

Exercice sur le programme de résolution des équations du 2nd degré

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L'interface

The screenshot shows a Windows application window titled "Equation du 2nd degré". The interface is green and contains the following elements:

- Header: "Equation du 2nd degré" with standard window controls.
- Section: "Coefficients de $Ax^2 + Bx + C = 0$ " with three input fields for "coeff-A", "coeff-B", and "coeff-C".
- Button: "RESOUDRE" (Solve).
- Section: "Déterminant 'delta'" with a label "delta =" and a text box "lblDelta".
- Results area (dashed green border):
 - Cas-1: "Pas de solutions réelles !" (No real solutions!).
 - Cas-2: "X1 = X2 = lblSolDouble" (Double root).
 - Cas-3: "X1 = lblX1 X2 = lblX2" (Two distinct roots).
- Button: "FERMER" (Close).

Noms des contrôles, respectant les conventions habituelles : **lblXYZ** pour les labels, **txtXYZ** pour les textboxes, **btnxyz** pour les boutons, **frmXYZ** pour les forms, etc.

This screenshot shows the Visual Studio IDE with the "frmEquation.vb" form in design view. The application window is visible in the center, matching the previous screenshot. On the right, the "Explorateur de solutions" (Solution Explorer) shows the project structure, and the "Propriétés" (Properties) window shows the properties for the selected "lblSolDouble" control.

Property	Value
(Name)	lblSolDouble
AccessibleDescription	
AccessibleName	
AccessibleRole	Default
AllowDrop	False
Anchor	Top, Left
AutoEllipsis	False
AutoSize	True
BackColor	255; 255; 192

Les étapes du code

- Déclarations des variables typées
- Saisie des coefficients de l'équation A (coeffA), B (coeffB), etc
- Calcul du discriminant $\text{delta} = B*B - 4 * (A* C)$ à afficher dans **lblDelta**
- Evaluation de delta
 - si $\text{delta} < 0 \Rightarrow$ pas de solution : affichage du résultat (phrase)
 - si $\text{delta} = 0 \Rightarrow$ une solution double $X1 = X2 = (-B)/(2*A)$ à afficher dans **lblSolDouble**
 - si $\text{delta} > 0 \Rightarrow$ deux solutions réelles $X1 = (-B-\text{racine}(\text{delta}))/2*A$ à afficher dans **lblX1**
 $X2 = (-B+\text{racine}(\text{delta}))/2*A$ à afficher dans **lblX2**

Le code presque complet (à terminer)

```
Public Class frmEquation

    Private Sub btnFermer_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles btnFermer.Click
        Me.Close()
    End Sub

    Private Sub btnResoudre_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles btnResoudre.Click
        'Recherche de solutions
        'Coefficients
        Dim A As Single : Dim B As Single
        Dim C As Single

        'Récup des valeurs saisies
        A = CSng(coeffA.Text) : B = CSng(coeffB.Text)
        C = CSng(coeffC.Text)

        'Calcul de delta
        Dim delta As Single

        delta = (B * B) - 4 * (A * C)      'Expression du discriminant

        'Affichage de delta
        lblDelta.Text = delta.ToString

        'Calcul et affichage des solutions
        If delta < 0 Then
            'Pas de soluces
            lblResult1.Text = " Pas de soluces réelles ! "
            MsgBox("Désolé, pas de solutions ! ")
        Else
            If delta = 0 Then
                Dim x12 As Single
                'Solution double
                x12 = (-B) / (2 * A)
                'Affichage solution double
                lblSolDouble.Text = x12.ToString
            Else
                MsgBox(" Il y a DEUX solutions réelles que vous devez calculer")
                'Cas deux solutions X1 et X2
                ' .....
                ' .....   A terminer   .....
                ' .....
            End If
        End If

    End Sub

End Class
```

Exécutions

1)

The screenshot shows a window titled "Equation du 2nd degré". The coefficients are: coeff-A : 2, coeff-B : 7, coeff-C : -15. The "RESOUDRE" button is visible. Below, the "Déterminant 'delta'" is 169. The results are: Cas-1: Pas de solutions réelles !; Cas-2: $X1 = X2 = \text{IbI} \text{Soldouble}$; Cas-3: $X1 = \text{IbIX1}$, $X2 = \text{IbIX2}$. A dialog box titled "equation" is overlaid, containing the text "Il y a DEUX solutions réelles que vous devez calculer" and an "OK" button. A "FERMER" button is at the bottom of the main window.

2)

The screenshot shows a window titled "Equation du 2nd degré". The coefficients are: coeff-A : 4, coeff-B : 20, coeff-C : 25. The "RESOUDRE" button is visible. Below, the "Déterminant 'delta'" is 0. The results are: Cas-1: Pas de solutions réelles !; Cas-2: $X1 = X2 = -2,5$; Cas-3: $X1 = \text{IbIX1}$, $X2 = \text{IbIX2}$. A "FERMER" button is at the bottom of the main window.