UNIVERSIDAD ICEL

CAMPUS ZONA ROSA

LUIS ALFREDO CERVANTES GONZÁLEZ

MARIO FRANCISCO ALCANTARA CORTES

LENGUAJES VISUALES

FRACTALES

16020386

CODIGO DEL PROGRAMA

```vb
Imports System.Drawing
Public Class Form1
    Dim i As Integer, j As Integer, escala As Integer, lineaX As Integer, lineaY As Integer,
iteracion As Integer
    Dim c_re As Double, c_im As Double, x As Double, y As Double, x_temp As Double
    Dim opcionA As Integer, opcionB As Integer, opcionC As Integer
    Dim R As Integer, G As Integer, B As Integer
    Dim Cr As Single
    Dim Ci As Single
    Dim bmp As Bitmap

    Private Sub Button_Graficar_Click(sender As Object, e As EventArgs) Handles
Button_Graficar.Click
        Repeticiones()
        Anchura()
        Seleccion()
    End Sub
    Private Sub Button_Limpiar_Click(sender As Object, e As EventArgs) Handles
Button_Limpiar.Click
        Limpiar()
    End Sub
    Sub Repeticiones()
        If Text_Iteracion.Text = "" Then
            iteracion = 1000
        Else
            iteracion = Text_Iteracion.Text
        End If
    End Sub
    Sub Anchura()
        opcionB = ComboBox_An.SelectedIndex

        If opcionB = 0 Then
            Picture_Plano.Width = 160
            Picture_Plano.Height = 160
        ElseIf opcionB = 1 Then
            Picture_Plano.Width = 320
            Picture_Plano.Height = 320
        ElseIf opcionB = 2 Then
            Picture_Plano.Width = 480
            Picture_Plano.Height = 480
        ElseIf opcionB = 3 Then
            Picture_Plano.Width = 640
            Picture_Plano.Height = 640
        ElseIf opcionB = 4 Then
            Picture_Plano.Width = 800
```

```vb
            Picture_Plano.Height = 800
        End If
    End Sub
    Sub Seleccion()
        opcionA = ComboBox_Op.SelectedIndex
        opcionC = ComboBox_Variantes.SelectedIndex
        If opcionA = 0 Then
            Mandelbrot()
        ElseIf opcionA = 1 Then
            If ComboBox_Variantes.SelectedIndex = -1 Then
                MsgBox("Selecciona la variante del fractal de julia.")
            ElseIf opcionC = 0 Then
                Cr = -0.72
                Ci = 0.196
                Julia()
            ElseIf opcionC = 1 Then
                Cr = 0.285
                Ci = -0.01
                Julia()
            ElseIf opcionC = 2 Then
                Cr = -0.8
                Ci = 0.0
                Julia()
            ElseIf opcionC = 3 Then
                Cr = 0.0
                Ci = 0.8
                Julia()
            ElseIf opcionC = 4 Then
                Cr = -0.8
                Ci = -0.25
                Julia()
            End If
        End If
    End Sub
    Sub Mandelbrot()
        Dim width As Integer, heigth As Integer, Coll As Integer, Row As Integer, iteraciones As Integer
        width = Picture_Plano.Width
        heigth = Picture_Plano.Height

        bmp = New Bitmap(width, heigth)

        For Row = 0 To (Width - 1)
            For Coll = 0 To (heigth - 1)
                c_re = (Coll - width / 2.0) * 4.0 / width
                c_im = (Row - heigth / 2.0) * 4.0 / heigth
                iteraciones = 0
                x = 0
```

```vbnet
            y = 0

            While iteraciones < iteracion And ((x * x) + (y * y)) <= 4
                x_temp = (x * x) - (y * y) + c_re
                y = 2 * x * y + c_im
                x = x_temp
                iteraciones = iteraciones + 1
            End While

            R = iteraciones Mod 128
            G = iteraciones Mod 50 * 5
            B = iteraciones Mod 10

            If iteraciones < iteracion Then
                bmp.SetPixel(Coll, Row, Color.FromArgb(R, G, B))
            Else
                bmp.SetPixel(Coll, Row, Color.Black)
            End If

        Next Coll
    Next Row
    Picture_Plano.Image = bmp
End Sub



Sub Julia()

    Dim bmp As Bitmap

    Dim i As Integer
    Dim j As Integer
    Dim k As Integer
    Dim N As Integer
    Dim paso As Integer

    Dim delta As Single
    Dim rr As Single
    Dim a As Single
    Dim B As Single
    Dim an As Single
    Dim a0 As Single
    Dim b0 As Single

    j = 0
    k = 0
    i = 0
    N = iteracion
```

```vbnet
paso = 200

delta = 4 / Picture_Plano.Width
a0 = -2.0
b0 = -2.0

bmp = New Bitmap(Picture_Plano.Width, Picture_Plano.Height)

For j = 1 To Picture_Plano.Width - 1
    For k = 1 To Picture_Plano.Height - 1

        a = a0 + j * delta

        B = b0 + k * delta

        i = 0
        rr = 0

        While i < N And (a * a) + (B * B) < 4
            an = a * a - B * B + Cr
            B = 2 * a * B + Ci
            a = an
            i = i + 1
        End While

        'If i < 100 Then
        '   bmp.SetPixel(j, k, Color.Black)
        'Else
        '   bmp.SetPixel(j, k, Color.White)
        'End If

        If i < 5 Then
            bmp.SetPixel(j, k, Color.Black)
        ElseIf i >= 5 And i < 25
            bmp.SetPixel(j, k, Color.Purple)
        ElseIf i >= 25 And i < 50
            bmp.SetPixel(j, k, Color.Blue)
        ElseIf i >= 50 And i < 75
            bmp.SetPixel(j, k, Color.DarkOrchid)
        ElseIf i >= 75 And i < 100
            bmp.SetPixel(j, k, Color.White)
        ElseIf i >= 100 And i < 1001
            bmp.SetPixel(j, k, Color.DarkSlateGray)
        End If


    Next k
Next j
```

```vb
        Picture_Plano.Image = bmp
    End Sub
    Sub Limpiar()
        Picture_Plano.Image.Dispose()
        Picture_Plano.Image = Nothing
        Text_Iteracion.Clear()
        ComboBox_An.Text = ""
        ComboBox_Op.Text = ""
        ComboBox_Variantes.Text = ""
    End Sub
End Class
```

CONTROLES

TIPO	NOMBRE
PictureBox	Picture_Plano
TextBox	Text_Iteracion
ComboBox	ComboBox_An
ComboBox	ComboBox_Op
ComboBox	ComboBox_Variantes
Button	Button_Graficar
Button	Button_Limpiar