Objectives

Program Purpose

• To create a simple and customisable racing game
• To enable a measure of unpredictability through the randomness of the car’s speed
• Display user instructions in the form of a label.
• Display a tally of wins for the car and plane.

Learning Goals

• To create a simple animation using the ‘Left’ property
• Use of Picture Properties
• Use of Timers
• Use of Random Numbers
• The addition of instructions to the Interface

Design Notes

The interval of the timer affects the movement of the car or plane. The lower the interval, the faster the object moves across the form. An event with an interval of 150 will occur after 150 milliseconds. In this project, the time interval is calculated randomly, so the speeds of the car and plane are unpredictable.

The ‘Left’ property is used to create the animation. By increasing the Left value, you can move the car or plane further from the left side of the form.

Interface

Create the interface as shown;
Use 2 Command Buttons, 2 shapes, 3 labels, 1 Line and 2 Picture Boxes.
Properties of Objects

<table>
<thead>
<tr>
<th>Type of Object</th>
<th>Number</th>
<th>Names of Objects</th>
<th>Initial Properties of Objects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form</td>
<td>1</td>
<td>Form1</td>
<td>Caption - &quot;Car Race 2&quot;; Icon - Find one in the 'Visual Studio...\icons' folder</td>
</tr>
<tr>
<td>Picture Box</td>
<td>2</td>
<td>Picture1, Picture2</td>
<td>Picture - find two pictures in the icons folder or use own images Backcolor - same as Backcolor of shape</td>
</tr>
<tr>
<td>Shapes</td>
<td>2</td>
<td>Shape1, Shape2</td>
<td>Rectangles, BackColor - two different colours (contrasting with the pictures)</td>
</tr>
<tr>
<td>Labels</td>
<td>3</td>
<td>Label1</td>
<td>Caption - “Press Start to Race the Car. Press Reset to set them up again”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Label2</td>
<td>No caption; Borderstyle - single; Alignment - Centre; Backstyle - Opaque</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Label3</td>
<td>No caption; Borderstyle - single; Alignment - Centre; Backstyle - Opaque</td>
</tr>
<tr>
<td>Command Buttons</td>
<td>2</td>
<td>Command1</td>
<td>Font – Bold, 12; Caption - &amp;Start</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Command2</td>
<td>Font – Bold, 12; Caption - &amp;Reset</td>
</tr>
<tr>
<td>Line</td>
<td>1</td>
<td>Line1</td>
<td>As displayed</td>
</tr>
</tbody>
</table>

Code

GENERAL SECTION

'we need two counters to store the number of wins for each racer
Dim CarWins As Integer
Dim PlaneWins As Integer

Private Sub Form_Load()
' set the counters to zero
CarWins = 0
PlaneWins = 0
End Sub

Private Sub Command1_Click()
'randomly set timer intervals which affect racing speeds
Timer1.Interval = Int(Rnd * 100) + 100 'creates a random number between 100 and 200
Timer2.Interval = Int(Rnd * 100) + 100 'creates a random number between 100 and 200
'turn on the timers
Timer1.Enabled = True
Timer2.Enabled = True
End Sub

Private Sub Command2_Click()
'move the pics back to the left
Picture1.Left = 120
Picture2.Left = 120
'stop the timers
Timer1.Enabled = False
Timer2.Enabled = False
End Sub
Private Sub Timer1_Timer()

    'if the picture hasn’t crossed the line, then move it a bit more
    If Picture1.Left <= Line1.X1 Then
        Picture1.Left = Picture1.Left + 120
    Else 'turn off the timers and add one to the counter
        Timer2.Enabled = False
        CarWins = CarWins + 1
        Timer1.Enabled = False
    End If

    'refresh the labels displaying the number of wins
    Label1.Caption = CarWins
    Label2.Caption = PlaneWins

End Sub

Private Sub Timer2_Timer()

    'if the picture hasn’t crossed the line, then move it a bit more
    If Picture2.Left <= Line1.X1 Then
        Picture2.Left = Picture2.Left + 120
    Else 'turn off the timers and add one to the counter
        Timer1.Enabled = False
        PlaneWins = PlaneWins + 1
        Timer2.Enabled = False
    End If

    'refresh the labels displaying the number of wins
    Label1.Caption = CarWins
    Label2.Caption = PlaneWins

End Sub

Questions

1. Which lines of code reset the pictures?
2. Which lines of code display the tally?
3. Why are both timers disabled when one object crosses the line?
4. There is a logical flaw. If a user keeps clicking on the Start button after one object has won, then it increments the tally of wins incorrectly. How could you fix this?
5. Why is the value 120 used to increment the Left property of the objects? How could you make them go faster or slower?

Extension

6. Add a button that resets the counters and labels to 0, as well as resetting the objects back to the starting position.
7. Add an additional racing track and a third vehicle. You will need an additional Timer, Label, Picture Box and some modifications to your code.
8. Design a rectangular track that moves the objects around a more elaborate racing circuit. 
   Hint: Use invisible lines to check if it’s time to turn a corner and move in a different direction. You will need to increment or decrement the Picture.Top property in order to move an object up or down.