

Part A: Exception Handling: You will be working through a couple of tutorials in chapter 3. In part A, you will be working on tutorial 3-9 in the textbook (p. 153). You can refer to the textbook for detail directions, but you might be able to get by with the following outline. In part A, your task is to write a simple application to allow the user to enter their annual salary and number of pay periods per year with the program calculating the salary per pay period. The application should look like the figure.

1) Create a New Project named Salary Calculation.

2-6) Add the following controls from the Toolbox, and modify their properties as:

Form1: Text: "Salary Calculation"

Label1: Text: "Annual salary:"

Label2: Text: "Pay periods per year:"

Label3: Text: "Salary per pay period:"

TextBox1: Name: txtAnnualSalary

TextBox2: Name: txtPayPeriods

Label4: Name: lblSalary, BorderStyle: Fixed3D

Button1: Name: btnCalculate, Text: "Calculate"

7) Double-click on the Calculate button to bring up the Code window with the btnCalculate_Click template inserted. Add the following code to calculate the salary per pay period:

```
Private Sub btnCalculate_Click(ByVal sender As System.Object, _
    ByVal e As System.EventArgs) Handles btnCalculate.Click

    Dim decAnnualSalary As Decimal ' annual salary
    Dim intPayPeriods As Integer ' number of pay periods per year
    Dim decSalary As Decimal ' salary per pay period

    decAnnualSalary = CDec(txtAnnualSalary.Text)
    intPayPeriods = CInt(txtPayPeriods.Text)
    decSalary = decAnnualSalary / intPayPeriods
    lblSalary.Text = decSalary.ToString("c")
End Sub
```

8) Save the code on the Desktop (latter you can copy it to your P:\Math-CS\810-030\

9) Rerun the code and **click the Calculate button before** you type anything into the textboxes. You should see an error about an InvalidCastException being unhandled. Stop the program (Debug | Stop Debugging).

10) Revise the btnCalculate_Click code to handle this exception by putting the statements that cause the error in a Try-Catch block to react to the exception by displaying a MessageBox containing an appropriate message.

Modify the code as shown below:

```
Private Sub btnCalculate_Click(ByVal sender As System.Object, _
    ByVal e As System.EventArgs) Handles btnCalculate.Click

    Dim decAnnualSalary As Decimal ' annual salary
    Dim intPayPeriods As Integer ' number of pay periods per year
    Dim decSalary As Decimal ' salary per pay period

    Try
        decAnnualSalary = CDec(txtAnnualSalary.Text)
        intPayPeriods = CInt(txtPayPeriods.Text)
    Catch
        MessageBox.Show("Input fields must contain " _
            & "nonzero numeric values", "Error")
    End Try
    decSalary = decAnnualSalary / intPayPeriods
    lblSalary.Text = decSalary.ToString("c")
End Sub
```

11) Rerun the code, and **again click the Calculate button before** you type anything into the textboxes. Now you get a different error: "Attempted to divide by zero". Stop the program (Debug | Stop Debugging). Why did the error occur?

12) We can fix the error by extending the Try-Catch block to include all of the btnCalculate_Click code as:

```
Dim decAnnualSalary As Decimal ' annual salary
Dim intPayPeriods As Integer ' number of pay periods per year
Dim decSalary As Decimal ' salary per pay period

Try
    decAnnualSalary = CDec(txtAnnualSalary.Text)
    intPayPeriods = CInt(txtPayPeriods.Text)
    decSalary = decAnnualSalary / intPayPeriods
    lblSalary.Text = decSalary.ToString("c")
Catch
    MessageBox.Show("Input fields must contain " _
        & "nonzero numeric values", "Error")
End Try
```

13) Rerun the code and save the code. Test that it works even under user-input error situations.

Part B: GroupBox, Date usage, and Exception handling:

In part B, you will be working on tutorial 3-10 in the textbook (p.162). You can refer to the textbook for detail directions, but you might be able to get by with the following outline. In part B, your task is to write a simple application for the Highland Hotel to calculate the total room charge when checking out. The application should look like the figure:. To speed things up, I've partially completed the layout of the form. The partial project is at: P:\Math-CS\810-030\common\Partial Tutorial 3-10 copy it to your Desktop.

1) You'll need to add the Additional Charges GroupBox from the Toolbox | Containers or even better copy the

Room Information GroupBox.

2-3) Add the following controls to the new GroupBox, and modify their properties as:

Label

- Text: "Room Service:"
- TextAlign: MiddleRight

TextBox

- Name: txtRoomServe
- Text: (initially cleared)

Label

- Text: "&Telephone:"
- TextAlign: MiddleRight

TextBox

- Name: txtTelephone
- Text: (initially cleared)

Label

- Text: "&Misc:"
- TextAlign: MiddleRight

TextBox

- Name: txtMisc
- Text: (initially cleared)

The screenshot shows a Windows application window titled "Form1" with a blue title bar. The main content area has a light beige background and is titled "Highlander Hotel" in a large, bold, black font. Below the title, there are two labels: "Today's Date:" and "Time:". The form is divided into three main sections, each with a blue header:

- Room Information:** Contains two text boxes. The first is labeled "Nights:" and the second is labeled "Nightly Charge:".
- Additional Charges:** Contains three text boxes. The first is labeled "Room Service:", the second is labeled "Telephone:", and the third is labeled "Misc:".
- Total Charges:** Contains five text boxes. The first is labeled "Room Charges:", the second is labeled "Additional Charges:", the third is labeled "Subtotal:", the fourth is labeled "Tax:", and the fifth is labeled "Total Charges:".

At the bottom of the window, there are three buttons: "Calculate Charges", "Clear", and "Exit".

4) You'll need to add code to initialize the date and time when the form gets loaded. Double-click on an area Form1 outside of a control to create the template for the Form1_Load event handler. Complete the code to be:

```
Private Sub Form1_Load(ByVal sender As System.Object, _
    ByVal e As System.EventArgs) Handles MyBase.Load

    ' Get today's date from the system and display it.
    lblDateToday.Text = Now.ToString("D")

    ' Get the current time from the system and display it.
    lblTimeToday.Text = Now.ToString("T")
End Sub
```

5) Double-click the Calculate Charges button and add code to handle its click:

```
Private Sub btnCalculate_Click(ByVal sender As System.Object, _
    ByVal e As System.EventArgs) Handles btnCalculate.Click

    ' Declare variables for the calculations.
    Dim decRoomCharges As Decimal           ' Room charges total
    Dim decAddCharges As Decimal           ' Additional charges
    Dim decSubtotal As Decimal             ' Subtotal
    Dim decTax As Decimal                  ' Tax
    Dim decTotal As Decimal                ' Total of all charges
    Const decTAX_RATE As Decimal = 0.08D  ' Tax rate

    Try
        ' Calculate and display the room charges. Handle
        ' error if the fields are blank.
        decRoomCharges = CDec(txtNights.Text) * _
            CDec(txtNightlyCharge.Text)
        lblRoomCharges.Text = decRoomCharges.ToString("c")
    Catch
        MessageBox.Show("Nights and Nightly Charge must be numbers", _
            "Error")
    End Try

    Try
        ' Calculate and display the additional charges. Handle
        ' error if fields are blank.
        decAddCharges = CDec(txtRoomService.Text) + _
            CDec(txtTelephone.Text) + _
            CDec(txtMisc.Text)
        lblAddCharges.Text = decAddCharges.ToString("c")
    Catch
        MessageBox.Show("Room service, Telephone, and Misc. " _
            & "must be numbers", "Error")
    End Try

    ' Calculate and display the subtotal.
    decSubtotal = decRoomCharges + decAddCharges
    lblSubtotal.Text = decSubtotal.ToString("c")

    ' Calculate and display the tax.
    decTax = decSubtotal * decTAX_RATE
    lblTax.Text = decTax.ToString("c")

    ' Calculate and display the total charges.
    decTotal = decSubtotal + decTax
    lblTotal.Text = decTotal.ToString("c")
End Sub
```

Study this code to see which exceptions are handled for erroneous user inputs.

6) Double-click the Clear button and add code to handle its click:

```
Private Sub btnClear_Click(ByVal sender As System.Object, _  
    ByVal e As System.EventArgs) Handles btnClear.Click  
  
    ' Clear the room info fields.  
    txtNights.Clear()  
    txtNightlyCharge.Clear()  
  
    ' Clear the additional charges fields.  
    txtRoomService.Clear()  
    txtTelephone.Clear()  
    txtMisc.Clear()  
  
    ' Clear the decTotal fields.  
    lblRoomCharges.Text = String.Empty  
    lblAddCharges.Text = String.Empty  
    lblSubtotal.Text = String.Empty  
    lblTax.Text = String.Empty  
    lblTotal.Text = String.Empty  
  
    ' Get today's date from the operating system and display it.  
    lblDateToday.Text = Now.ToString("D")  
  
    ' Get the current time from the operating system and display it.  
    lblTimeToday.Text = Now.ToString("T")  
  
    ' Reset the focus to the first field.  
    txtNights.Focus()  
End Sub
```

7) Double-click the Exit button and add code to handle its click:

```
Private Sub btnExit_Click(ByVal sender As System.Object, _  
    ByVal e As System.EventArgs) Handles btnExit.Click  
  
    ' End the application, by closing the window.  
    Me.Close()  
End Sub
```

8) Save All from the File menu to save your code on the Desktop.

9) Run the application to debug your errors., the application and exit Visual Studio

10) Copy the folder containing your code to the P: in your folder.

Make sure as you leave that you signed the attendance sheet to indicate that you were in class. You might also want to also store your VB application folder on a USB flash drives, too.