Arrays

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Data Structure

Array A of Integer type with a dimension of 5 by 1

| A(0) | 12 |
| A(1) | 77 |
| A(2) | 86 |
| A(3) | 103 |
| A(4) | 56 |

Consecutively located in memory
Declaration of arrays

Dim A(5) As Integer
Dim A(5) As Integer, x(26) As Long, s(14) As String, a@ (4)
Dim A(5, 10) As Double, B(100, 1000, 3) As Single

- Initialized to zero by default

Array Index

- Default base index is 0.
- Can specify base index
  
  Option Base 1
  
  Dim A(50 to 100) As Integer
  Dim A(1 to 100, 5 to 200) As Double

- Functions **LBound** and **UBound** can be used to check the size of an array
  
  For I = LBound(A) to UBound(A) Step 1
  
  ...
Dynamic Arrays

- Used when you do not know the size of an array until after the program starts (e.g., the size of an array is given by the user at the run-time)
- Avoid wasting memory

```vba
Private Sub InputArray()
    Dim Darray() As Double
    'read size of array N, L
    ReDim Darray(1 to 10, 1 to 100)
    'read the value of array
End Sub
```

- An dynamic array may be resized any time
- The existing values may be preserved during resizing

```vba
Private Sub InputArray()
    Dim Darray() As Double
    'read size of array N, L
    ReDim Darray(1 to 10, 1 to 100)
    'read the value of array
    'perform operations
    ReDim Preserve Darray(1 to 100, 1 to 100)
    'perform more operations
End Sub
```

- ReDim cannot change the dimensionality of arrays!
Variable-Length Arguments

ParamArray can be used to pass variable-length arguments to procedures.

Private Sub Form_Load()
    Call AnyNumberArguments
    Call AnyNumberArguments(1)
    Call AnyNumberArguments(1, 2, 10, 13, 89, 43, 12, 56, 1, 0, 98)
End Sub

Private Sub AnyNumberArguments(ParamArray x() As Variant)
    Dim i As Integer
    For i = Lbound(x) To Ubound(x)
        Print x(i) & Space$(4)
    Next I
End Sub

Assignment 5

create a form from which the size of an one-dimensional array will be provided by the user
randomly generate numbers to fill the array
generate statistics of the numbers including minimum, maximum, medium, mean, frequency (10 intervals), standard deviation, 25 percentile, 75 percentile, skewness
display the results on the form