Chapter 6  Repetition

Section 6.1  Do Loops

1. What is wrong with the following Do loop?

   ```vbnet
   Dim index As Integer = 1
   Do While index <> 9
       ListBox.Items.Add("Hello")
       index += 1
   Loop
   ```

   (A) The test variable should not be changed inside a Do loop.
   (B) The test condition will never be true.
   (C) This is an infinite loop.
   (D) Nothing

   D

2. What numbers will be displayed in the list box when the button is clicked?

   ```vbnet
   Private Sub btnDisplay_Click(...) Handles btnDisplay.Click
       Dim num as Double = 10
       Do While num > 1
           ListBox.Items.Add(num)
           num = num - 3
       Loop
   End Sub
   ```

   (A) 10, 7, and 4
   (B) 10, 7, 4, and 1
   (C) 10, 7, 4, 1, and -2
   (D) No output

   A

3. Which While statement is equivalent to Until num < 100?

   (A) While num <= 100
   (B) While num > 100
   (C) While num >= 100
   (D) There is no equivalent While statement.

   C
4. What is wrong with the following Do loop?

```vbnet
Dim index As Integer = 1
Do While index <> 10
   lstBox.Items.Add("Hello")
   index += 2
Loop
```

(A) It should have been written as a Do Until loop.
(B) It is an infinite loop.
(C) The test variable should not be changed within the loop itself.
(D) Nothing

B

5. In analyzing the solution to a program, you conclude that you want to construct a loop so that the loop terminates either when \( a < 12 \) or when \( b = 16 \). Using a Do loop, the test condition should be

(A) `Do While (a > 12) Or (b <> 16)`
(B) `Do While (a >= 12) Or (b <> 16)`
(C) `Do While (a < 12) Or (b <> 16)`
(D) `Do While (a >= 12) And (b <> 16)`
(E) `Do While (a < 12) And (b = 16)`

D

6. When Visual Basic executes a Do While loop it first checks the truth value of the

(A) pass
(B) loop
(C) condition
(D) statement

C

7. If the loop is to be executed at least once, the condition should be checked at the

(A) top of the loop
(B) middle of the loop
(C) bottom of the loop
(D) Nothing should be checked.

C

8. A Do While loop checks the While condition before executing the statements in the loop. (T/F)

T

9. If the While condition in a Do While loop is false the first time it is encountered, the statements in the loop are still executed once. (T/F)

F
10. The following statement is valid. (T/F)
   
   Do While x <> 0
   T

11. The following two sets of code produce the same output. (T/F)
   
   Dim num As Integer = 1
   Dim num As Integer = 1
   Do While num <= 5
       Do
           lstBox.Items.Add("Hello")
           num += 1
           lstBox.Items.Add("Hello")
           num += 1
       Loop
   Loop Until (num > 5)
   T

12. A loop written using the structure Do While...Loop can usually be rewritten using the structure Do...Loop Until. (T/F)
   T

13. A variable declared inside a Do loop cannot be referred to outside of the loop. (T/F)
   T

14. Assume that i and last are Integer variables. Describe precisely the output produced by the following segment for the inputs 4 and −2.
   
   Dim last, i As Integer
   last = CInt(InputBox("Enter terminating value:"))
   i = 0
   Do While (i <= last)
       lstBox.Items.Add(i)
       i += 1
   Loop
   (Input 4): 0 1 2 3 4
   (Input −2): No output

15. The following is an infinite loop. Rearrange the statements so that the loop will terminate as intended.
   
   x = 0
   Do
       lstBox.Items.Add(x)
   Loop Until x > 13
   x += 2
   Move the last statement one line up, before the Loop Until statement
16. What is wrong with the following simple password program where today's password is "intrepid"?

```vbc
Private Sub btnDisplay_Click(...) Handles btnDisplay.Click
    Dim password As String
    password = InputBox("Enter today's password:")
    Do
        lstBox.Items.Add("Incorrect")
        password = InputBox("Enter today's password:")
    Loop Until password = "intrepid"
    lstBox.Items.Add("Password Correct. You may continue.")
End Sub
```

(A) There is no way to re-enter a failed password.
(B) The Loop Until condition should be `password <> "intrepid"`.
(C) It will display "Incorrect." even if the first response is "intrepid".
(D) Nothing

17. How many times will HI be displayed when the following lines are executed?

```vbc
Dim c As Integer = 12
Do
    lstBox.Items.Add("HI")
    c += 3
Loop Until (c >= 30)
```

(A) 5
(B) 9
(C) 6
(D) 4
(E) 10

18. In the following code segment, what type of variable is `counter`?

```vbc
Dim temp, counter, check As Integer
Do
    temp = CInt(InputBox("Enter a number."))
    counter += temp
    If counter = 10 Then
        check = 0
    End If
Loop Until (check = 0)
```

(A) counter
(B) accumulator
(C) sentinel
(D) loop control variable
19. What numbers will be displayed in the list box by the following code when the button is clicked?

```vbnet
Private Sub btnDisplay_Click(...) Handles btnDisplay.Click
    Dim num As Integer = 7
    Do
        num += 1
        ListBox.Items.Add(num)
    Loop Until (num > 6)
    ListBox.Items.Add(num)
End Sub
```

(A) 7  
(B) 8  
(C) 7 and 8  
(D) 8 and 8  

20. ________ calculate the number of elements in lists.

   (A) Sentinels  
   (B) Counter variables  
   (C) Accumulators  
   (D) Nested loops  

   B

21. ________ calculate the sums of numerical values in lists.

   (A) Sentinels  
   (B) Counter variables  
   (C) Accumulator variables  
   (D) Nested loops  

   C

22. The following are equivalent While and Until statements. (T/F)

   ```vbnet
   While (num > 2) And (num < 5)
   Until (num <= 2) Or (num >= 5)
   T
   ```

23. A Do…Loop Until block is always executed at least once. (T/F)

   T

24. A counter variable is normally incremented or decremented by 1. (T/F)

   T
25. The following program uses a counter variable to force the loop to end. (T/F)

```vbnet
Private Sub btnDisplay_Click(...) Handles btnDisplay.Click
    Dim r As Double = 1
    Dim t As Double = 0
    Do While (t < 5000)
        t = 2 * t + r
        r += 1
        lstBox.Items.Add(t)
    Loop
End Sub
```
F

Section 6.2 For...Next Loops

1. When the number of repetitions needed for a set of instructions is known before they are executed in a program, the best repetition structure to use is a(n)
   (A) Do While...Loop structure.
   (B) Do...Loop Until structure.
   (C) For...Next loop.
   (D) If blocks.
   C

2. What is one drawback in using non-integer Step sizes?
   (A) Round-off errors may cause unpredictable results.
   (B) Decimal Step sizes are invalid in Visual Basic.
   (C) A decimal Step size is never needed.
   (D) Decimal Step sizes usually produce infinite loops.
   A

3. When the odd numbers are added successively, any finite sum will be a perfect square (e.g., 1 + 3 + 5 = 9 and 9 = 3^2). What change must be made in the following program to correctly demonstrate this fact for the first few odd numbers?

```vbnet
Private Sub btnDisplay_Click(...) Handles btnDisplay.Click
    Dim oddNumber As Integer
    Dim sum As Integer = 0
    For i As Integer = 1 To 9 Step 2     'Generate first few odd numbers
        oddNumber = i
    Next
    For j As Integer = 1 To oddNumber Step 2     'Add odd numbers
        sum += j
    Next
    lstBox.Items.Add(sum & " is a perfect square.")
End Sub
```
(A) Change the Step size to 1 in the first For statement.
(B) Move `oddNumber = i` inside the second For loop.
(C) Reset `sum` to zero immediately before the second Next statement.
(D) Reset `sum` to zero immediately before the first Next statement.
C
4. What does the following program do with a person's name?

```vbnet
Private Sub btnDisplay_Click(...) Handles btnDisplay.Click
    Dim name, test As String
    Dim n As String = ""
    name = InputBox("Enter your first name:")
    For i As Integer = 0 To (name.Length - 1) Step 2
        test = name.Substring(i, 1)
        n = test & n
    Next
    txtBox.Text = n
End Sub
```

It displays the name

(A) in reverse order.
(B) in reverse order and skips every other letter.
(C) as it was entered.
(D) as it was entered, but skips every other letter.

B

5. Suppose the days of the year are numbered from 1 to 365 and January 1 falls on a Tuesday as it did in 2013. What is the correct For statement to use if you want only the numbers for the Fridays in 2013?

(A) For i As Integer = 3 to 365 Step 7
(B) For i As Integer = 1 to 365 Step 3
(C) For i As Integer = 365 To 1 Step -7
(D) For i As Integer = 3 To 365 Step 6

A

6. Given the following partial program, how many times will the statement `lstBox.Items.Add(j + k + m)` be executed?

```vbnet
For j As Integer = 1 To 4
    For k As Integer = 1 To 3
        For m As Integer = 2 To 10 Step 3
            lstBox.Items.Add(j + k + m)
        Next
    Next
Next
```

(A) 24
(B) 60
(C) 36
(D) 10
(E) None of the above

C
7. Which of the following program segments will sum the eight numbers input by the user?

(A) For k As Integer = 1 To 8
    s = CDbl(InputBox("Enter a number.\n"))
    s += k
    Next

(B) For k As Integer = 1 To 8
    a = CDbl(InputBox("Enter a number.\n"))
    s += a
    Next

(C) For k As Integer = 1 To 8
    a = CDbl(InputBox("Enter a number.\n"))
    a += s
    Next

(D) For k As Integer = 1 To 8
    a = CDbl(InputBox("Enter a number.\n"))
    s += 1

D

8. What will be displayed by the following program when the button is clicked?

Private Sub btnDisplay_Click(...) Handles btnDisplay.Click
    Dim a As String, n, c As Integer
    a = "HIGHBACK"
    n = CInt(Int(a.Length / 2))
    c = 0
    For k As Integer = 0 To n - 1
        If a.Substring(k, 1) > a.Substring(7 - k, 1) Then
            c += 1
        End If
    Next
    txtBox.Text = CStr(c)
End Sub

(A) 1
(B) 2
(C) 3
(D) 4
(E) 5

9. In a For statement of the form shown below, what is the default step value when the "Step c" clause is omitted?

For i As Integer = a To b Step c

(A) the same as a
(B) the same as b
(C) 0
(D) 1
D
10. What will be displayed when the following lines are executed?

```vbnet
TextBox.Clear()
For k As Integer = 1 To 3
    TextBox.Text &= "ABCD".Substring(4 - k, 1)
Next
```

(A) ABC  
(B) CBA  
(C) DBA  
(D) DCBA  
(E) DCB

11. Which loop computes the sum of $\frac{1}{2} + \frac{2}{3} + \frac{3}{4} + \frac{4}{5} + \ldots + \frac{99}{100}$?

(A) For n As Integer = 1 To 99
    s += n / (1 + n)
Next

(B) For q As Integer = 100 To 1
    s += (q + 1) / q
Next

(C) For d As Integer = 2 To 99
    s = 1 / d + d / (d + 1)
Next

(D) For x As Integer = 1 To 100
    s += 1 / (x + 1)
Next

A

12. How many times will PETE be displayed when the following lines are executed?

```vbnet
For c As Integer = 15 to -4 Step -6
    lstBox.Items.Add("PETE")
Next
```

(A) 1  
(B) 2  
(C) 3  
(D) 4  
D
13. What will be displayed by the following program when the button is clicked?

```vbnet
Private Sub btnDisplay_Click(...) Handles btnDisplay.Click
    Dim s As Double
    s = 0
    For k As Integer = 1 To 5
        If k / 2 = Int(k / 2) Then
            s += k
        End If
    Next
    txtBox.Text = CStr(s)
End Sub
```

(A) 12  
(B) 9  
(C) 15  
(D) 6

14. How many lines of output are produced by the following program segment?

```vbnet
For i As Integer = 1 To 3
    For j As Integer = 1 To 3
        For k As Integer = i To j
            lstBox.Items.Add("Programming is fun.")
        Next
    Next
Next
```

(A) 8  
(B) 9  
(C) 10  
(D) 11

15. Assuming the following statement, what is the For...Next loop's counter variable?

```vbnet
For yr As Integer = 1 To 5
```

(A) 1  
(B) 5  
(C) To  
(D) yr
16. What is the value of \( j \) after the end of the following code segment?

   ```vba
   For j As Integer = 1 to 23
       lstBox.Items.Add("The counter value is " & j)
   Next
   ```

   (A) 22 
   (B) 23 
   (C) 24 
   (D) \( j \) no longer exists  

   D

17. A For...Next loop with a positive step value continues to execute until what condition is met?

   (A) The counter variable is greater than the terminating value.  
   (B) The counter variable is equal to or greater than the terminating value. 
   (C) The counter variable is less than the terminating value. 
   (D) The counter variable is less than or equal to the terminating value.  

   A

18. Which of the following loops will always be executed at least once when it is encountered?

   (A) a For...Next loop 
   (B) a Do loop having posttest form 
   (C) a Do loop having pretest form 
   (D) none of the above.  

   B

19. Which of the following are valid for an initial or terminating value of a For...Next loop?

   (A) a numeric literal 
   (B) info.Length, where \( info \) is a string variable 
   (C) a numeric expression  
   (D) All of the above  

   D

20. What is the data type of the variable \( \text{num} \) if Option Infer is set to On and the statement `Dim num = 7.0` is executed?

   (A) Integer  
   (B) Boolean  
   (C) Double  
   (D) String  

   C

21. The value of the counter variable should not be altered within the body of a For...Next loop. 

   (T/F)  

   T
22. The body of a For...Next loop in Visual Basic will always be executed once no matter what the initial and terminating values are. (T/F)  
   F

23. If the terminating value of a For...Next loop is less than the initial value, then the body of the loop is never executed. (T/F)  
   F

24. If one For...Next loop begins inside another For...Next loop, it must also end within this loop. (T/F)  
   T

25. The value of the counter variable in a For...Next loop need not be a whole number. (T/F)  
   T

26. One must always have a Next statement paired with a For statement. (T/F)  
   T

27. If the initial value is greater than the terminating value in a For...Next loop, the statements within are still executed one time. (T/F)  
   F

28. When one For...Next loop is contained within another, the name of the counter variable for each For...Next loop may be the same. (T/F)  
   F

29. A For...Next loop cannot be nested inside a Do loop. (T/F)  
   F

30. The following code segment is valid. (T/F)  
   
   \[
   \text{If (firstLetter > "A") Then} \\
   \text{For x As Integer = 1 to 100} \\
   \text{lstBox.Items.Add(x)} \\
   \text{Next} \\
   \text{End If}
   \]
   
   T

31. In a For...Next loop, the initial value should be greater than the terminating value if a negative step is used and the body of the loop is to be executed at least once. (T/F)  
   T

32. If the counter variable of a For...Next loop will assume values that are not whole numbers, then the variable should not be of type Integer. (T/F)  
   T

33. The step value of a For...Next loop can be given by a numeric literal, variable, or expression. (T/F)  
   T
34. The variable \textit{index} declared with the statement \texttt{For index As Integer = 0 To 5 cannot be referred to outside of the For…Next loop. (T/F)}
   T

35. When Option Infer is set to On, a statement of the form \texttt{Dim num = 7} is valid. (T/F)
   T

36. What is displayed in the text box when the button is clicked?
   \begin{verbatim}
   Private Sub btnDisplay_Click(...) Handles btnDisplay.Click
     Dim word As String = "Alphabet"
     Dim abbreviation As String = ""n
     For i As Integer = 0 To word.Length - 1
       If word.Substring(i, 1).ToUpper <> "A" Then
         abbreviation &= word.Substring(i, 1)
       End If
     Next
     txtBox.Text = abbreviation
   End Sub
   \end{verbatim}

Section 6.3 List Boxes and Loops

1. Which of the following expressions refers to the contents of the last row of the list box?
   (A) \texttt{lstBox.Items(lstBox.Items.Count)}
   (B) \texttt{lstBox.Items(lstBox.Items.Count - 1)}
   (C) \texttt{lstBox.Items(Count)}
   (D) \texttt{lstBox.Items.Count}
   B

2. Which of the following expressions refers to the contents of the first row of the list box?
   (A) \texttt{lstBox.Items(0)}
   (B) \texttt{lstBox.Items(1)}
   (C) \texttt{lstBox.Items.First}
   (D) \texttt{lstBox.Items(First)}
   A

3. Each item in a list box is identified by an index number; the first item in the list is assigned which of the following values as an index?
   (A) a randomly assigned value
   (B) 1.
   (C) a value initially designated by the programmer
   (D) 0
   D
4. The following lines of code display all the items of lstBox. (T/F)

   For n As Integer = 1 to lstBox.Items.Count
       lstBox2.Items.Add(lstBox.Items(n))
   Next
F

5. The number of items in ListBox1 is ListBox1.Items.Count. (T/F)
   T

6. If no item in a list box is selected, the value of lstBox.SelectedIndex is 0. (T/F)
   F

7. Which of the statements will unhighlight any highlighted item in lstBox?

   (A) lstBox.SelectedItem = Nothing
   (B) lstBox.SelectedItem = ""
   (C) lstBox.SelectedIndex = 0
   (D) lstBox.SelectedIndex = -1
   D

8. A list box named lstBox has its Sorted property set to True and contains the three items Cat, Dog, and Gnu in its Items collection. If the word Elephant is added to the Items collection at run time, what will be its index value?

   (A) 2
   (B) 1
   (C) 3
   (D) 0
   A

9. A list box named lstBox has its Sorted property set to False and contains the three items Cat, Dog, and Gnu in its list. If the word Elephant is added to the list at run time, what will be its index value?

   (A) 2
   (B) 1
   (C) 3
   (D) 0
   C

10. If a program contains procedures for both the Click and DoubleClick events on a list box and the user double-clicks on the list box, only the Click event will be raised. (T/F)
    T

11. If a list box has its sorted property set to True and the list box contains all numbers, then the values in the list box will always be in increasing numerical order. (T/F)
    F
12. If a list box contains all numbers, then which of the following values can be calculated without using a loop?

   (A) average value of the numbers
   (B) largest number
   (C) smallest number
   (D) number of numbers

13. Which of the following is not a main type of event that can be raised by user selections of items in a list box?

   (A) Click event
   (B) SelectedIndexChanged event
   (C) FillDown event
   (D) DoubleClick event

14. The value of ListBox.Items(n) is the \( n \)th item in the list box. (T/F)

   F

15. The sorted property can only be set to True at design time. (T/F)

   F

16. The _____________ data type is most suited to a flag.

   (A) Boolean
   (B) Integer
   (C) String
   (D) Double

   A

17. A variable that keeps track of whether a certain situation has occurred is called

   (A) a counter.
   (B) an accumulator.
   (C) a switch.
   (D) a flag.

   D