

```

*****
'*** Standard module with procedures for working with ***
'*** files. Part of the RodRego application. ***
*****
'*** Programmer : Nikolai Shvertner ***
'*** Date : 6/20/2001 ***
'*** Compiler : Visual Basic 5 ***
'*** Notes : ***
'*** Revisions : ***
*****

```

Option Explicit

```

Sub FileOpenProc()
    Dim intRetVal
    Dim intResponse As Integer
    Dim strOpenFileName As String

    ' If the file has changed, save it
    If Dirty = True Then

        Dim strMsg As String
        Dim strFilename As String

        ' Check to see if the text has been changed.
        If Dirty Then
            strFilename = Right(frmMain.Caption, Len(frmMain.Caption) - 10)
            strMsg = "The text in [" & strFilename & "] has changed."
            strMsg = strMsg & vbCrLf
            strMsg = strMsg & "Do you want to save the changes?"
            intResponse = MsgBox(strMsg, 51, frmMain.Caption)
            Select Case intResponse
                Case 6 ' User chose Yes.
                    If Left(frmMain.Caption, 8) = "Untitled" Then
                        ' The file hasn't been saved yet.
                        strFilename = "untitled.rgo"
                        ' Get the strFilename, and then call the save procedure, GetstrFilename.
                        strFilename = GetFileName(strFilename)
                    Else
                        ' The form's Caption contains the name of the open file.
                        strFilename = frmMain.Caption
                    End If
                    ' Call the save procedure. If strFilename = Empty, then
                    ' the user chose Cancel in the Save As dialog box; otherwise,
                    ' save the file.
                    If strFilename <> "" Then
                        SaveFileAs strFilename
                    End If
                Case 7 ' User chose No. Unload the file.
                    'Cancel = False
                Case 2 ' User chose Cancel. Cancel the unload.
                    Exit Sub
            End Select
        End If
    End If

    On Error Resume Next

    frmMain.COMDialog1.FileName = ""
    frmMain.COMDialog1.ShowOpen
    If err <> 32755 Then ' User chose Cancel.
        strOpenFileName = frmMain.COMDialog1.FileName
        ' If the file is larger than 65K, it can't

```

```

' be opened, so cancel the operation.
If FileLen(strOpenFileName) > 65000 Then
    MsgBox "The file is too large to open."
    Exit Sub
End If

```

```

    OpenFile (strOpenFileName)

```

```

End If

```

```

End Sub

```

```

Function GetFileName(Filename As Variant)

```

```

' Display a Save As dialog box and return a filename.

```

```

' If the user chooses Cancel, return an empty string.

```

```

On Error Resume Next

```

```

frmMain.CMDialog1.FileName = Filename

```

```

frmMain.CMDialog1.ShowSave

```

```

If err <> 32755 Then ' User chose Cancel.

```

```

    GetFileName = frmMain.CMDialog1.FileName

```

```

Else

```

```

    GetFileName = ""

```

```

End If

```

```

End Function

```

```

Sub OpenFile(Filename)

```

```

    Dim fIndex As Integer

```

```

    On Error Resume Next

```

```

' Open the selected file.

```

```

Open Filename For Input As #1

```

```

If err Then

```

```

    MsgBox "Can't open file: " + Filename

```

```

    Exit Sub

```

```

End If

```

```

' Change the mouse pointer to an hourglass.

```

```

Screen.MousePointer = 11

```

```

' Change the form's caption and display the new text.

```

```

frmMain.Caption = "RodRego - " & UCase(Filename)

```

```

frmMain.txtProg.Text = Input(LOF(1), 1)

```

```

Dirty = False

```

```

Close #1

```

```

' Reset the mouse pointer.

```

```

Screen.MousePointer = 0

```

```

End Sub

```

```

Sub SaveFileAs(Filename)

```

```

    On Error Resume Next

```

```

    Dim strContents As String

```

```

' Open the file.

```

```

Open Filename For Output As #1

```

```

' Place the contents of the notepad into a variable.

```

```

strContents = frmMain.txtProg.Text

```

```

' Display the hourglass mouse pointer.

```

```

Screen.MousePointer = 11

```

```

' Write the variable contents to a saved file.

```

```

Print #1, strContents

```

```

Close #1

```

```

' Reset the mouse pointer.

```

```

Screen.MousePointer = 0

```

```

' Set the form's caption.

```

File_Io - 3

If err Then

 MsgBox error, 48, App.Title

Else

 frmMain.Caption = "RodRego - " & Filename

 ' Reset the dirty flag.

 Dirty = False

End If

End Sub

```

*****
'***      Standard "About" dialog.          ***
'***      Part of the RodRego application.   ***
*****
'***      Programmer : Nikolai Shvertner    ***
'***      Date       : 6/20/2001           ***
'***      Compiler  : Visual Basic 5       ***
'***      Notes     :                      ***
'***      Revisions :                      ***
*****

```

Option Explicit

```

' Reg Key Security Options...
Const READ_CONTROL = &H20000
Const KEY_QUERY_VALUE = &H1
Const KEY_SET_VALUE = &H2
Const KEY_CREATE_SUB_KEY = &H4
Const KEY_ENUMERATE_SUB_KEYS = &H8
Const KEY_NOTIFY = &H10
Const KEY_CREATE_LINK = &H20
Const KEY_ALL_ACCESS = KEY_QUERY_VALUE + KEY_SET_VALUE + _
                      KEY_CREATE_SUB_KEY + KEY_ENUMERATE_SUB_KEYS + _
                      KEY_NOTIFY + KEY_CREATE_LINK + READ_CONTROL

' Reg Key ROOT Types...
Const HKEY_LOCAL_MACHINE = &H80000002
Const ERROR_SUCCESS = 0
Const REG_SZ = 1           ' Unicode null terminated string
Const REG_DWORD = 4       ' 32-bit number

Const gREGKEYSYSINFOLOC = "SOFTWARE\Microsoft\Shared Tools Location"
Const gREGVALSYSINFOLOC = "MSINFO"
Const gREGKEYSYSINFO = "SOFTWARE\Microsoft\Shared Tools\MSINFO"
Const gREGVALSYSINFO = "PATH"

Private Declare Function RegOpenKeyEx Lib "advapi32" Alias "RegOpenKeyExA" (ByVal hKey As Long,
ByVal lpSubKey As String, ByVal ulOptions As Long, ByVal samDesired As Long, ByRef phkResult As
Long) As Long
Private Declare Function RegQueryValueEx Lib "advapi32" Alias "RegQueryValueExA" (ByVal hKey As
Long, ByVal lpValueName As String, ByVal lpReserved As Long, ByRef lpType As Long, ByVal lpData
As String, ByRef lpcbData As Long) As Long
Private Declare Function RegCloseKey Lib "advapi32" (ByVal hKey As Long) As Long

Private Sub cmdSysInfo_Click()
    Call StartSysInfo
End Sub

Private Sub cmdOK_Click()
    Unload Me
End Sub

Private Sub Form_Load()
    Me.Caption = "About " & App.Title
    lblVersion.Caption = "Version " & App.Major & "." & App.Minor & " (build " & App.Revision &
    ")"
    lblTitle.Caption = App.Title
End Sub

```

```

Public Sub StartSysInfo()
    On Error GoTo SysInfoErr

    Dim rc As Long
    Dim SysInfoPath As String

    ' Try To Get System Info Program Path\Name From Registry...
    If GetKeyValue(HKEY_LOCAL_MACHINE, gREGKEYSYSINFO, gREGVALSYSINFO, SysInfoPath) Then
        ' Try To Get System Info Program Path Only From Registry...
        ElseIf GetKeyValue(HKEY_LOCAL_MACHINE, gREGKEYSYSINFOLOC, gREGVALSYSINFOLOC, SysInfoPath) Th
en
        ' Validate Existance Of Known 32 Bit File Version
        If (Dir(SysInfoPath & "\MSINFO32.EXE") <> "") Then
            SysInfoPath = SysInfoPath & "\MSINFO32.EXE"

            ' Error - File Can Not Be Found...
        Else
            GoTo SysInfoErr
        End If
        ' Error - Registry Entry Can Not Be Found...
    Else
        GoTo SysInfoErr
    End If

    Call Shell(SysInfoPath, vbNormalFocus)

    Exit Sub
SysInfoErr:
    MsgBox "System Information Is Unavailable At This Time", vbOKOnly
End Sub

Public Function GetKeyValue(KeyRoot As Long, KeyName As String, SubKeyRef As String, ByRef KeyVa
l As String) As Boolean
    Dim i As Long                ' Loop Counter
    Dim rc As Long              ' Return Code
    Dim hKey As Long            ' Handle To An Open Registry Key
    Dim hDepth As Long         '
    Dim KeyValType As Long      ' Data Type Of A Registry Key
    Dim tmpVal As String        ' Temporary Storage For A Registry K
ey Value
    Dim KeyValSize As Long      ' Size Of Registry Key Variable
    '-----
    ' Open RegKey Under KeyRoot {HKEY_LOCAL_MACHINE...}
    '-----
    rc = RegOpenKeyEx(KeyRoot, KeyName, 0, KEY_ALL_ACCESS, hKey) ' Open Registry Key

    If (rc <> ERROR_SUCCESS) Then GoTo GetKeyError                ' Handle Error...

    tmpVal = String$(1024, 0)                                     ' Allocate Variable Space
    KeyValSize = 1024                                           ' Mark Variable Size

    '-----
    ' Retrieve Registry Key Value...
    '-----
    rc = RegQueryValueEx(hKey, SubKeyRef, 0, _
        KeyValType, tmpVal, KeyValSize) ' Get/Create Key Value

    If (rc <> ERROR_SUCCESS) Then GoTo GetKeyError                ' Handle Errors

    If (Asc(Mid(tmpVal, KeyValSize, 1)) = 0) Then                ' Win95 Adds Null Terminated String.
..

```


VERSION 5.00

Begin VB.Form frmAbout

```
BorderStyle = 3 'Fixed Dialog
Caption = "About MyApp"
ClientHeight = 3555
ClientLeft = 2340
ClientTop = 1935
ClientWidth = 5730
ClipControls = 0 'False
Icon = (Icon)
LinkTopic = "Form2"
MaxButton = 0 'False
MinButton = 0 'False
ScaleHeight = 2453.724
ScaleMode = 0 'User
ScaleWidth = 5380.766
ShowInTaskbar = 0 'False
StartupPosition = 1 'CenterOwner
```

Begin VB.PictureBox picIcon

```
AutoSize = -1 'True
BorderStyle = 0 'None
ClipControls = 0 'False
Height = 480
Left = 240
Picture = (Icon)
ScaleHeight = 337.12
ScaleMode = 0 'User
ScaleWidth = 337.12
TabIndex = 1
Top = 240
Width = 480
```

End

Begin VB.CommandButton cmdOK

```
Cancel = -1 'True
Caption = "OK"
Default = -1 'True
Height = 345
Left = 4245
TabIndex = 0
Top = 2625
Width = 1260
```

End

Begin VB.CommandButton cmdSysInfo

```
Caption = "&System Info..."
Height = 345
Left = 4260
TabIndex = 2
Top = 3075
Width = 1245
```

End

Begin VB.Line Line1

```
BorderColor = &H00808080&
BorderStyle = 6 'Inside Solid
Index = 1
X1 = 84.515
X2 = 5309.398
Y1 = 1687.583
Y2 = 1687.583
```

End

Begin VB.Label lblDescription

```
Caption = "Author: Prof. Daniel Dennett
```

Programmer:

```
ForeColor      =  &H00000000&
Height         =  1170
Left           =  1050
TabIndex       =  3
Top            =  1125
Width          =  3885
```

End

Begin VB.Label lblTitle

```
Caption        =  "Application Title"
ForeColor      =  &H00000000&
Height         =  480
Left           =  1050
TabIndex       =  5
Top            =  240
Width          =  3885
```

End

Begin VB.Line Line1

```
BorderColor    =  &H00FFFFFF&
BorderWidth    =  2
Index          =  0
X1              =  98.6
X2              =  5309.398
Y1              =  1697.936
Y2              =  1697.936
```

End

Begin VB.Label lblVersion

```
Caption        =  "Version"
Height         =  225
Left           =  1050
TabIndex       =  6
Top            =  780
Width          =  3885
```

End

Begin VB.Label lblDisclaimer

```
Caption        =  "This program is free for educational and home use. It is provided as
ForeColor      =  &H00000000&
Height         =  825
Left           =  255
TabIndex       =  4
Top            =  2625
Width          =  3870
```

End

End



Application Title

Version

Author: Prof. Daniel Dennett
Programmer: Nikolai Shvertner

This program is free for educational and home use. It is provided as is without any warranty. Use it at your own risk.



frmGoToLine - 1

```
*****
'***      Standard dialog for the GoTo line function      ***
'***      Part of the RodRego application.                ***
*****
'***      Programmer : Nikolai Shvertner                  ***
'***      Date       : 6/20/2001                          ***
'***      Compiler  : Visual Basic 5                      ***
'***      Notes     :                                     ***
'***      Revisions :                                     ***
*****
```

Option Explicit

```
Private Sub cmdCancel_Click()
    ' Unload the form upon a click on the Cancel Button
    Unload Me
End Sub
```

```
Private Sub cmdOK_Click()
    ' Execute the GoLineProc procedure and unload the form
    ' upon a click on the OK button
    GoLineProc (txtLineNum.Text)
    Unload Me
End Sub
```

VERSION 5.00

```
Begin VB.Form frmGoToLine
    BorderStyle      = 3   'Fixed Dialog
    Caption          = "Go To Line"
    ClientHeight     = 1185
    ClientLeft      = 2565
    ClientTop       = 1500
    ClientWidth     = 2160
    Icon             = (None)
    KeyPreview       = -1  'True
    LinkTopic       = "Form1"
    MaxButton       = 0   'False
    MinButton       = 0   'False
    ScaleHeight     = 1185
    ScaleWidth      = 2160
    ShowInTaskbar   = 0   'False
    StartUpPosition = 1   'CenterOwner
Begin VB.TextBox txtLineNum
    Height          = 285
    Left           = 120
    TabIndex       = 0
    Top            = 360
    Width         = 1935
End
Begin VB.PictureBox picOptions
    BorderStyle     = 0   'None
    Height          = 3780
    Index          = 3
    Left           = -20000
    ScaleHeight    = 3780
    ScaleWidth     = 5685
    TabIndex       = 5
    TabStop        = 0   'False
    Top            = 480
    Width          = 5685
Begin VB.Frame fraSample4
    Caption        = "Sample 4"
    Height        = 1785
    Left         = 2100
    TabIndex     = 8
    Top          = 840
    Width       = 2055
End
End
Begin VB.PictureBox picOptions
    BorderStyle     = 0   'None
    Height          = 3780
    Index          = 2
    Left           = -20000
    ScaleHeight    = 3780
    ScaleWidth     = 5685
    TabIndex       = 4
    TabStop        = 0   'False
    Top            = 480
    Width          = 5685
Begin VB.Frame fraSample3
    Caption        = "Sample 3"
    Height        = 1785
    Left         = 1545
    TabIndex     = 7
    Top          = 675
```

```
        Width           =    2055
    End
End
Begin VB.PictureBox picOptions
    BorderStyle         =    0   'None
    Height              =    3780
    Index              =    1
    Left               =    -20000
    ScaleHeight        =    3780
    ScaleWidth         =    5685
    TabIndex           =    3
    TabStop            =    0   'False
    Top                =    480
    Width              =    5685
    Begin VB.Frame fraSample2
        Caption          =    "Sample 2"
        Height           =    1785
        Left             =    645
        TabIndex        =    6
        Top              =    300
        Width            =    2055
    End
End
Begin VB.CommandButton cmdCancel
    Cancel              =    -1   'True
    Caption             =    "&Cancel"
    Height              =    375
    Left               =    1320
    TabIndex           =    2
    Top                =    720
    Width              =    735
End
Begin VB.CommandButton cmdOK
    Caption             =    "&OK"
    Height              =    375
    Left               =    120
    TabIndex           =    1
    Top                =    720
    Width              =    1095
End
Begin VB.Label Label1
    Caption             =    "Enter Line Number:"
    Height              =    255
    Left               =    120
    TabIndex           =    9
    Top                =    120
    Width              =    1935
End
End
End
```

Enter Line Number:



frmMain - 1

```
*****
'*** A main form holding graphics and standard      ***
'*** interface objects. Part of the RodRego app.    ***
*****
'*** Programmer : Nikolai Shvertner                ***
'*** Date       : 6/20/2001                        ***
'*** Compiler  : Visual Basic 5                   ***
'*** Notes     :                                   ***
'*** Revisions :                                   ***
*****
```

Option Explicit

```
Sub btnDec_Click(Index As Integer)
' When the user clicks on one of the register decrement
' buttons, decrement the respective register with one and
' redraw the registers array.
If Register(Index) > 0 Then
    Register(Index) = Register(Index) - 1
    DrawBullets
End If
End Sub
```

```
Private Sub btnDec_MouseDown(Index As Integer, Button As Integer, Shift As Integer, X As Single,
Y As Single)
' Switch the image of the respective decrement button
' with the shadowed one when the user holds down
' the mouse button
btnDec(Index).Picture = imgMinus_off.Picture
End Sub
```

```
Private Sub btnDec_MouseUp(Index As Integer, Button As Integer, Shift As Integer, X As Single, Y
As Single)
' Switch the image back to normal upon mouse release
btnDec(Index).Picture = imgMinus_on.Picture
End Sub
```

```
Sub btnInc_Click(Index As Integer)
' Increment the respective register and redraw the registers
' only if the register holding limit is not exceeded.
If Register(Index) < 16 Then
    Register(Index) = Register(Index) + 1
    DrawBullets
End If
End Sub
```

```
Private Sub btnInc_MouseDown(Index As Integer, Button As Integer, Shift As Integer, X As Single,
Y As Single)
' Update the image upon a mouse hold
btnInc(Index).Picture = imgPlus_off.Picture
End Sub
```

```
Private Sub btnInc_MouseUp(Index As Integer, Button As Integer, Shift As Integer, X As Single, Y
As Single)
' Restore the image upon mouse release
btnInc(Index).Picture = imgPlus_on.Picture
End Sub
```

```
Private Sub btnReset_Click()
' Reset the program by re-parsing the program
' and updating all flags to ready position
```

```

' Stop the interpreter (if needed)
frmMain.Timer.Interval = 0
running = False

' Update the status caption and the Program Counter
status.SimpleText = ""
pc = 1

' Parse the program code and react according to the
' success of the operation.
If loadProgram() Then
    ' Upon success enable the Step button and
    ' Draw the program on the LCD display
    btnStep_Enabled = True
    drawProgram (Deviation)
Else
    ' Upon failure disable the Step button
    btnStep_Enabled = False
End If
End Sub

Private Sub btnReset_MouseDown(Button As Integer, Shift As Integer, X As Single, Y As Single)
    ' Update the Reset button image upon mouse hold
    btnReset.Picture = imgReset_off.Picture
End Sub

Private Sub btnReset_MouseUp(Button As Integer, Shift As Integer, X As Single, Y As Single)
    ' Restore the Reset button image upon mouse release
    btnReset.Picture = imgReset_on.Picture
End Sub

Private Sub btnRun_Click()
    ' Parse the program and launch the interpreter upon
    ' success

    If loadProgram() Then
        ' Upon success of the parsing do an initial drawing of the
        ' the program in the LCD display, update the status line,
        ' enable the Step button and launch the interpreter
        ' by setting the Auto-advance timer to 1/3 sec.
        initializeDrawProgram
        status.SimpleText = "Running"
        btnStep_Enabled = True
        running = True
        Timer.Interval = 330
    Else
        ' Reset the interpreter upon failure
        btnReset_Click
    End If
End Sub

Private Sub btnRun_MouseDown(Button As Integer, Shift As Integer, X As Single, Y As Single)
    ' Update the button picture upon mouse hold
    btnRun.Picture = imgRun_off.Picture
End Sub

Private Sub btnRun_MouseUp(Button As Integer, Shift As Integer, X As Single, Y As Single)
    ' Restore the picture upon mouse release
    btnRun.Picture = imgRun_on.Picture
End Sub

```

```

Sub btnScrollDown_Click()
    ' If scroll is possible, increment the deviation of the
    ' LC view area and make sure the up scroll button is
    ' enabled.
    If (Deviation < max_dev) Then
        Deviation = Deviation + 1
        btnScrollUp.Enabled = True

        ' If the limit is reached, disable the button
        If (Deviation = max_dev) Then btnScrollDown.Enabled = False

        ' Update the LCD display
        drawProgram (Deviation)
    End If
End Sub

Private Sub btnScrollDown_MouseDown(Button As Integer, Shift As Integer, X As Single, Y As Single)
    ' Update the button image upon mouse hold
    btnScrollDown.Picture = imgDown_off.Picture
End Sub

Private Sub btnScrollDown_MouseUp(Button As Integer, Shift As Integer, X As Single, Y As Single)
    ' Restore the button image upon mouse release
    btnScrollDown.Picture = imgDown_on.Picture
End Sub

Sub btnScrollUp_Click()
    ' If possible, decrement the scroll deviation, enable the
    ' ScrollDown button and self-disable the button if needed.
    If (Deviation > 0) Then
        Deviation = Deviation - 1
        btnScrollDown.Enabled = True
        If (Deviation = 0) Then btnScrollUp.Enabled = False
        drawProgram (Deviation) ' Update the LCD display
    End If
End Sub

Private Sub btnScrollUp_MouseDown(Button As Integer, Shift As Integer, X As Single, Y As Single)
    ' Update the button image upon mouse hold
    btnScrollUp.Picture = imgUp_off.Picture
End Sub

Private Sub btnScrollUp_MouseUp(Button As Integer, Shift As Integer, X As Single, Y As Single)
    ' Restore the button image upon mouse release
    btnScrollUp.Picture = imgUp_on.Picture
End Sub

Private Sub DrawBullets()
    Dim i, k As Integer

    ' Set the images of all register bullets to either on or
    ' off
    For i = 0 To 9 ' loop through all registers
        For k = 0 To 14 ' loop through individual bullets
            If k < Register(i) Then
                imgBullet(k + i * 15).Picture = imgBlt_on.Picture
            Else
                imgBullet(k + i * 15).Picture = imgBlt_off.Picture
            End If
        Next k
    Next i

```


frmMain - 4

```
Next i
End Sub
```

```
Private Sub btnStep_Click()
    ' To perform a step:
    ' 1. Make sure the Auto-step timer is off
    ' 2. Set the running flag to off
    ' 3. Execute a step with the interpreter
    If (btnStep_Enabled = True) Then
        Timer.Interval = 0
        running = False
        status.SimpleText = "Step"
        Step_Program
    End If
End Sub
```

```
Private Sub btnStep_MouseDown(Button As Integer, Shift As Integer, X As Single, Y As Single)
    ' Update the button image upon mouse hold
    btnStep.Picture = imgStep_off.Picture
End Sub
```

```
Private Sub btnStep_MouseUp(Button As Integer, Shift As Integer, X As Single, Y As Single)
    ' Reset the button image upon mouse release
    btnStep.Picture = imgStep_on.Picture
End Sub
```

```
Private Sub Form_Load()
    Dim i As Integer

    ' Application starts here (Load event of Startup form).
    Show

    ' Set the working directory to the directory containing the application.
    ChDir App.Path

    ' Set a couple important flags plus the application version
    lblVersion.Caption = App.Major & "." & App.Minor
    Dirty = False
    pc = 1
    running = False

    ' Initialize all registers and all button images

    For i = 0 To 9
        Register(i) = i
    Next i

    For i = 0 To 9
        btnInc(i).Picture = imgPlus_on.Picture
        btnDec(i).Picture = imgMinus_on.Picture
    Next i

    btnScrollUp.Picture = imgUp_on.Picture
    btnScrollDown.Picture = imgDown_on.Picture
    btnRun.Picture = imgRun_on.Picture
    btnStep.Picture = imgStep_on.Picture
    btnReset.Picture = imgReset_on.Picture

    ' The step button starts disabled
    btnStep_Enabled = False
```

frmMain - 5

```
' Clear all lines of the LCD display
For i = 0 To 11
    clearLine i
Next i
```

```
' Draw the register bullets
DrawBullets
```

End Sub

```
Private Sub Form_QueryUnload(Cancel As Integer, UnloadMode As Integer)
```

```
Dim strMsg As String
Dim strFilename As String
Dim intResponse As Integer
```

```
' Check to see if the text has been changed.
```

```
If Dirty Then
```

```
    strFilename = Right(Me.Caption, Len(Me.Caption) - 10)
    strMsg = "The text in [" & strFilename & "] has changed."
    strMsg = strMsg & vbCrLf
    strMsg = strMsg & "Do you want to save the changes?"
    intResponse = MsgBox(strMsg, 51, frmMain.Caption)
    Select Case intResponse
```

```
        Case 6 ' User chose Yes.
```

```
            If Left(Me.Caption, 8) = "Untitled" Then
```

```
                ' The file hasn't been saved yet.
```

```
                strFilename = "untitled.rgo"
```

```
                ' Get the strFilename, and then call the save procedure, GetstrFilename.
```

```
                strFilename = GetFileName(strFilename)
```

```
            Else
```

```
                ' The form's Caption contains the name of the open file.
```

```
                strFilename = Me.Caption
```

```
            End If
```

```
            ' Call the save procedure. If strFilename = Empty, then
```

```
            ' the user chose Cancel in the Save As dialog box; otherwise,
```

```
            ' save the file.
```

```
            If strFilename <> "" Then
```

```
                SaveFileAs strFilename
```

```
            End If
```

```
        Case 7 ' User chose No. Unload the file.
```

```
            Cancel = False
```

```
        Case 2 ' User chose Cancel. Cancel the unload.
```

```
            Cancel = True
```

```
    End Select
```

```
End If
```

End Sub

```
Private Sub imgBullet_Click(Index As Integer)
```

```
Dim reg_id, value As Integer
```

```
' Determine the register in which the click was generated.
```

```
' Find what is the requested value.
```

```
reg_id = Int(Index / 15)
```

```
value = (Index Mod 15) + 1
```

```
' Set the register to the appropriate value
```

```
If Register(reg_id) = value Then
```

```
    Register(reg_id) = 0
```

```
Else
```

```
    Register(reg_id) = value
```

```
End If
```

frmMain - 6

```
' Redraw the registers
DrawBullets
End Sub

Private Sub mnuEditCopy_Click()
' Call the copy procedure
EditCopyProc
End Sub

Private Sub mnuEditCut_Click()
' Call the cut procedure
EditCutProc
End Sub

Private Sub mnuEditGoto_Click()
' Load the GoToLine dialog as modal
frmGoToLine.Show 1, frmMain

' Set the focus to the text box
frmMain.txtProg.SetFocus
End Sub

Private Sub mnuEditPaste_Click()
' Call the paste procedure.
EditPasteProc
End Sub

Private Sub mnuEditSelectAll_Click()
' Use SelStart & SelLength to select the text.
txtProg.SelStart = 0
txtProg.SelLength = Len(txtProg.Text)
txtProg.SetFocus
End Sub

Private Sub mnuFileExit_Click()
' End the application.
Unload Me
End Sub

Private Sub mnuFileNew_Click()
' Call the new form procedure
FileNew
End Sub

Private Sub mnuFileOpen_Click()
' Call the file open procedure.
FileOpenProc
End Sub

Private Sub mnuFileSave_Click()
'Call the file save procedure
FileSave
End Sub

Private Sub mnuFileSaveAs_Click()
Dim strSaveFileName As String
Dim strDefaultName As String

' Assign the form caption to the variable.
strDefaultName = Right$(Me.Caption, Len(Me.Caption) - 10)
If Me.Caption = "RodRego - Untitled" Then
```

frmMain - 7

```
' The file hasn't been saved yet.  
' Get the filename, and then call the save procedure, strSaveFileName.
```

```
strSaveFileName = GetFileName("Untitled.rgo")  
If strSaveFileName <> "" Then SaveFileAs (strSaveFileName)
```

```
Else
```

```
' The form's Caption contains the name of the open file.  
strSaveFileName = GetFileName(strDefaultName)  
If strSaveFileName <> "" Then SaveFileAs (strSaveFileName)
```

```
End If
```

```
End Sub
```

```
Private Sub mnuHelpAbout_Click()
```

```
' Load the About dialog as modal  
frmAbout.Show 1, frmMain
```

```
End Sub
```

```
Private Sub mnuHelpContents_Click()
```

```
MsgBox ("Help is not yet available. We apologize for the inconvenience.")
```

```
End Sub
```

```
Private Sub mnuOptionsNewInstance_Click()
```

```
Dim strApp As String
```

```
' Shell a new instance of RodRego.  
strApp = App.Path & "\" & App.EXEName  
Shell strApp, 1
```

```
End Sub
```

```
Private Sub Timer_Timer()
```

```
' The Auto-Step timer clicks;  
' Make a step in the interpreter engine  
If running = True Then Step_Program
```

```
End Sub
```

```
Private Sub txtProg_Change()
```

```
' Set the public variable to show that text has changed.  
Dirty = True
```

```
End Sub
```

frmMain - 1

VERSION 5.00

Object = "{F9043C88-F6F2-101A-A3C9-08002B2F49FB}#1.2#0"; "COMDLG32.OCX"

Object = "{6B7E6392-850A-101B-AFC0-4210102A8DA7}#1.3#0"; "COMCTL32.OCX"

Begin VB.Form frmMain

```
BackColor      = &H00000000&
BorderStyle    = 1 'Fixed Single
Caption        = "RodRego - Untitled"
ClientHeight   = 6480
ClientLeft     = 150
ClientTop      = 720
ClientWidth    = 9000
Icon           = (Icon)
LinkTopic      = "Form1"
MaxButton      = 0 'False
MinButton      = 0 'False
Picture        = (Bitmap)
ScaleHeight    = 6480
ScaleWidth     = 9000
StartPosition  = 3 'Windows Default
```

Begin ComctlLib.StatusBar status

```
Align          = 2 'Align Bottom
Height         = 300
Left           = 0
TabIndex       = 1
Top            = 6180
Width          = 9000
_ExtentX      = 15875
_ExtentY      = 529
Style         = 1
SimpleText    = ""
_Version       = 327682
BeginProperty Panels {0713E89E-850A-101B-AFC0-4210102A8DA7}
EndProperty
```

End

Begin VB.TextBox txtProg

```
BeginProperty Font
  Name          = "Courier New"
  Size          = 9.75
  CharSet       = 0
  Weight        = 400
  Underline     = 0 'False
  Italic        = 0 'False
  Strikethrough = 0 'False
EndProperty
Height         = 5655
Left           = 5000
MultiLine     = -1 'True
ScrollBars     = 2 'Vertical
TabIndex       = 0
Top            = 240
Width          = 3735
```

End

Begin VB.Timer Timer

```
Left          = 5040
Top           = 360
```

End

Begin MSComDlg.CommonDialog CMDialog1

```
Left          = 6360
Top           = 360
_ExtentX      = 847
_ExtentY      = 847
```

```
_Version          = 393216
CancelError      = -1 'True
DefaultExt       = "RGO"
Filter           = "RodRego Files (*.rgo)|*.rgo|All Files (*.*)|*.*"
FilterIndex      = 473
FontSize         = 7.98198e-38
End
Begin VB.Image imgRun_off
    Height        = 390
    Left          = 5160
    Picture       = (Bitmap)
    Top           = 2040
    Visible       = 0 'False
    Width         = 2205
End
Begin VB.Image imgStep_off
    Height        = 390
    Left          = 5160
    Picture       = (Bitmap)
    Top           = 2400
    Visible       = 0 'False
    Width         = 2205
End
Begin VB.Image imgReset_off
    Height        = 390
    Left          = 5160
    Picture       = (Bitmap)
    Top           = 2760
    Visible       = 0 'False
    Width         = 2205
End
Begin VB.Label lblVersion
    Alignment     = 1 'Right Justify
    BackStyle     = 0 'Transparent
    Caption       = "1.0"
    BeginProperty Font
        Name       = "Arial"
        Size      = 15.75
        Charset   = 0
        Weight    = 400
        Underline = 0 'False
        Italic    = 0 'False
        Strikethrough = 0 'False
    EndProperty
    ForeColor     = &H00808080&
    Height        = 375
    Left          = 3480
    TabIndex      = 2
    Top           = 480
    Width         = 975
End
Begin VB.Image btnReset
    Height        = 390
    Left          = 2400
    Top           = 5400
    Width         = 2205
End
Begin VB.Image btnStep
    Height        = 390
    Left          = 2400
    Top           = 4920
```

```
        Width          = 2205
End
Begin VB.Image btnRun
    Height          = 390
    Left           = 2400
    Top            = 4440
    Width          = 2205
End
Begin VB.Image imgReset_on
    Height          = 390
    Left           = 5160
    Picture         = (Bitmap)
    Top            = 1680
    Visible        = 0 'False
    Width          = 2205
End
Begin VB.Image imgStep_on
    Height          = 390
    Left           = 5160
    Picture         = (Bitmap)
    Top            = 1320
    Visible        = 0 'False
    Width          = 2205
End
Begin VB.Image imgRun_on
    Height          = 390
    Left           = 5160
    Picture         = (Bitmap)
    Top            = 960
    Visible        = 0 'False
    Width          = 2205
End
Begin VB.Image btnScrollDown
    Enabled         = 0 'False
    Height          = 1395
    Left           = 4200
    Top            = 2745
    Width          = 300
End
Begin VB.Image imgDown_on
    Height          = 1395
    Left           = 7680
    Picture         = (Bitmap)
    Top            = 2280
    Visible        = 0 'False
    Width          = 300
End
Begin VB.Image imgDown_off
    Height          = 1395
    Left           = 7440
    Picture         = (Bitmap)
    Top            = 2280
    Visible        = 0 'False
    Width          = 300
End
Begin VB.Image imgUp_on
    Height          = 1395
    Left           = 7680
    Picture         = (Bitmap)
    Top            = 720
    Visible        = 0 'False
```

```
        Width          = 300
End
Begin VB.Image imgUp_off
    Height          = 1395
    Left           = 7440
    Picture        = (Bitmap)
    Top            = 720
    Visible       = 0 'False
    Width         = 300
End
Begin VB.Image btnScrollUp
    Enabled        = 0 'False
    Height        = 1395
    Left         = 4200
    Top         = 1350
    Width       = 300
End
Begin VB.Image imgINC
    Height        = 195
    Index        = 1
    Left         = 5760
    Picture      = (Bitmap)
    Top         = 5400
    Visible     = 0 'False
    Width       = 345
End
Begin VB.Image imgDEB
    Height        = 195
    Index        = 1
    Left         = 6120
    Picture      = (Bitmap)
    Top         = 5400
    Visible     = 0 'False
    Width       = 345
End
Begin VB.Image imgEND
    Height        = 195
    Index        = 1
    Left         = 6480
    Picture      = (Bitmap)
    Top         = 5400
    Visible     = 0 'False
    Width       = 345
End
Begin VB.Image imgNoOp
    Height        = 195
    Left         = 5400
    Picture      = (Bitmap)
    Top         = 5280
    Visible     = 0 'False
    Width       = 345
End
Begin VB.Image imgLCD
    Height        = 195
    Index        = 10
    Left         = 5640
    Picture      = (Bitmap)
    Top         = 5640
    Visible     = 0 'False
    Width       = 105
End
```



```
Begin VB.Image imgLCD
    Height      = 195
    Index       = 11
    Left        = 5760
    Picture     = (Bitmap)
    Top         = 5640
    Visible     = 0 'False
    Width       = 105
End
```

```
Begin VB.Image imgLCD
    Height      = 195
    Index       = 12
    Left        = 5880
    Picture     = (Bitmap)
    Top         = 5640
    Visible     = 0 'False
    Width       = 105
End
```

```
Begin VB.Image imgLCD
    Height      = 195
    Index       = 13
    Left        = 6000
    Picture     = (Bitmap)
    Top         = 5640
    Visible     = 0 'False
    Width       = 105
End
```

```
Begin VB.Image imgLCD
    Height      = 195
    Index       = 14
    Left        = 6120
    Picture     = (Bitmap)
    Top         = 5640
    Visible     = 0 'False
    Width       = 105
End
```

```
Begin VB.Image imgLCD
    Height      = 195
    Index       = 15
    Left        = 6240
    Picture     = (Bitmap)
    Top         = 5640
    Visible     = 0 'False
    Width       = 105
End
```

```
Begin VB.Image imgLCD
    Height      = 195
    Index       = 16
    Left        = 6360
    Picture     = (Bitmap)
    Top         = 5640
    Visible     = 0 'False
    Width       = 105
End
```

```
Begin VB.Image imgLCD
    Height      = 195
    Index       = 17
    Left        = 6480
    Picture     = (Bitmap)
    Top         = 5640
    Visible     = 0 'False
End
```

```
        Width          = 105
End
Begin VB.Image imgLCD
    Height          = 195
    Index          = 18
    Left           = 6600
    Picture        = (Bitmap)
    Top            = 5640
    Visible        = 0 'False
    Width          = 105
End
Begin VB.Image imgLCD
    Height          = 195
    Index          = 19
    Left           = 6720
    Picture        = (Bitmap)
    Top            = 5640
    Visible        = 0 'False
    Width          = 105
End
Begin VB.Image imgLN1
    Height          = 195
    Index          = 11
    Left           = 3960
    Top            = 3960
    Width          = 105
End
Begin VB.Image imgLN0
    Height          = 195
    Index          = 11
    Left           = 3840
    Top            = 3960
    Width          = 105
End
Begin VB.Image imgLP1
    Height          = 195
    Index          = 11
    Left           = 3600
    Top            = 3960
    Width          = 105
End
Begin VB.Image imgLP0
    Height          = 195
    Index          = 11
    Left           = 3480
    Top            = 3960
    Width          = 105
End
Begin VB.Image imgReg
    Height          = 195
    Index          = 11
    Left           = 3240
    Top            = 3960
    Width          = 105
End
Begin VB.Image imgLine1
    Height          = 195
    Index          = 11
    Left           = 2520
    Top            = 3960
    Width          = 105
```

```
End
Begin VB.Image imgLine0
    Height      = 195
    Index       = 11
    Left        = 2400
    Top         = 3960
    Width       = 105
End
Begin VB.Image imgOp
    Height      = 195
    Index       = 11
    Left        = 2760
    Top         = 3960
    Width       = 345
End
Begin VB.Image imgLN1
    Height      = 195
    Index       = 10
    Left        = 3960
    Top         = 3720
    Width       = 105
End
Begin VB.Image imgLN0
    Height      = 195
    Index       = 10
    Left        = 3840
    Top         = 3720
    Width       = 105
End
Begin VB.Image imgLP1
    Height      = 195
    Index       = 10
    Left        = 3600
    Top         = 3720
    Width       = 105
End
Begin VB.Image imgLP0
    Height      = 195
    Index       = 10
    Left        = 3480
    Top         = 3720
    Width       = 105
End
Begin VB.Image imgReg
    Height      = 195
    Index       = 10
    Left        = 3240
    Top         = 3720
    Width       = 105
End
Begin VB.Image imgLine1
    Height      = 195
    Index       = 10
    Left        = 2520
    Top         = 3720
    Width       = 105
End
Begin VB.Image imgLine0
    Height      = 195
    Index       = 10
    Left        = 2400
```

```
    Top           = 3720
    Width         = 105
End
Begin VB.Image imgOp
    Height        = 195
    Index         = 10
    Left          = 2760
    Top           = 3720
    Width         = 345
End
Begin VB.Image imgLN1
    Height        = 195
    Index         = 9
    Left          = 3960
    Top           = 3480
    Width         = 105
End
Begin VB.Image imgLN0
    Height        = 195
    Index         = 9
    Left          = 3840
    Top           = 3480
    Width         = 105
End
Begin VB.Image imgLP1
    Height        = 195
    Index         = 9
    Left          = 3600
    Top           = 3480
    Width         = 105
End
Begin VB.Image imgLP0
    Height        = 195
    Index         = 9
    Left          = 3480
    Top           = 3480
    Width         = 105
End
Begin VB.Image imgReg
    Height        = 195
    Index         = 9
    Left          = 3240
    Top           = 3480
    Width         = 105
End
Begin VB.Image imgLine1
    Height        = 195
    Index         = 9
    Left          = 2520
    Top           = 3480
    Width         = 105
End
Begin VB.Image imgLine0
    Height        = 195
    Index         = 9
    Left          = 2400
    Top           = 3480
    Width         = 105
End
Begin VB.Image imgOp
    Height        = 195
```

```
    Index      = 9
    Left       = 2760
    Top        = 3480
    Width      = 345
End
Begin VB.Image imgLN1
    Height     = 195
    Index      = 8
    Left       = 3960
    Top        = 3240
    Width      = 105
End
Begin VB.Image imgLN0
    Height     = 195
    Index      = 8
    Left       = 3840
    Top        = 3240
    Width      = 105
End
Begin VB.Image imgLP1
    Height     = 195
    Index      = 8
    Left       = 3600
    Top        = 3240
    Width      = 105
End
Begin VB.Image imgLP0
    Height     = 195
    Index      = 8
    Left       = 3480
    Top        = 3240
    Width      = 105
End
Begin VB.Image imgReg
    Height     = 195
    Index      = 8
    Left       = 3240
    Top        = 3240
    Width      = 105
End
Begin VB.Image imgLine1
    Height     = 195
    Index      = 8
    Left       = 2520
    Top        = 3240
    Width      = 105
End
Begin VB.Image imgLine0
    Height     = 195
    Index      = 8
    Left       = 2400
    Top        = 3240
    Width      = 105
End
Begin VB.Image imgOp
    Height     = 195
    Index      = 8
    Left       = 2760
    Top        = 3240
    Width      = 345
End
```

```
Begin VB.Image imgLN1
    Height      = 195
    Index       = 7
    Left        = 3960
    Top         = 3000
    Width       = 105
```

End

```
Begin VB.Image imgLN0
    Height      = 195
    Index       = 7
    Left        = 3840
    Top         = 3000
    Width       = 105
```

End

```
Begin VB.Image imgLP1
    Height      = 195
    Index       = 7
    Left        = 3600
    Top         = 3000
    Width       = 105
```

End

```
Begin VB.Image imgLP0
    Height      = 195
    Index       = 7
    Left        = 3480
    Top         = 3000
    Width       = 105
```

End

```
Begin VB.Image imgReg
    Height      = 195
    Index       = 7
    Left        = 3240
    Top         = 3000
    Width       = 105
```

End

```
Begin VB.Image imgLine1
    Height      = 195
    Index       = 7
    Left        = 2520
    Top         = 3000
    Width       = 105
```

End

```
Begin VB.Image imgLine0
    Height      = 195
    Index       = 7
    Left        = 2400
    Top         = 3000
    Width       = 105
```

End

```
Begin VB.Image imgOp
    Height      = 195
    Index       = 7
    Left        = 2760
    Top         = 3000
    Width       = 345
```

End

```
Begin VB.Image imgLN1
    Height      = 195
    Index       = 6
    Left        = 3960
    Top         = 2760
```

```
        Width          = 105
End
Begin VB.Image imgLN0
    Height          = 195
    Index          = 6
    Left           = 3840
    Top            = 2760
    Width          = 105
End
Begin VB.Image imgLP1
    Height          = 195
    Index          = 6
    Left           = 3600
    Top            = 2760
    Width          = 105
End
Begin VB.Image imgLP0
    Height          = 195
    Index          = 6
    Left           = 3480
    Top            = 2760
    Width          = 105
End
Begin VB.Image imgReg
    Height          = 195
    Index          = 6
    Left           = 3240
    Top            = 2760
    Width          = 105
End
Begin VB.Image imgLine1
    Height          = 195
    Index          = 6
    Left           = 2520
    Top            = 2760
    Width          = 105
End
Begin VB.Image imgLine0
    Height          = 195
    Index          = 6
    Left           = 2400
    Top            = 2760
    Width          = 105
End
Begin VB.Image imgOp
    Height          = 195
    Index          = 6
    Left           = 2760
    Top            = 2760
    Width          = 345
End
Begin VB.Image imgLN1
    Height          = 195
    Index          = 5
    Left           = 3960
    Top            = 2520
    Width          = 105
End
Begin VB.Image imgLN0
    Height          = 195
    Index          = 5
```

```
    Left      = 3840
    Top       = 2520
    Width     = 105
End
Begin VB.Image imgLP1
    Height    = 195
    Index     = 5
    Left      = 3600
    Top       = 2520
    Width     = 105
End
Begin VB.Image imgLP0
    Height    = 195
    Index     = 5
    Left      = 3480
    Top       = 2520
    Width     = 105
End
Begin VB.Image imgReg
    Height    = 195
    Index     = 5
    Left      = 3240
    Top       = 2520
    Width     = 105
End
Begin VB.Image imgLine1
    Height    = 195
    Index     = 5
    Left      = 2520
    Top       = 2520
    Width     = 105
End
Begin VB.Image imgLine0
    Height    = 195
    Index     = 5
    Left      = 2400
    Top       = 2520
    Width     = 105
End
Begin VB.Image imgOp
    Height    = 195
    Index     = 5
    Left      = 2760
    Top       = 2520
    Width     = 345
End
Begin VB.Image imgLN1
    Height    = 195
    Index     = 4
    Left      = 3960
    Top       = 2280
    Width     = 105
End
Begin VB.Image imgLN0
    Height    = 195
    Index     = 4
    Left      = 3840
    Top       = 2280
    Width     = 105
End
Begin VB.Image imgLP1
```



```
    Height      = 195
    Index       = 4
    Left        = 3600
    Top         = 2280
    Width       = 105
End
Begin VB.Image imgLP0
    Height      = 195
    Index       = 4
    Left        = 3480
    Top         = 2280
    Width       = 105
End
Begin VB.Image imgReg
    Height      = 195
    Index       = 4
    Left        = 3240
    Top         = 2280
    Width       = 105
End
Begin VB.Image imgLine1
    Height      = 195
    Index       = 4
    Left        = 2520
    Top         = 2280
    Width       = 105
End
Begin VB.Image imgLine0
    Height      = 195
    Index       = 4
    Left        = 2400
    Top         = 2280
    Width       = 105
End
Begin VB.Image imgOp
    Height      = 195
    Index       = 4
    Left        = 2760
    Top         = 2280
    Width       = 345
End
Begin VB.Image imgLN1
    Height      = 195
    Index       = 3
    Left        = 3960
    Top         = 2040
    Width       = 105
End
Begin VB.Image imgLN0
    Height      = 195
    Index       = 3
    Left        = 3840
    Top         = 2040
    Width       = 105
End
Begin VB.Image imgLP1
    Height      = 195
    Index       = 3
    Left        = 3600
    Top         = 2040
    Width       = 105
```

```
End
Begin VB.Image imgLP0
    Height      = 195
    Index       = 3
    Left        = 3480
    Top         = 2040
    Width       = 105
End
Begin VB.Image imgReg
    Height      = 195
    Index       = 3
    Left        = 3240
    Top         = 2040
    Width       = 105
End
Begin VB.Image imgLine1
    Height      = 195
    Index       = 3
    Left        = 2520
    Top         = 2040
    Width       = 105
End
Begin VB.Image imgLine0
    Height      = 195
    Index       = 3
    Left        = 2400
    Top         = 2040
    Width       = 105
End
Begin VB.Image imgOp
    Height      = 195
    Index       = 3
    Left        = 2760
    Top         = 2040
    Width       = 345
End
Begin VB.Image imgLN1
    Height      = 195
    Index       = 2
    Left        = 3960
    Top         = 1800
    Width       = 105
End
Begin VB.Image imgLN0
    Height      = 195
    Index       = 2
    Left        = 3840
    Top         = 1800
    Width       = 105
End
Begin VB.Image imgLP1
    Height      = 195
    Index       = 2
    Left        = 3600
    Top         = 1800
    Width       = 105
End
Begin VB.Image imgLP0
    Height      = 195
    Index       = 2
    Left        = 3480
```

```
    Top           = 1800
    Width         = 105
End
Begin VB.Image imgReg
    Height        = 195
    Index        = 2
    Left         = 3240
    Top          = 1800
    Width        = 105
End
Begin VB.Image imgLine1
    Height        = 195
    Index        = 2
    Left         = 2520
    Top          = 1800
    Width        = 105
End
Begin VB.Image imgLine0
    Height        = 195
    Index        = 2
    Left         = 2400
    Top          = 1800
    Width        = 105
End
Begin VB.Image imgOp
    Height        = 195
    Index        = 2
    Left         = 2760
    Top          = 1800
    Width        = 345
End
Begin VB.Image imgLN1
    Height        = 195
    Index        = 1
    Left         = 3960
    Top          = 1560
    Width        = 105
End
Begin VB.Image imgLN0
    Height        = 195
    Index        = 1
    Left         = 3840
    Top          = 1560
    Width        = 105
End
Begin VB.Image imgLP1
    Height        = 195
    Index        = 1
    Left         = 3600
    Top          = 1560
    Width        = 105
End
Begin VB.Image imgLP0
    Height        = 195
    Index        = 1
    Left         = 3480
    Top          = 1560
    Width        = 105
End
Begin VB.Image imgReg
    Height        = 195
```

```
    Index      = 1
    Left       = 3240
    Top        = 1560
    Width      = 105
End
Begin VB.Image imgLine1
    Height     = 195
    Index      = 1
    Left       = 2520
    Top        = 1560
    Width      = 105
End
Begin VB.Image imgLine0
    Height     = 195
    Index      = 1
    Left       = 2400
    Top        = 1560
    Width      = 105
End
Begin VB.Image imgOp
    Height     = 195
    Index      = 1
    Left       = 2760
    Top        = 1560
    Width      = 345
End
Begin VB.Image imgLN1
    Height     = 195
    Index      = 0
    Left       = 3960
    Top        = 1320
    Width      = 105
End
Begin VB.Image imgLN0
    Height     = 195
    Index      = 0
    Left       = 3840
    Top        = 1320
    Width      = 105
End
Begin VB.Image imgLP1
    Height     = 195
    Index      = 0
    Left       = 3600
    Top        = 1320
    Width      = 105
End
Begin VB.Image imgLP0
    Height     = 195
    Index      = 0
    Left       = 3480
    Top        = 1320
    Width      = 105
End
Begin VB.Image imgReg
    Height     = 195
    Index      = 0
    Left       = 3240
    Top        = 1320
    Width      = 105
End
```

```
Begin VB.Image imgLine1
    Height      = 195
    Index       = 0
    Left        = 2520
    Top         = 1320
    Width       = 105
End
Begin VB.Image imgLine0
    Height      = 195
    Index       = 0
    Left        = 2400
    Top         = 1320
    Width       = 105
End
Begin VB.Image imgOp
    Height      = 195
    Index       = 0
    Left        = 2760
    Top         = 1320
    Width       = 345
End
Begin VB.Image imgEND
    Height      = 195
    Index       = 0
    Left        = 6480
    Picture     = (Bitmap)
    Top         = 5280
    Visible     = 0 'False
    Width       = 345
End
Begin VB.Image imgDEB
    Height      = 195
    Index       = 0
    Left        = 6120
    Picture     = (Bitmap)
    Top         = 5280
    Visible     = 0 'False
    Width       = 345
End
Begin VB.Image imgINC
    Height      = 195
    Index       = 0
    Left        = 5760
    Picture     = (Bitmap)
    Top         = 5280
    Visible     = 0 'False
    Width       = 345
End
Begin VB.Image imgLCD
    Height      = 195
    Index       = 9
    Left        = 6720
    Picture     = (Bitmap)
    Top         = 5040
    Visible     = 0 'False
    Width       = 105
End
Begin VB.Image imgLCD
    Height      = 195
    Index       = 8
    Left        = 6600
```

```
    Picture      = (Bitmap)
    Top         = 5040
    Visible     = 0 'False
    Width      = 105
End
Begin VB.Image imgLCD
    Height      = 195
    Index       = 7
    Left       = 6480
    Picture     = (Bitmap)
    Top        = 5040
    Visible    = 0 'False
    Width      = 105
End
Begin VB.Image imgLCD
    Height      = 195
    Index       = 6
    Left       = 6360
    Picture     = (Bitmap)
    Top        = 5040
    Visible    = 0 'False
    Width      = 105
End
Begin VB.Image imgLCD
    Height      = 195
    Index       = 5
    Left       = 6240
    Picture     = (Bitmap)
    Top        = 5040
    Visible    = 0 'False
    Width      = 105
End
Begin VB.Image imgLCD
    Height      = 195
    Index       = 4
    Left       = 6120
    Picture     = (Bitmap)
    Top        = 5040
    Visible    = 0 'False
    Width      = 105
End
Begin VB.Image imgLCD
    Height      = 195
    Index       = 3
    Left       = 6000
    Picture     = (Bitmap)
    Top        = 5040
    Visible    = 0 'False
    Width      = 105
End
Begin VB.Image imgLCD
    Height      = 195
    Index       = 2
    Left       = 5880
    Picture     = (Bitmap)
    Top        = 5040
    Visible    = 0 'False
    Width      = 105
End
Begin VB.Image imgLCD
    Height      = 195
```

```
    Index      = 1
    Left       = 5760
    Picture    = (Bitmap)
    Top        = 5040
    Visible    = 0 'False
    Width      = 105
End
Begin VB.Image imgLCD
    Height     = 195
    Index      = 0
    Left       = 5640
    Picture    = (Bitmap)
    Top        = 5040
    Visible    = 0 'False
    Width      = 105
End
Begin VB.Image imgNone
    Height     = 195
    Left       = 5520
    Picture    = (Bitmap)
    Top        = 5040
    Visible    = 0 'False
    Width      = 105
End
Begin VB.Image imgBullet
    Appearance = 0 'Flat
    Height     = 135
    Index      = 149
    Left       = 1200
    Top        = 5400
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance = 0 'Flat
    Height     = 135
    Index      = 148
    Left       = 1080
    Top        = 5400
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance = 0 'Flat
    Height     = 135
    Index      = 147
    Left       = 960
    Top        = 5400
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance = 0 'Flat
    Height     = 135
    Index      = 146
    Left       = 840
    Top        = 5400
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance = 0 'Flat
    Height     = 135
    Index      = 145
    Left       = 720
```

```
    Top           = 5400
    Width         = 135
End
Begin VB.Image imgBullet
    Appearance     = 0 'Flat
    Height         = 135
    Index         = 144
    Left          = 1200
    Top           = 5520
    Width         = 135
End
Begin VB.Image imgBullet
    Appearance     = 0 'Flat
    Height         = 135
    Index         = 143
    Left          = 1080
    Top           = 5520
    Width         = 135
End
Begin VB.Image imgBullet
    Appearance     = 0 'Flat
    Height         = 135
    Index         = 142
    Left          = 960
    Top           = 5520
    Width         = 135
End
Begin VB.Image imgBullet
    Appearance     = 0 'Flat
    Height         = 135
    Index         = 141
    Left          = 840
    Top           = 5520
    Width         = 135
End
Begin VB.Image imgBullet
    Appearance     = 0 'Flat
    Height         = 135
    Index         = 140
    Left          = 720
    Top           = 5520
    Width         = 135
End
Begin VB.Image imgBullet
    Appearance     = 0 'Flat
    Height         = 135
    Index         = 139
    Left          = 1200
    Top           = 5640
    Width         = 135
End
Begin VB.Image imgBullet
    Appearance     = 0 'Flat
    Height         = 135
    Index         = 138
    Left          = 1080
    Top           = 5640
    Width         = 135
End
Begin VB.Image imgBullet
    Appearance     = 0 'Flat
```



```
Height      = 135
Index       = 137
Left        = 960
Top         = 5640
Width       = 135
```

End

```
Begin VB.Image imgBullet
Appearance   = 0 'Flat
Height      = 135
Index       = 136
Left        = 840
Top         = 5640
Width       = 135
```

End

```
Begin VB.Image imgBullet
Appearance   = 0 'Flat
Height      = 135
Index       = 135
Left        = 720
Top         = 5640
Width       = 135
```

End

```
Begin VB.Image imgBullet
Appearance   = 0 'Flat
Height      = 135
Index       = 134
Left        = 1200
Top         = 4920
Width       = 135
```

End

```
Begin VB.Image imgBullet
Appearance   = 0 'Flat
Height      = 135
Index       = 133
Left        = 1080
Top         = 4920
Width       = 135
```

End

```
Begin VB.Image imgBullet
Appearance   = 0 'Flat
Height      = 135
Index       = 132
Left        = 960
Top         = 4920
Width       = 135
```

End

```
Begin VB.Image imgBullet
Appearance   = 0 'Flat
Height      = 135
Index       = 131
Left        = 840
Top         = 4920
Width       = 135
```

End

```
Begin VB.Image imgBullet
Appearance   = 0 'Flat
Height      = 135
Index       = 130
Left        = 720
Top         = 4920
Width       = 135
```

```
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 129
    Left           = 1200
    Top            = 5040
    Width          = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 128
    Left           = 1080
    Top            = 5040
    Width          = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 127
    Left           = 960
    Top            = 5040
    Width          = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 126
    Left           = 840
    Top            = 5040
    Width          = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 125
    Left           = 720
    Top            = 5040
    Width          = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 124
    Left           = 1200
    Top            = 5160
    Width          = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 123
    Left           = 1080
    Top            = 5160
    Width          = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 122
```

```
    Left      = 960
    Top       = 5160
    Width     = 135
End
Begin VB.Image imgBullet
    Appearance = 0 'Flat
    Height     = 135
    Index      = 121
    Left       = 840
    Top        = 5160
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance = 0 'Flat
    Height     = 135
    Index      = 120
    Left       = 720
    Top        = 5160
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance = 0 'Flat
    Height     = 135
    Index      = 119
    Left       = 1200
    Top        = 4440
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance = 0 'Flat
    Height     = 135
    Index      = 118
    Left       = 1080
    Top        = 4440
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance = 0 'Flat
    Height     = 135
    Index      = 117
    Left       = 960
    Top        = 4440
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance = 0 'Flat
    Height     = 135
    Index      = 116
    Left       = 840
    Top        = 4440
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance = 0 'Flat
    Height     = 135
    Index      = 115
    Left       = 720
    Top        = 4440
    Width      = 135
End
Begin VB.Image imgBullet
```

```
    Appearance      = 0 'Flat
    Height          = 135
    Index           = 114
    Left            = 1200
    Top             = 4560
    Width           = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index           = 113
    Left            = 1080
    Top             = 4560
    Width           = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index           = 112
    Left            = 960
    Top             = 4560
    Width           = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index           = 111
    Left            = 840
    Top             = 4560
    Width           = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index           = 110
    Left            = 720
    Top             = 4560
    Width           = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index           = 109
    Left            = 1200
    Top             = 4680
    Width           = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index           = 108
    Left            = 1080
    Top             = 4680
    Width           = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index           = 107
    Left            = 960
    Top             = 4680
```

```
        Width          = 135
End
Begin VB.Image imgBullet
    Appearance          = 0 'Flat
    Height              = 135
    Index               = 106
    Left                = 840
    Top                 = 4680
    Width               = 135
End
Begin VB.Image imgBullet
    Appearance          = 0 'Flat
    Height              = 135
    Index               = 105
    Left                = 720
    Top                 = 4680
    Width               = 135
End
Begin VB.Image imgBullet
    Appearance          = 0 'Flat
    Height              = 135
    Index               = 104
    Left                = 1200
    Top                 = 3960
    Width               = 135
End
Begin VB.Image imgBullet
    Appearance          = 0 'Flat
    Height              = 135
    Index               = 103
    Left                = 1080
    Top                 = 3960
    Width               = 135
End
Begin VB.Image imgBullet
    Appearance          = 0 'Flat
    Height              = 135
    Index               = 102
    Left                = 960
    Top                 = 3960
    Width               = 135
End
Begin VB.Image imgBullet
    Appearance          = 0 'Flat
    Height              = 135
    Index               = 101
    Left                = 840
    Top                 = 3960
    Width               = 135
End
Begin VB.Image imgBullet
    Appearance          = 0 'Flat
    Height              = 135
    Index               = 100
    Left                = 720
    Top                 = 3960
    Width               = 135
End
Begin VB.Image imgBullet
    Appearance          = 0 'Flat
    Height              = 135
```

```
    Index      = 99
    Left       = 1200
    Top        = 4080
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance = 0 'Flat
    Height     = 135
    Index      = 98
    Left       = 1080
    Top        = 4080
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance = 0 'Flat
    Height     = 135
    Index      = 97
    Left       = 960
    Top        = 4080
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance = 0 'Flat
    Height     = 135
    Index      = 96
    Left       = 840
    Top        = 4080
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance = 0 'Flat
    Height     = 135
    Index      = 95
    Left       = 720
    Top        = 4080
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance = 0 'Flat
    Height     = 135
    Index      = 94
    Left       = 1200
    Top        = 4200
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance = 0 'Flat
    Height     = 135
    Index      = 93
    Left       = 1080
    Top        = 4200
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance = 0 'Flat
    Height     = 135
    Index      = 92
    Left       = 960
    Top        = 4200
    Width      = 135
End
End
```

```
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 91
    Left           = 840
    Top            = 4200
    Width          = 135
End
```

```
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 90
    Left           = 720
    Top            = 4200
    Width          = 135
End
```

```
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 89
    Left           = 1200
    Top            = 3480
    Width          = 135
End
```

```
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 88
    Left           = 1080
    Top            = 3480
    Width          = 135
End
```

```
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 87
    Left           = 960
    Top            = 3480
    Width          = 135
End
```

```
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 86
    Left           = 840
    Top            = 3480
    Width          = 135
End
```

```
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 85
    Left           = 720
    Top            = 3480
    Width          = 135
End
```

```
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 84
    Left           = 1200
End
```

```
    Top           = 3600
    Width         = 135
End
Begin VB.Image imgBullet
    Appearance     = 0 'Flat
    Height        = 135
    Index         = 83
    Left          = 1080
    Top           = 3600
    Width         = 135
End
Begin VB.Image imgBullet
    Appearance     = 0 'Flat
    Height        = 135
    Index         = 82
    Left          = 960
    Top           = 3600
    Width         = 135
End
Begin VB.Image imgBullet
    Appearance     = 0 'Flat
    Height        = 135
    Index         = 81
    Left          = 840
    Top           = 3600
    Width         = 135
End
Begin VB.Image imgBullet
    Appearance     = 0 'Flat
    Height        = 135
    Index         = 80
    Left          = 720
    Top           = 3600
    Width         = 135
End
Begin VB.Image imgBullet
    Appearance     = 0 'Flat
    Height        = 135
    Index         = 79
    Left          = 1200
    Top           = 3720
    Width         = 135
End
Begin VB.Image imgBullet
    Appearance     = 0 'Flat
    Height        = 135
    Index         = 78
    Left          = 1080
    Top           = 3720
    Width         = 135
End
Begin VB.Image imgBullet
    Appearance     = 0 'Flat
    Height        = 135
    Index         = 77
    Left          = 960
    Top           = 3720
    Width         = 135
End
Begin VB.Image imgBullet
    Appearance     = 0 'Flat
```



```
Height      = 135
Index       = 76
Left        = 840
Top         = 3720
Width       = 135
```

End

```
Begin VB.Image imgBullet
Appearance   = 0 'Flat
Height      = 135
Index       = 75
Left        = 720
Top         = 3720
Width       = 135
```

End

```
Begin VB.Image imgBullet
Appearance   = 0 'Flat
Height      = 135
Index       = 74
Left        = 1200
Top         = 3000
Width       = 135
```

End

```
Begin VB.Image imgBullet
Appearance   = 0 'Flat
Height      = 135
Index       = 73
Left        = 1080
Top         = 3000
Width       = 135
```

End

```
Begin VB.Image imgBullet
Appearance   = 0 'Flat
Height      = 135
Index       = 72
Left        = 960
Top         = 3000
Width       = 135
```

End

```
Begin VB.Image imgBullet
Appearance   = 0 'Flat
Height      = 135
Index       = 71
Left        = 840
Top         = 3000
Width       = 135
```

End

```
Begin VB.Image imgBullet
Appearance   = 0 'Flat
Height      = 135
Index       = 70
Left        = 720
Top         = 3000
Width       = 135
```

End

```
Begin VB.Image imgBullet
Appearance   = 0 'Flat
Height      = 135
Index       = 69
Left        = 1200
Top         = 3120
Width       = 135
```

```
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 68
    Left           = 1080
    Top            = 3120
    Width          = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 67
    Left           = 960
    Top            = 3120
    Width          = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 66
    Left           = 840
    Top            = 3120
    Width          = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 65
    Left           = 720
    Top            = 3120
    Width          = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 64
    Left           = 1200
    Top            = 3240
    Width          = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 63
    Left           = 1080
    Top            = 3240
    Width          = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 62
    Left           = 960
    Top            = 3240
    Width          = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 61
```

```
    Left      = 840
    Top       = 3240
    Width     = 135
End
Begin VB.Image imgBullet
    Appearance = 0 'Flat
    Height     = 135
    Index      = 60
    Left       = 720
    Top        = 3240
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance = 0 'Flat
    Height     = 135
    Index      = 59
    Left       = 1200
    Top        = 2520
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance = 0 'Flat
    Height     = 135
    Index      = 58
    Left       = 1080
    Top        = 2520
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance = 0 'Flat
    Height     = 135
    Index      = 57
    Left       = 960
    Top        = 2520
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance = 0 'Flat
    Height     = 135
    Index      = 56
    Left       = 840
    Top        = 2520
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance = 0 'Flat
    Height     = 135
    Index      = 55
    Left       = 720
    Top        = 2520
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance = 0 'Flat
    Height     = 135
    Index      = 54
    Left       = 1200
    Top        = 2640
    Width      = 135
End
Begin VB.Image imgBullet
```

```
    Appearance      = 0 'Flat
    Height          = 135
    Index           = 53
    Left            = 1080
    Top             = 2640
    Width           = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index           = 52
    Left            = 960
    Top             = 2640
    Width           = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index           = 51
    Left            = 840
    Top             = 2640
    Width           = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index           = 50
    Left            = 720
    Top             = 2640
    Width           = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index           = 49
    Left            = 1200
    Top             = 2760
    Width           = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index           = 48
    Left            = 1080
    Top             = 2760
    Width           = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index           = 47
    Left            = 960
    Top             = 2760
    Width           = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index           = 46
    Left            = 840
    Top             = 2760
```

```
        Width          = 135
End
Begin VB.Image imgBullet
    Appearance         = 0 'Flat
    Height             = 135
    Index              = 45
    Left               = 720
    Top                = 2760
    Width              = 135
End
Begin VB.Image imgBullet
    Appearance         = 0 'Flat
    Height             = 135
    Index              = 44
    Left               = 1200
    Top                = 2040
    Width              = 135
End
Begin VB.Image imgBullet
    Appearance         = 0 'Flat
    Height             = 135
    Index              = 43
    Left               = 1080
    Top                = 2040
    Width              = 135
End
Begin VB.Image imgBullet
    Appearance         = 0 'Flat
    Height             = 135
    Index              = 42
    Left               = 960
    Top                = 2040
    Width              = 135
End
Begin VB.Image imgBullet
    Appearance         = 0 'Flat
    Height             = 135
    Index              = 41
    Left               = 840
    Top                = 2040
    Width              = 135
End
Begin VB.Image imgBullet
    Appearance         = 0 'Flat
    Height             = 135
    Index              = 40
    Left               = 720
    Top                = 2040
    Width              = 135
End
Begin VB.Image imgBullet
    Appearance         = 0 'Flat
    Height             = 135
    Index              = 39
    Left               = 1200
    Top                = 2160
    Width              = 135
End
Begin VB.Image imgBullet
    Appearance         = 0 'Flat
    Height             = 135
```

```
    Index      = 38
    Left       = 1080
    Top        = 2160
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance  = 0 'Flat
    Height     = 135
    Index      = 37
    Left       = 960
    Top        = 2160
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance  = 0 'Flat
    Height     = 135
    Index      = 36
    Left       = 840
    Top        = 2160
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance  = 0 'Flat
    Height     = 135
    Index      = 35
    Left       = 720
    Top        = 2160
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance  = 0 'Flat
    Height     = 135
    Index      = 34
    Left       = 1200
    Top        = 2280
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance  = 0 'Flat
    Height     = 135
    Index      = 33
    Left       = 1080
    Top        = 2280
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance  = 0 'Flat
    Height     = 135
    Index      = 32
    Left       = 960
    Top        = 2280
    Width      = 135
End
Begin VB.Image imgBullet
    Appearance  = 0 'Flat
    Height     = 135
    Index      = 31
    Left       = 840
    Top        = 2280
    Width      = 135
End
End
```

```
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 30
    Left           = 720
    Top            = 2280
    Width          = 135
End
```

```
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 29
    Left           = 1200
    Top            = 1560
    Width          = 135
End
```

```
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 28
    Left           = 1080
    Top            = 1560
    Width          = 135
End
```

```
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 27
    Left           = 960
    Top            = 1560
    Width          = 135
End
```

```
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 26
    Left           = 840
    Top            = 1560
    Width          = 135
End
```

```
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 25
    Left           = 720
    Top            = 1560
    Width          = 135
End
```

```
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 24
    Left           = 1200
    Top            = 1680
    Width          = 135
End
```

```
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 23
    Left           = 1080
End
```

```
    Top          = 1680
    Width        = 135
End
Begin VB.Image imgBullet
    Appearance    = 0 'Flat
    Height       = 135
    Index        = 22
    Left         = 960
    Top          = 1680
    Width        = 135
End
Begin VB.Image imgBullet
    Appearance    = 0 'Flat
    Height       = 135
    Index        = 21
    Left         = 840
    Top          = 1680
    Width        = 135
End
Begin VB.Image imgBullet
    Appearance    = 0 'Flat
    Height       = 135
    Index        = 20
    Left         = 720
    Top          = 1680
    Width        = 135
End
Begin VB.Image imgBullet
    Appearance    = 0 'Flat
    Height       = 135
    Index        = 19
    Left         = 1200
    Top          = 1800
    Width        = 135
End
Begin VB.Image imgBullet
    Appearance    = 0 'Flat
    Height       = 135
    Index        = 18
    Left         = 1080
    Top          = 1800
    Width        = 135
End
Begin VB.Image imgBullet
    Appearance    = 0 'Flat
    Height       = 135
    Index        = 17
    Left         = 960
    Top          = 1800
    Width        = 135
End
Begin VB.Image imgBullet
    Appearance    = 0 'Flat
    Height       = 135
    Index        = 16
    Left         = 840
    Top          = 1800
    Width        = 135
End
Begin VB.Image imgBullet
    Appearance    = 0 'Flat
```



```
Height      = 135
Index       = 15
Left        = 720
Top         = 1800
Width       = 135
```

End

```
Begin VB.Image imgBullet
Appearance  = 0 'Flat
Height     = 135
Index      = 14
Left       = 1200
Top        = 1080
Width      = 135
```

End

```
Begin VB.Image imgBullet
Appearance  = 0 'Flat
Height     = 135
Index      = 13
Left       = 1080
Top        = 1080
Width      = 135
```

End

```
Begin VB.Image imgBullet
Appearance  = 0 'Flat
Height     = 135
Index      = 12
Left       = 960
Top        = 1080
Width      = 135
```

End

```
Begin VB.Image imgBullet
Appearance  = 0 'Flat
Height     = 135
Index      = 11
Left       = 840
Top        = 1080
Width      = 135
```

End

```
Begin VB.Image imgBullet
Appearance  = 0 'Flat
Height     = 135
Index      = 10
Left       = 720
Top        = 1080
Width      = 135
```

End

```
Begin VB.Image imgBullet
Appearance  = 0 'Flat
Height     = 135
Index      = 9
Left       = 1200
Top        = 1200
Width      = 135
```

End

```
Begin VB.Image imgBullet
Appearance  = 0 'Flat
Height     = 135
Index      = 8
Left       = 1080
Top        = 1200
Width      = 135
```

```
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 7
    Left           = 960
    Top            = 1200
    Width          = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 6
    Left           = 840
    Top            = 1200
    Width          = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 5
    Left           = 720
    Top            = 1200
    Width          = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 0
    Left           = 720
    Top            = 1320
    Width          = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 1
    Left           = 840
    Top            = 1320
    Width          = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 2
    Left           = 960
    Top            = 1320
    Width          = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 3
    Left           = 1080
    Top            = 1320
    Width          = 135
End
Begin VB.Image imgBullet
    Appearance      = 0 'Flat
    Height          = 135
    Index          = 4
```

```
    Left      = 1200
    Top       = 1320
    Width     = 135
End
Begin VB.Image btnDec
    Height    = 225
    Index     = 9
    Left      = 1740
    Top       = 5520
    Width     = 300
End
Begin VB.Image btnInc
    Height    = 225
    Index     = 9
    Left      = 1440
    Top       = 5520
    Width     = 300
End
Begin VB.Image btnDec
    Height    = 225
    Index     = 8
    Left      = 1740
    Top       = 5040
    Width     = 300
End
Begin VB.Image btnInc
    Height    = 225
    Index     = 8
    Left      = 1440
    Top       = 5040
    Width     = 300
End
Begin VB.Image btnDec
    Height    = 225
    Index     = 7
    Left      = 1740
    Top       = 4560
    Width     = 300
End
Begin VB.Image btnInc
    Height    = 225
    Index     = 7
    Left      = 1440
    Top       = 4560
    Width     = 300
End
Begin VB.Image btnDec
    Height    = 225
    Index     = 6
    Left      = 1740
    Top       = 4080
    Width     = 300
End
Begin VB.Image btnInc
    Height    = 225
    Index     = 6
    Left      = 1440
    Top       = 4080
    Width     = 300
End
Begin VB.Image btnDec
```

```
    Height      = 225
    Index       = 5
    Left        = 1740
    Top         = 3600
    Width       = 300
End
Begin VB.Image btnInc
    Height      = 225
    Index       = 5
    Left        = 1440
    Top         = 3600
    Width       = 300
End
Begin VB.Image btnDec
    Height      = 225
    Index       = 4
    Left        = 1740
    Top         = 3120
    Width       = 300
End
Begin VB.Image btnInc
    Height      = 225
    Index       = 4
    Left        = 1440
    Top         = 3120
    Width       = 300
End
Begin VB.Image btnInc
    Height      = 225
    Index       = 3
    Left        = 1440
    Top         = 2640
    Width       = 300
End
Begin VB.Image btnDec
    Height      = 225
    Index       = 3
    Left        = 1740
    Top         = 2640
    Width       = 300
End
Begin VB.Image btnInc
    Height      = 225
    Index       = 2
    Left        = 1440
    Top         = 2160
    Width       = 300
End
Begin VB.Image btnDec
    Height      = 225
    Index       = 2
    Left        = 1740
    Top         = 2160
    Width       = 300
End
Begin VB.Image btnInc
    Height      = 225
    Index       = 1
    Left        = 1440
    Top         = 1680
    Width       = 300
```

```
End
Begin VB.Image btnDec
    Height      = 225
    Index       = 1
    Left        = 1740
    Top         = 1680
    Width       = 300
End
Begin VB.Image btnDec
    Height      = 225
    Index       = 0
    Left        = 1740
    Top         = 1200
    Width       = 300
End
Begin VB.Image btnInc
    Appearance  = 0 'Flat
    Height      = 225
    Index       = 0
    Left        = 1440
    Top         = 1200
    Width       = 300
End
Begin VB.Image imgPlus_off
    Height      = 225
    Left        = 5280
    Picture     = (Bitmap)
    Top         = 600
    Visible     = 0 'False
    Width       = 300
End
Begin VB.Image imgPlus_on
    Height      = 225
    Left        = 5280
    Picture     = (Bitmap)
    Top         = 360
    Visible     = 0 'False
    Width       = 300
End
Begin VB.Image imgMinus_off
    Height      = 225
    Left        = 5640
    Picture     = (Bitmap)
    Top         = 600
    Visible     = 0 'False
    Width       = 300
End
Begin VB.Image imgMinus_on
    Height      = 225
    Left        = 5640
    Picture     = (Bitmap)
    Top         = 360
    Visible     = 0 'False
    Width       = 300
End
Begin VB.Image imgBlt_off
    Height      = 135
    Left        = 6000
    Picture     = (Bitmap)
    Top         = 600
    Visible     = 0 'False
```

```
        Width          = 135
End
Begin VB.Image imgBlt_on
    Height          = 135
    Left           = 6000
    Picture        = (Bitmap)
    Top            = 360
    Visible        = 0 'False
    Width          = 135
End
Begin VB.Menu mnuFile
    Caption         = "&File"
    Begin VB.Menu mnuFileNew
        Caption      = "&New"
        Shortcut     = ^N
    End
    Begin VB.Menu mnuFileOpen
        Caption      = "&Open..."
        Shortcut     = ^O
    End
    Begin VB.Menu mnuFileSave
        Caption      = "&Save"
        Shortcut     = ^S
    End
    Begin VB.Menu mnuFileSaveAs
        Caption      = "Save &As..."
    End
    Begin VB.Menu mnuFileSep
        Caption      = "-"
    End
    Begin VB.Menu mnuFileExit
        Caption      = "&Exit"
        Shortcut     = ^Q
    End
End
Begin VB.Menu mnuEdit
    Caption         = "&Edit"
    Begin VB.Menu mnuEditCut
        Caption      = "Cu&t"
        Shortcut     = ^X
    End
    Begin VB.Menu mnuEditCopy
        Caption      = "&Copy"
        Shortcut     = ^C
    End
    Begin VB.Menu mnuEditPaste
        Caption      = "&Paste"
        Shortcut     = ^V
    End
    Begin VB.Menu mnuEditSelectAll
        Caption      = "Select &All"
        Shortcut     = ^A
    End
    Begin VB.Menu mnuEditSep
        Caption      = "-"
    End
    Begin VB.Menu mnuEditGoto
        Caption      = "&Go to line..."
    End
End
Begin VB.Menu mnuOptions
```

```
    Caption          = "&Options"
Begin VB.Menu mnuOptionsNewInstance
    Caption          = "&New Instance"
End
End
Begin VB.Menu mnuHelp
    Caption          = "&Help"
Begin VB.Menu mnuHelpContents
    Caption          = "&Contents..."
    Shortcut         = {F1}
End
Begin VB.Menu mnuHelpAbout
    Caption          = "&About..."
End
End
End
End
```


Interpreter - 1

```
*****
'***      Standard module with the interpreter engine.      ***
'***      Part of the RodRego application.                  ***
*****
'***      Programmer : Nikolai Shvertner                   ***
'***      Date       : 6/20/2001                           ***
'***      Compiler   : Visual Basic 5                       ***
'***      Notes      :                                       ***
'***      Revisions  :                                       ***
*****
```

Option Explicit

```
Global pc As Integer      ' Program Counter
Global running As Boolean ' Flagged when the interpreter is
                          ' running in auto-step mode
```

Sub Step_Program()

' Main interpreter switch

' Select the corresponding program line on the LCD display

select_line (pc)

' Check the operator

Select Case Program(pc).OpCode

Case OPCODE_END ' END operator - end the execution of the program

frmMain.Timer.Interval = 0

running = False

pc = 1

btnStep_Enabled = False

frmMain.status.SimpleText = ""

Case OPCODE_INC ' INC operator - increment a register

frmMain.btnInc_Click (Program(pc).Register)

pc = Program(pc).Line1

Case OPCODE_DEB ' DEB operator - decrement a register and branch

If Register(Program(pc).Register) > 0 Then

frmMain.btnDec_Click (Program(pc).Register)

pc = Program(pc).Line1

Else

pc = Program(pc).Line2

End If

End Select

End Sub

Parser - 1

```
*****
'***      Standard module with procedures for parsing      ***
'***      and debugging a program.                        ***
'***      Part of the RodRego application.                 ***
*****
'***      Programmer : Nikolai Shvertner                  ***
'***      Date       : 6/20/2001                          ***
'***      Compiler   : Visual Basic 5                     ***
'***      Notes      :                                     ***
'***      Revisions  :                                     ***
*****
```

Option Explicit

' Convenience constants for Error level returns

```
Global Const SUCCESS = 0
Global Const ERROR_LINE_NUMBER_EXPECTED = 12
Global Const ERROR_UNEXPECTED_END_OF_LINE = 13
Global Const ERROR_INVALID_OPERATION = 14
Global Const ERROR_REGISTER_EXPECTED = 15
Global Const ERROR_INVALID_LINE_ARGUMENT = 16
Global Const ERROR_TOO_MANY_ARGUMENTS = 17
Global Const ERROR_NO_PROGRAM = 18
Global Const ERROR_DUPLICATE_LINE = 19
Global Const ERROR_RETURN = -1
Global Const TOKEN_NLCR = "nlcr9754367899"
Global Const TOKEN_EOF = "eof7545425214"
```

' A custom defined data type for error level returns

```
Public Type error
    error_code As Byte ' The code of the error
    line As Byte      ' The line where the error occurred
End Type
```

Function ParseString(strProg As Variant) As error

```
' A classic parser function for a simple programming language
Dim ch As String
Dim tokens(0 To 1000) As String
Dim pointer, line, ptToken, i, line_prog, op, reg, l1, l2 As Integer
```

```
' Clear the memory
For i = 0 To 255
    Program(i).OpCode = OPCODE_NONE
Next i
```

```
' Initilize variables
pointer = 1 ' Marker for reading the text
ptToken = 0 ' Token index
tokens(0) = TOKEN_EOF ' Initial token configuration
line = 0    ' Line counter
```

'### Phase I: Break the text into Tokens (strings)

While (pointer <= Len(strProg))

```
' Skip all white space characters (spaces)
ch = Mid(strProg, pointer, 1)
While (pointer <= Len(strProg) And ch = " ")
    pointer = pointer + 1
If (pointer <= Len(strProg)) Then ch = Mid(strProg, pointer, 1)
Wend
```

```

' Clear the token
tokens(ptToken) = ""

' Feed characters in the token, until encountering a white
' space character
While (pointer <= Len(strProg) And ch <> " " And ch <> Chr(13))
    tokens(ptToken) = tokens(ptToken) & ch
    pointer = pointer + 1
    If (pointer <= Len(strProg)) Then ch = Mid(strProg, pointer, 1)
Wend

' Check if something got in the Token
If (tokens(ptToken) <> "") Then ptToken = ptToken + 1

If (pointer <= Len(strProg) And ch = Chr(13)) Then
    ' A new line was encountered, so
    ' advance the required number of characters
    ' and make a NEW-LINE Token
    pointer = pointer + 2
    tokens(ptToken) = TOKEN_NLCR
    ptToken = ptToken + 1
End If

If (pointer > Len(strProg)) Then
    ' Reached the end of the text. Make a special Token.
    tokens(ptToken) = TOKEN_EOF
    ptToken = ptToken + 1
End If
Wend ' Close the loop

ptToken = 0 ' Reset the Token index pointer

'### Phase II: Analyze the Tokens and extract the meaning

' Until we reach the final Token...
While (tokens(ptToken) <> TOKEN_EOF)
    ' Skip new-line Tokens and Comment Tokens
    While (tokens(ptToken) = TOKEN_NLCR Or IsComment(tokens(ptToken)))
        If (IsComment(tokens(ptToken))) Then
            ' We've got a comment. Skip till the end of the line.
            While (tokens(ptToken) <> TOKEN_NLCR And tokens(ptToken) <> TOKEN_EOF)
                ptToken = ptToken + 1
            Wend
        Else
            ptToken = ptToken + 1
            line = line + 1
        End If
    Wend

    If (tokens(ptToken) = TOKEN_EOF) Then
        ' The end of the Token sequence is reached.
        ' Mission complete.
        ParseString.error_code = SUCCESS
        Exit Function
    End If

    ' Try to convert the Token to a number and advance to
    ' the next Token.
    line_prog = String2Num(tokens(ptToken))
    ptToken = ptToken + 1

```

```

If (line_prog = ERROR_RETURN) Then
    ' Problem: the first Token on a line must be a number
    ParseString.error_code = ERROR_LINE_NUMBER_EXPECTED
    ParseString.line = line
    Exit Function
End If

' Try to obtain the code of the Operand
op = getOpCode(tokens(ptToken))
ptToken = ptToken + 1

If (op = ERROR_RETURN) Then
    ' Problem: Couldn't recognize the operation string
    ParseString.error_code = ERROR_INVALID_OPERATION
    ParseString.line = line
    Exit Function
End If

' Try to acquire the arguments as needed
If (op <> OPCODE_END) Then
    reg = String2Num(tokens(ptToken))
    ptToken = ptToken + 1

    If (reg = ERROR_RETURN) Then
        ParseString.error_code = ERROR_REGISTER_EXPECTED
        ParseString.line = line
        Exit Function
    End If

    l1 = String2Num(tokens(ptToken))
    ptToken = ptToken + 1

    If (l1 = ERROR_RETURN) Then
        ParseString.error_code = ERROR_INVALID_LINE_ARGUMENT
        ParseString.line = line
        Exit Function
    End If

    If (op = OPCODE_DEB) Then
        l2 = String2Num(tokens(ptToken))
        ptToken = ptToken + 1

        If (l2 = ERROR_RETURN) Then
            ParseString.error_code = ERROR_INVALID_LINE_ARGUMENT
            ParseString.line = line
            Exit Function
        End If
    End If
End If

If Program(line_prog).OpCode <> OPCODE_NONE Then
    ' Problem: The line already exists...
    ParseString.error_code = ERROR_DUPLICATE_LINE
    ParseString.line = line
    Exit Function
End If

' Encode the command line (statement encoding)
Select Case (op)
    Case OPCODE_END
        Program(line_prog).OpCode = op

```

```

    Case OPCode_INC
        Program(line_prog).OpCode = op
        Program(line_prog).Register = reg
        Program(line_prog).Line1 = l1
    Case OPCode_DEB
        Program(line_prog).OpCode = op
        Program(line_prog).Register = reg
        Program(line_prog).Line1 = l1
        Program(line_prog).Line2 = l2
End Select

' Only a comment is acceptable until the end of the line
If (IsComment(tokens(ptToken))) Then
    ' All right: skip till the end of the line
    While (tokens(ptToken) <> TOKEN_NLCR And tokens(ptToken) <> TOKEN_EOF)
        ptToken = ptToken + 1
    Wend
Else
    If (tokens(ptToken) <> TOKEN_NLCR And tokens(ptToken) <> TOKEN_EOF) Then
        ' Problem: Non-comment Token
        ParseString.error_code = ERROR_TOO_MANY_ARGUMENTS
        ParseString.line = line
        Exit Function
    End If
End If
Wend

```

```

' Done
ParseString.error_code = SUCCESS
End Function

```

```

Function ValidLetter(strChar As Variant)
    ' If the letter in the argument is in the range of
    ' the alphabet characters, return TRUE

    If strChar >= "A" And strChar <= "Z" Then
        ValidLetter = True
        Exit Function
    End If

    If strChar >= "a" And strChar <= "z" Then
        ValidLetter = True
        Exit Function
    End If

    ' Hmmmm, that's not a letter
    ValidLetter = False
End Function

```

```

Function ValidDigit(strChar As Variant)
    ' is TRUE if a character is in the range of valid digits
    If strChar >= "0" And strChar <= "9" Then
        ValidDigit = True
        Exit Function
    End If

    ValidDigit = False
End Function

```

```

Function ValidNumber(strNumber As Variant)
    ' TRUE if the string is contains only digits

```

```

Dim i As Integer

For i = 1 To Len(strNumber)
    If ValidDigit(Mid(strNumber, i, 1)) = False Then
        ' The character failed the test, so reject
        ValidNumber = False
        Exit Function
    End If
Next i

```

```

ValidNumber = True
End Function

```

```

Function Character2Digit(strChar As Variant)
    ' Convert a valid digit character to its numeric value

    If ValidDigit(strChar) Then
        ' The character is a digit - convert it
        Character2Digit = Asc(strChar) - Asc("0")
        Exit Function
    End If

    ' Otherwise e are in trouble
    Character2Digit = ERROR_RETURN
End Function

```

```

Function String2Num(strNumber As Variant)
    ' Converts a string to its numeric representation

    Dim i As Integer

    If ValidNumber(strNumber) = False Then
        ' The string is not a valid number
        String2Num = ERROR_RETURN
        Exit Function
    End If

    ' Convert the string to the number digit by digit
    String2Num = 0
    For i = 1 To Len(strNumber)
        String2Num = String2Num * 10 + Character2Digit(Mid(strNumber, i, 1))
    Next i
End Function

```

```

Function IsComment(strNumber As Variant)
    ' A string is a comment, if its first character is a pound
    If (Len(strNumber) = 0 Or Mid(strNumber, 1, 1) <> "#") Then
        IsComment = False
    Else
        IsComment = True
    End If
End Function

```

```

Function getOpCode(strNumber As Variant)
    ' A case insensitive check, if a string is a
    ' one of the three instructions
    Select Case (UCase(strNumber))
        Case INSTR_INC
            getOpCode = OPCode_INC
        Case INSTR_DEB
            getOpCode = OPCode_DEB
    End Select

```

```

    Case INSTR_END
        getOpCode = OPCODE_END
    Case Else
        getOpCode = ERROR_RETURN
    End Select
End Function

Function getError(ByVal error_code As Integer)
    ' Convert an error code to a string message
    Select Case error_code
        Case SUCCESS
            getError = "OK"
        Case ERROR_LINE_NUMBER_EXPECTED
            getError = "Line Number Expected"
        Case ERROR_UNEXPECTED_END_OF_LINE
            getError = "Unexpected End of Line"
        Case ERROR_INVALID_OPERATION
            getError = "Invalid Operation"
        Case ERROR_REGISTER_EXPECTED
            getError = "Valid Register Expected"
        Case ERROR_INVALID_LINE_ARGUMENT
            getError = "Invalid Argument"
        Case ERROR_TOO_MANY_ARGUMENTS
            getError = "Too Many Arguments"
        Case ERROR_NO_PROGRAM
            getError = "Empty Program"
        Case ERROR_DUPLICATE_LINE
            getError = "Duplicate Line"
        Case Else
            getError = ""
    End Select
End Function

Function VerifyProg(strProg As Variant) As error
    ' An additional level of Program syntax analysis

    Dim i, k As Integer
    Dim END_exists, flag1, flag2 As Boolean

    END_exists = False
    lenProgPointers = 0

    ' Record the indexes of all valid program lines
    For i = 0 To 255
        If Program(i).OpCode <> OPCODE_NONE Then
            ProgPointers(lenProgPointers) = i
            lenProgPointers = lenProgPointers + 1
        End If
    Next i

    If lenProgPointers = 0 Then
        ' Problem: No valid program line
        VerifyProg.error_code = ERROR_NO_PROGRAM
        VerifyProg.line = 0
        Exit Function
    End If

    ' Now analyze the line arguments of each statement.
    ' Check for arguments to non-existing lines.
    For i = 0 To lenProgPointers - 1
        Select Case Program(ProgPointers(i)).OpCode

```

```

Case OPCODE_END
    END_exists = True
Case OPCODE_INC
    flag1 = False
    For k = 0 To lenProgPointers - 1
        If Program(ProgPointers(i)).Line1 = ProgPointers(k) Then
            flag1 = True
            k = lenProgPointers - 1
        End If
    Next k
    If flag1 = False Then
        VerifyProg.error_code = ERROR_INVALID_LINE_ARGUMENT
        VerifyProg.line = i
        Exit Function
    End If
    If Program(ProgPointers(i)).Register > 12 Then
        VerifyProg.error_code = ERROR_REGISTER_EXPECTED
        VerifyProg.line = i
        Exit Function
    End If
Case OPCODE_DEB
    flag1 = False
    flag2 = False
    For k = 0 To lenProgPointers - 1
        If Program(ProgPointers(i)).Line1 = ProgPointers(k) Then
            flag1 = True
            If (flag2 = True) Then k = lenProgPointers - 1
        End If
        If Program(ProgPointers(i)).Line2 = ProgPointers(k) Then
            flag2 = True
            If (flag1 = True) Then k = lenProgPointers - 1
        End If
    Next k
    If flag1 = False Or flag2 = False Then
        VerifyProg.error_code = ERROR_INVALID_LINE_ARGUMENT
        VerifyProg.line = i
        Exit Function
    End If
    If Program(ProgPointers(i)).Register > 12 Then
        VerifyProg.error_code = ERROR_REGISTER_EXPECTED
        VerifyProg.line = i
        Exit Function
    End If
Case Else
    VerifyProg.error_code = ERROR_INVALID_OPERATION
    VerifyProg.line = i
    Exit Function
End Select
Next i

' Done
VerifyProg.error_code = SUCCESS
End Function

```


RodRego - 1

```
*****
'*** Global module for the RodRego application. *****
*****
'***      Programmer : Nikolai Shvertner      ***
'***      Date       : 6/20/2001             ***
'***      Compiler   : Visual Basic 5        ***
'***      Notes      :                       ***
'***      Revisions  :                       ***
*****

Option Explicit

' Data structure for one full RodRego instruction
Type Instruction
    OpCode As Byte    ' Code of the operator
    Register As Byte  ' The register to which the operation is applied
    Line1 As Byte     ' Next line to go to
    Line2 As Byte     ' Alternative line to go to
End Type

' A pair to be used in function returns
Type Duce
    first As Byte
    second As Byte
End Type

' The contents of the registers go here
Public Register(0 To 9) As Integer

' The parsed program is encoded here
Public Program(0 To 255) As Instruction

' Here we store the indexes of the valid entries
' in the Program array
Public ProgPointers(0 To 255) As Integer
Public lenProgPointers As Integer ' The number of elements in ProgPointers

' A flag to indicate that the text boxes in RodRego
' has been touched
Public Dirty As Boolean

' Variables to be used when scrolling around the LCD display
Public Deviation, max_dev As Integer

' The enabled status for button "Step"
Public btnStep_Enabled As Boolean

' Constants defining the language and the operator codes
Global Const OPCODE_NONE = 0
Global Const OPCODE_INC = 1
Global Const OPCODE_DEB = 2
Global Const OPCODE_END = 3
Global Const INSTR_NONE = "NONE"
Global Const INSTR_INC = "INC"
Global Const INSTR_DEB = "DEB"
Global Const INSTR_END = "END"

' Color constants - do not alter their values or the
' program might not function properly!
Global Const COLOR_RED = 0
Global Const COLOR_GREEN = 1
```

```

Sub EditCopyProc()
    ' Copy the selected text onto the Clipboard.
    Clipboard.SetText frmMain.txtProg.SelText
End Sub

Sub EditCutProc()
    ' Copy the selected text onto the Clipboard.
    Clipboard.SetText frmMain.txtProg.SelText
    ' Delete the selected text.
    frmMain.txtProg.SelText = ""
End Sub

Sub EditPasteProc()
    ' Place the text from the Clipboard into the active control.
    frmMain.txtProg.SelText = Clipboard.GetText()
End Sub

Sub FileNew()
    ' If the file has changed, save it
    If Dirty = True Then
        If FileSave = False Then Exit Sub
    End If
    ' Clear the textbox and update the caption.
    frmMain.txtProg.Text = ""
    frmMain.Caption = "RodRego - Untitled"
End Sub

Function FileSave() As Boolean
    Dim strFilename As String

    If frmMain.Caption = "RodRego - Untitled" Then
        ' The file hasn't been saved yet.
        ' Get the filename, and then call the save procedure, GetFileName.
        strFilename = GetFileName(strFilename)
    Else
        ' The form's Caption contains the name of the open file.
        strFilename = Right(frmMain.Caption, Len(frmMain.Caption) - 10)
    End If
    ' Call the save procedure. If Filename = Empty, then
    ' the user chose Cancel in the Save As dialog box; otherwise,
    ' save the file.
    If strFilename <> "" Then
        SaveFileAs strFilename
        FileSave = True
    Else
        FileSave = False
    End If
End Function

Sub GoLineProc(linenum As Integer)
    ' Select a line in the text box in RodRego

    Dim i, k As Integer
    Dim ch As String

    i = 1 ' Marker of the line start position

    ' If the line is non-positive, leave
    If (linenum < 1) Then Exit Sub

```

```

' How many lines are left to the requested line?
While (linenum > 1)

    ' Advance the marker until reaching the end of the line
    ch = Mid(frmMain.txtProg.Text, i, 1)
    While (ch <> Chr(13))
        i = i + 1
        If (i > Len(frmMain.txtProg.Text)) Then
            MsgBox ("Line out of range")
            Exit Sub
        End If
        ch = Mid(frmMain.txtProg.Text, i, 1)
    Wend

    ' If possible, continue the operation
    i = i + 1
    If (i > Len(frmMain.txtProg.Text)) Then
        MsgBox ("Line out of range")
        Exit Sub
    End If
    linenum = linenum - 1
Wend

' Now we have the starting position of the line to be
' selected. Let's find the length of the selection.
k = 0

Do
    ch = Mid(frmMain.txtProg.Text, i + k, 1)
    k = k + 1
    If (i + k > Len(frmMain.txtProg.Text)) Then ch = Chr(13)
Loop While (ch <> Chr(13))

' Perform the selecting
frmMain.txtProg.SelStart = i - 1
frmMain.txtProg.SelLength = k
End Sub

Sub drawProgram(Deviation As Integer)
    ' Display the program on the LCD display

    Dim end_index, i, dev_i As Integer

    ' Determine the final member of the program pointers
    ' array to be displayed
    If (lenProgPointers > 12) Then
        end_index = 11
    Else
        end_index = lenProgPointers - 1
    End If

    ' Clear all lines
    For i = 0 To 11
        clearLine i
    Next i

    ' Calculate the exact indexes of the Program
    ' statements to be displayed and draw them in red
    For i = 0 To end_index
        dev_i = i + Deviation
        drawLineProgram(ProgPointers(dev_i)), i, COLOR_RED
    Next i
End Sub

```

```

    Next i
End Sub

Sub initializeDrawProgram()
    ' Set all required variables when initially drawing a
    ' program on the LCD display
    Dim i As Integer

    Deviation = 0 ' Start at the top of the program

    ' Set the required Scroll button settings
    If lenProgPointers > 12 Then
        max_dev = lenProgPointers - 12
        frmMain.btnScrollUp.Enabled = False
        frmMain.btnScrollDown.Enabled = True
    Else
        frmMain.btnScrollUp.Enabled = False
        frmMain.btnScrollDown.Enabled = False
    End If

    ' Draw the program with the required deviation
    drawProgram (Deviation)
End Sub

Sub select_line(line As Integer) ' "line" is a line in the program
    ' Highlight a line on the LCD display by redrawing it in red
    Dim i, pos As Integer

    pos = 0

    ' Determine the relative position of the requested program
    ' line in the list of lines to be displayed on the LCD
    ' screen
    While ProgPointers(pos) <> line And pos < lenProgPointers
        pos = pos + 1
    Wend

    ' Adjust the view as required
    While pos < Deviation
        frmMain.btnScrollUp_Click
    Wend

    While pos > 11 + Deviation
        frmMain.btnScrollDown_Click
    Wend

    ' Redraw all lines in red or clear them as necessary
    ' *** NOTE: This needs to be optimized in the next version
    For i = 0 To 11
        If i + Deviation < lenProgPointers Then
            drawLine Program(ProgPointers(i)), i, COLOR_RED
        Else
            clearLine i
        End If
    Next i

    ' Redraw the required line in green
    drawLine Program(ProgPointers(pos)), pos - Deviation, COLOR_GREEN
End Sub

Function loadProgram()

```

```

' Parse a program into memory
Dim err As error
err = ParseString(frmMain.txtProg.Text) ' call the parser

loadProgram = False

If err.error_code <> SUCCESS Then
    ' The parse failed. Go to the problematic
    ' line and display an error message.
    GoLineProc (err.line + 1)
    frmMain.txtProg.SetFocus
    frmMain.status.SimpleText = "(Line " & (err.line + 1) & ") Error: " & getError(err.error
_code)
Else
    ' Do a level 2 check of the program syntax
    err = VerifyProg(frmMain.txtProg.Text)
    If (err.error_code <> SUCCESS) Then
        ' Still problems
        frmMain.status.SimpleText = "Error: " & getError(err.error_code)
    Else
        ' Everything succeeded
        loadProgram = True
    End If
End If
End Function

Sub drawLine(inst As Instruction, ByVal line As Byte, color As Byte)
    ' Draws a line on the LCD display
    ' + inst = the instruction to be displayed
    ' + line = the index at which the line should be drawn
    ' + color = the color to be used (COLOR_RED or COLOR_GREEN)
    Dim tmp_d As Duce

    ' Obtain the digit of the real "line number"
    tmp_d = breakDigits(ProgPointers(line + Deviation))

    ' Set the pictures of the line number to the required images
    If tmp_d.first > 0 Then
        frmMain.imgLine0(line).Picture = frmMain.imgLCD(tmp_d.first + 10 * color).Picture
    Else
        frmMain.imgLine0(line).Picture = frmMain.imgNone.Picture
    End If
    frmMain.imgLine1(line).Picture = frmMain.imgLCD(tmp_d.second + 10 * color).Picture

    ' Check the instruction
    Select Case (inst.OpCode)
        Case OPCODE_END
            ' END operator has no arguments
            frmMain.imgOp(line).Picture = frmMain.imgEND(color).Picture

        Case OPCODE_INC
            ' INC has 2 arguments
            frmMain.imgOp(line).Picture = frmMain.imgINC(color).Picture

            tmp_d = breakDigits(inst.Register)
            frmMain.imgReg(line).Picture = frmMain.imgLCD(tmp_d.second + 10 * color).Picture

            tmp_d = breakDigits(inst.Line1)
            If tmp_d.first > 0 Then
                frmMain.imgLP0(line).Picture = frmMain.imgLCD(tmp_d.first + 10 * color).Picture
            Else

```

```

        frmMain.imgLP0(line).Picture = frmMain.imgNone.Picture
    End If
    frmMain.imgLP1(line).Picture = frmMain.imgLCD(tmp_d.second + 10 * color).Picture

Case OPCODE_DEB
    ' DEB has all 3 arguments
    frmMain.imgOp(line).Picture = frmMain.imgDEB(color).Picture

    tmp_d = breakDigits(inst.Register)
    frmMain.imgReg(line).Picture = frmMain.imgLCD(tmp_d.second + 10 * color).Picture

    tmp_d = breakDigits(inst.Line1)
    If tmp_d.first > 0 Then
        frmMain.imgLP0(line).Picture = frmMain.imgLCD(tmp_d.first + 10 * color).Picture
    Else
        frmMain.imgLP0(line).Picture = frmMain.imgNone.Picture
    End If
    frmMain.imgLP1(line).Picture = frmMain.imgLCD(tmp_d.second + 10 * color).Picture

    tmp_d = breakDigits(inst.Line2)
    If tmp_d.first > 0 Then
        frmMain.imgLN0(line).Picture = frmMain.imgLCD(tmp_d.first + 10 * color).Picture
    Else
        frmMain.imgLN0(line).Picture = frmMain.imgNone.Picture
    End If
    frmMain.imgLN1(line).Picture = frmMain.imgLCD(tmp_d.second + 10 * color).Picture

```

```
Case Else
```

```
End Select
```

```
End Sub
```

```
Sub clearLine(ByVal line As Byte)
```

```
    ' Clear a line on the LCD display by placing the
    ' space-holder images
```

```
    frmMain.imgLine0(line).Picture = frmMain.imgNone.Picture
    frmMain.imgLine1(line).Picture = frmMain.imgNone.Picture
    frmMain.imgOp(line).Picture = frmMain.imgNoOp.Picture
    frmMain.imgReg(line).Picture = frmMain.imgNone.Picture
    frmMain.imgLP0(line).Picture = frmMain.imgNone.Picture
    frmMain.imgLP1(line).Picture = frmMain.imgNone.Picture
    frmMain.imgLN0(line).Picture = frmMain.imgNone.Picture
    frmMain.imgLN1(line).Picture = frmMain.imgNone.Picture

```

```
End Sub
```

```
Function breakDigits(ByVal num As Byte) As Duce
```

```
    ' Return the two rightmost digits of a number
    breakDigits.first = (Int(num / 10)) Mod 10
    breakDigits.second = num Mod 10

```

```
End Function
```