

Graphics, Animation, and Randomization

FIT 100

Having introduced the main programming ideas for FIT100, it is time to put it all together. The task will be to draw something interesting on the form and in the process get experience writing procedures

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FIT 100 Drawing On The Form

- ❖ The form is logically divided into a grid, and a position is designated by how many grid points it is from the Left and the Top
 - ❑ The upper left corner is position (0,0)
 - ❑ The position (x, y) is x units from Left, and y units from Top
 - ❑ Increasing the x value moves to the right
 - ❑ Unlike graphing, though, increasing the y value moves down
 - ❑ The lower right corner is position (ScaleWidth, ScaleHeight)
 - ❑ To resize the form, change ScaleWidth and ScaleHeight

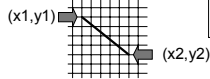
The Unit is a twip
(1440 twips per inch)

Picture	(None)
RightToLeft	False
ScaleHeight	3195
ScaleLeft	0
ScaleMode	1 - Twip
ScaleTop	0
ScaleWidth	4680
ShowInTaskbar	True
StartupPosition	3 - Windows Default
Tag	
Top	0
Visible	True

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FIT 100 Drawing A Line

- ❖ To draw a line on Form1, call the procedure
Form1.Line (x1, y1) - (x2, y2)
- ❖ If there is only one form, the form name can be *elided*
- ❖ To get a color, follow the positioning information with the specification of the color
Form1.Line (x1, y1) - (x2, y2), RGB(255,255,255)



Notice the "minus" between the two coordinates

Draw a white line beginning x1 units from the Left and y1 units from Top, and extending to a point x2 units from Left and y2 units down from Top

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FIT 100 Red, Green and Blue

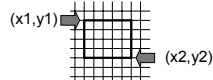
- ❖ Recall that colors are created on the screen with a combination of three colors of light -- red, green, blue
- ❖ When drawing, one can specify the exact color by calling a procedure, RGB(, ,) whose three parameters are the contribution of the three colors in the range 0 -- 255
 - ❑ RGB(0, 0, 0)
 - ❑ RGB(255, 0, 0)
 - ❑ RGB(0, 255, 0)
 - ❑ RGB(0, 0, 255)
 - ❑ RGB(255,255,255)

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FIT 100 Drawing A Box

- ❖ Drawing a rectangle is like drawing a line except that there is a final parameter "B"

Line (x1, y1) - (x2, y2), RGB(r, g, b), B



- ❖ A specific fill color can be achieved by having two properties set
 - ❑ FillColor = RGB(, ,)
 - ❑ FillStyle = 0 Indicates opaque

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FIT 100 Programming A Rectangle

- ❖ To begin, draw a box in the Form_Click event handler

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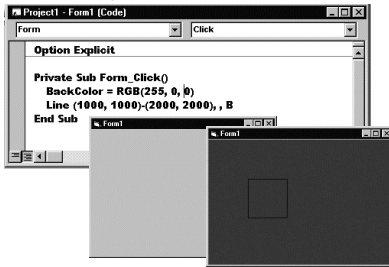
Project1 - Form1 [Code]
Form
Click
Option Explicit
Private Sub Form_Click()
Line (1000, 1000)-(2000, 2000), B
End Sub
    
```

Notice the default color, black, and where position (1000,1000) is located ... 1440 twips per inch

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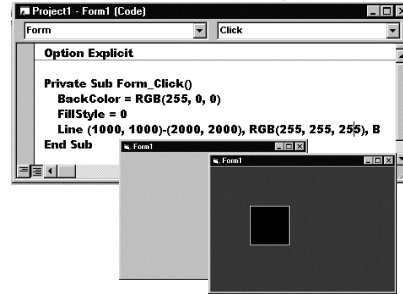
FIT 100 Color

- ❖ A black rectangle on a gray form is a little dorky ...
- ❖ Set the background color of the form



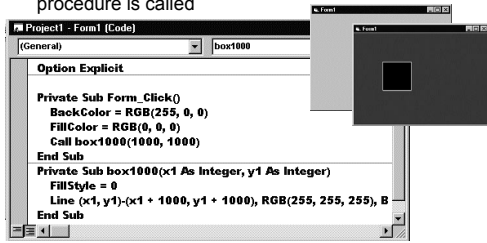
FIT 100 Make the Form More Interesting

- ❖ Make box fill opaque and change line to white line



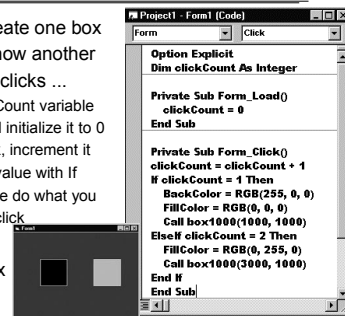
FIT 100 Make A Procedure For Box Drawing

- ❖ Draw a 1Kx1K box with opaque fill and a white line
- ❖ The fill color will be whatever color is set when the procedure is called



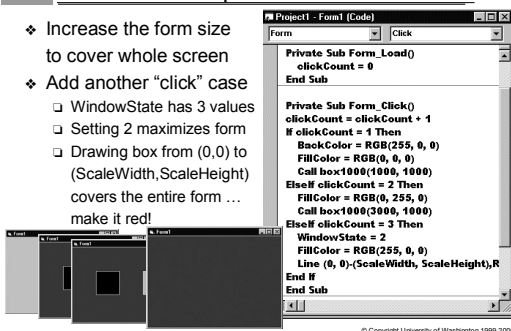
FIT 100 More Action, Please

- ❖ Click once, create one box
- ❖ Click again, show another
- ❖ Steps for multiclicks ...
 - Declare clickCount variable
 - In Form_Load initialize it to 0
 - In Form_Click, increment it
 - Then test its value with If
 - For each value do what you want on that click
- ❖ 1st: black box
- ❖ 2nd: green box



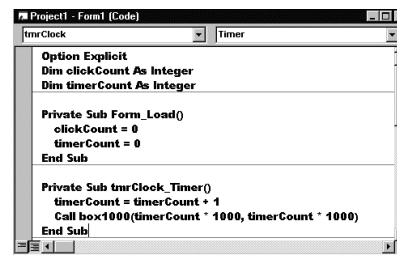
FIT 100 Add Another Option

- ❖ Increase the form size to cover whole screen
- ❖ Add another "click" case
 - WindowState has 3 values
 - Setting 2 maximizes form
 - Drawing box from (0, 0) to (ScaleWidth, ScaleHeight) covers the entire form ... make it red!



FIT 100 To Give Motion, Draw On Timer Tick

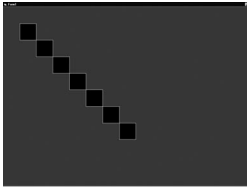
- ❖ Adding a timer allows changes to be made a regular intervals ... place timer anywhere on form



FIT 100

Turn Timer On/Off With Click

- ❖ The 4th click starts box draw and the 5th click stops it



```

Project1 - Form1 (Code)
Form Click
Private Sub Form_Click()
    clickCount = clickCount + 1
    If clickCount = 1 Then
        BackColor = RGB(255, 0, 0)
        FillColor = RGB(0, 0, 0)
        Call box1000(1000, 1000)
    ElseIf clickCount = 2 Then
        FillColor = RGB(0, 255, 0)
        Call box1000(3000, 1000)
    ElseIf clickCount = 3 Then
        WindowState = 2
        FillColor = RGB(255, 0, 0)
        Line (0, 0), (ScaleWidth, Scale)
        FillColor = RGB(0, 0, 0)
    ElseIf clickCount = 4 Then
        tmrClock.Interval = 200
    Else
        tmrClock.Interval = 0
    End If
End Sub

```

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Randomize!

- ❖ Diagonal boxes are boring ... randomize
- ❖ To place boxes randomly,
 - ❑ Set Randomize in Form_Load
 - ❑ Declare xPos, yPos in tmrClock
 - ❑ Pick a random number in (0,1) range with a Rnd(1) procedure call
 - ❑ Multiply by the largest size to scale & make Int

```

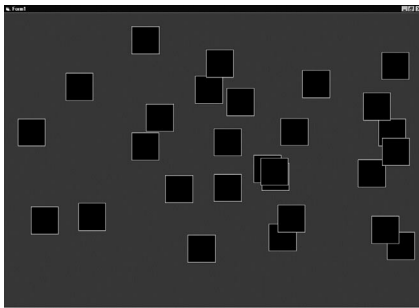
Project1 - Form1 (Code)
tmrClock Timer
Private Sub Form_Load()
    clickCount = 0
    timerCount = 0
    Randomize
End Sub
Private Sub tmrClock_Timer()
    Dim xPos As Integer, yPos As Integer
    timerCount = timerCount + 1
    xPos = Int(Rnd(1) * (ScaleWidth - 1000))
    yPos = Int(Rnd(1) * (ScaleHeight - 1000))
    Call box1000(xPos, yPos)
End Sub

```

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FIT 100

One result ...

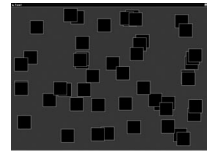


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Summary

- ❖ Project 2 is to design your own "artistic" image ... or electronic greeting card to impress your family and friends ... and TA
- ❖ There is no limit to how intricate your design can be
- ❖ There are points for creativity and ...
- ❖ You must use procedures as called for in the assignment



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