CSE 1530

Introduction to Computer Use II: Programming

Winter 2006 (Section M)

Topic C: Control Structures - Selection

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Overview (1):

- **Before We Begin**
  - Some administrative details
  - Some questions to consider
- **CheckBox and Option Controls**
  - Introduction to CheckBoxes
  - Introduction to Option controls
  - The Frame (Control Array)
  - Live Examples
    - Exercise 4-6

Before We Begin

Administrative Details (1):

- **Lab Exercise 3-3**
  - Still have a few that have not been picked up yet
    - If you have not picked up your exercise yet, you can after the lecture
- **Reminder**
  - You should be working on Ex 4-8 this week
  - Test 1 will be held Wednesday February 8 2006
    - Be here on time → will begin 1:30pm sharp!


Some Questions to Consider (1):

- How can we validate user input (to ensure all characters comprising the input string) are numeric ?
- What are Boolean operators and why are they important ?
- Are all Boolean operators binary ?
- List the four main Boolean operators we will be dealing with in this course

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CheckBox and Option Controls

Introduction to CheckBoxes (1):

- **What is a CheckBox ?**
  - Allows the user to select or de-select an option
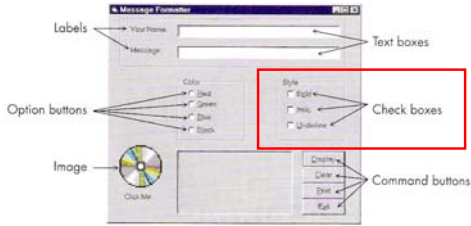

Introduction to CheckBoxes (2):

- **What is a CheckBox ? (cont.)**
  - In a group of CheckBoxes, any number of them may be selected
  - Every Checkbox object contains a Property called Value that takes one of three values
    - Value = 0 → unchecked
    - Value = 1 → checked
    - Value = 2 → disabled

Introduction to CheckBoxes (3):

- **What is a CheckBox ? (cont.)**
  - Event handler is available and is executed when the user selects/de-selects a CheckBox
    - Click()
  - Every CheckBox object also contains a property called Caption
    - The text that appears beside the CheckBox

Introduction to Option Controls (1):

- **What is an Option Control ?**
  - Similar to a CheckBox however, when a group of Option controls are available, only one Option may be selected
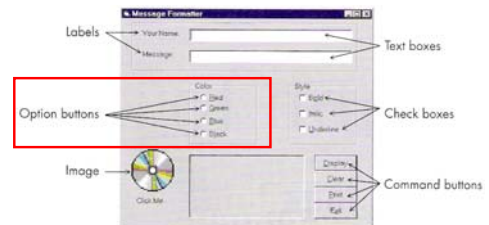
Introduction to Option Controls (2):

- **What is an Option Control ? (cont.)**
  - Every Option object contains a Property called Value that takes one of two values
    - Value = 0 (False) → unchecked
    - Value = 1 (True) → checked
  - Every Option object also contains a property called Caption
    - Text that appears beside the Option control
  - Event handler is available and is executed when the user selects an Option control
    - Click()

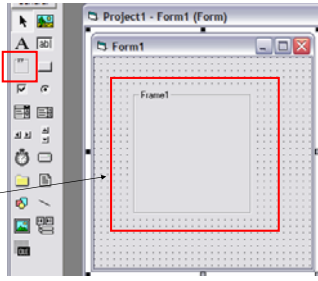## Introduction to Option Controls (3):

- **What is an Option Control ? (Cont.)**
  - Any Option controls (sometimes called buttons) placed directly on the form function as a group → be careful because this is not what you may want!
  - Any option buttons in a Frame function as a group together
    - You probably should create a Frame first and then place the Option controls in the Frame
    - Do not place them on the Form first and then drag them into the frame → will still be part of the Form and not the frame!

Introduction to Option Controls (4):

- **What is an Option Control ? (Cont.)**
  - What is a Frame ?
    - An object

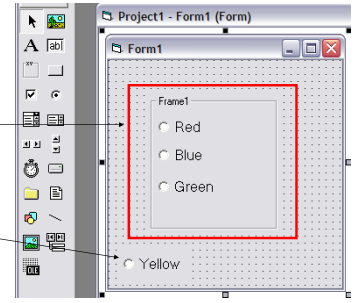Selecting a Frame object via the toolbar

Frame object on the form

Introduction to Option Controls (5):

- **What is an Option Control ? (Cont.)**
  - Is "Yellow" part of Frame 1 group ?

Option control within a Frame

Option control on Form

CheckBox and Option Controls (1):

- **Typically Accompany If Statements**
  - Since both CheckBox and Option controls are used to provide the user a way to select amongst various choices, we need some way to determine which (if any) user has selected
    - If statements can be used to accomplish this → can you think of how we can accomplish this ? (hint – think of the Value property)!

The Frame (Control Array) (1):

- **The Frame Object We Briefly Mentioned Earlier is Also Known as a Control Array**
  - Important when dealing with Option objects
    - Allows us to "link" a group of Option objects that are intended to form a group together → recall only one Option object can be selected from a group!
    - Of course since we are dealing with a "group" of controls we will develop a "new" and different way of referring too andaccessing these controls

The Frame (Control Array) (2):

- **As an Aside**
  - What is an array with respect to most programming languages ?
    - Basically, a collection of variables of some particular type
    - Many times we want to group multiple variables together and the array allows us to do this
    - Consider requiring 10 variables of type Integer → we can declare 10 such variables and call them each a different name or we can create one "array" and that will hold all 10 Integers and then simply access these 10 Integers within the array

The Frame (Control Array) (3):

- **As an Aside (cont.)**
  - Same idea with Visual basic and the Frame object
    - Allows us to group Option controls together under one group (or set etc.)
    - We can then access the Option controls by referring to a single name only and use some notation to access the Option controls within the Frame
    - Imagine adding 10 Option controls without a Frame, each with its own name → we will have 10 control objects, each with its own name making it difficult to keep track of!

The Frame (Control Array) (4):

- **Two Ways to Creating the Control Array**
  - Non-Frame Method
    - Create first object in the array (named appropriately) e.g., place control object on Form
    - Copy this object and then paste as many new objects needed in the array
    - First time you paste object, a dialog appears asking if you want to create a control array → of course you should answer yes!

The Frame (Control Array) (5):

- **Two Ways to Creating the Control Array**
  - Frame Method
    - Create the Frame object on the Form first
    - Set the Caption property of the Frame object accordingly
    - Place Option control within the Frame
    - Copy it and then paste it into the frame
    - Same dialog box appears asking you if you want to create a Control array → choose yes
    - Paste as many more controls as needed within the Frame

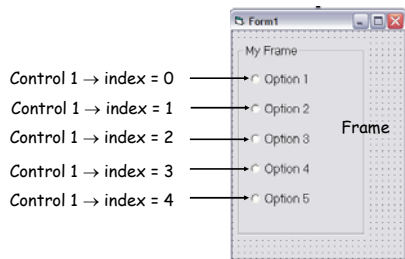## The Frame (Control Array) (6):

- **Working With Control Arrays**
  - Recall how we access a control object on a Form
    - objectName.property
    - This will not be sufficient for the items in a control array → all items in the array have the same name!
    - Recall that the whole point of a control array is to avoid referring to individual objects → rather, we refer to the name of the control array only and some means to access its elements

The Frame (Control Array) (7):

- **Working With Control Arrays (cont.)**
  - Objects in the array all have the same name
    - Name of first object placed in Frame
    - So how do we access these objects if they all the same name ?
    - Each object given a unique "index" within the array → think of the index as a position within the array
    - First object in array is assigned index value of 0
    - Second object in array is assigned index value of 1
    - Third object in array is assigned index value of 2
    - Etc …
   - Last object in array is assigned index value of N-1

The Frame (Control Array) (8):

- **Working With Control Arrays (cont.)**
  - Consider a Frame with five option buttons that was created using the "Frame method" described earlier

Control 1 → index = 0
Control 1 → index = 1
Control 1 → index = 2
Control 1 → index = 3
Control 1 → index = 4

Frame

The Frame (Control Array) (9):

- **Working With Control Arrays (cont.)**
  - But how do we access these controls in the code ?
    - Syntax → ControlName(index).property
  - Previous example
  - Assume name of the control objects in the array is optTest
    - optTest(0).Value = True
    - optTest(1).Value = False
    - optTest(2).Value = False
    - optTest(3).Value = False
    - optTest(4).Value = False
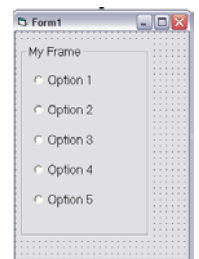
The Frame (Control Array) (10):

- **Some "Live" Examples**
  - Lets begin with Exercise 4-6
    - "Global Classics Cinema"

Lets create the "Movie" and "Time" Frames on our Form

You should complete this on your own!!!