```vb
' *************************************************************************
' Surname, Initials: Zuze, ML
' Student Number: 201477488
' Practical: P09
' Class name: cGains
' *************************************************************************

Option Strict On
Option Explicit On
Option Infer Off

<Serializable()> Public MustInherit Class cGains
    Private aName As String 'Name of the alcohol
    Private BottleCapacity As Double 'Capacity of the alcohol

    Public Sub New(ByVal Nme As String, ByVal Capacity As Double) 'Constructor
        aName = Nme
        BottleCapacity = Capacity
    End Sub

    'Property

    Public Property Name As String
        Get
            Return aName
        End Get
        Set(VName As String)
            aName = VName
        End Set
    End Property

    Public Property Capacity As Double
        Get
            Return BottleCapacity
        End Get
        Set(vCapacity As Double)
            validate(vCapacity)
            BottleCapacity = vCapacity
        End Set
    End Property

    Protected Sub validate(Value As Double) 'Validation
        If Value <= 0 Then
            Value = 1
        End If
    End Sub

    Public MustOverride Function Popularity() As Char


    Public Overridable Function DisplayInfo() As String 'Display Roster
        Return "Bottle Name: " + Name + vbCrLf + "Bottle Capacity: " +
CStr(BottleCapacity) + "l"
    End Function


End Class
```

```vbnet
' *************************************************************************
' Surname, Initials: Zuze, ML
' Student Number: 201477488
' Practical: P09
' Class name:  cGrog
' *************************************************************************

Option Strict On
Option Explicit On
Option Infer Off

<Serializable()> Public Class cGrog
    Inherits cGains
    Private AContent As Double 'Used to store the content of the grog

    Public Sub New(ByVal Nme As String, ByVal Cap As Double, ByVal Content As Double)
'Constructor
        MyBase.New(Nme, Cap)
        AContent = Content
    End Sub

    'Property

    Public Property Content As Integer
        Get
            Return AContent
        End Get
        Set(vContent As Integer)
            AContent = vContent
        End Set
    End Property

    Public Overrides Function Popularity() As Char 'Calculates the popularity of the
Grog depending on the content
        Dim popular As Char
        Select Case AContent
            Case 50 To 70
                popular = "B"
            Case 40 To 50
                popular = "C"
            Case Is > 70
                popular = "A"
        End Select
        Return popular
    End Function


    Public Overrides Function DisplayInfo() As String 'Display Roster
        Return MyBase.DisplayInfo() + vbCrLf + "Content: " + CStr(AContent) + "%" +
vbCrLf
    End Function

End Class
```

```vb
' *************************************************************************
' Surname, Initials: Zuze, ML
' Student Number: 201477488
' Practical: P09
' Class name: cRum
' *************************************************************************

Option Strict On
Option Explicit On
Option Infer Off

<Serializable()> Public Class cRum
    Inherits cGains
    Private Vintage As Integer 'Used to store the year in which the rum was made
    Private RemainAmt As Double 'used to store the amount remaining in the bottle

    Public Sub New(ByVal Nme As String, ByVal Cap As Double, Vint As Integer, Remains
As Double) 'Constructor
        MyBase.New(Nme, Cap)
        Vintage = Vint
        RemainAmt = Remains
    End Sub

    'Properties

    Public Property Vint As Integer
        Get
            Return Vintage
        End Get
        Set(vVintage As Integer)
            validate(vVintage)
            If vVintage > 2014 Then 'Validation
                vVintage = 2014
            End If
            Vintage = vVintage
        End Set
    End Property

    Public Property RemainingAmount As Double
        Get
            Return RemainAmt
        End Get
        Set(vRemains As Double)
            validate(vRemains) 'Validation
            RemainAmt = vRemains
        End Set
    End Property

    'Methods

    Public Overrides Function Popularity() As Char 'Calculates the popularity of the
Rum depending on the remainAmt
        Select Case RemainAmt
            Case Is > 10
                Return "B"
            Case Is >= 60
                Return "C"
            Case Else
                Return "A"
        End Select
    End Function
```

```vbnet
    Public Overrides Function DisplayInfo() As String 'Display Roster
        Return MyBase.DisplayInfo() + vbCrLf + "Vintage: " + CStr(Vintage) + vbCrLf +
"Remaining Amount: " + CStr(RemainAmt) + "%" + vbCrLf + "Popularity: " +
CStr(Popularity()) + vbCrLf
    End Function

End Class




' ***************************************************************************
' Surname, Initials: Zuze, ML
' Student Number: 201477488
' Practical: P09
' Class name: cBooty
' ***************************************************************************

Option Strict On
Option Explicit On
Option Infer Off

<Serializable()> Public Class cBooty
    Private Name As String 'Name of the booty
    Private Value As Double 'Value of booty in gold

    Public Sub New(ByVal Nme As String, ByVal val As Double) 'Constructor
        Name = Nme
        Value = val
    End Sub

    'Property

    Public Property BootyName As String
        Get
            Return Name
        End Get
        Set(vName As String)
            Name = vName
        End Set
    End Property

    Public Property Val As Double
        Get
            Return Value
        End Get
        Set(vValue As Double)
            If vValue <= 0.0 Then   'Validation
                Value = 0.1
            End If
            Value = vValue
        End Set
    End Property

    'Methods

    Public Function GoldtoSilverConverter(ByVal exRate As Double) As Double 'converts
the value of booty to gold
        Return exRate * Value
    End Function
```

```vb
    Public Function DisplayInfo() As String 'Display Roster
        Return "Name: " + Name + vbCrLf + "Value of Booty (Gold Coins): " +
CStr(Value) + vbCrLf
    End Function

End Class




' *************************************************************************
' Surname, Initials: Zuze, ML
' Student Number: 201477488
' Practical: P09
' Class name: Less30Content
' *************************************************************************

Option Strict On
Option Explicit On
Option Infer Off

Public Class Less30Content
    Inherits Exception
    'used to validate whether the grog content is less than 30
    Public Sub New()
        MyBase.New("The Number you have input does not Exist as a Content")
    End Sub
End Class




' *************************************************************************
' Surname, Initials: Zuze, ML
' Student Number: 201477488
' Practical: P09
' Class name: frmCaptain
' *************************************************************************

Option Strict On
Option Explicit On
Option Infer Off

Imports System.IO
Imports System.Runtime.Serialization.Formatters.Binary

Public Class frmCaptain
    Private Grog() As cGrog 'used to create new grog object
    Private Rum() As cRum 'used to create new Rum object
    Private Booty() As cBooty 'used to create new Booty object
    Private FS As FileStream
    Private BF As BinaryFormatter
    Private ExRate As Double
    Private tot As Double


    Private Sub MsRum_Click(sender As Object, e As EventArgs) Handles MsRum.Click
```

```vb
        rtbDisplay.Text += "Rum Information: " + vbCrLf + vbCrLf
        Dim iloop As Integer
        Dim Name As String
        Dim Capacity As Double
        Dim Remains As Double
        Dim numRum As Integer
        Dim Vintage As Integer
        Dim counter1 As Integer
        FS = New FileStream("Rum.IFM", FileMode.Create, FileAccess.Write) 'Creating a
new file to write to
        BF = New BinaryFormatter
        Try
            numRum = CInt(InputBox("How many bottles of Rum did the Captain Gain?",
"Grog Amount"))
        Catch
            Dim ex As Exception
            MsgBox("You have entered an Invalid value value, Please try again")
            numRum = CInt(InputBox("How many bottles of Rum did the Captain Gain?",
"Grog Amount"))
        End Try
        ReDim Rum(numRum)
        For iloop = 1 To numRum
            Name = InputBox("What is the Name of the Rum", "Rum Name")
            Try
                Capacity = CDbl(InputBox("What is the Capacity of the bottle?",
"Bottle Capacity"))
                Vintage = CInt(InputBox("Which Year was this Rum Produced?",
"Vintage"))
                Remains = CInt(InputBox("How much is Remaining in the bottle" + vbCrLf
+ "Enter Percenatge", "Amount Remaining"))
            Catch
                Dim ex As Exception
                MsgBox("You have entered an Invalid value value, Please try again")
                Capacity = CDbl(InputBox("What is the Capacity of the bottle (in
Letres)?", "Bottle Capacity"))
                Vintage = CInt(InputBox("Which Year was this Rum Produced?",
"Vintage"))
                Remains = CInt(InputBox("How much is Remaining in the bottle (in
Letres)" + vbCrLf + "Enter Percenatge", "Amount Remaining"))
            End Try
            Rum(iloop) = New cRum(Name, Capacity, Vintage, Remains)
            BF.Serialize(FS, Rum(iloop)) 'converting to binary
            rtbDisplay.Text += Rum(iloop).DisplayInfo + vbCrLf 'Display roster
            If Rum(iloop).Popularity = "A" Then
                counter1 += 1
            End If
        Next
        rtbDisplay.Text += "Number of A-rated Rum: " + CStr(counter1) + vbCrLf
        FS.Close()
        FS = Nothing
        BF = Nothing
    End Sub

    Private Sub MSGrog_Click(sender As Object, e As EventArgs) Handles MSGrog.Click
        rtbDisplay.Text += "Grog Information: " + vbCrLf + vbCrLf
        Dim iloop As Integer
        Dim Name As String
        Dim Capacity As Double
        Dim Content As Double
        Dim numgrog As Integer
        Dim counter As Integer
```

```vb
        FS = New FileStream("Grog.IFM", FileMode.Create, FileAccess.Write) 'Creating a
new file to write to
        BF = New BinaryFormatter
        Try
            numgrog = CInt(InputBox("How many bottles of Grog did the Captain Gain?",
"Grog Amount"))
        Catch
            Dim ex As Exception
            MsgBox("You have entered an Invalid value value, Please try again")
            numgrog = CInt(InputBox("How many bottles of Grog did the Captain Gain?",
"Grog Amount"))
        End Try
        ReDim Grog(numgrog)
        For iloop = 1 To numgrog
            Name = InputBox("What is the Name of the Grog", "Grog Name")
            Try
                Capacity = CDbl(InputBox("What is the Capacity of the bottle (in
Letres)?", "Bottle Capacity"))
            Catch
                Dim ex As Exception
                MsgBox("You have entered an Invalid value value, Please try again")
                Capacity = CDbl(InputBox("What is the Capacity of the bottle (in
Letres)?", "Bottle Capacity"))
            End Try
            Try
                Content = CDbl(InputBox("What is the Alcohol Content?", "Alcohol
Content"))
                If Content <= 30 Then Throw New Less30Content()
            Catch

                Dim ex As Less30Content
                MsgBox("You have input an invalid value, try again")
                Content = CDbl(InputBox("What is the Alcohol Content Percentage?",
"Alcohol Content"))
            End Try
            Grog(iloop) = New cGrog(Name, Capacity, Content)
            BF.Serialize(FS, Grog(iloop)) 'converting to binary
            rtbDisplay.Text += Grog(iloop).DisplayInfo + vbCrLf 'Display roster
            If Grog(iloop).Popularity = "C" Then
                counter += 1
            End If
        Next iloop
        rtbDisplay.Text += "Number of C-rated Grog: " + CStr(counter) + vbCrLf
        FS.Close()
        FS = Nothing
        BF = Nothing
    End Sub

    Private Sub MSBooty_Click(sender As Object, e As EventArgs) Handles MSBooty.Click
        rtbDisplay.Text += "Booty Information: " + vbCrLf + vbCrLf
        Dim iloop As Integer
        Dim Name As String
        Dim Value As Double
        Dim numBooty As Integer
        FS = New FileStream("Booty.IFM", FileMode.Create, FileAccess.Write) 'Creating
a new file to write to
        BF = New BinaryFormatter
        Try
            numBooty = CInt(InputBox("How much Booty did the Captain Gain?", "Booty
Amount"))
            ExRate = CDbl(InputBox("What is the exchage rate from Gold to Silver",
"Booty Amount"))
```

```vbnet
        Catch
            Dim ex As Exception
            MsgBox("You have entered an Invalid value value, Please try again")

            numBooty = CInt(InputBox("How much Booty did the Captain Gain?", "Booty
Amount"))
            ExRate = CDbl(InputBox("What is the exchage rate from Gold to Silver",
"Exchange Rate"))
        End Try
        ReDim Booty(numBooty)
        For iloop = 1 To numBooty
            Name = InputBox("What is the Name of the Booty", "Booty Name")
            Value = CDbl(InputBox("What is the Value of the Booty (in Gold Coins)?",
"Booty Value"))
            Booty(iloop) = New cBooty(Name, Value)
            BF.Serialize(FS, Booty) 'converting to binary
            rtbDisplay.Text += Booty(iloop).DisplayInfo + vbCrLf 'Display roster
            tot += Booty(iloop).GoldtoSilverConverter(ExRate)
        Next iloop
        rtbDisplay.Text += "Total value of Booty in silver: " + CStr(tot) + vbCrLf
        FS.Close()
        FS = Nothing
        BF = Nothing
    End Sub

    Private Sub MsopenBooty_Click(sender As Object, e As EventArgs) Handles
MsopenBooty.Click
        rtbDisplay.Text += "Booty Information From File : " + vbCrLf + vbCrLf
        Dim tot As Double = 0
        FS = New FileStream("Booty.IFM", FileMode.Open, FileAccess.Read) 'Opening the
file
        BF = New BinaryFormatter
        While FS.Position < FS.Length
            Dim TempBooty As cBooty
            TempBooty = CType(BF.Deserialize(FS), cBooty) 'Converting to booty type
            rtbDisplay.Text += TempBooty.DisplayInfo + vbCrLf
            tot += TempBooty.GoldtoSilverConverter(ExRate)
        End While
        rtbDisplay.Text += "Total value of Booty in silver: " + CStr(tot) + vbCrLf
        FS.Close()
        FS = Nothing
        BF = Nothing
    End Sub

    Private Sub MsOpenGrog_Click(sender As Object, e As EventArgs) Handles
MsOpenGrog.Click
        rtbDisplay.Text += "Grog Information From File: " + vbCrLf + vbCrLf
        FS = New FileStream("Grog.IFM", FileMode.Open, FileAccess.Read) 'Opening the
file
        BF = New BinaryFormatter
        Dim counter As Integer
        While FS.Position < FS.Length
            Dim TempGrog As cGrog
            TempGrog = CType(BF.Deserialize(FS), cGrog) 'Converting to Grog type
            rtbDisplay.Text += TempGrog.DisplayInfo + vbCrLf
            If TempGrog.Popularity = "C" Then
                counter += 1
            End If
        End While
        rtbDisplay.Text += "Number of C-rated Grog: " + CStr(counter) + vbCrLf
        FS.Close()
        FS = Nothing
```

```vb
            BF = Nothing
    End Sub

    Private Sub MSOpenRum_Click(sender As Object, e As EventArgs) Handles
MSOpenRum.Click
        rtbDisplay.Text += "Rum Information From File: " + vbCrLf + vbCrLf
        Dim counter1 As Integer
        FS = New FileStream("Rum.IFM", FileMode.Open, FileAccess.Read) 'Opening the
file
        BF = New BinaryFormatter
        While FS.Position < FS.Length
            Dim TempRum As cRum
            TempRum = CType(BF.Deserialize(FS), cRum) 'Converting to rum type
            rtbDisplay.Text += TempRum.DisplayInfo + vbCrLf
            If TempRum.Popularity = "A" Then
                counter1 += 1
            End If
        End While
        rtbDisplay.Text += "Number of A-rated Rum: " + CStr(counter1) + vbCrLf
        FS.Close()
        FS = Nothing
        BF = Nothing
    End Sub
End Class
```