PSU Math Relays 2017 **Programming** No Calculators 35 Questions

Select the letter of the most appropriate answer and shade in the corresponding region on the answer sheet. If no answer seems appropriate then shade in region E on the answer sheet.

1) **The purpose of an algorithm is to _____.**
   A) understand what a programming language does
   B) analyze the nature of a problem
   C) list a set of steps to solve a problem
   D) list the elements needed for the user interface

2) **A word that has a specific meaning in a programming language is called _____.**
   A) a variable B) a keyword C) a comment D) an operator

3) **Flowcharts are used to _____.**
   A) check for syntax errors
   B) graphically depict the flow of a method
   C) determine the controls required for a program
   D) describe the programs input and output

4) **A variable _____.**
   A) performs various operations on data
   B) is a storage location in memory represented by a name
   C) is a key element of the graphical user interface
   D) is a set of programming statements to perform a specific task

5) **Why is it necessary to run a program using test data for input?**
   A) To be sure that there are no syntax errors in the program
   B) To verify the application produces correct results
   C) To see if the flowchart is correct
   D) To verify that programming language elements are used correctly

6) **Which of the following is an example of a binary number?**
   A) 324 B) 101 C) 123 D) 202

7) **Pseudocode is a combination of programming language and machine code.**
   A) True B) False

8) **What is the result after evaluating the following expression: 24 MOD 9?**
   A) 2 B) 6 C) 5 D) 3

9) **A Boolean type variable can hold only one of two possible values: _____.**
   A) -1 or 1 B) 0 or 1 C) *True* or *False* D) `A` or `B`

10) **Which of the following has the highest order of precedence in arithmetic expressions?**
   A) Addition and subtraction
   B) Exponentiation (the ^ operator)
   C) Multiplication and division
   D) None of the above; calculations are always evaluated from left to right.

11) **What will be the value of intAnswer after execution of these statements?**

```
Const intNumA As Integer = 6
Const intNumB As Integer = 2
intAnswer = intNumA / intNumB + intNumA * intNumB
```

   A) 16 B) 12 C) 15 D) 18

12) **What is the value of intE after the following statements execute?**

```
Dim intC As Integer
Dim intD As Integer
Dim intE As Integer
intC = 20
intD = 3
intE = intC \ intD
```

A) 7 B) 6 C) 0 D) 6.666667

13) **What is the value of dblOutcome after the following section of code executes?**

```
Dim dblA as Double
Dim dblB as Double
Dim dblC as Double
Dim dblOutcome as Double
dblA = 45
dblB = 30
dblC = 3 * dblA / dblB
dblOutcome = 2 * (dblC + 15)
```

A) 80 B) 39 C) 0 D) 24

14) **What will be assigned to the label lblResult when the following statements execute?**

```
Dim dblVal As Double = 11.75
lblResult.Text = dblVal.ToString("n3")
```

A) 12 B) $11.75 C) 11.750 D) 11.75

15) **Which will be displayed in the label lblResult following execution of the code below?**

```
Dim dblGrossPay as Double
dblGrossPay = 3500
lblResult.Text = dblGrossPay.ToString("c")
```

A) $3500.00 B) $3,500.00 C) 3500.00 D) 3500

16) **Which of the following code segments assigns the string "Great Year" to the Text property of a label named lblMessage when the value in the variable decSales is either greater than 50,000 or equal to 50,000?**

A)
```
If decSales > 50000 Then
    lblMessage.Text = "Great Year"
End If
```

B)
```
If decSales < 50000 Then
    lblMessage.Text = "Great Year"
End If
```

C)
```
If decSales >= 50000 Then
    lblMessage.Text = "Great Year"
End If
```

D)
```
If decSales <= 50000 Then
    lblMessage.Text = "Great Year"
End If
```

17) **Suppose you want to determine whether a variable, decPayAmount, is between 1200 and 1400, inclusively. If it is, you want to set lblMessage text to "Pay amount is in the range." Which of the following code segments will accomplish this?**

A)
```
If decPayAmount > 1200 Or decPayAmount < 1400 Then
    lblMessage.Text = "Pay amount is in the range"
End If
```

B)
```
If decPayAmount <= 1200 And decPayAmount>= 1400 Then
    lblMessage.Text = "Pay amount is in the range"
End If
```

C)
```
If decPayAmount >=1200 And decPayAmount <=1400 then
    lblMessage.Text = "Pay amount is in the range"
End If
```

D)
```
If decPayAmount <=1200 Or decPayAmount >= 1400 Then
    lblMessage.Text = "Pay amount is in the range"
End If
```

18) **Suppose you want to verify that the user has entered a value into a text box named txtInput. Which of the following code segments responds with an appropriate message if the user does not enter a value?**

A)
```
If txtInput.Text = String.Empty Then
      lblStatus.Text = "No data has been entered"
End If
```

B)
```
If txtInput <> String.Empty Then
      lblStatus.Text = "No data has been entered"
End If
```

C)
```
If txtInput.text <> "" Then
      lblStatus.Text = "No data has been entered"
End If
```

D)
```
If txtInput.Text = " "  Then
      lblStatus.Text = "No data has been entered"
End If
```

19) **If the Boolean expression A is *True* and B is *False*, the value of the logical expression A And B is _____.**

A) True B) False C) 1 D) 0

20) **If the Boolean expression A is *True* and B is *False*, the value of the logical expression A Or B is _____.**

A) True B) False C) 1 D) 0

21) What is assigned to `lblMessage.Text` when the following code segment executes?

```
Dim strName1 As String = "Jim"
Dim strName2 As String = "John"
If strName1 > strName2 Then
  lblMessage.Text = "Jim is greater"
Else
  lblMessage.Text = "John is greater"
End If
```

A) Jim is greater B) False C) True D) John is greater

22) **What value is assigned to the String variable strSecond when the following code is executes?**

```
Dim strFirst As String
Dim strSecond As String
strFirst  = "1 2 Button My Shoe"
strSecond = strFirstName.ToUpper()
```

A) `"1 2 BUTTON MY SHOE"` B) `"12BUTTONMYSHOE"`
C) `"    BUTTON MY SHOE"` D) `"1 2 bUTTON mY sHOE"`

23) **What value will be assigned to strGrade when intScore equals 90?**

```
If intScore > 60 Then
     strGrade = "D"
End If
If intScore > 70 Then
     strGrade = "C"
End If
If intScore > 80 Then
     strGrade = "B"
End If
If intScore > 90 Then
     strGrade = "A"
End If
```

A) A B) B C) C D) D

24) **In the following statement that begins a For…Next loop, what is the purpose of the Step clause?**

```
For intX = 1 to 100 Step 5
```

A) It causes the loop to end when `intX` is equal to 5.
B) It causes `intX` to be decremented by 5 each time the loop repeats.
C) It causes `intX` to be initialized to 5 when the loop begins.
D) It causes `intX` to be incremented by 5 each time the loop repeats.

25) **What is the difference in the execution of the Do Until Loop (first example) and the Do Loop Until (second example)?**

```
'First Example
sngPayAmount = 200
Do Until sngPayAmount > 150
     sngPayAmount = sngPayAmount — 50
Loop

' Second Example
sngPayAmount = 200
Do
     sngPayAmount = sngPayAmount — 50
Loop Until sngPayAmount > 150
```

A) Both loops are executed in an identical manner.
B) The first loop will never be executed while the second is an infinite loop.
C) The first loop will never be executed while the second loop will execute once.
D) The first loop will execute one more time than the second loop.

26) **What is wrong with the following code?**

```
Dim intIndex As Integer
For intIndex = 5 To 1
    ListBox.Items.Add(intIndex.ToString)
Next
```

A) You need to specify a negative step value in order to execute this loop.
B) `intIndex` is declared incorrectly for use with this type of loop.
C) The `Next` statement must read `Next intIndex`.
D) A `For Next` loop cannot be used to count backward.

27) **What value is assigned to lblSum.Text by the following code?**

```
Dim intTotal As Integer = 0
For intOuter = 1 To 3
   For intInner = intOuter To 3
      intTotal += intOuter * intInner
   Next
Next
lblSum.Text = intTotal.ToString()
```

A) 25 B) 36 C) 16 D) 9

28) **Which type of loop repeats as long as its loop condition remains *True*?**

A) `Do While` B) `Do Next` C) `Do Until` D) all of the above

29) **Which of the following code fragments calculates the average of 5 numbers input with an input box, and displays the result in lblResult?**

A)
```
intCount = 0
intSum = 0
Do While intCount <= 5
     intValue = CInt(InputBox("enter a number"))
     intSum = intSum + intValue
     intCount += 1
Loop
sngAvg = intSum / intCount
lblResult.Text = sngAvg.ToString()
```

B)
```
intCount = 0
intSum = 0
Do While intCount < 5
     intValue = CInt(InputBox("enter a number"))
     intSum = += intValue
     intCount += 1
Loop
sngAvg = intSum / intCount
lblResult.Text = sngAvg.ToString()
```

C)
```
intCount = 0
intSum = 0
Do While intCount <=5
     intValue = CInt(InputBox("enter a number"))
     intSum = intSum + intValue
Loop
sngAvg = intSum / intCount
lblResult.Text = sngAvg.ToString()
```

D)
```
intCount = 5
intSum = 0
Do While intCount = 5
     intSum = CInt(InputBox("enter a number"))
     sngAvg = intSum / intCount
     lblResult.Text = sngAvg.ToString()
Loop
```

30) **How many times will the message *I love Visual Basic* be displayed?**

```
Dim intCount As Integer = 0
Do
     lstOutPut.Items.Add("I love Visual Basic")
     intCout += 1
Loop While intCount > 10
```

A) It will display once.
B) It will display 10 times.
C) It will display 2 times.
D) It will not be displayed at all.

31) **What is the difference in execution between the two following sections of code?**

```
'Example 1
intCounter = 0
Do While intCounter < 10
     lstOutput.Items.Add(intCounter * intCounter)
     intCounter = intCounter + 1
Loop

'Example 2
For intCounter = 0 to 9
     lstOutput.Items.Add(intCounter * intCounter)
Next intCounter
```

A) Both loops are executed in an identical manner.
B) The loop in the first example will never be executed.
C) The loop in the first example will execute one more time than the second example.
D) The first example is an infinite loop.

32) **What will be the final value of intCount?**

```
Dim  intCount As Integer = 3
Do
     intCount += 6
Loop While intCount < 20
```

A) 9 B) 15 C) 20 D) 21

33) **Which of the following code segments will copy the values of a 5 element array named intOldValues into another 5 element array named intNewValues?**

A)
```
intIndex = 0
Do While intIndex < 5
  intNewValues(intIndex) = intOldValues(intIndex)
  intIndex = intIndex + 1
Loop
```

B)
```
intIndex = 1
 Do While intIndex <=5
    intNewValues(intIndex) = intOldValues(intIndex)
    intIndex = intIndex + 1
Loop
```

C)
```
For intIndex = 1 To 5
  intNewValues(intIndex) = intOldValues(intIndex)
Next intIndex
```

D)
```
For intIndex = 0 To 4
  intOldValues(intIndex) = intNewValues(intIndex)
Next intIndex
```

34) **Which of the following code segments is the correct solution for the following problem?**

Find the first occurrence of the value "Joe" in the array `strNames`. Save the index of the element containing "Joe" in a variable named `intPosition`. Discontinue searching the array once the first occurrence of the element "Joe" has been located. Assume any variables you need are already defined.

A)
```
blnFound = True
intCount = 0
Do While (Not blnFound) And (intCount <= strNames.Length — 1)
  If strNames(intCount) = "Joe" Then
      blnFound = False
      positon = intCount
  End If
  intCount += 1
Loop
```

B)
```
For intCount = 0  To strNames.length-1
If strNames(intCount) = "Joe" Then
 intPosition = intCount
 End If
Next
```

C)
```
blnFound = False
intCount = 0
Do While (Not blnFound) And (intCount < strNames.Length)
  If strNames(intCount) = "Joe" Then
      blnFound = True
      intPosition = intCount
  End If
  intCount += 1
Loop
```

D)
```
blnFound = False
For intCount  = 0 to strNames.Length -1 and Not blnFound
  If  strNames(intCount) = "Joe" Then
     blnFound = True
     intPosition = intCount
  End If
Next
```

35) **What does the following section of code do?**

```
Dim intCount as Integer
Dim intXXXX as Integer = intNumbers(0)

For intCount = 1 to (inNumbers.Length - 1)
      If intNumbers(intCount) > intXXXX Then
           intXXXX = intNumbers(intCount)
      End If
Next intCount
```

A) Finds the last element of the array `intNumbers`

B) Finds the first element of the array `intNumbers`

C) Finds the highest value in the array `intNumbers`

D) Finds the lowest value in the array `intNumbers`