1. (12) Determine the value of the variable "count" displayed by each of the three MsgBox procedures below:

```
Private Sub Command1_Click()
   Dim n As Integer
   Dim k As Integer
   Dim count As Integer

   For n = 1 To 5
      For k = n To 3
         count = count + 1
      Next k
   Next n
   MsgBox count ' What does count equal?

   count = 0
   For n = 1 To 5
      For k = 1 To 5 Step n
         count = count + 1
      Next k
   Next n
   MsgBox count ' What does count equal?

   count = 0
   k = 1
   For n = 1 To 5
      Do While k < 5
         If k = 3 Then
            Exit Do
         End If
         k = k + n
         count = count + 1
      Loop
      k = n
   Next n
   MsgBox count ' What does count equal?

End Sub
```

2. (13) You are given the following type definition:

```
Private Type Stats
   Mean As Double
   StdDev As Double
End Type
```

You are also given the following click event:

```
Private Sub cmdCompute_Click()
   Dim a(1 To 50) As Integer
   Dim arrayStats As Stats
   Dim i As Integer

   For i = 1 To UBound(a)
      a(i) = Int(Rnd() * 1000) 'fill a() with random integers
   Next i

   doStats a(), arrayStats

   MsgBox "Mean = " & arrayStats.Mean
   MsgBox "Standard Deviation = " & arrayStats.StdDev

End Sub
```

You are required to write the complete procedure "doStats" referenced in the code above. This procedure is passed an integer array and a variable of the type Stats. The procedure should compute and store the mean and standard deviation of the numbers in the array in the "arrayStats" variable. Assume that the array is always full, e.g., cells 1 to 50 all store integers.

The formulas for computing the mean and standard deviation are:

$$\text{mean} = (\sum X) / n, \text{ and standard deviation} = \sqrt{\frac{(\sum X^2) - (\sum X)^2 / n}{n - 1}}$$

where X represents the values in the array.

3. (12) You have the following array named Sales that stores the annual sales in four regions for the time periods 1995 to 1998.

Sales array

Year	Region 1	2	3	4
1995				
1996				
1997				
1998				

Assume that sales data has been stored in the array. Write a code segment that computes the four annual sales figures across the four regions. Each of these annual totals should be stored in another one-dimensional array named annSales that has been declared as follows:

```
Dim annSales(1995 To 1998) As Currency
```

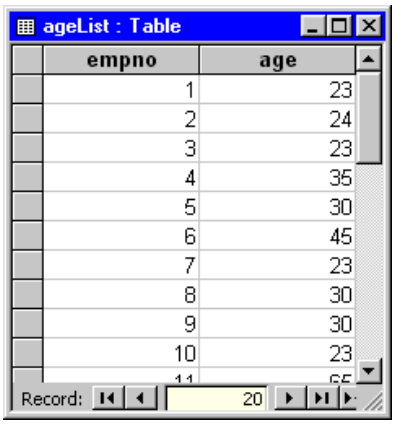
4. (12) Given the code below, what will be the values stored in the array "a" when the second nested For … Next loop finishes executing (before the click event terminates)?

```
Private Sub Command1_Click()
   Dim a(1 To 4, 1 To 4) As Integer
   Dim i As Integer, j As Integer
   Dim k As Integer

   For i = 1 To 4
      For j = 1 To 4
         k = k + 1
         a(i, j) = k
      Next j
   Next i

   For i = 1 To 4
      For j = 1 To 4
         If i <> j Then
            a(i, j) = a(j, i)
         End If
      Next j
   Next i
   ' What is stored in a() here?
End Sub
```

5. (12) You have a database named “Ages.mdb” that includes a single table named “ageList”. A portion of this table is shown below:



Write the click event for a command button that computes and displays (via a Form.Print statement) each age and its frequency. For example, you can see that the age “23” occurs 4 times in the data above so your code should report that the age 23 has a frequency of 4. Do not print ages that have a frequency of zero. Also assume that ages fall in the range 1-99 inclusive. Do not make any assumptions about the number of records in the table.

In writing your solution, assume that a data control named “datAgeList” exists on the form and has its DatabaseName property set to “Ages.mdb” and its RecordSource property set to “ageList”.

6. (15) Indicate whether the following statements are True(T) or False(F).

T or F By using an SQL Select statement, it is possible to access data in two or more relational databases using a single data control.

T or F A Visual Basic Recordset is always equivalent to a relational database table.

T or F You may not always be confident with the accuracy of a Recordset’s RecordCount property.

T or F The ReDim statement is used to redimension an array at run time and it always retains the values in cells that existed before the dimensions were changed.

T or F The FlexGrid control is strictly an “output only” control. That is, there is no way for the user to interact with the grid or its cells.

7. (12) If the current record in a Recordset points to the last record and you execute the Recordset’s MoveNext method, the EOF property is set to True but no error is generated. However, if you execute the MoveNext method again, an error occurs. Explain why this is the case.

8. (12) Assume you have a numeric array named "a()" that stores integers and you want to sort this array into ascending order. Instead of writing a sort procedure, you decide to take advantage of the list control's "Sorted" property (set to True). You come up with the following code segment:

```
Dim a(1 To 20) As Integer
Dim k As Integer

' the array is populated with unsorted integers – code not shown

For k = 1 To 20
   List1.AddItem a(k) ' put array elements into list (with Sorted set to true)
Next k

For k = 1 To 20
   a(k) = List1.List(k - 1) ' copy the sorted list back to the array elements
Next k

' the array is now sorted
```

Unfortunately, this strategy does not work.

a. Explain why it does not work.
b. Suggest a way to make it work without abandoning the strategy.

1. The three values of the variable “count” are 6, 13, and 5.

2. An example version of the “doStats” procedure is:

```
Private Sub doStats(theArray() As Integer, theStats As Stats)
   Dim sumX As Double
   Dim sumX2 As Double
   Dim i As Integer
   Dim n As Integer

   n = UBound(theArray)
   For i = 1 To n
      sumX = sumX + theArray(i)
      sumX2 = sumX2 + theArray(i) ^ 2
   Next i

   theStats.Mean = sumX / n
   theStats.StdDev = Sqr((sumX2 - (sumX ^ 2) / n) / (n - 1))

End Sub
```

3. The following code segment computes the four annual sales figures:

```
For y = 1995 To 1998
   For r = 1 To 4
      annSales(y) = annSales(y) + sales(y, r)
   Next r
Next y
```

4. The values stored in the “a()” array are:

a()

	1	2	3	4
1	1	5	9	13
2	5	6	10	14
3	9	10	11	15
4	13	14	15	16

5. A sample click event that computes and displays the age frequencies (excluding those ages with a frequency of zero) is:

```
Private Sub Command1_Click()
   Dim freq(1 To 100) As Integer
   Dim age As Integer, i As Integer

   Do While Not datAgeList.Recordset.EOF
      age = datAgeList.Recordset("age")
      freq(age) = freq(age) + 1
      datAgeList.Recordset.MoveNext
   Loop

   For i = 1 To 100
      If freq(i) <> 0 Then
         Form1.Print i, freq(i)
      End If
   Next i

End Sub
```

6. The correct answers to the True/False questions are:

   False – You can access two or more tables within the same database, but not two or more databases.

   False – The Recordset can be a single table or the result of an SQL Select statement where many tables are joined.

   True – The RecordCount property may not be accurate until you do a MoveLast in the RecordSet or MoveNext until you come to the last record.

   False – Values are lost using a ReDim unless the Preserve option is used.

   False – While it is true that the user cannot enter text into a FlexGrid cell, the user can click on a cell and make it active. This action can be detected with a Click event and cause actions to be performed (such as was done with customer information in Assignment 7).

7. With the first MoveNext, the current record pointer is pointing to a legitimate record (the last record) before the move occurs. In the second MoveNext, the record pointer is not pointing to anything before the move occurs and thus generates the error.

8. The code fails because a list box stores data as String type. Thus you get a "String" sort where, for example, "11" comes before "2". To solve the problem, force leading zeros to be placed in front of the strings written to the list box as follows:

```
For k = 1 To 20
   List1.AddItem Format$(a(k), "00000")
Next k
```

   This will cause "00002" to come before "00011".