

Assignment-5	CSCI-A201 Object Oriented Programming (VB .Net) Arrays	H. Hakimzadeh 20 Pts. 10 pts. Extra Credit Due Nov. 21 11:59pm
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Objectives:

- To learn about arrays and its operations
- To learn about passing arrays as parameters to procedures or functions (Pass by Value vs. Pass by Reference)
- To implement a sort algorithm

Part 1:

Write a VB program which creates an array of 10 integers (0 to 9), and then create the following procedures (or functions) to manipulate this array:

- Initialize the array elements to all zeros.
- Print the array elements.
- Populates the array with random numbers (between 1000 and 2000).
- Find the minimum (smallest) element in the array and return it (function)
- Calculate the average for the elements in the array and return it (function)
- Sort the elements in ascending order

Part 2: Extra credit (10 point)

Convert the above program into a windows application. Write a VB program which dynamically creates an array of 10 **textboxes** (see appropriate lab!). Design an appropriate GUI, with a button for each operation described in Part 1 above.

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Note the above textboxes simply provide a mechanism for your program to display the content of the array after each operation.

What to hand in:

- 1) Zipped project
Make sure your documentation is complete, including documentation for the procedures and functions. Also make sure Option Strict and Explicit are turned on.
- 2) Testing
Test each function, and then print the array after each operation that changes the array.

Look below for the starting point....

Feel free to start from scratch or use the code provided below as your starting point. The code includes a DRIVER module as well as a series of STUBs. The first two STUB modules have actually been

programmed, but the rest are just empty shells that you need to complete. Pay special attention to why the parameters are passed by value vs. by reference.

```
' Properly document the program
' http://cs.iusb.edu/~hhakimza/A201_A505/Handouts/ProgrammingStyle.pdf

Option Explicit On
Option Strict On

Module Module1

    ' Driver Module
    ' Explain what this driver module is doing...

    Sub Main()

        ' We will create an array of 10 integers to hold test scores. (actually 11 integers!)
        Dim TestScores(10) As Integer

        ' Lets test the array properties and methods to make sure we allocated the right
        ' size array

        Initialize_Array(TestScores)
        Console.WriteLine("Print The Initialized Array")
        Print_Array(TestScores)

        Randomize_Array(TestScores)
        Console.WriteLine("Print The Randomized Array")
        Print_Array(TestScores)

        Dim TheSmallest As Integer
        TheSmallest = Min_Array(TestScores)
        Console.WriteLine("The Smallest number in the array is = {0}", TheSmallest)

        Dim TheAverage As Double
        TheAverage = Avg_Array(TestScores)
        Console.WriteLine("The Average = {0}", TheAverage)

        Sort_Array(TestScores)
        Console.WriteLine("Print The Sorted Array")
        Print_Array(TestScores)

        Console.ReadLine() ' pause the program

    End Sub

    '-----
    ' Stub modules for manipulating the array
    '-----

    ' Document Each procedure and/or function
    ' http://cs.iusb.edu/~hhakimza/A201_A505/Handouts/ProgrammingStyle.pdf
    Private Sub Initialize_Array(ByRef TheArray() As Integer)
        Dim Index As Integer
        For Index = 0 To TheArray.GetUpperBound(0)
            TheArray(Index) = -1
        Next Index
    End Sub

    ' Document Each procedure and/or function
    ' http://cs.iusb.edu/~hhakimza/A201_A505/Handouts/ProgrammingStyle.pdf
    Private Sub Print_Array(ByVal TheArray() As Integer)
        Dim Index As Integer
        For Index = 0 To TheArray.GetUpperBound(0)
            Console.WriteLine(TheArray(Index))
        Next Index
        Console.WriteLine("-----")
    End Sub
```

```

' Document Each procedure and/or function
' http://cs.iusb.edu/~hhakimza/A201_A505/Handouts/ProgrammingStyle.pdf
'-----
Private Sub Randomize_Array(ByRef TheArray() As Integer)
    Dim Index As Integer
    Randomize() 'Generate a Random Seed

    'Complete the rest of this code to
    'Populates the array with random numbers
    '(between 1000 and 2000).

End Sub

' Document Each procedure and/or function
' http://cs.iusb.edu/~hhakimza/A201_A505/Handouts/ProgrammingStyle.pdf
'-----
Private Function Min_Array(ByVal TheArray() As Integer) As Integer
    Dim Index As Integer
    Dim Min_value As Integer

    'Find the minimum (smallest) element in the array and return it (function)

    Return (Min_value)

End Function

' Document Each procedure and/or function
' http://cs.iusb.edu/~hhakimza/A201_A505/Handouts/ProgrammingStyle.pdf
'-----
Private Function Avg_Array(ByVal TheArray() As Integer) As Double
    Dim Index As Integer
    Dim Avg_value As Integer

    'Calculate the average for the elements in the array and return it (function)

    Return (Avg_value)

End Function

' Document Each procedure and/or function
' http://cs.iusb.edu/~hhakimza/A201_A505/Handouts/ProgrammingStyle.pdf
'-----
Private Sub Sort_Array(ByRef TheArray() As Integer)

    'Sort the elements in ascending order

End Sub

End Module

```

```

file:///C:/Users/hhakimza/AppData/Local/Temporary Projects/Assignment5_Starting_Point_Arrays/...
Array length = 11
Array upper bound = 10
Print The Initialized Array
-1
-1
-1
-1
-1
-1
-1
-1
-1
-1
-1

-----
Print The Randomized Array
-1
-1
-1
-1
-1
-1
-1
-1
-1
-1
-1

-----
The Smallest number in the array is = 0
The Average = 0
Print The Sorted Array
-1
-1
-1
-1
-1
-1
-1
-1
-1
-1
-1

```