

## CustomerSegmentation.aspx:

```
<%@ Page Language="VB" AutoEventWireup="false"  
CodeFile="CustomerSegmentation.aspx.vb" Inherits="CustomerSegmentation" %>
```

```
<!DOCTYPE html>
```

```
<html xmlns="http://www.w3.org/1999/xhtml">
```

```
<head runat="server">
```

```
  <title>Customer Segmentation</title>
```

```
<style>
```

```
  body {
```

```
    font-family: Arial, sans-serif;
```

```
  }
```

```
  asp\:Table, table {
```

```
    width: 100%;
```

```
  }
```

```
  td, th {
```

```
    border: 1px solid black;
```

```
    padding: 8px;
```

```
    text-align: center;
```

```
  }
```

```
.UpperPanel {
```

```
  display: flex;
```

```
    align-items: flex-start;
    gap: 10px;
    margin-bottom: 5px;
}
.leftPanel {
    width: 50%;
}
.rightPanel {
    width: 25%;
}
.btn {
    background-color: darkslategray;
    color: white;
    border: none;
    padding: 10px 10px;
    margin: 1px;
    border-radius: 6px;
    cursor: pointer;
    font-weight: bolder;
}

.filter-box {
    display: flex;
    flex-direction: column;
    margin-bottom: 10px;
```

```
    text-align: left;
}
```

```
.filter-box label {

    font-weight: bold;
    margin-bottom: 1px;
}
```

```
.LowerPanel {
    width: 98%;
    margin: auto;
    background-color: ghostwhite;
    padding: 15px;
    border-radius: 10px;
    text-align: left;

    /*display: grid;
    grid-template-columns: 1fr 1fr;*/
    gap: 15px;
    display: flex;
    flex-direction: row;
}
```

```
</style>
```

```
</head>
```

```
<body>
```

```
<form id="form1" runat="server">
```

```
<h2 style="margin-left:40% ; font-weight: bold;">Customer Segmentation</h2>
```

```
<hr /><hr />
```

```
<div class="UpperPanel">
```

```
<div class="leftPanel">
```

```
<div class="definitionBox">
```

```
<h3>Customer Segmentation Rules</h3>
```

```
<ul>
```

```
<li><b>Premium Customers:</b> Total spending exceeds threshold  
(Fro10,000).</li>
```

```
<li><b>Frequent Customers:</b> High number of orders in a period.</li>
```

```
<li><b>Bulk Buyers:</b> Large quantity purchases in orders.</li>
```

```
<li><b>Low Customers:</b> Low total spending below threshold.</li>
```

```
</ul>
```

```
</div>
```

```
</div>
```

```
<div class="rightPanel">
```

```
    <div class="filter-box">
```

```
        <label>No of Records to Show:</label>
```

```
        <asp:TextBox ID="noOfRecordsT" runat="server" Text="5"
        CssClass="btn"></asp:TextBox>
```

```
    </div>
```

```
    <div class="filter-box">
```

```
        <label>Premium Threshold (Total Spending):</label>
```

```
        <asp:TextBox ID="prmThresholdT" runat="server" Text="10000"
        CssClass="btn"></asp:TextBox>
```

```
    </div>
```

```
    <div class="filter-box">
```

```
        <label>Bulk Buyer Threshold (Quantity):</label>
```

```
        <asp:TextBox ID="blkThresholdT" runat="server" Text="20"
        CssClass="btn"></asp:TextBox>
```

```
    </div>
```

```
    <asp:Button ID="applyBtn" runat="server" Text="Apply Filters"
    OnClick="applyBtn_Click" CssClass="btn"/>
```

```
</div>
```

```
</div>
```

```
<hr />
```

```
<hr />
```

```
<table class="MiddlePanel">
```

```
<tr>
```

```
<td>
```

```
<h3>Premium Customers</h3>
```

```
<asp:Table ID="tblPremium" runat="server"></asp:Table>
```

```
</td>
```

```
<td>
```

```
<h3>Frequent Customers</h3>
```

```
<asp:Table ID="tblFrequent" runat="server"></asp:Table>
```

```
</td>
```

```
</tr>
```

```
<tr>
```

```
<td>
```

```
<h3>Bulk Buyers</h3>
```

```
<asp:Table ID="tblBulk" runat="server"></asp:Table>
```

```
</td>
```

```
<td>
```

```
<h3>Low Customers</h3>
```

```
<asp:Table ID="tblLow" runat="server"></asp:Table>
```

```
</td>
```

```
</tr>
```

```
</table>
```

```
<hr />
```

```
<div class="LowerPanel">
```

```
<div>
```

```
<h3>Segment Control</h3>
```

```
<label>Select Segment</label>
```

```
<asp:RadioButtonList ID="rblSegment" runat="server">
```

```
<asp:ListItem Text="Premium" Value="Premium" selected="true"/>
```

```
<asp:ListItem Text="Frequent" Value="Frequent" />
```

```
<asp:ListItem Text="Bulk" Value="Bulk" />
```

```
<asp:ListItem Text="Low" Value="Low" />
```

```
</asp:RadioButtonList>
```

```
<br />
```

```
<label>Action Type</label>
```

```
<asp:RadioButtonList ID="actionType" runat="server">
```

```
<asp:ListItem Text="Message" Value="MessageAction" Selected="True" />
```

```
<asp:ListItem Text="Discount" Value="DiscountAction" />
```

```
</asp:RadioButtonList>
```

```
<br />
```

</div>

<div>

```
<asp:TextBox ID="msgInput" runat="server"
    TextMode="MultiLine"
    Rows="4" Columns="80" placeholder="Write Message or Reason for
Discount"></asp:TextBox>
```

<h3>Discount Settings</h3>

<label>Discount %</label>

```
<asp:TextBox ID="discoutInput" runat="server"></asp:TextBox>
```

<br />

<label>Start Date</label>

```
<asp:TextBox ID="startDate" runat="server" TextMode="Date"></asp:TextBox>
```

<br />

<label>End Date</label>

```
<asp:TextBox ID="endDate" runat="server" TextMode="Date"></asp:TextBox>
```

<br /><br />

```
<asp:Button ID="actionBtn" runat="server" Text="Send Message/Discount"  
CssClass="btn" />
```

```
<br /><br />
```

```
<asp:Label ID="actionResultL" runat="server" Color="Green"></asp:Label>
```

```
</div>
```

```
</div>
```

```
</form>
```

```
</body>
```

```
</html>
```

## **CustomerSegmentation.aspx.vb:**

```
Imports System.Data.SqlClient
```

```
Partial Class CustomerSegmentation
```

```
    ' Inherits System.Web.UI.Page
```

```
    Inherits BasePage
```

```
    'Hosted Db con string
```

```
    Dim conStr As String = "workstation id=bahadurDB.mssql.somee.com;packet  
size=4096;user id=bahadurkhann40_SQLLogin_1;pwd=akwnj6jiaz;data  
source=bahadurDB.mssql.somee.com;persist security info=False;initial  
catalog=bahadurDB;TrustServerCertificate=True"
```

```
    'Local Db con string
```

```
    ' Dim conStr As String = "Data Source=MEHTABPC\SQLEXPRESS;Initial  
Catalog=FurnitureDB;Persist Security Info=True;User ID=mehtab;Password=aftab"
```

Private Sub CustomerSegmentation\_Load(sender As Object, e As EventArgs) Handles Me.Load

    CheckPermission("CustomerSegmentation")

    If Not IsPostBack Then

        LoadAll()

        msgInput.Text = ""

        discoutInput.Text = ""

        startDate.Text = ""

        endDate.Text = ""

        actionResultL.Text = ""

    End If

End Sub

Protected Sub applyBtn\_Click(sender As Object, e As EventArgs)

    LoadAll()

End Sub

Private Sub LoadAll()

    ' we need to wrok here so that the ids dont' get duplicated ... makeing sure to clear ...  
    giving wired output...

    If Session("PremiumIDs") Is Nothing Then

        Session("PremiumIDs") = New List(Of Integer)

    Else

        CType(Session("PremiumIDs"), List(Of Integer)).Clear()

End If

If Session("FrequentIDs") Is Nothing Then

    Session("FrequentIDs") = New List(Of Integer)

Else

    CType(Session("FrequentIDs"), List(Of Integer)).Clear()

End If

If Session("BulkIDs") Is Nothing Then

    Session("BulkIDs") = New List(Of Integer)

Else

    CType(Session("BulkIDs"), List(Of Integer)).Clear()

End If

If Session("LowIDs") Is Nothing Then

    Session("LowIDs") = New List(Of Integer)

Else

    CType(Session("LowIDs"), List(Of Integer)).Clear()

End If

' Session("FrequentIDs") = New List(Of Integer)

'Session("BulkIDs") = New List(Of Integer)

'Session("LowIDs") = New List(Of Integer)

LoadPremium()

LoadFrequent()

LoadBulk()

```
LoadLow()  
End Sub  
Private Sub FillTable(query As String, tbl As Table)  
  
tbl.Rows.Clear()  
  
Dim conn As New SqlConnection(conStr)  
Dim cmd As New SqlCommand(query, conn)  
  
Try  
    conn.Open()  
    Dim reader As SqlDataReader = cmd.ExecuteReader()  
  
    Dim header As New TableRow()  
    header.BackColor = Drawing.Color.Black  
    header.ForeColor = Drawing.Color.White  
  
    Dim h1 As New TableCell()  
    h1.Text = "ID"  
  
    Dim h2 As New TableCell()  
    h2.Text = "Name"  
  
    Dim h3 As New TableCell()  
    h3.Text = "Value"
```

```
header.Cells.Add(h1)
```

```
header.Cells.Add(h2)
```

```
header.Cells.Add(h3)
```

```
tbl.Rows.Add(header)
```

```
While reader.Read()
```

```
    Dim row As New TableRow()
```

```
        Dim cell1 As New TableCell()
```

```
        cell1.Text = reader(0).ToString()
```

```
        Dim cell2 As New TableCell()
```

```
        cell2.Text = reader(1).ToString()
```

```
        Dim cell3 As New TableCell()
```

```
        cell3.Text = reader(2).ToString()
```

```
        row.Cells.Add(cell1)
```

```
        row.Cells.Add(cell2)
```

```
        row.Cells.Add(cell3)
```

```
tbl.Rows.Add(row)
```

'here we will fill of our ids list so that we can later send messages

```
Dim id As Integer = Convert.ToInt32(reader(0))
```

```
If tbl.ID = "tblPremium" Then
    CType(Session("PremiumIDs"), List(Of Integer)).Add(id)

Elseif tbl.ID = "tblFrequent" Then
    CType(Session("FrequentIDs"), List(Of Integer)).Add(id)

Elseif tbl.ID = "tblBulk" Then
    CType(Session("BulkIDs"), List(Of Integer)).Add(id)

Elseif tbl.ID = "tblLow" Then
    CType(Session("LowIDs"), List(Of Integer)).Add(id)
End If
'-----
End While

reader.Close()

Catch ex As Exception
    Response.Write(ex.Message)

Finally
    conn.Close()
End Try

End Sub
```

```
Private Sub LoadPremium()
```

```
' also this part needed to make safe using math.max fuction lets mke it crash safe
```

```
Dim noOfRecords As Integer = Math.Max(1, Val(noOfRecordsT.Text))
```

```
Dim thr As Integer = Math.Max(0, Val(prmThresholdT.Text))
```

```
Dim query As String = ""
```

```
query &= "SELECT TOP " & noOfRecords & " C.Customer_Id, C.Customer_Name, "
```

```
query &= "SUM(P.Standard_Price * OL.Ordered_Quantity) "
```

```
query &= "FROM Customer_t C "
```

```
query &= "JOIN Order_t O ON C.Customer_Id = O.Customer_Id "
```

```
query &= "JOIN Order_line_t OL ON O.Order_Id = OL.Order_Id "
```

```
query &= "JOIN Product_t P ON OL.Product_Id = P.Product_Id "
```

```
query &= "GROUP BY C.Customer_Id, C.Customer_Name "
```

```
query &= "HAVING SUM(P.Standard_Price * OL.Ordered_Quantity) >= " & thr & " "
```

```
query &= "ORDER BY SUM(P.Standard_Price * OL.Ordered_Quantity) DESC"
```

```
FillTable(query, tblPremium)
```

```
End Sub
```

```
Private Sub LoadFrequent()
```

```
Dim noOfRecords As Integer = Math.Max(1, Val(noOfRecordsT.Text))
```

```
Dim query As String = ""
```

```
query &= "SELECT TOP " & noOfRecords & " C.Customer_Id, C.Customer_Name, "  
query &= "COUNT(O.Order_Id) "  
query &= "FROM Customer_t C "  
query &= "JOIN Order_t O ON C.Customer_Id = O.Customer_Id "  
query &= "GROUP BY C.Customer_Id, C.Customer_Name "  
query &= "ORDER BY COUNT(O.Order_Id) DESC"
```

```
FillTable(query, tblFrequent)
```

```
End Sub
```

```
Private Sub LoadBulk()
```

```
Dim noOfRecords As Integer = Math.Max(1, Val(noOfRecordsT.Text)) ' can be made safe  
form sql injection but now sufficient
```

```
Dim thr As Integer = Math.Max(0, Val(blkThresholdT.Text))
```

```
Dim query As String = ""
```

```
query &= "SELECT TOP " & noOfRecords & " C.Customer_Id, C.Customer_Name, "  
query &= "SUM(OL.Ordered_Quantity) "  
query &= "FROM Customer_t C "  
query &= "JOIN Order_t O ON C.Customer_Id = O.Customer_Id "  
query &= "JOIN Order_line_t OL ON O.Order_Id = OL.Order_Id "  
query &= "GROUP BY C.Customer_Id, C.Customer_Name "  
query &= "HAVING SUM(OL.Ordered_Quantity) >= " & thr & " "  
query &= "ORDER BY SUM(OL.Ordered_Quantity) DESC"
```

```
FillTable(query, tblBulk)
```

```
End Sub
```

```
Private Sub LoadLow()
```

```
Dim noOfRecords As Integer = Math.Max(1, Val(noOfRecordsT.Text))
```

```
Dim query As String = ""
```

```
query &= "SELECT TOP " & noOfRecords & " C.Customer_Id, C.Customer_Name, "
```

```
query &= "SUM(P.Standard_Price * OL.Ordered_Quantity) "
```

```
query &= "FROM Customer_t C "
```

```
query &= "JOIN Order_t O ON C.Customer_Id = O.Customer_Id "
```

```
query &= "JOIN Order_line_t OL ON O.Order_Id = OL.Order_Id "
```

```
query &= "JOIN Product_t P ON OL.Product_Id = P.Product_Id "
```

```
query &= "GROUP BY C.Customer_Id, C.Customer_Name "
```

```
query &= "ORDER BY SUM(P.Standard_Price * OL.Ordered_Quantity) ASC"
```

```
FillTable(query, tblLow)
```

```
End Sub
```

```
' ok so lets implement Message or Discout System
```

```
' Made two tables in db segmentmessage and CustomerDiscounts
```

' For administration Actions lets make a button event handler

Protected Sub actionBtn\_Click(sender As Object, e As EventArgs) Handles  
actionBtn.Click

actionResultL.Text = ""

' First of all , lets get the ids of customer in a particular segment in a list ....!

Dim list As List(Of Integer)

If rblSegment.SelectedValue = "Premium" Then

list = CType(Session("PremiumIDs"), List(Of Integer))

Elseif rblSegment.SelectedValue = "Frequent" Then

list = CType(Session("FrequentIDs"), List(Of Integer))

Elseif rblSegment.SelectedValue = "Bulk" Then

list = CType(Session("BulkIDs"), List(Of Integer))

Else

```
list = CType(Session("LowIDs"), List(Of Integer))
```

```
End If
```

```
Dim conn As New SqlConnection(conStr)
```

```
Dim cmd As New SqlCommand
```

```
cmd.Connection = conn
```

```
' One last thing if no reocrd in particular segment ...
```

```
If list Is Nothing OrElse list.Count = 0 Then
```

```
    actionResultL.Text = "No customers found in selected segment."
```

```
    LoadAll()
```

```
Exit Sub
```

```
End If
```

```
Try
```

```
    conn.Open()
```

```
    actionResultL.Text = ""
```

```
' First of all lets do validaiton for discount
```

```
Dim discountValue As Integer
```

```
If actionType.SelectedValue = "DiscountAction" Then
```

```
    If Not Integer.TryParse(discountInput.Text, discountValue) Then
```

```
        actionResultL.Text = "Please enter a valid number."
```

```
        LoadAll()
```

```
        Exit Sub
```

```
    End If
```

```
    If discountValue < 0 Or discountValue > 100 Then
```

```
        actionResultL.Text = "Discount must be between 0 and 100."
```

```
        LoadAll()
```

```
        Exit Sub
```

```
    End If
```

```
    If startDate.Text = "" Then
```

```
        actionResultL.Text = "Please enter a valid start date."
```

```
        LoadAll()
```

```
        Exit Sub
```

```
    End If
```

```
    If endDate.Text = "" Then
```

```
        actionResultL.Text = "Please enter a valid end date."
```

```
        LoadAll()
```

```
        Exit Sub
```

```
    End If
```

```
End If
```

```
If actionType.SelectedValue = "MessageAction" Then
```

```

If msgInput.Text = "" Then
    actionResultL.Text = "Please Enter a message to send."
    LoadAll()
    Exit Sub
End If
End If

For Each id As Integer In list
    ' as we are doing two queires so we should clear the parameter
    cmd.Parameters.Clear()
    'IF the admin selects to send messge

    actionResultL.Text &= "apply aciton on : " & id & "<br>"

    If actionType.SelectedValue = "MessageAction" Then

        Dim query As String = "INSERT INTO SegmentMessages (CustomerId,
MessageText, CreatedDate) VALUES (@id, @msg, GETDATE())"

        cmd.CommandText = query

        cmd.Parameters.AddWithValue("@id", id)

        cmd.Parameters.AddWithValue("@msg", msgInput.Text)

        Dim rowsAffected As Integer = cmd.ExecuteNonQuery()

        actionResultL.Text &= "Rows inserted: " & rowsAffected & "<br>"

```

```

' Response.Write("command made : " & cmd.CommandText & "<br>")

'for 2nd choice

Elseif actionType.SelectedValue = "DiscountAction" Then

' One thing that we missed earlier is causing probme is not to delete teh previosu
discounts :

Dim delCmd As New SqlCommand("DELETE FROM CustomerDiscounts WHERE
CustomerId=@id", conn)

delCmd.Parameters.AddWithValue("@id", id)

delCmd.ExecuteNonQuery()

Dim query As String = "INSERT INTO CustomerDiscounts (CustomerId,
DiscountPercent, Reason, StartDate, EndDate) VALUES (@id, @d, @r, @s, @e)"

cmd.CommandText = query

cmd.Parameters.AddWithValue("@id", id)

cmd.Parameters.AddWithValue("@d", discountValue)

cmd.Parameters.AddWithValue("@r", msgInput.Text)

cmd.Parameters.AddWithValue("@s", Convert.ToDateTime(startDate.Text))

cmd.Parameters.AddWithValue("@e", Convert.ToDateTime(endDate.Text))

' Response.Write("sent discout to customer : " & id & " with discount percent : " &
Val(discoutInput.Text))

' actionResultL.Text &= "Sent discount to customer : " & id & " with discount
percent : " & Val(discoutInput.Text) & "<br>"

Dim rowsAffected As Integer = cmd.ExecuteNonQuery()

actionResultL.Text &= "Rows inserted: " & rowsAffected & "<br>"

```

End If

Next

actionResultL.Text = "Action applied successfully to " & list.Count & " customers!"

LoadAll()

Catch ex As Exception

actionResultL.Text = ex.Message

Finally

conn.Close()

End Try

' lets clear so that it don;t creat mess after action applied

msgInput.Text = ""

discoutInput.Text = ""

startDate.Text = ""

endDate.Text = ""

End Sub

End Class

' Here is summary fo validadation and Database changes we have done so far

' VALIDATIONS

' MESSAGE VALIDATION

' Check if message textbox is empty

' If empty show error "Please enter a message"

' Stop execution using Exit Sub

' Prevents inserting blank messages in database

' DISCOUNT VALIDATIONS

' Discount must be numeric using Integer.TryParse()

' Discount must be between 0 and 100

' Start Date validation

' Check if empty to avoid DateTime conversion error

' End Date validation

' Check if empty

' Better approach

' Use DateTime.TryParse instead of Convert.ToDateTime

' GENERAL VALIDATIONS

' Check if selected segment has customers

' If no customers found show message and stop execution

' IMPORTANT

' Clear ActionResultL.Text at start to remove old messages

' Use Exit Sub after validation failure so no database query runs

' DATABASE TABLES FOR THIS FEATURE

' SegmentMessages

' Stores messages sent to customers

' Fields

' CustomerId

' MessageText

' CreatedDate

' CustomerDiscounts

' Stores discount information

' Fields

' CustomerId

' DiscountPercent

' Reason

' StartDate

' EndDate

' Before inserting new discount old discount is deleted to avoid duplicates

# OUTPUT:

## Customer Segmentation

### Customer Segmentation Rules

- **Premium Customers:** Total spending exceeds threshold (Fro10,000).
- **Frequent Customers:** High number of orders in a period.
- **Bulk Buyers:** Large quantity purchases in orders.
- **Low Customers:** Low total spending below threshold.

No of Records to Show:

2

Premium Threshold (Total Spending):

10000

Bulk Buyer Threshold (Quantity):

20

Apply Filters

| Premium Customers |                      |       |
|-------------------|----------------------|-------|
| ID                | Name                 | Value |
| 1                 | Contemporary Casuals | 20    |

| Frequent Customers |                      |       |
|--------------------|----------------------|-------|
| ID                 | Name                 | Value |
| 1                  | Contemporary Casuals | 5     |
| 2                  | Value Furniture      | 3     |

| Bulk Buyers |                      |       |
|-------------|----------------------|-------|
| ID          | Name                 | Value |
| 1           | Contemporary Casuals | 20    |

| Low Customers |                          |         |
|---------------|--------------------------|---------|
| ID            | Name                     | Value   |
| 11            | American Euro Lifestyles | 525.00  |
| 4             | Eastern Furniture        | 1600.00 |

| Bulk Buyers |                      |       |
|-------------|----------------------|-------|
| ID          | Name                 | Value |
| 1           | Contemporary Casuals | 20    |

| Low Customers |                          |         |
|---------------|--------------------------|---------|
| ID            | Name                     | Value   |
| 11            | American Euro Lifestyles | 525.00  |
| 4             | Eastern Furniture        | 1600.00 |

### Segment Control

Write Message or Reason for Discount

Select Segment

Premium

Frequent

Bulk

Low

### Discount Settings

Discount %

Start Date

End Date

Send Message/Discount

Action Type

Message

Discount