Overview (1):
- Before We Begin
  - Some administrative details
  - Some questions to consider
- Manipulation of Strings
  - Introduction
  - String related functions
  - Working with strings
  - Example → Exercise 5-4

Before We Begin
Administrative Details (1):
- Lab Exercises
  - You should be working on Ex 5-9 this week
  - Due March 6
  - We will be covering Ex. 5-4 and 5-5 in this week's lecture → I recommend you work on these and the other exercises in Ch. 5 on your own

Some Questions to Consider (1):
- What is a ListBox control?
- What is an item?
- How can we add items to a ListBox?
- How do we remove the information on a ListBox?
- Describe the Date type
- How can we manipulate Date types?

Manipulation of Strings
Review of Strings (1):

- Recall
  - A String is a sequence of characters enclosed between quotes
  - Characters are not restricted to being alphanumeric (e.g., a,b,c… and 1,2,3…) → can be anything
  - Strings are of course widely used in many situations
    - Convey information (e.g., Label objects etc.)
    - User input is typically a string (e.g., TextBox)

Introduction (1):

- Often Need to Manipulate Strings
  - Given the widespread use of strings, there are many situations where we have to manipulate strings in some form or another
    - Convert lower-case to upper-case
    - Remove characters from a string
    - Add characters to a string
    - Catenate two strings
  - Many string-related functions are available in Visual Basic (and many other programming languages) to perform a wide variety of operations on strings

String Related Functions (1):

- Some VB String-Related Functions
  - Visual Basic contains many built-in functions to perform a wide variety of operations on strings
  - See your textbook (page 5-17 and 5-18) for a listing of several of these functions
  - Let’s take a look at a few of the more popular functions → remember, the best way to familiarize yourself with these functions is to practice using them!
Introduction to Computer Use II

String Related Functions (2):

Some VB String-Related Functions (cont.)
- `InStr(Integer - optional, String1, String2)`
  - Returns a Long specifying the position of the first occurrence of "String2" in "String1" from the beginning of "String1" (or from Start if optional argument is specified)
- `LCase(String1)`
  - Returns "String1" converted to lower-case
- `UCase(String1)`
  - Returns "String1" converted to upper-case

String Related Functions (3):

Some VB String-Related Functions
- `Left(String1, Integer)`
  - Returns a string containing the specified number of characters from the left of "String1"
- `Right(String1, Integer)`
  - Returns a string containing the specified number of characters from the right of "String1"
- `Len(String1)`
  - Returns a Long that specifies the number of characters the string contains

String Related Functions (4):

Some VB String-Related Functions
- `StrReverse(String1)`
  - Returns a string composed of the characters of "String1" but in reverse order
- `StrComp(String1, String2)`
  - Returns an integer indicating the comparison of "String1" and "String2"
    - "String1" less than "String2" → -1
    - "String1" equal to "String2" → 0
    - "String1" greater than "String2" → 1
String Related Functions (5):

- **Some VB String-Related Functions**
  - **Rtrim(String1)**
    - Returns a string with blanks removed from the right of "String1"
  - **Space(Long)**
    - Returns a string composed of just blanks as many specified by the Long argument
  - **Str(Long)**
    - Returns a string representation of the Long argument number

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Working With Strings (1):

- **Some Notes**
  - Recall that a string is a sequence of characters
    - Beginning from the left of the string, we have the first character, second character etc...
    - You can think of each character in a unique position within the string → remember "index"?
    - Each character of the string has an index just as in control arrays but lets start at 1 not 0
      - First character → index 1
      - Second character → index 2
      - Third character → index 3 ...

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Working With Strings (1):

- **Some Notes (cont.)**
  - Given we have this sequence of N characters, when we want to manipulate these characters in some manner, we can iterate through each character of the string using a loop!
    - Many times we use a loop to go through each of the characters in a string, examine them and potentially alter them
    - Since we know the length of the string (e.g., number of characters) a counted loop seems like the right choice!
Example: Exercise 5-4 (1):

- **Lets Practice Working With Strings**
  - Develop a program that requests the user to input a string and then perform some operation on the string depending on which option is selected.

![Image of a program interface with options to select operations on strings.]

Example: Exercise 5-4 (2):

- **Lets Practice Working With Strings (cont.)**
  - Lets Look at the first option ("List all the Characters")
    - List each of the characters within the string in a ListBox, one character per line.

![Image of a ListBox displaying characters of a string.]

Example: Exercise 5-4 (3):

- **Lets Practice Working With Strings (cont.)**
  - Lets Look at the first option ("List all the Characters")
  - Steps to be performed
    1. Obtain the input string
    2. Obtain the length of the input string
    3. Set-up counted loop
      - Obtain character in the string → use the "Mid" function
      - Display character in ListBox
Example: Exercise 5-4 (4):

- Lets Practice Working With Strings (cont.)
  - Lets look at the Mid function
    - Mid(String, Start(Long), Length(Long - optional))
      - Returns all (or "Length" if it is specified)
        characters from a string starting at position
        "Start"
      - Example → Assume following string: "Goodbye"
        and we want to obtain the fourth character "d"
    - char = Mid("Goodbye", 4, 1)
Example: Exercise 5-4 (4):

- Let's Practice Working With Strings (cont.)
  - You should experiment with and at least complete some of the remaining options available
  - A good way to practice working with strings!
  - Work on them on your own and we can discuss the solutions to the rest of the options during the next lecture
  - Look at pages 5-24 and 5-25 in your textbook for tips on how to experiment (test) your program

As An Aside (1):

- A Closer Look At Comparisons
  - Be careful when comparing values and strings!
    - May not always be what you think
  - Consider the following → we wish to compare two numbers (values): 50 and 100
  - Try the following on your own and try to understand the result → we will look at it next lecture...
    - \( (50 < 100) \) → True or False?
    - \( "50" < "100" \) → True or False?