void Segm(System.Drawing.Graphics Linie, Pen Pen, Punct P, Punct Q) // Segm. PQ
        {
            Linie.DrawLine(Pen, u(P.x), v(P.y), u(Q.x), v(Q.y));
        }
        void OutTextxy(System.Drawing.Graphics Mes, string s, Font myFont, Brush myBrush, Punct M)
        {
            Mes.DrawString (s, myFont, myBrush, u(M.x) - 10, v(M.y) - 25);
        }
        public Form1()
        {
            InitializeComponent();
        }
    }
}

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private void button1_Click(object sender, EventArgs e) // Linie / Segment
{
    System.Drawing.Graphics Linie;
    Linie = this.CreateGraphics();
    Pen myPen = new Pen(System.Drawing.Color.Blue, 2);
    Linie.DrawLine(myPen, 20, 20, 350, 250);
}

private void button2_Click(object sender, EventArgs e) // Text
{
    System.Drawing.Graphics graphicsObj;
    graphicsObj = this.CreateGraphics();
    Font myFont = new System.Drawing.Font("Helvetica", 20, FontStyle.Italic);
    Brush myBrush = new SolidBrush(System.Drawing.Color.DarkBlue);
    graphicsObj.DrawString("Exemplu", myFont, myBrush, 175, 50);
}

private void button3_Click(object sender, EventArgs e) // Drept.
{
    System.Drawing.Graphics Drept;
    Drept = this.CreateGraphics();
    Pen myPen = new Pen(System.Drawing.Color.RoyalBlue);
    Rectangle myRectangle = new Rectangle(20, 20, 350-20, 250-20);
    Drept.DrawRectangle(myPen, myRectangle);
}

double Min3(double a, double b, double c)
{
    return Math.Min(Math.Min(a,b),c);
}

double Max3(double a, double b, double c)
{
    return Math.Max(Math.Max(a,b),c);
}

private void button4_Click(object sender, EventArgs e) // Triunghi din planul real (ABC)
{
    Punct A = new Punct(10, 30), B = new Punct(-15, -5), C = new Punct(20, 10);
    ViewPort(75,50, 275,250);
    Window(Min3(A.x,B.x,C.x), Max3(A.y,B.y,C.y),
            Max3(A.x,B.x,C.x), Min3(A.y,B.y,C.y)); // (a,d, b,c)
    System.Drawing.Graphics Triunghi;
    Triunghi = this.CreateGraphics();
}

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Pen myBPen = new Pen(Color.FromArgb(160,255,140), 1);
if (a * b < 0)      {
    Punct P = new Punct(0, Max3(A.y, B.y, C.y));
    Punct Q = new Punct(0, Min3(A.y, B.y, C.y)); // Oy
    Segm(Triunghi, myBPen, P, Q);
}
if (c * d < 0)      {
    Punct P = new Punct(Min3(A.x, B.x, C.x), 0);
    Punct Q = new Punct(Max3(A.x, B.x, C.x), 0); // Ox
    Segm(Triunghi, myBPen, P, Q);
}
Pen myPen = new Pen(System.Drawing.Color.LightGreen, 2);
Segm(Triunghi, myPen, A, B);
Segm(Triunghi, myPen, B, C);
Segm(Triunghi, myPen, A, C);
Font myFont = new System.Drawing.Font("Helvetica", 15, FontStyle.Bold);
Brush myBrush = new SolidBrush(System.Drawing.Color.Green);
OutTextxy(Triunghi, "A", myFont, myBrush, A);
OutTextxy(Triunghi, "B", myFont, myBrush, B);
OutTextxy(Triunghi, "C", myFont, myBrush, C);
label1.Visible = label2.Visible = label3.Visible = true;
}
private void Form1_MouseClick(object sender, MouseEventArgs e)
{
    int u_ = e.X, v_ = e.Y;
    System.Drawing.Graphics Punct;      Punct = this.CreateGraphics();
    Pen myPen = new Pen(Color.Red, 1);
    double x = u_1(u_), y = v_1(v_);
    Rectangle myRectangle = new Rectangle(u(x)-2, v(y)-2, 4,4);
    Punct.DrawRectangle(myPen, myRectangle);
    double xx= (double)((int) (x*100+0.5))/100;
    label2.Text = "x=" + xx.ToString();
    double yy = (double)((int)(y * 100 + 0.5)) / 100;
    label3.Text = "y="+yy.ToString();
}
}
}
}

```



