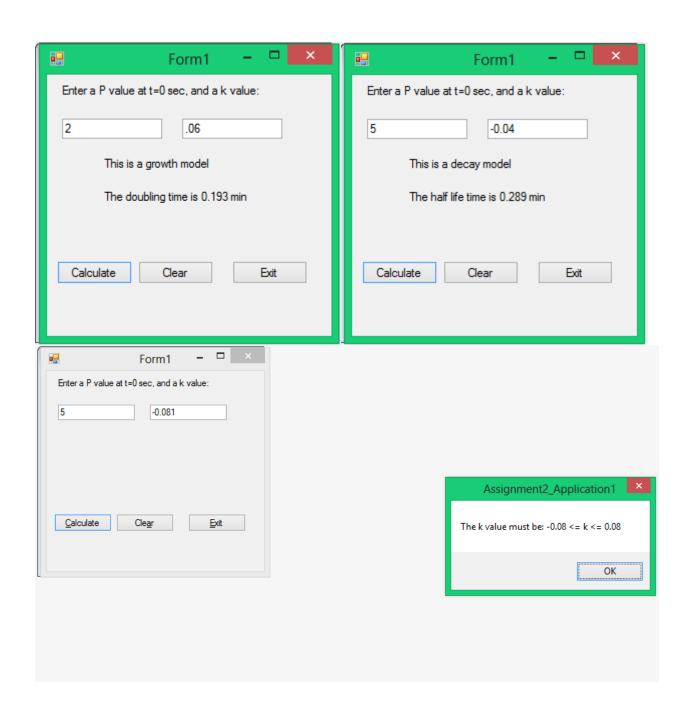
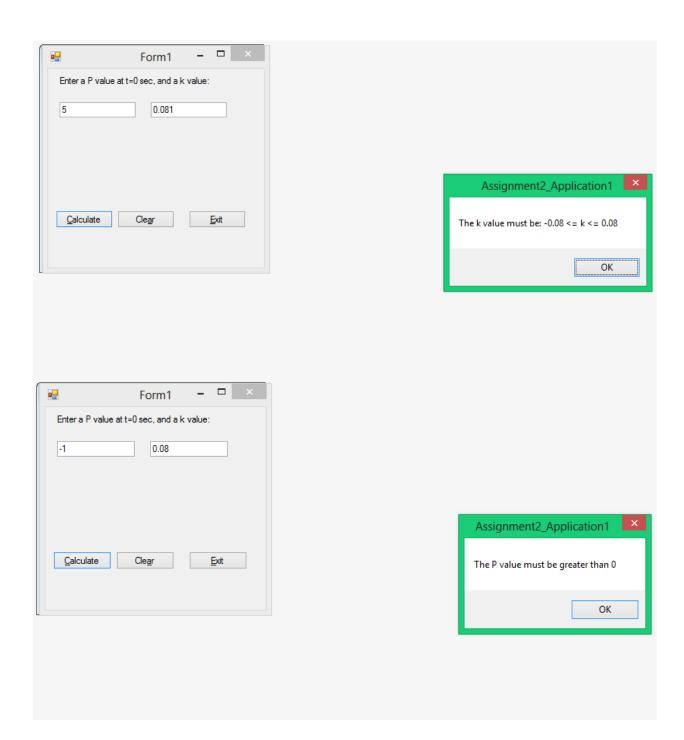
## Question 1:

```
Public Class Form1 ' Ilker Hadzhalaran
   Private Sub btnCalculate_Click(sender As Object, e As EventArgs) Handles
btnCalculate.Click
       Dim dblPo, dblK, dblTime As Double
        dblPo = CDbl(txtInputPo.Text)
        dblK = CDbl(txtInputK.Text)
        If dblK < -0.08 Or dblK > 0.08 Then
            MsgBox("The k value must be: -0.08 <= k <= 0.08")
           Exit Sub
        ElseIf dblPo <= 0 Then</pre>
            MsgBox("The P value must be greater than 0")
            Exit Sub
       End If
        If dblK > 0 Then
            lblModelType.Text = "This is a growth model"
            dblTime = GrowthModel(dblPo, dblK)
            lblDoubleOrHalfTime.Text = "The doubling time is " & (dblTime /
60).ToString("n3") & " min"
       Else
            lblModelType.Text = "This is a decay model"
            dblTime = DecayModel(dblPo, dblK)
            lblDoubleOrHalfTime.Text = "The half life time is " & (dblTime /
60).ToString("n3") & " min"
       End If
   End Sub
   Private Function GrowthModel(ByVal dblPo As Double, ByVal dblK As Double) As Double
        Dim dblTime As Double
        dblTime = (Math.Log(2)) / dblK
        Return dblTime
    End Function
```





## Question 2:

```
Public Class Form1 ' Ilker Hadzhalaran
   Private Sub btnCalculate_Click(sender As Object, e As EventArgs) Handles
btnCalculate.Click
       Dim dblDiameter, dblHeight, dblDepth, dblSheetThickness, dblSheetWidth,
dblVolume, dblForce, dblWorkAtHeight, dblTotalWork As Double
       Dim intN As Integer
        dblDiameter = CDbl(txtInputDiameter.Text)
        dblHeight = CDbl(txtInputHeight.Text)
        dblDepth = CDbl(txtInputDepth.Text)
        dblSheetThickness = CDbl(txtInputSheetThickness.Text)
       If dblHeight < dblDepth Or dblDepth < dblSheetThickness Then</pre>
            MsgBox("Height of the tank must be greater than depth of oil, and the depth
of oil must be larger than and a multiple of the sheet thickness.")
            Exit Sub
       End If
       lblDiameter.Text = "Diameter (m): " & dblDiameter.ToString("N3")
        lblHeight.Text = "Height (m): " & dblHeight.ToString("N3")
       lblDepth.Text = "Depth (m): " & dblDepth.ToString("N3")
       lblSheetThickness.Text = "Sheet Thickness (m): " &
dblSheetThickness.ToString("N3")
       dblSheetWidth = dblDepth * dblDiameter / dblHeight
       dblVolume = CalculateVolume(dblSheetWidth, dblSheetThickness)
        dblForce = CalculateForce(dblVolume)
       dblWorkAtHeight = CalculateWorkAtHeight(dblForce, dblDepth)
        dblTotalWork = 0
        intN = CInt(dblDepth / dblSheetThickness)
       For intCounter As Integer = 1 To intN Step 1
            dblTotalWork += dblWorkAtHeight
       Next intCounter
       lblTotalWork.Text = "Total Work (N): " & dblTotalWork.ToString("N3")
    End Sub
   Private Function CalculateVolume(ByVal dblSheetWidth As Double, ByVal
dblSheetThickness As Double) As Double
       Dim dblVolume As Double
```

```
dblVolume = (Math.PI) * (dblSheetWidth / 2) ^ 2 * (dblSheetThickness)
       Return dblVolume
    End Function
   Private Function CalculateForce(ByVal dblVolume As Double) As Double
       Const GRAVITY As Double = 9.8 'in m/s^2
       Const DENSITY As Double = 2000 'in kg/m^3
       Dim dblForce As Double
       dblForce = DENSITY * GRAVITY * dblVolume
       Return dblForce
    End Function
   Private Function CalculateWorkAtHeight(ByVal dblForce As Double, ByVal dblDepth As
Double) As Double
       Dim dblWorkAtHeight As Double
       dblWorkAtHeight = dblForce * (20 - dblDepth)
       Return dblWorkAtHeight
    End Function
   Private Sub btnClear_Click(sender As Object, e As EventArgs) Handles btnClear.Click
       lblDepth.Text = String.Empty
       lblDiameter.Text = String.Empty
       lblHeight.Text = String.Empty
       lblSheetThickness.Text = String.Empty
       lblTotalWork.Text = String.Empty
       txtInputDepth.Clear()
       txtInputDiameter.Clear()
       txtInputHeight.Clear()
       txtInputSheetThickness.Clear()
   End Sub
   Private Sub btnExit_Click(sender As Object, e As EventArgs) Handles btnExit.Click
       Me.Close()
   End Sub
End Class
```

