

Please answer **all** the following questions on **separate sheets of paper**. Question point values are shown in parentheses.

1. (12) For each of the following code segments, determine what is printed for the variables n and k. Assume that all variables have been declared as integer types.

a. n = 0
k = 0
For i = 1 To 4
 k = k + 1
 For j = i To 5 Step k
 n = n + 1
 Next j
Next i
Form1.Print n, k 'What is printed here?

b. n = 0
k = 10
Do While n < k
 n = n + 1
 k = k - n
Loop
Form1.Print n, k 'What is printed here?

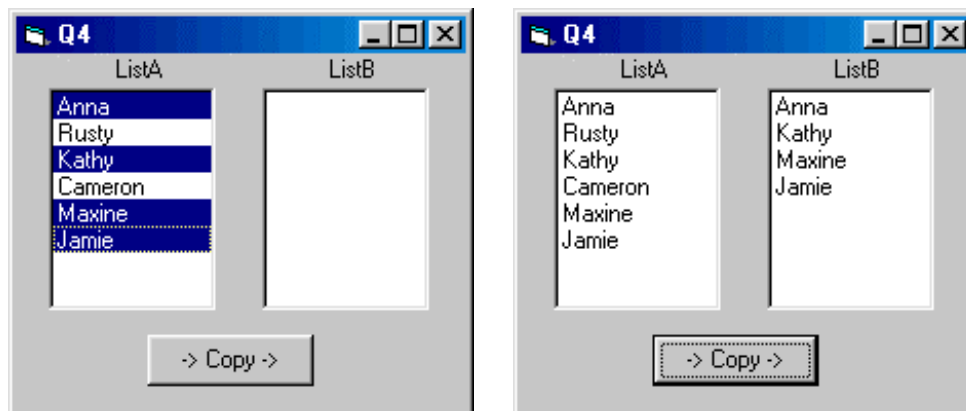
c. n = 0
k = -4
For i = 1 To 5
 k = k + 1
 Do Until k > i
 k = k + i
 n = n + 1
 Loop
Next i
Form1.Print n, k 'What is printed here?

2. (12) Explain why the following For loop might not execute as expected.

```
Dim z As Single  
For z = .10 To .20 Step .001  
    ' loop body here  
Next z
```

3. (12) For each of the following statements indicate if they are true or false.
- a. The “Do” type loop is appropriate when the number of iterations are unknown when the loop first starts and the “For” type loop is appropriate when the number of iterations are known when the loop first starts.
 - b. Accessing data in an array is generally faster than accessing data from a database.
 - c. You can display the values of database fields on the user interface using components like text boxes and labels even if these components are **not** bound to a data control.
 - d. A recordset can be created from records in a single database table as well as from records in two or more database tables.
 - e. It is not possible to create a control array that includes labels as well as text boxes.
 - f. A limitation of the FlexGrid component is that the user cannot enter information directly into one of its cells at runtime.
4. (12) Assume that you have two list boxes (lstA and lstB). Write a click event that copies the selected items from lstA to lstB. The copy must implement the following rules:
- 1. lstB should be cleared before the items are copied into lstB.
 - 2. The items in lstB should be in the same order as they were in lstA.
 - 3. The items in lstA should not be selected after the copy.

Example images (before [left] and after [right] pressing the command button) are shown below.



5. (12) You have a database with the following tables:

Product = { ProdNo + Desc + Price }

Order = { OrderNo + ProdNo + CustNo + Qty }

Customer = { CustNo + Name + Phone }

All fields are Text type except Price (Single) and Qty (Integer). Write an SQL query for each of the following requirements:

- a. A recordset that includes the OrderNo, ProdNo, Desc, and Qty fields. This should include all the matching records in the Product and Order tables.
 - b. A recordset that includes the Name, ProdNo, and Desc fields. This should include all the records in the Order table that have matching records in both the Product and Customer tables.
 - c. A recordset that includes the ProdNo, OrderNo and Qty fields. This should include all the records in the Order table that have matching records in the Product table for ProdNo 12X13.
 - d. A recordset that includes the Name, ProdNo, and Desc fields. This should include all the records in the Order table that have matching records in the Customer and Product tables and that have Qty > 10.
6. (16) What values are stored in the array x after the code below has executed?

```
Private Sub cmdQ6_Click()  
    Static x(1 To 4, 1 To 4) As Integer  
    Dim i As Integer, j As Integer  
    For i = 1 To 4  
        For j = 1 To 4  
            x(i, j) = i + j  
        Next j  
    Next i  
  
    For i = 1 To 4  
        For j = 4 To i + 1 Step -1  
            x(i, j) = x(j, i)  
        Next j  
    Next i  
End Sub
```

7. (12) Write the complete function procedure named iMax that is passed a one dimensional integer array and returns the maximum value stored in that array. The function should search **all** the cells of the array regardless of the array's lower and upper bound. The code below shows an example use of the function.

```
Private Sub cmdFindMax_Click()  
    Dim x(3 To 8) As Integer, i As Integer  
    ' fill the array with random values  
    For i = 3 To 8  
        x(i) = Int(Rnd() * 1000)  
    Next i  
    lblMax.Caption = iMax(x()) ' write this iMax() function  
End Sub
```

8. (12) You have a database that contains a table named Client. This Client table is defined as follows (all fields are Text type):

Client = { ClientId + Name + ClientType }

You have a data control named datQ8. Assume that the data control has had its DatabaseName defined at design time and also assume that the data control's RecordSource property has been set to the Client table.

Write the VB code that adds the Name field to a list box named lstQ8 for all clients in the table who have a ClientType field equal to 55.

Answer Key

1.
 - a. 9, 4
 - b. 4, 0
 - c. 5, 6
2. Since the variable “z” stores numbers internally as binary, there could be a base 10 to base 2 representation error. If this happens, the loop could execute one too few or too many times.
3.
 - a. True
 - b. True
 - c. True
 - d. True
 - e. True
 - f. True

4. One solution follows:

```
Private Sub cmdCopy_Click()  
    Dim k As Integer  
    lstB.Clear  
    For k = 0 To lstA.ListCount - 1  
        If lstA.Selected(k) Then  
            lstB.AddItem lstA.List(k)  
            lstA.Selected(k) = False  
        End If  
    Next k  
End Sub
```

5.
 - a.

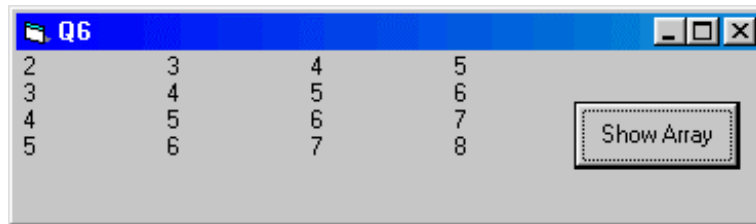
```
Select OrderNo, Product.ProdNo, Desc, Qty  
From Product, Order  
Where Product.ProdNo = Order.ProdNo
```
 - b.

```
Select Name, Order.ProdNo, Desc  
From Product, Order, Customer  
Where Product.ProdNo = Order.ProdNo  
And Order.CustNo = Customer.CustNo
```
 - c.

```
Select Order.ProdNo, OrderNo, Qty  
From Product, Order  
Where Product.ProdNo = Order.ProdNo  
And Order.ProdNo = '12X13'
```
 - d.

```
Select Name, Order.ProdNo, Desc  
From Product, Order, Customer  
Where (Product.ProdNo = Order.ProdNo  
And Order.CustNo = Customer.CustNo)  
And Qty > 10
```

6.



7. A sample solution follows:

```
Private Function iMax(x() As Integer) As Integer
    Dim i As Integer, m As Integer
    m = x(LBound(x))
    For i = LBound(x) + 1 To UBound(x)
        If x(i) > m Then m = x(i)
    Next i
    iMax = m
End Function
```

8. One solution using “Find” methods is:

```
Private Sub cmdSolnA_Click()
    datQ8a.Recordset.FindFirst "ClientType = '55'"
    If datQ8a.Recordset.NoMatch Then
        MsgBox "No matches"
        Exit Sub
    End If

    Do Until datQ8a.Recordset.NoMatch
        lstQ8a.AddItem datQ8a.Recordset("Name")
        datQ8a.Recordset.FindNext "ClientType = '55'"
    Loop
End Sub
```

Another solution using SQL is:

```
Private Sub cmdSolnB_Click()
    datQ8b.RecordSource = "Select Name From Client Where ClientType = '55'"
    datQ8b.Refresh

    Do Until datQ8b.Recordset.EOF
        lstQ8b.AddItem datQ8b.Recordset("Name")
        datQ8b.Recordset.MoveNext
    Loop
End Sub
```