

## APÉNDICE 2: CÓDIGO DE LA CLASE CROMOSOMA

```
Option Explicit
Option Base 1
```

```
Dim Ruta() As String
Dim NodosDisp As Integer
Dim Completo As Boolean
Dim Valor As Double
```

```
Private Sub Class_Initialize()
    Completo = False
    NodosDisp = 0
End Sub
```

```
Property Get Comp()
    Comp = Completo
End Property
```

```
Function toString() As String
    Dim Temp
    Dim i
    Dim cadena As String
    cadena = ""
    Temp = ObtenRuta
    For i = 1 To UBound(Temp)
        cadena = cadena & CStr(Temp(i)) & " "
    Next
    toString = cadena
End Function
```

```
Property Let SetRuta(arr As Variant)
    Dim i As Integer
```

```
    ReDim Ruta(1 To UBound(arr))
    For i = 1 To UBound(arr)
        Ruta(i) = arr(i)
    Next
    Completo = False
    NodosDisp = UBound(Ruta)
    Valor = Val
End Property
```

```
Property Get ObtenRuta() As Variant
    Dim Temp As Variant
    Temp = Ruta
    ObtenRuta = Temp
End Property
```

```
Sub Recombina(ByVal Por As Single)
```

```
Dim i As Integer
```

```
If Completo = True Then Exit Sub
```

```
i = UBound(Ruta) * Por
```

```
If i = 0 Then
```

```
    ReDim Ruta(1 To 1)
```

```
Else
```

```
    ReDim Preserve Ruta(1 To i)
```

```
End If
```

```
NodosDisp = UBound(Ruta)
```

```
Completo = True
```

```
End Sub
```

```
Sub LlenaAleatorio()
```

```
Dim NodoInicial As String
```

```
Dim NodoFinal As String
```

```
Dim ArregloConec As Variant
```

```
Dim ArregloDist As Variant
```

```
Dim i As Integer
```

```
Dim NoConex As Integer
```

```
If NodosDisp = 0 Then
```

```
    NodoInicial = Info(1).Nombre
```

```
    NodosDisp = 1
```

```
    ReDim Ruta(1 To NodosDisp)
```

```
    Ruta(NodosDisp) = NodoInicial
```

```
Else
```

```
    NodoInicial = Ruta(NodosDisp)
```

```
End If
```

```
NodoFinal = NodoInicial
```

```
While NodoInicial <> Info(UBound(Info)).Nombre
```

```
    For i = 1 To UBound(Info)
```

```
        If Info(i).Nombre = NodoInicial Then
```

```
            ArregloConec = Info(i).ArrNodos
```

```
            ArregloDist = Info(i).ArrDist
```

```
            Exit For
```

```
        End If
```

```
    Next
```

```
    Randomize
```

```
    NoConex = Rnd() * (UBound(ArregloConec) - 1) + 1
```

```
    NodosDisp = NodosDisp + 1
```

```
    ReDim Preserve Ruta(1 To NodosDisp)
```

```
    Ruta(NodosDisp) = ArregloConec(NoConex)
```

```
    NodoInicial = Ruta(NodosDisp)
```

```
Wend
```

```
Valor = Val
Completo = False
End Sub
Property Get ObtenValor()
ObtenValor = Valor
End Property
```

```
Private Function Val() As Double
Dim i As Integer
Dim p As Integer
Dim k As Integer
Dim ArrConex As Variant
Dim ArrDist As Variant
Dim valor1 As Double
```

```
valor1 = 0
For i = 1 To UBound(Ruta) - 1
    For p = 1 To UBound(Info)
        If Ruta(i) = Info(p).Nombre Then
            valor1 = valor1 + Info(p).ObtenDist(Ruta(i + 1))
            Exit For
        End If
    Next
Next
```

```
Val = valor1
End Function
```