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

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.

![Image of Option Controls]

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 (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 to and accessing 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

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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
  
  ![Frame with five option buttons](image)

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

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The Frame (Control Array) (9):

- **Working With Control Arrays (cont.)**
  - But how do we access these controls in the code?
    - Syntax → ControlName(index).property
  
  ![Frame with five option buttons](image)

  - 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
  - Let's begin with Exercise 4-6
  - "Global Classics Cinema"

Let's create the "Movie" and "Time" Frames on our Form.

You should complete this on your own!!