CSE 1530

Introduction to Computer Use II: Programming

Winter 2006 (Section M)

Topic D: Control Structures - Iteration

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Bill Kapralos

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 weeks 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 alpha-numeric (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
    - Lets 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!

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

Working With Strings (1):

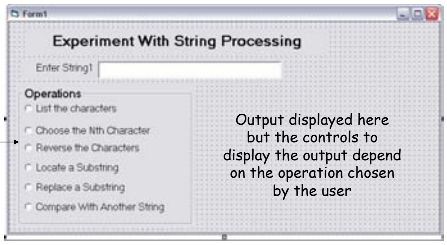
- **Some Notes**
  - Recall that a string is a sequence of characters
    - Beginning from the left of the string, we have the first character, second character etc…
    - You can think of each character in a unique position within the string → remember "index" ?
    - Each character of the string has 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 …

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

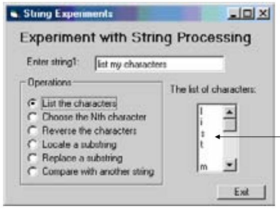


Available options

Output displayed here but the controls to display the output depend on the operation chosen by the user

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



Enter string1: list my characters

● List the characters
○ Choose the Nth character
○ Reverse the characters
○ Locate a substring
○ Replace a substring
○ Compare with another string

l
i
s
t

m

Characters of the input string list in a ListBox one character per line

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 (3):

- **Lets Practice Working With Strings (cont.)**
  - Here is the Code to Perform the first operation

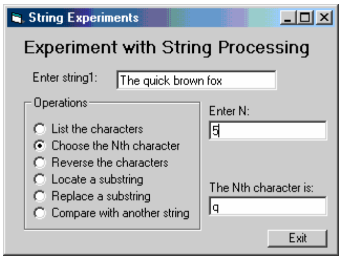
```
inputStr = Text1.Text
 If (Option1(0).Value = True) Then

   ' Make the appropriate output control objects visible
   Label3.Visible = True
   Label3.Enabled = True
   List1.Visible = True
   List1.Enabled = True

   ' Lets now display the characters of the string
   For loopIndex = 1 To Len(inputStr)
      Dim char As String
      char = Mid(inputStr, loopIndex, 1)
      List1.AddItem (char)
   Next
 End If
```

Example: Exercise 5-4 (3):

- **Lets Practice Working With Strings (cont.)**
  - Lets Look at the second option ("Choose the Nth character")



String Experiments

Experiment with String Processing

Enter string1: The quick brown fox

Operations

- ○ List the characters
- ● Choose the Nth character
- ○ Reverse the characters
- ○ Locate a substring
- ○ Replace a substring
- ○ Compare with another string

Enter N: 5

The Nth character is: q

How should we proceed here ?

Example: Exercise 5-4 (4):

- **Lets 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 string!
    - 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?