week10

March 19, 2018

1 Collections

- Data structures that can be used to store groups of data.
- Native data types usually contain single value (e.g., 1, 100, -20).
- Collections can store multiple values in the same variable.

2 Collection Types

- Depends on how data is organized
- **Lists**, queues, and vectors: Data is ordered in sequence
- **Dictionaries**, maps, and hashes: Every value is stored with a key
- Sets: Data is unique

3 Lists

- Sequence of data or objects.
- Accessed with index.
- Index starts from 0 up to number of elements - 1.

4 Declaring a List in VB

```
' these are empty lists
Dim myList1 As New List(Of String)
Dim myList2 As New List(Of Integer)
```

5 Declaring and Initializing a List in VB

```
' the list contains data
Dim nameList As New List(Of String) From {"mohammed", "ali", "sara"}
```

6 To Access Item in List

```
nameList.item(0) 'for mohammad
nameList(0) 'also for mohammed
```

```
'To display mohammad in MsgBox
MsgBox(nameList(0))
```

6.0.1   Use the item of a list as if you are using any variable, everything you know applies

7   Adding Items to a List

```
Dim myList1 As New List(Of String)
Dim myList2 As New List(Of Integer)

myList1.add("Kuwait")
myList1.add("KSA")
myList1.insert(1, "USA")

myList2.add("KSA")   'Error why?
```

8   Useful List Operation/Functions

```
myList1.Count ' Count number of elements in list
myList1(0) = "KWT" 'replace item 0
myList1.item(0) = "KWT" 'replace item 0
myList1.remove("USA") ' Remove the item from the list
myList1.removeAt(1) ' remove item at index 1
```

9   Challenge

Create application that: - Allows the user to input words, the words are stored in a List (collection, not a ListBox) - Add button that allows user to display 1st item, another for 2nd item, and another for last item - Add button to show number of items in the list - Add button to remove first item in list, and another to remove last item in list - Add button to display the list

10   About the Challenge

- Where are the names stored? why are they not on screen?
- How many variables hold the stored names?
- Why is the first element stored in location 0?
- What happens if you remove from a location that contains no item?
- Why can't you print the list?

11   ListBox

Used to list a group of items
   To access items programmatically you reference the Items property and use it as a list
   Can be modified to allow user to select single or multiple items

12 Important ListBox Properties

- Items
  - Collection containing all the values shown in the list box
- SelectedIndex,
  - The currently selected **index**
- SelectedValue, SelectedItem
  - The currently selected **value**

13 Main ListBox Event

- Double clicking on the list box will allow you to modify **SelectedIndexChanged** event
- Action is performed whenever the user selects an item
- Becareful sometime the selected index is -1 when there is no item selected

14 Improved Challenge

- Modify the previous list challenge to use ListBox instead of List
- Add a button that displays which index is selected, and which value is selected
- Add button to remove the selected item

15 When to Use Lists or ListBoxes?

- When you have lots of data that you want to perform operations on
- Store the data in a list to ensure you don't lost it
- Use ListBox for display, not operations (like sorting and filtering)
- Many times we use them together

16 New Control Challenge

- Can you find another control that contains a list
  - What is it?
  - How is it different from the ListBox?
- Modify the last improved challenge to use the new control