using System;  
using System.Windows.Forms;  
  
namespace LinearEquationsSolver.WindowsForms   
{  
    public partial class Form1 : Form  
    {  
        public Form1()  
        {  
            InitializeComponent();  
        }  
  
        private void solveButton\_Click(object sender, EventArgs e)  
        {  
            double a1 = GetDoubleValueFromTextBox(a1TextBox);  
            double a2 = GetDoubleValueFromTextBox(a2TextBox);  
            double a3 = GetDoubleValueFromTextBox(a3TextBox);  
            double b1 = GetDoubleValueFromTextBox(b1TextBox);  
            double b2 = GetDoubleValueFromTextBox(b2TextBox);  
            double b3 = GetDoubleValueFromTextBox(b3TextBox);  
            double c1 = GetDoubleValueFromTextBox(c1TextBox);  
            double c2 = GetDoubleValueFromTextBox(c2TextBox);  
            double c3 = GetDoubleValueFromTextBox(c3TextBox);  
            double d1 = GetDoubleValueFromTextBox(d1TextBox);  
            double d2 = GetDoubleValueFromTextBox(d2TextBox);  
            double d3 = GetDoubleValueFromTextBox(d3TextBox);  
  
            double D = (a1 \* b2 \* c3) + (b1 \* c2 \* a3) + (c1 \* a2 \* b3) - (a3 \* b2 \* c1) - (b3 \* c2 \* a1) - (c3 \* a2 \* b1);  
            double Dx = (d1 \* b2 \* c3) + (b1 \* c2 \* d3) + (c1 \* d2 \* b3) - (d3 \* b2 \* c1) - (b3 \* c2 \* d1) - (c3 \* d2 \* b1);  
            double Dy = (a1 \* d2 \* c3) + (d1 \* c2 \* a3) + (c1 \* a2 \* d3) - (a3 \* d2 \* c1) - (d3 \* c2 \* a1) - (c3 \* a2 \* d1);  
            double Dz = (a1 \* b2 \* d3) + (b1 \* d2 \* a3) + (d1 \* a2 \* b3) - (a3 \* b2 \* d1) - (b3 \* d2 \* a1) - (d3 \* a2 \* b1);  
  
            if (D == 0)  
            {  
                resultLabel.Text = "The system of equations has no unique solution.";  
            }  
            else  
            {  
                double x = Dx / D;  
                double y = Dy / D;  
                double z = Dz / D;  
  
                resultLabel.Text = $"The solution of the system of equations is:\n x = {x}\n y = {y}\n z = {z}";  
            }  
        }  
  
        private double GetDoubleValueFromTextBox(TextBox textBox)  
        {  
            double value;  
  
            if (!double.TryParse(textBox.Text, out value))  
            {  
                MessageBox.Show("Please enter a valid number!");  
                throw new Exception("Invalid number input");  
            }  
  
            return value;  
        }  
    }  
}