Pizza Program Solutions and Questions

Size	Base Price	Each Topping
Small	$9.95	$1.00
Medium	$12.95	$1.25
Large	$15.95	$1.50
Party Size	$18.95	$2.00
Drinks	$1.25	

The Problem

"Newfoundlander Style Pizzeria Problem"

The Plan

Input

What information must the user enter?

Process Order Button

Pizza Size, Number of Pizzas, Number of Toppings, Number of Drinks

Calculate Change Button

Amount of money customer pays.

Processing

What must be done with the information?

Process Order Button

1. Determine base price for pizza size chosen
2. Determine price per topping for chosen size
3. Calculate cost before taxes
4. Calculate HST
5. Calculate total for order
6. Add total to total for all customers
7. Increase the number of orders by 1
8. Calculate the average cost of each order

Calculate Change Button

Calculate change.

Output

What should be displayed after processing is complete?

Process Order Button

1. Display subtotal
2. Display HST
3. Display total
4. Display total spent by all customers
5. Display average amount spent by each customer

Calculate Change Button

Display change.

1. Explain why ***most*** of the variables are declared as ***local variables*** while a few are declared as ***global variables***.

2. Explain the purpose of the "NumOrders" variable.

Variables (Memory)

Local Variables

Integer Variables

NumPizzas

NumToppings

NumDrinks

These variables store values that involve a whole number of items

Decimal Variables

PizzaBasePrice
PricePerTopping
SubTotal
HST
Change
CashTendered
AverageAmountSpent

These variables store values that involve an amount of money

Global Variables

Decimal Variables

TotalCostOfOrder

TotalSpentByAllCustomers

NumOrders

```
''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''
' The following variables are called GLOBAL VARIABLES because they are declared OUTSIDE the subs, which means
'       1. the values of these variables remain stored in RAM (main memory)as long as the
'          form is loaded in RAM (i.e. the computer will "remember" the values
'          of these variables for as long as the form remains loaded in the main memory)
'       2. these variables are VISIBLE to all the subs.  Each sub can access each
'          global variable, allowing two or more subs to SHARE their values.
' A variable should be declared GLOBALLY whenever two or more subs need to access it (i.e. use or change its
' value) and/or whenever its value needs to be "remembered" after a sub has finished executing.
''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''
Dim TotalSpentByAllCustomers As Decimal=0, TotalCostOfOrder As Decimal=0, NumOrders As Decimal=0

Private Sub ProcessOrderButton_Click(sender As System.Object, e As System.EventArgs) _
                                                                            Handles ProcessOrderButton.Click
    ''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''
    ' The variables declared inside a sub are called LOCAL VARIABLES.  Local variables are
    '       1. VISIBLE only within the sub in which they are declared.
    '       2. CREATED when the sub is invoked (i.e. called or executed).
    '       3. DESTROYED when the sub returns (has finished executing).
    ' Local variables should be used whenever possible. They help to reduce the time needed to debug a program
    ' because they keep information PRIVATE. If information is needed only by a particular sub, it is best
    ' to HIDE it from other subs. Local variables also help to conserve memory because they are discarded
    ' as soon as the sub returns.
    ''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''
    Dim PizzaBasePrice As Decimal, PricePerTopping As Decimal, SubTotal As Decimal
    Dim HST As Decimal, AverageAmountSpent As Decimal
    Dim NumPizzas As Integer, NumDrinks As Integer, NumToppings As Integer

    'INPUT: Obtain information from user.
    NumPizzas = Val(PizzasTextBox.Text)
    NumToppings = Val(ToppingsTextBox.Text)
    NumDrinks = Val(DrinksTextBox.Text)

    'PROCESSING
    'Decide what the base price and price per topping should be.
    If  SmallRadioButton.Checked Then
        PizzaBasePrice = 9.95
        PricePerTopping = 1
    ElseIf MediumRadioButton.Checked Then
        PizzaBasePrice = 12.95
        PricePerTopping = 1.25
    ElseIf LargeRadioButton.Checked Then
        PizzaBasePrice = 15.95
        PricePerTopping = 1.5
    Else
        PizzaBasePrice = 18.95
        PricePerTopping = 2
    End If

    'Now perform all calculations
    SubTotal = (PizzaBasePrice + PricePerTopping * NumToppings) * NumPizzas + NumDrinks * 1.25
    HST = Math.Round(SubTotal * 0.13, 2)
    TotalCostOfOrder = SubTotal + HST
    TotalSpentByAllCustomers = TotalSpentByAllCustomers + TotalCostOfOrder
    NumOrders = NumOrders + 1
    AverageAmountSpent = Math.Round(TotalSpentByAllCustomers / NumOrders, 2)

    'OUTPUT: Display results.
    SubTotalLabel.Text = FormatCurrency(SubTotal)
    HSTLabel.Text = FormatCurrency(HST)
    TotalLabel.Text = FormatCurrency(TotalCostOfOrder)
    TotalSpentLabel.Text = FormatCurrency(TotalSpentByAllCustomers)
    AverageSpentLabel.Text = FormatCurrency(AverageAmountSpent)

End Sub
```

3. Explain why "**Else**" is used instead of "**ElseIf**" for the final clause of this "**If**" statement.

```
Private Sub CalculateChangeButton_Click(sender As System.Object, _
           e As System.EventArgs) Handles ProcessOrderButton.Click

    Dim Change As Decimal, CashTendered As Decimal
    'INPUT
    CashTendered = Val(AmountPaidTextBox.Text)
    'PROCESSING
    Change = Math.Round(CashTendered - TotalCostOfOrder, 2)
    'OUTPUT
    ChangeLabel.Text = FormatCurrency(Change)

End Sub
```

4. Explain why the change calculations are done in "CalculateChangeButton_Click" sub instead of "ProcessOrderButton_Click."

```
Private Sub ClearButton_Click(sender As System.Object,
           e As System.EventArgs) Handles ClearButton.Click

    SmallRadioButton.Checked = True

    ToppingsTextBox.Text = ""
    PizzasTextBox.Text = ""
    DrinksTextBox.Text = ""
    AmountPaidTextBox.Text = ""

    SubTotalLabel.Text = ""
    HSTLabel.Text = ""
    TotalLabel.Text = ""
    ChangeLabel.Text = ""

End Sub


Private Sub QuitButton_Click(sender As System.Object, e As System.EventArgs) Handles QuitButton.Click

    Application.Exit()

End Sub
```