

Animation



To make something appear to move on the form:
erase it and redraw it a small distance away

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A Simple Idea

- ❖ Concept: Animation is simply the rapid display of still pictures
- ❖ The process
 - Erase the figure
 - Reposition the figure by some distance value (10,20,30, etc.)
 - Redraw the figure
- ❖ Small distance value → slow, large distance value → fast

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Draw a circle

```
Private Sub drawcircle(x1 As Integer, y1 As Integer,  
    r As Integer, g As Integer, b As Integer)
```

```
    FillStyle = 0  
    FillColor = RGB(r, g, b)  
    Circle (x1, y1), 1000, RGB(r, g, b)  
End Sub
```

```
Private Sub Form_Load()  
    BackColor = RGB(255, 0, 0)  
    WindowState = 2  
End Sub
```

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Draw and erase circles

```
Private Sub Form_Click()  
    Dim x as Integer, y as Integer  
    x = 1000  
    y = 1000  
    Do While (x < ScaleWidth - 1000) And (y < ScaleHeight - 1000)  
        Call drawcircle(x, y, 0, 0, 0)  
        Call pause(100, 40)  
        Call drawcircle(x, y, 255, 0, 0)  
        Call pause(100, 40)  
        x = x + 1000  
        y = y + 1000  
    Loop  
End Sub
```

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Creating Art



Two ways that artists often go forward with their creations is by design or inspiration.

Art by design requires the planning and consideration of the work to be produced.

Art from inspiration can often involve a non-methodical use, test and experimentation with the tools available for creation, in your case: loops, procedures and randomization

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Experimentation in Art

- ❖ You're staring at a blank form.....
- ❖ What to do, what to do?
- ❖ Experiment!

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What do you know about VB graphics?

- ❖ Cls: Clears all graphics on a Form or Picture Box
 - The form is assumed, you must name the picture box if you want that to clear
PictureBox1.Cls
- ❖ PSet: Sets the color and location of an individual pixel
PSet (x, y), RGB(R,G,B)
- ❖ Line: Draws a line, rectangle or filled in box
Line (x, y) – (x1, y1), RGB (R,G,B), B
- ❖ Circle: Draws a circle, ellipse or arc
Circle (x, y), radius, RGB (R,G,B)
ellipse: Circle (x, y), radius, RGB (R,G,B), , , aspect
arc: Circle (x, y), radius, RGB (R,G,B), start, end, aspect

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What if you.....

- ❖ Randomize FillColors!
- ❖ Randomize FillStates!
- ❖ Randomize Box Size
- ❖ Allow users to enter numbers for coordinates or for colors and randomize those?
- ❖ Draw a flower or scene that has different colors every time?
- ❖ The possibilities are ENDLESS!!!

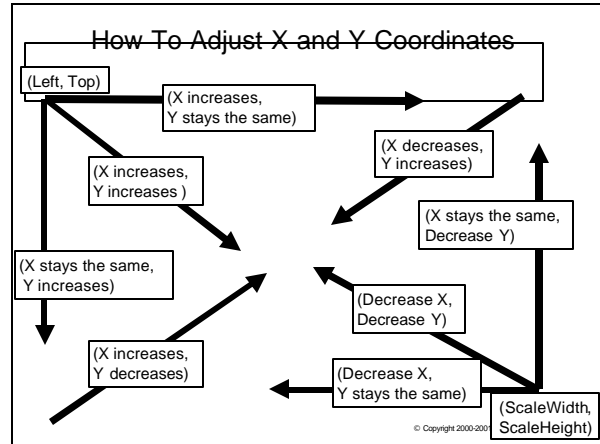
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Planning Your Creation

- ❖ You know what you want to do, but where do you start?
- ❖ If there is animation, what should go first?
- ❖ Idea:
 - I want to show a green meadow, the sun rises, grass and flowers grow, the sun sets and the moon (a half moon) rises
- ❖ What should be done first? Where should it be done?
 - Meadow
 - Sunrise
 - Grass
 - Flowers
 - Sunset
 - Moon rises

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Indexing



A common way to refer to many instances of the same thing is to give them a single name and index them. So we have Super Bowl XX, Pope John 23, Games of the XXIII Olympiad

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Indexing, A Basic Idea

- ❖ Motivation: When there is a large number of similar things that must be referenced and manipulated, it can be inconvenient to think up a unique name for each, and to refer to them by the name
 - For example: Each of the 7 Continents also has a name, but who can remember them? (What if we were referring to city sites of the Olympics?)
 - Also, it is difficult to refer to them in a loop since there is no way to enumerate them
- ❖ Concept: Indexing names items by associating a base name and a number – the index – with each
- ❖ Computer notation: Continent(4) → Europe

7 Continents

Africa
Antarctica
Asia
Australia/Oceania
Europe
North America
South America

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Indexing Particulars

- ❖ Everyday indexing commonly begins with 1
 - May 1, SuperBowl 1, Elizabeth 1
- ❖ The number at which indexing begins is its origin
- ❖ Many computer languages use 1 as the origin, but for many others, including VB 6, the index origin is 0

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Arrays

- ❖ When a variable is indexed it is called an *array*
- ❖ Arrays represent collections of data values (integers, strings, etc.)
 - For example:
 - continent (0) = "Africa"
 - continent (1) = "Antarctica"
 - continent (2) = "Asia"
 -
- ❖ Elements of an array must all be of the same type
- ❖ The index of an array element is also known as a *subscript*

Notice that x0 and x1 are variable names, while
x(0) and x(1) are different elements of array x

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Arrays in VB6

- ❖ Arrays are declared like any other variable using a Dim statement

Keyword
Array name
Largest Index
Type
 Dim continent (6) As String

- ❖ Notice
 - The syntax is just like a normal declaration except for the pair of parenthesis
 - In the parenthesis is the largest desired index
 - The total number of elements of the array will be one more than the largest index, since the origin is 0
 - The type applies to all of the elements

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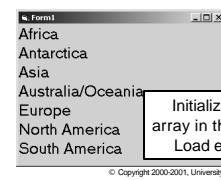
Indexing Arrays

- ❖ To refer to the individual elements of the array, all you have to do is change the index...
- ❖ The index value must be an integer constant (1), a variable (myNdex) or expression (myNdex +1)
- ❖ A loop can sweep through all of the elements

```

Option Explicit
Dim continent(6) As String

Private Sub Form_Click()
  Dim index As Integer
  index = 0
  Do While index < 7
    Print continent(index)
    index = index + 1
  Loop
End Sub
  
```



Initialize the array in the Form Load event

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FIT 100 Combining Indexing, Arrays, Loops

❖ A common error is to index beyond the end of the array ...

```

Option Explicit
Dim continent(6) As String
Private Sub Form_Click()
    Dim index As Integer
    index = 1
    Do While index <= 7
        Print continent(index)
        index = index + 1
    Loop

```

Run-time error '9':
Subscript out of range

FIT 100 Experiment with Rnd

```

Private Sub spin(choices as Integer, result as Integer)
    result = Int(choices * Rnd)
End Sub

Private Sub Form_Click()
    Call experiment
End Sub

Private Sub experiment()
    Dim roll As Integer
    Dim outcome0 As String
    Dim outcome1 As String
    Dim outcome2 As String
    Dim outcome3 As String
    Dim reps As Integer
    reps = 0
    outcome0 = "0 : "
    outcome1 = "1 : "
    outcome2 = "2 : "
    outcome3 = "3 : "

    Do While reps < 100
        Call spin (4, roll)
        If roll = 0 Then
            outcome0=outcome0 & """"
        Elseif roll = 1 Then
            outcome1=outcome1 & """"
        Elseif roll = 2 Then
            outcome2=outcome2 & """"
        Elseif roll = 3 Then
            outcome3=outcome3 & """"
        End If
        reps = reps + 1
    Loop
    lblBar0.Caption = outcome0
    lblBar1.Caption = outcome1
    lblBar2.Caption = outcome2
    lblBar3.Caption = outcome3
End Sub

```

FIT 100 Experiment with Rnd

```

Private Sub spin(choices as Integer, result as Integer)
    result = Int(choices * Rnd)
End Sub

Private Sub Form_Click()
    Call experiment
End Sub

Private Sub experiment()
    Dim roll As Integer
    Dim outcome(3) As String
    reps = 0
    i = 0
    Do While i <= 3
        outcome(i) = i & " : "
        i = i + 1
    Loop
    Do While reps < 100
        Call spin(4, roll)
        outcome(roll) =
            outcome(roll) & """"
        reps = reps + 1
    Loop

```

FIT 100 Summary

- ❖ Animation is the repeated redisplay of still images
- ❖ Indexing is a general means of naming like things by a base name and a number
- ❖ Controls, variables and other objects can be indexed
- ❖ VB uses 0 origin indexing