

IST 256
Lab Week 10, Day 1 – Monday, November 2, 2009

1. Understanding an Array Program

a. In today’s temperatures program (**the first temperatures array program**), suppose that the input file had the following temperatures.

5
10
20
10

After the user clicks the button, “Read Temperatures from File”, here are the values of these variables. Note that with 4 numbers, the array subscripts from 0 to 3 are being used for numbers. The rest of the array is not used.

Variable	Value
temperatures(0)	5
temperatures(1)	10
temperatures(2)	20
temperatures(3)	10
temperatures(4)	---
...	---
numtemps	4

b. Without running the program, think about the values of the variables during the execution of the button procedure for the “Highest Temperature” button. Here is that part of the program:

```
Dim high As Single
Dim index As Integer

' initialize the high so far to be the first element
high = temperatures(0)

' loop over the remaining array and find the highest
For index = 1 To numtemps - 1
' if the temp is higher than the high so far, make it the new high
  If (temperatures(index) > high) Then
    high = temperatures(index)
  End If
Next
```

Write here the values of the variables index and high before and during the loop. What is the last index number that is used? Are there too many spaces here?

Variable	Before loop	Loop iteration 1	Loop iteration 2	Loop iteration 3	Loop iteration 4	Loop iteration 5 ..
index	-----					
high						

2. Understanding How to Write a Procedure Call

Suppose that we have a form with a general procedure defined at the top of the form:

```
Public Class Form1
    ' This procedure takes the number of units,
    '   computes the total price using a fixed price of $2.50,
    '   and displays the result in a textbox
    Private Sub DisplayPrice ( ByVal units as Integer, ByRef tb as TextBox)
        Dim price as Single = 2.5
        Dim total as Single

        total = units * price
        tb.Text = "Total = " & Format(total, "currency")
    End Sub
    ....
End Class
```

Suppose that the form has a textbox named TextBox1 and in a button click procedure, we have a variable declared and given a value:

```
Dim number as Integer
number = 10
```

a. Write a valid **procedure call** to DisplayPrice that could occur in the procedure using the variable "number" as one of the parameters:

b. With the procedure call that you wrote in part a, write what output will be given in TextBox1:

3. Working with the TempDayArray Program (the second temperatures array program).

Use the new process for opening a Visual Studio project:

- a. Go to the C: drive and make a folder at the top level with your name or userid, something like: C:\njmccrac
- b. Open Visual Studio and go to create a new project/solution. When this Dialog box opens,
 - i. name: pick a name for the project – something like TempDayArray
 - ii. Then do a “Save All” and choose the folder that you made **or** put it in the location
- c. In this first part, create the form and use the program that was gone over in class to read the days of the week and temperatures from a file and store them in an array. Making the form: make four Labels, four textboxes and four Buttons on the form that looks something like:

Type temperature file name: | _____ |

|__Read Temperatures from File__| Status (label)

|__Average Temperature__| | _____ |

|__Highest Temperature__| Temperature: | _____ |
 Day of the week: | _____ |

|_Close_|

- e. Copy the data file “Mar05daytemps.txt” from the web page and save it in the C:\name\Courses\bin\Debug part of the project folder.
- f. Copy the four button procedures for TempArray from the file on the web page. The first three buttons:
 - read the file into an array and display a status
 - compute the average of temperatures from the array
 - compute the highest temperature from the array
- g. To test this program, in the input filename box, put the name *Mar05daytemps.txt* .
- h. Experiment with file errors:**
 - i. First open the file *Mar05daytemps.txt* in Notepad and edit the first line to remove the first number or day. Run the program and observe the error message. What type of error did you get? (Write a short version here.)

ii. Now add the number or day back into the file `courses.txt` and add an extra comma at the end of the first line. Run the program and observe the error message. What type of error did you get? (Write a short version here.)

Restore the file *Mar05daytemps.txt* back to its original condition.

4. Extending the TempDayArray Program to find the days below zero

Now we will extend the TempDayArray program (**the second temperatures array program**), to have another button that shows the number of days that had a temperature below zero.

a. Add another button to your form called “Days Below Zero” and put a textbox next to it:

|__Days Below Zero__| |_____|

b. Double click on this new button to add the heading of a button procedure to your Form1.vb program. Write a button procedure that will count the number of temperatures in the file that are below zero.

This procedure will use the *temperatures* array and the *numtemps* variable that says how many temperatures were read into the array. These were declared at the top of the form so they can be used in this button. Note that this is similar to the program last week that counted how many elements of the array were below average.

1. Start by declaring an Integer variable to count the number of temperatures below zero, and initialize this variable to 0.
2. Then **write a for loop** that will index over every element of the array. To see an example of this, look at the button that computes the average temperature.
3. During the for loop, test each array temperature to see if it is below zero. If it is, add 1 to the count variable.
4. After the for loop, display the count of temperatures below zero in the TextBox next to the Days Below Zero button.

c. Test your program on the file `Mar05daytemps.txt`.

***** **At the end of lab, Don't forget to save your work!** *****

Go to the C: drive where you put your folder with your name. Copy and paste this entire folder to the H: drive under your IST256 projects. **Hand in today's sheet and program with your Wednesday lab for this week.**