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using System;
using System.Windows.Forms;

namespace TP4_LoiNormal
{
    public partial class Form_Main : Form
    {
        double[,] Table = new double[,] {
            {0.0000, 0.0040, 0.0080, 0.0120, 0.0160, 0.0199, 0.0239, 0.0279, 0.0319, 0.0359},
            {0.0398, 0.0438, 0.0478, 0.0517, 0.0557, 0.0596, 0.0636, 0.0675, 0.0714, 0.0753},
            {0.0793, 0.0832, 0.0871, 0.0910, 0.0948, 0.0987, 0.1026, 0.1064, 0.1103, 0.1141},
            {0.1179, 0.1217, 0.1255, 0.1293, 0.1331, 0.1368, 0.1406, 0.1443, 0.1480, 0.1517},
            {0.1554, 0.1591, 0.1628, 0.1664, 0.1700, 0.1736, 0.1772, 0.1808, 0.1844, 0.1879},
            {0.1915, 0.1950, 0.1985, 0.2019, 0.2054, 0.2088, 0.2123, 0.2157, 0.2190, 0.2224},
            {0.2257, 0.2291, 0.2324, 0.2357, 0.2389, 0.2422, 0.2454, 0.2486, 0.2517, 0.2549},
            {0.2580, 0.2611, 0.2642, 0.2673, 0.2704, 0.2734, 0.2764, 0.2794, 0.2823, 0.2852},
            {0.2881, 0.2910, 0.2939, 0.2967, 0.2995, 0.3023, 0.3051, 0.3078, 0.3106, 0.3133},
            {0.3159, 0.3186, 0.3212, 0.3238, 0.3264, 0.3289, 0.3315, 0.3340, 0.3365, 0.3389},
            {0.3413, 0.3438, 0.3461, 0.3485, 0.3508, 0.3531, 0.3554, 0.3577, 0.3599, 0.3621},
            {0.3643, 0.3665, 0.3686, 0.3708, 0.3729, 0.3749, 0.3770, 0.3790, 0.3810, 0.3830},
            {0.3849, 0.3869, 0.3888, 0.3907, 0.3925, 0.3944, 0.3962, 0.3980, 0.3997, 0.4015},
            {0.4032, 0.4049, 0.4066, 0.4082, 0.4099, 0.4115, 0.4131, 0.4147, 0.4162, 0.4177},
            {0.4192, 0.4207, 0.4222, 0.4236, 0.4251, 0.4265, 0.4279, 0.4292, 0.4306, 0.4319},
            {0.4332, 0.4345, 0.4357, 0.4370, 0.4382, 0.4394, 0.4406, 0.4418, 0.4429, 0.4441},
            {0.4452, 0.4463, 0.4474, 0.4484, 0.4495, 0.4505, 0.4515, 0.4525, 0.4535, 0.4545},
            {0.4554, 0.4564, 0.4573, 0.4582, 0.4591, 0.4599, 0.4608, 0.4616, 0.4625, 0.4633},
            {0.4641, 0.4649, 0.4656, 0.4664, 0.4671, 0.4678, 0.4686, 0.4693, 0.4699, 0.4706},
            {0.4713, 0.4719, 0.4726, 0.4732, 0.4738, 0.4744, 0.4750, 0.4756, 0.4761, 0.4767},
            {0.4772, 0.4778, 0.4783, 0.4788, 0.4793, 0.4798, 0.4803, 0.4808, 0.4812, 0.4817},
            {0.4821, 0.4826, 0.4830, 0.4834, 0.4838, 0.4842, 0.4846, 0.4850, 0.4854, 0.4857},
        }
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        {0.4861, 0.4864, 0.4868, 0.4871, 0.4875, 0.4878, 0.4881, 0.4884, 0.4887, 0.4890},
        {0.4893, 0.4896, 0.4898, 0.4901, 0.4904, 0.4906, 0.4909, 0.4911, 0.4913, 0.4916},
        {0.4918, 0.4920, 0.4922, 0.4925, 0.4927, 0.4929, 0.4931, 0.4932, 0.4934, 0.4936},
        {0.4938, 0.4940, 0.4941, 0.4943, 0.4945, 0.4946, 0.4948, 0.4949, 0.4951, 0.4952},
        {0.4953, 0.4955, 0.4956, 0.4957, 0.4959, 0.4960, 0.4961, 0.4962, 0.4963, 0.4964},
        {0.4965, 0.4966, 0.4967, 0.4968, 0.4969, 0.4970, 0.4971, 0.4972, 0.4973, 0.4974},
        {0.4974, 0.4975, 0.4976, 0.4977, 0.4977, 0.4978, 0.4979, 0.4979, 0.4980, 0.4981},
        {0.4981, 0.4982, 0.4982, 0.4983, 0.4984, 0.4984, 0.4985, 0.4985, 0.4986, 0.4986},
        {0.4987, 0.4987, 0.4987, 0.4988, 0.4988, 0.4989, 0.4989, 0.4989, 0.4990, 0.4990},
        {0.4990, 0.4991, 0.4991, 0.4991, 0.4992, 0.4992, 0.4992, 0.4992, 0.4993, 0.4993},
        {0.4993, 0.4993, 0.4994, 0.4994, 0.4994, 0.4994, 0.4994, 0.4995, 0.4995, 0.4995},
        {0.4995, 0.4995, 0.4995, 0.4996, 0.4996, 0.4996, 0.4996, 0.4996, 0.4996, 0.4997},
        {0.4997, 0.4997, 0.4997, 0.4997, 0.4997, 0.4997, 0.4997, 0.4997, 0.4997, 0.4998},
        {0.4998, 0.4998, 0.4998, 0.4998, 0.4998, 0.4998, 0.4998, 0.4998, 0.4998, 0.4998},
        {0.4998, 0.4998, 0.4999, 0.4999, 0.4999, 0.4999, 0.4999, 0.4999, 0.4999, 0.4999},
        {0.4999, 0.4999, 0.4999, 0.4999, 0.4999, 0.4999, 0.4999, 0.4999, 0.4999, 0.4999},
        {0.4999, 0.4999, 0.4999, 0.4999, 0.4999, 0.4999, 0.4999, 0.4999, 0.4999, 0.4999},
        {0.5000, 0.5000, 0.5000, 0.5000, 0.5000, 0.5000, 0.5000, 0.5000, 0.5000, 0.5000},
        {0.5000, 0.5000, 0.5000, 0.5000, 0.5000, 0.5000, 0.5000, 0.5000, 0.5000, 0.5000}
    };

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public Form_Main()
{
    InitializeComponent();
    comboBox1.SelectedIndex = 0;
}

//Se déclenche lorsque l'utilisateur pèse sur Réinitialiser
//Efface tout ce qui a été entré
private void button_Réinitialiser_Click(object sender, EventArgs e)
{

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        numericUpDown_A.Value = 0;
        numericUpDown_B.Value = 0;
        numericUpDown_Moyenne.Value = 0;
        numericUpDown_ET.Value = numericUpDown_ET.Minimum;
        textBox_Prob.Text = "";
        comboBox1.SelectedIndex = 0;
    }

    //Se déclenche lorsque l'utilisateur pèse sur Calculer
    //Choisis la bonne fonction en fonction du choix de l'utilisateur
    private void button_Calculer_Click(object sender, EventArgs e)
    {
        if (comboBox1.SelectedItem.ToString() == "P(a < X < b)")
        {
            if (numericUpDown_A.Value > numericUpDown_B.Value) MessageBox.Show("La
                valeur de la variable a ne peut être supérieure à celle de la
                variable b.");
            else Intervale();
        }
        else if (comboBox1.SelectedItem.ToString() == "P(X < a)") Inferieure();
        else if (comboBox1.SelectedItem.ToString() == "P(X > a)") Superieure();
    }

    private void Intervale() //fonction pour calculer la probabilité d'être à
        l'intérieur d'une intervalle
    {
        bool sameSide = false;
        double ValeurA = Convert.ToDouble(numericUpDown_A.Value);
        double ValeurB = Convert.ToDouble(numericUpDown_B.Value);

        if ((ValeurA < 0 && ValeurB < 0) || (ValeurA > 0 && ValeurB > 0)) sameSide =
            true;

        double[] CoteZs = new double[]
        {Convert.ToDouble((numericUpDown_A.Value * numericUpDown_ET.Value -
            numericUpDown_Moyenne.Value) / numericUpDown_ET.Value),
        Convert.ToDouble((numericUpDown_B.Value * numericUpDown_ET.Value -
            numericUpDown_Moyenne.Value) / numericUpDown_ET.Value)};

        double Probabilite = 0;
        int X, Y;

        foreach (double d in CoteZs)
        {
            Y = (int)(d * 100) - ((int)(d * 100) / 10) * 10; ;
            X = (int)(d * 10);

            if (X < 0) X *= -1;
            if (Y < 0) Y *= -1;
            if (X > 41) X = 40;

            if(sameSide)

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        {
            Probabilite -= Table[X, Y];
            sameSide = false;
        }
        else Probabilite += Table[X, Y];
    }
    if (Probabilite < 0) Probabilite *= -1;
    AfficherProb((float)Probabilite);
}

private void Inferieure() //fonction pour calculer la probabilité d'être
    inférieur à une valeur
{
    double CoteZ = Convert.ToDouble((numericUpDown_A.Value *
        numericUpDown_ET.Value - numericUpDown_Moyenne.Value) /
        numericUpDown_ET.Value);
    double Probabilite = 0.5;
    int X, Y;

    Y = (int)(CoteZ * 100) - ((int)(CoteZ * 100) / 10) * 10; ;
    X = (int)(CoteZ * 10);
    if (X > 41) X = 40;

    if (X < 0) X *= -1;
    if (Y < 0) Y *= -1;
    if(numericUpDown_A.Value < 0) Probabilite -= Table[X, Y];
    else Probabilite += Table[X, Y];
    AfficherProb((float)Probabilite);
}

private void Superieure() //fonction pour calculer la probabilité d'être
    supérieur à une valeur
{
    double CoteZ = Convert.ToDouble((numericUpDown_A.Value *
        numericUpDown_ET.Value - numericUpDown_Moyenne.Value) /
        numericUpDown_ET.Value);
    double Probabilite = 0.5;
    int X, Y;

    Y = (int)(CoteZ * 100) - ((int)(CoteZ * 100) / 10) * 10; ;
    X = (int)(CoteZ * 10);
    if (X > 41) X = 40;

    if (X < 0) X *= -1;
    if (Y < 0) Y *= -1;
    if (numericUpDown_A.Value > 0) Probabilite -= Table[X, Y];
    else Probabilite += Table[X, Y];
    AfficherProb((float)Probabilite);
}

private void AfficherProb(float probabilite) //fonction qui affiche la

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    probabilité
    {
        textBox_Prob.Text = "" + probabilite;
    }

    private void DotToComma(object sender, KeyPressEventArgs e) //Event qui change ↗
        un point pour une virgule
    {
        if (e.KeyChar.Equals('.'))
        {
            e.KeyChar =
                (System.Globalization.CultureInfo.CurrentCulture).NumberFormat.Numbe ↗
                rDecimalSeparator.ToCharArray()[0];
        }
    }

    //fonction qui surligne tout le texte d'un numericupdown lorsque l'utilisateur ↗
    l'atteint avec TAB
    private void SelectAllTextWithTab(object sender, EventArgs e)
    {
        NumericUpDown curBox = sender as NumericUpDown;
        curBox.Select();
        curBox.Select(0, curBox.Text.Length);
    }

    //fonction qui surligne tout le texte d'un numericupdown lorsque l'utilisateur ↗
    clique sur le controle
    private void SelectAllTextWithMouse(object sender, MouseEventArgs e)
    {
        NumericUpDown curBox = sender as NumericUpDown;
        curBox.Select(0, curBox.Text.Length);
    }

    //fonction qui surligne tout le texte de la sortie de la variable probabilité. ↗

    //Met aussi la valeur de la variable de probabilité dans le presse papier
    //il est donc inutile de copier la valeur
    private void textBox_Prob_MouseDown(object sender, MouseEventArgs e)
    {
        textBox_Prob.Select(0, textBox_Prob.Text.Length);
        if(textBox_Prob.Text.Length > 0) Clipboard.SetText(textBox_Prob.Text);
    }
}

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