You can read the following textbook to find the answers:

- **Python for Everyone, 2nd Edition, Cay S. Horstmann, Rance D. Necaise, Wiley, 2016.**

1. Which statement corrects the off-by-one error in the following code:

```
# This code prints the first 10 numbers starting with zero
i = 0
while i <= 10 :
  print(i)
  i = i + 1
```

1. Replace |i = 0| with |i = 1|
2. Replace |while i <= 10| with |while i < 10|
3. Replace |i = i + 1| with |i = i + 2|
4. Replace |while i <= 10| with |while i + 1< 10|

2. How many times will the following loop run?

```
i = 0
while i < 10 :
  print(i)
  i = i + 1
```

1. |0|
2. |8|
3. |9|
4. |10|

3. What is the output of the code snippet given below?

```
i = 0
while i != 9 :
```

```
  print(i, end = " ")
  i = i + 2
```

1. No output
2. 0 2 4 6 8
3. 10 12 14 16 18 ... (infinite loop)
4. 0 2 4 6 8 10 12 14 ... (infinite loop)

4. How many times does the code snippet given below display "Loop Execution"?

```
i = 1
while i != 10 :
  print("Loop Execution")
  i = i + 1
```

1. Infinite times
2. 8 times
3. 9 times
4. 10 times

5. What is the output of the code fragment given below?

```
i = 0
j = 0
while i < 27 :
  i = i + 2
  j = j + 1
print("j =",  j)
```

1. |j = 27|
2. |j = 12|
3. |j = 13|

4. |j = 14|

6. What is the output of the following code snippet?

```
i = 1
while i < 10 :
  print(i, end =  " ")
  i = i + 2
  if i == 5 :
    i = 9
```

1. 1 3 5
2. 1 3 9
3. 1 3 5 7 9
4. 1 3 5 9

7. The code snippet below is supposed to check whether an integer greater than 1 is a prime number. What will be the result of executing it?

```
j = 2
result = 0
number = int(input("Please enter an integer (2 or greater):"))
while j < number :
  if number % j  == 0 :
    result = 1
  j = j + 1
if result == 1 :
  print("Number:", number, "is Not Prime.")
else :
  print("Number:", number, "is Prime.")
```

1. The code snippet contains a compile error.
2. The code snippet displays the desired result.

3. The code snippet displays an incorrect result.

4. The code snippet causes an infinite loop.

8. What is the output of the following code snippet?

```
a = 2
n = 16
r = 1
b = a
i = n
while i > 0 :
  if i % 2 == 0 : # n is even
    b = b * b
    i = i / 2
  else :
    r = r * b
    i = i -  1
print("r =", r)
```

1. r = 16
2. r = 128
3. r = 4096
4. r = 65536

9. What is the output of the code fragment given below?

```
i = 0
j = 0
while i  < 125 :
  i = i + 2
  j = j + 1
print(j)
```

1. 0
2. 62
3. 63
4. The code fragment displays no output because it does not compile.

10. What is the output of the following loop?

```
s  = 1
n  = 1
while  s < 10 * n :
  s = s + n
  n = n + 1
print(s)
```

1. 211
2. 210
3. 120
4. 123

11. What will be the result of running the following code fragment?

```
year = 0
rate = 5
principal = 10000
interest = 0
while year < 10 :
  interest = (principal * year * rate) / 100
  print("Interest ", interest)
```

1. The code fragment will display the interest calculated for nine years.
2. The code fragment will continue to display the calculated interest forever because the loop will never end.
3. The code fragment will not display the calculated interest and
   halt abruptly.

4. The code fragment will not display any output because it will not compile.

12. Which of the following code snippets displays the output exactly 10 times?

1.
```
i = 0
while i <= 10 :
    print("This is example 1.")
    i = i + 1
```

2.
```
i = 0
while i < 10 :
    print("This is example 2.")
    i = i + 1
```

3.
```
i = 0
while i < 10 :
    print("This is example 3.")
```

4.
```
i = 1
while i < 10 :
    print("This is example 4.")
    i = i + 1
```

13. What is the output of the following code snippet?

```
i = 1
while i != 9 :
```

```
    print(i , end = " ")
    i = i + 1
    if i == 9 :
      print("End")
```

1. 1 End
2. 1 End (infinite loop)
3. 1 2 3 4 5 6 7 8 End
4. 1 2 3 4 5 6 7 8 End (infinite loop)

14. Which of the following changes will make the following code snippet display |Let us learn Python| exactly 10 times?

```
i = 0
while i <= 10 :
  print("Let us learn Python")
  i = i + 1
```

1. Replace |while i <= 10| with |while i < 9 |
2. Replace |while i <= 10| with |while i < 11 |
3. Replace |while i <= 10| with |while i < 12 |
4. Replace |i = 0| with |i = 1|

15. How many times is the text "Let's have fun with Python." printed when this code snippet is run?

```
i = 0
while i <= 10 :
  print("Let's have fun with Python.")
  i = i + 1
  if i % 2 == 0 :
    i = 10
```

1. 1

2. 2

3. 3

4. 10

16. Select the statement that correctly completes the loop in this code snippet.

```
years = 20
rate = 0.05
balance =  10000
while years  > 0 :
   #  Place code here
   interest = balance * rate / 100
   balance = balance + interest
```

1.

```
years = years + 1
```

2.

```
years = years - 1
```

3.

```
balance = balance + 1
```

4.

```
balance = balance - 1
```

17. Is the following code snippet legal?

```
b = False
while b != b :
   print("Do you think in Python?")
```

1. Yes, it is legal but does not print anything.

2. Yes, it is legal and prints "Do you think in Python?" once.

3. Yes, it is legal and prints "Do you think in Python?" twice.

4. No, it is not legal and gives a compilation error.

18. What is the output of the following code snippet?

```
i = 1
while i  < 20 :
  print(i , " ")
  i = i + 2
  if i == 15 :
    i = 19
```

1. 1 3 5 7 9 11 13 15 17 19

2. 1 3 5 7 9 11 13 19

3. 1 3 5 7 9 11 13 15 17

4. 1 3 5 7 9 11 13 17 19

19. What are the values of i and j after the following code snippet is run?

```
i = 10
j = 20
count = 0
while count < 5 :
  i = i + i
  i = i + 1
  j = j - 1
  j = j - j
  count = count + 1
print("i = ", i , ", j = ", j)
```

1. i = 45, j = 1

2. i = 351, j = 0

3. i = 351, j = 2

4. i = 1311, j = 35

20. What is the output of the following code fragment?

```
i = 1
sum = 0
while i <= 15 :
  sum = sum + i
  i = i + 1
print("The value of sum is", sum)
```

1. The value of sum is 0
2. The value of sum is 105
3. The value of sum is 120
4. The value of sum is 136

21. What are the values of |i| and |j| after the following code fragment runs?

```
i = 60
j = 50
count = 0
while count < 5 :
 i = i + i
 i = i + 1
 j = j - 1
 j = j - j
 count = count + 1
 print("i =",  i, ", j =", j)
```

1. |i = 1951, j = 0 |
2. |i = 1951, j = 45 |
3. |i = 65, j = 1 |

4. |i = 65, j = 45 |

22. Which type of error could be reported by Python when the program contains an "off-by-one" error?

1. Syntax error
2. Compile-time error
3. Run-time error
4. Infinite loop error

23. What is the output of the code snippet given below?

```
i = 0
while i !=  11 :
  print(i, end=" ")
  i = i + 3
```

1. 0 3 6 9 12
2. 0 3 6 9 12 15 18
3. 0 1 3 5 7 9
4. 0 3 6 9 12 ... (infinite loop)

24. How many times does the following code fragment display "Hi"?

```
i = 10
while i >= 0 :
  print("Hi")
  i = i -  1
```

1. 9 times
2. 10 times
3. 11 times
4. 12 times

25. What is the output of the following code fragment?

```
i = 1
sum = 0
while i <= 11 :
  sum = sum + i
  i = i + 1
print("The value of sum is", sum)
```

1. The value of sum is 65
2. The value of sum is 66
3. The value of sum is 55
4. The value of sum is 56

26. What is the output of the code snippet given below?

```
n = 0
while n * n < 100 :
  print(n * n,  end =  "  ")
  n = n + 1
```

1. 0 1 4 9 16 25 36 49 64 81
2. 0 1 2 3 4 5 6 7 ... 99 100
3. 0 1 1 2 3 5 8 13 21 34 55 89
4. 0 0 0 0 0 0 (infinite loop)

27. What is the last line of output produced by the code snippet below?

```
i = 0
total = 0
while total < 0 :
  i = i + 1
  total = total - i
  print(i, total)
```

1. 0 0
2. 1 1
3. No output
4. 0 -1

28. How many times does the following loop run?

```
i = 0
j = 1
while j >= 1 :
  print("" , i , ";" , j)
  i = j + 1
  if i % 2 == 0 :
    j = j - 1
```

1. 0 times
2. 1 time
3. 2 times
4. 4 times

29. What is the output of the code snippet given below?

```
s = "abcde"
length = len(s)
i = 1
while i < length :
  print(s[i])
  i = i + 1
```

1. No output
2. abcd
3. abcde
4. bcde

30. What is the output of the code snippet given below?

```
s = "abcde"
i = 1
while i < 5 :
  if i > 1 :
    print(s[i])
```

1. No output
2. No output (infinite loop)
3. abcde
4. bcde

31. What is the output of the code snippet given below?

```
s = "abcde"
j = len(s) - 1
while j >= 0 :
  print(s[j])
  j = j -  1
```

1. abcd
2. bcde
3. bcbcd
4. edcba

32. What is the output of the code snippet given below?

```
s = "12345"
i = 0
while i < 5 :
  print(s[i])
  i = i + 1
```

1. No output
2. 1234
3. 12345
4. 2345

33. What is the output of the code snippet given below?

```
s = "12345"
i = 1
while i < 5 :
  if i > 1 :
    print(s[i])
```

1. No output
2. No output (infinite loop)
3. 12345
4. 2345

34. How many times does the code snippet below display "Hello"?

```
i = 0
while i != 15 :
  print("Hello")
  i = i + 1
```

1. Infinite times
2. 14 times
3. 15 times
4. 16 times

35. What is the output of the code snippet given below?

```
i = 0
while i != 11 :
```

```
  print(" ", i)
  i = i + 2
```

1. No output
2. 0 2 4 6 8
3. 10 12 14 16 18 ... (infinite loop)
4. 0 2 4 6 8 ... (infinite loop)

36. How many times does the following loop run?

```
i = 0
j = 1
while j >= 1 :
  print(i , ";" , j)
  i = i + 1
  if i % 3 == 0 :
    j = j -  1
```

1. 1 time
2. 2 times
3. 3 times
4. 4 times

37. What will be the output of the following code snippet?

```
token = False
while token :
  print("Hello")
```

1. "Hello" will continue to be displayed until the user stops the program.
2. No output because of compilation error.
3. No output after successful compilation.
4. "Hello" will be displayed only once.

38. What is the output of the following code snippet?

```
i = 1
while i <= 10 :
  print("Inside the while loop")
  i = i + 10
```

1. No output because of compilation error.
2. "Inside the while loop" will be displayed 10 times.
3. No output after successful compilation.
4. "Inside the while loop" will be displayed only once.

39. How many copies of the letter |A| are printed by the following loop?

```
i = 0
while i < 5 :
  print("A")
  i = i + 1
```

1. 0
2. 4
3. 5
4. Infinity

40. How many copies of the letter |B| are printed by the following loop?

```
i = 0
while i == 5 :
  print("B")
  i = i + 1
```

1. 0
2. 4

3. 5

4. Infinity

41. How many copies of the letter |C| are printed by the following loop?

```
i = 0
while i < 5 :
  print("C")
  i = i - 1
```

1. 0

2. 4

3. 5

4. Infinity

42. What is the value of |i| at the end of the following code segment?

```
i = 1
while i < 32 :
  i = i * 2
```

1. 16

2. 31

3. 32

4. 64

43. The following while loop should continue to run as long as the user does *not* enter a negative number. What condition should be used to achieve this behavior?

```
x = int(input("Enter an integer: "))
while _____ :
  x = int(input("Enter an integer: "))
```

1. |x != 0|
2. |x == 0|
3. |x <= 0|
4. |x >= 0|

44. What are the final values of the variables |i|, |j|, and |n| at the end of this loop?

```
i = 0
j = 12
n = 0
while i != j :
  i = i + 2
  j = j - 2
  n = n + 1
```

1. 2 10 1
2. 4 8 2
3. 6 6 3
4. 0 12 0

45. When hand-tracing the loop in the code snippet below, which variables are important to evaluate?

```
i  = 10
j  = 5
k  = -10
sum  = 0
while  i > 0 :
  sum = sum + i + j
  i = i -  1
  print("Iteration: ", i)
```

1. The variables |i| and |j|

2. The variables |i| and |sum|

3. The variables |i, j,| and |k|

4. The variables |j| and |k|

46. When hand tracing, drawing a line through the value stored in a variable means that

1. The value stored there has changed to something new

2. The variable is the wrong data type for the code being executed

3. The expression being evaluated uses that variable

4. The variable must be inside a loop

47. When hand-tracing a portion of code, which statement about Boolean conditions is true?

1. They typically are too complex to be evaluated.

2. They do not need to be monitored because their result usually is not stored in a variable.

3. It is rare to encounter a Boolean condition.

4. They are crucial to evaluate since they determine if-statement conditions and looping.

48. What is the output of this code snippet?

```
s = 1
n = 1
while s  < 3 * n :
  s = s + n
  print(s , end = " ")
  n = n + 1
```

1. 2 4 7 11 16 22

2. 1 3 5 7 9

3. 2 3 5 6 7

4. 2 4 6 8

49. What are the values of |i| and |j| after the following code snippet executes?

```
i  = 20
j  = 70
count  = 0
while  count < 5 :
  i = i + i
  i = i + 1
  j = j - 1
  j = j - j
  count = count + 1
print(i)
print(j)
```

1. i = 25, j = 1
2. i = 25, j = 65
3. i = 671, j = 0
4. i = 671, j = 65

50. The process of hand-tracing code is valuable because

1. It is usually faster than just running the code.
2. It is the best way to design an algorithm.
3. You must already have a working program in order to do it.
4. It gives valuable insight that you do not get by running the code.

51. What is the output of the code snippet given below?

```
s = "aeiou"
i = 0
while i < 5 :
  print(s[i], s[i + 1], end = " ")
  i = i + 1
  if i >= 3 :
```

```
    i = 5
```

1. a
2. a e
3. a e i o u
4. a e e i i o

52. What is the sentinel value in the following code segment?

```
value = 15
x = int(input("Enter an integer: "))
while x != 0 :
  value = value * 2
  print(value + 3)
  x = int(input("Enter an integer: "))
```

1. 0
2. 2
3. 3
4. 15

53. Of the following options, what should the user enter to cause the following while loop to terminate?

```
done = False
while not done :
  x = float(input("Enter a number: "))
  if x > 5.0 :
    print(x)
  elif x > 0.0 :
    done = False
  elif x < -5.0 :
    print(-x)
  else :
```

```
    done = True
```

1. -7.5
2. -2.5
3. 2.5
4. 7.5

54. What happens when the following loop is executed?

```
val1 = True
val2 = False
while val1 :
  if val1 :
    print("Hello")
  val1 = val2
```

1. No output will be displayed because of a compilation error.
2. "Hello" will be displayed only once.
3. "Hello" will be displayed an infinite number of times.
4. No output will be displayed even after successful compilation of the code snippet.

55. Which of the following statements is correct about a sentinel?

1. A sentinel is a value that creates a bridge between a data set and unrelated input.
2. A sentinel is a value that is part of the data to be processed by the program.
3. A sentinel is a value that terminates a program.
4. A sentinel is a value that indicates the end of an input sequence.

56. Which statement is correct about the execution of the loop in the following code fragment?

```
num = int(input("Please enter a number (0 when done): "))
incr = 0
```

```
while num != 0 :
  incr = incr + 1
  num = int(input("Please enter a number (0 when done): "))
print(incr)
```

1. The loop will execute only when 0 is entered.
2. The execution of the loop is independent of user input.
3. The program prints the count of positive inputs.
4. The program prints the count of inputs not equal to zero.

57. What will be the output of the following code snippet?

```
token1 = True
while token1 :
 for i in range(0,10) :
   print("Hello")
 token1 = False
```

1. No output.
2. Hello will be displayed 10 times.
3. Hello will be displayed 9 times.
4. Hello will be displayed infinite times.

58. What is the sentinel value in the following code snippet?

```
age = 0
sumOfAges = 0
stop = 1
age = int(input("Enter  an age (-1 to stop):"))
while age != -1 :
  sumOfAges =  sumOfAges + age
  age = input("Enter an age (-1 to stop):")
print("Sum  of ages ", sumOfAges)
```

1. 0

2. 1

3. 2

4. -1

59. What will be the final output of the following code snippet when a user enters input values in the order 10, 20, 30, 40, 50, and -1?

```
sum = 0
count = 0
salary = 0
average = 0
while salary != -1 :
  salary = float(input("Enter  salaries (-1 to stop): "))
  if  salary != -1 :
    sum = sum + salary
    count = count + 1
if count > 0 :
  average = sum / count
  print("The average salary:  ", average)
else :
  print("No data!")
```

1. The average salary: 0.0

2. The average salary: 30.0

3. The average salary: 24.83333

4. There will be no output as the code snippet will not compile.

60. Insert a statement that will correctly terminate this loop when the end of input is reached.

```
done = False
while done != True :
  x = input("Enter a value")
```

```
if x == "Q" :
    _____
```

1. stop
2. done = 1
3. exit
4. done = True

61. Storyboards are a helpful part of the design process because the storyboard develops

1. A pseudocode description of the algorithm being designed
2. The mathematical formulas required for computing a correct answer
3. The information needed to solve the problem, and how to present that information
4. The amount of time and space needed to find a solution

62. When designing storyboards, it is a good idea to use different colors to

1. Make it easy to distinguish between user input and program output.
2. Match the colors your program will use when it is finally designed.
3. Emphasize the difference between numbers and words.
4. Draw lines to divide up panels into different regions.

63. Suppose you must design a program to calculate the roll-out (number of inches traveled in one revolution of the pedals of a bicycle based on its gear combinations). The user must provide the gear sizes, which must be converted into roll-out for all different gear combinations. How can the flow of user interaction for this problem be designed?

1. Hand-tracing can confirm code that implements gear selection.
2. Pseudocode can guide algorithm design through divide-and-conquer strategy.
3. A storyboard can be used.
4. The physical gears can lead to ideas for the correct algorithm to use.

64. Which statement about storyboards is true?

1. A storyboard can help prevent potential user confusion early in the design process.
2. Storyboards are used primarily to understand how implemented programs work.
3. The storyboard helps to train users about how to use software.
4. Storyboards have no relationship to the structure of an actual working program.

65. How many times does the while loop execute?

```
s = "abcdEfghI"
found = False
count = 0
while found == False :
  if s[count].isupper() :
    print(letter)
    found = True
  count = count + 1
```

1. 9 times
2. 8 times
3. 5 times
4. 1 time

66. Consider the following code snippet. What should be placed in the blank to cause a message to be displayed when the user enters the same letter twice in a row?

```
letter = input("Enter the next letter in the  alphabet: ")
while letter != "":
  previous = letter
  letter = input("Enter the next letter")
  if _____ :
    print("Duplicate input")
```

1. |letter == letter |
2. |alphabet[0] == letter |

3. |letter == previous |

4. |alphabet[0] == previous |

67. What is the output of this code snippet if the user enters the numbers 1 2 3 4 -1?

```
total = 0
validNumber = True
while validNumber :
  value = int(input("Please enter a positive value < 100: "))
  if value > 0 and value < 100 :
    total = total + value
  else :
    validNumber = False
print(total)
```

1. 15
2. 14
3. 12
4. 10

68. What will be printed by the statements below?

```
a = 10
while a  > 5 :
  print(a , end = " ")
  a = a - 2
```

1. 10 9 8 7 6 5
2. 10 8 6 4
3. 10 8 6
4. 10 8

69. What will be printed by the statements below?

```
a = 10
while a  > 5 :
  a = a - 2
  print(a , end = " ")
```

1. 10 8 6
2. 10 8 6 4
3. 8 6
4. 8 6 4

70. What will be printed by the statements below?

```
val = 1
sum = 0
while val < 5 :
  sum = sum + val
  val = val + 1
print(sum)
```

1. 4
2. 5
3. 10
4. 15

71. What will be printed by the statements below?

```
val = 1
sum = 0
while val  < 5 :
  sum = 0
  sum = sum + val
  val = val + 1
print(sum)
```

1. 15
2. 10
3. 5
4. 4

72. What will be printed by the statements below?

```
for ctr in range(0, 10) :
  print(ctr, end = " ")
```

1. 0 1 2 3 4 5 6 7 8 9 10
2. 0 1 2 3 4 5 6 7 8 9
3. 0 2 4 6 8
4. 0 1 3 5 7 9

73. What will be printed by the statements below?

```
for ctr in range(10, 5, -1) :
  print(ctr, end = " ")
```

1. 10 9 8 7 6 5
2. 10 9 8 7 6
3. 5 6 7 8 9 10
4. 6 7 8 9 10

74. Which of the following loops will print the odd numbers between 0 and 20?

1.

```
num = 1
while num < 20 :
  print(num, " ")
  num = num + 2
```

2.

```
num = 1
while num < 20 :
  print(num, " ")
  num = num + 1
```

3.

```
num = 0
while num < 20 :
  print(num,  " ")
  num = num + 2
```

4.

```
num = 1
while num < 20 :
  num = num + 2
  print(num, " ")
```

75. Which of the following loops will print the odd numbers between 0 and 20?

1.

```
num = 1
while num < 11 :
  value  = num * 2 - 1
  print(value, " ")
  num = num + 1
```

2.

```
num = 1
while num < 20 :
  value = num * 2 - 1
  print(value, " ")
  num = num + 1
```

3.

```
num = 1
while num < 10 :
  print(num, " ")
  num = num + 2
```

4.

```
num = 1
while num < 20 :
  num = num + 2
  print(num, " ")
```

76. Which of the following conditions can be added to the code below so it will loop until the value of sum is greater than 100?

```
sum = input("enter an integer")
while #  Put condition here :
  sum = sum + input("Enter an integer")
```

1.

```
sum != 0
```

2.

```
sum <= 100
```

3.

```
sum > 100
```

4.

```
sum == 100
```

77. What does the following code compute?

```
sum = 0
count = 0
value = input("enter an  integer")
while value > 0 :
  sum = sum + value
  count = count + 1
  value = input("enter next integer")
result = sum * 1.0 / count
print(result)
```

1. The average of all the integers in the input
2. The sum of all the positive integers in the input divided by the number of integers in the input
3. The average of all the positive integers in the input
4. The second smallest value in the input

78. What is printed by the following code segment?

```
position = 0
str = input("Enter a string: ")
while position < len(str) and str[position] != 'e' :
  position = position + 1
print(position)
```

1. The position of the first 'e' in the string or the length of the string if there is no 'e'
2. The position of the last 'e' in the string or the length of the string if there is no 'e'
3. The position of the first character that is not an 'e' in the string or the length of the string if there is no character that is not an 'e'
4. The position of the last character that is not an 'e' in the string or the length of the string if there is no character that is not an 'e'

79. What is the output of the code below?

```
for val in range(0, 4) :
  print("+", end = "")
  for num in range(0,  val) :
    print("0",  end = "")
```

1. +0+00+000+0000
2. +000+000+000+000
3. ++0+00+000
4. ++++000000

80. What is the output of the code below?

```
num = 1
for val in range(0, 4) :
  sum = val
  for x in  range(0, val, num) :
    sum = sum +  x
  print(sum , end  = " ")
```

1. 1 3 6
2. 1 2 3 6
3. 0 1 3 6
4. 0 1 2 3 3

81. How many times does the following loop execute?

```
i = 0
found = False
while i < 100 and found != True :
  i = i + 1
  print(i, end = " ")
  j = i * i
  if i * i * i % j == j :
```

```
    found = True
```

1. 10 times
2. 20 times
3. 100 times
4. An infinite number of times

82. Which code snippet produces the sum of the first n positive even numbers? Note that 0 is neither positive nor negative.

1.
```
sum = 0
for i in range(1, n) :
  if i % 2 == 0 :
    sum = sum + i
```

2.
```
sum = 0
for i in range(1, n + 1) :
  sum = sum + i * 2
```

3.
```
sum = 0
for i in range (0, n) :
  if i % 2 == 0 :
    sum = sum + i
```

4.
```
sum = 0
for i in range(1, n) :
  sum = sum + i * 2
```

83. What is the output of this loop?

```
i = 0
found = False
while i < 20 and found != True :
  sum = i * 2 + i * 3
  print(sum, end=" ")
  if sum > 50 :
    found = True
  i = i + 1
```

1. 0 5 10 15 20 25 30 35 40 45 50 55
2. 0
3. No output, compilation error
4. 0 5 10

84. The following program is supposed to sum all of the numbers entered by the user. What line of code must be inserted in the blank so that the program will achieve this goal?

```
total = 0.0
inputStr = input("Enter a value: ")
while inputStr != "" :
  value = float(inputStr)
  _____
  inputStr = input("Enter a value: ")
```

1. |value = value + inputStr|
2. |value = value + total|
3. |total = total + inputStr|
4. |total = total + value|

85. The following program is supposed to count how many even numbers are entered by the user. What line of code must be inserted in the blank so that the program will achieve this goal?

```
evens = 0
inputStr = input("Enter a value: ")
_____
  value = int(inputStr)
  if value % 2 == 0:
    evens = evens + 1
  inputStr = input("Enter a value: ")
```

1. |while inputStr != 0 :|
2. |while inputStr % 2 == 0 :|
3. |while inputStr == 2 or 4 or 6 or 8 or 10 or ... :|
4. |while inputStr != "" :|

86. The following program is supposed to continue reading values from the user until a value between 25 and 75 is entered. What line of code must be inserted in the blank so that the program will achieve this goal?

```
value = int(input("Enter a value: "))
_____
  value = int(input("Enter a value: "))
```

1. |while value >= 25 or value <= 75 :|
2. |while value >= 25 and value <= 75 :|
3. |while value < 25 or value > 75 :|
4. |while value < 25 and value > 75 :|

87. The following program is supposed to print a message any time the user enters two consecutive values that are the same. What line of code must be inserted in the blank so that the program will achieve this goal?

```
value = int(input("Enter a value: ")
inputStr = input("Enter a value: ")
while inputStr != "" :
  previous = value
  value = int(inputStr)
```

_____

```
    print("Found consecutive values that are the same")
  inputStr = input("Enter a value: ")
```

1. |if value == inputStr :|
2. |if value == input :|
3. |if previous == inputStr :|
4. |if previous == value :|

88. What is the output of this loop?

```
counter = 1
for i in range(1, 100) :
  counter = counter + 1
print(counter)
```

1. 100
2. 49
3. 60
4. 10

89. What does the following code snippet print?

```
fruitName = "banana"
for letter in fruitName :
  print(letter, end = " ")
```

1. banana
2. b a n a n a
3. Nothing, there is a syntax error
4. Nothing, this is an infinite loop

90. What is the output of the following code snippet?

```
for i in range(4) :
  for j in  range(3) :
    print("*", end="")
  print()
```

1. Prints 3 rows of 4 asterisks each
2. Prints 12 rows of asterisks
3. Prints 4 rows of 3 asterisks each
4. Prints 12 rows of 3 asterisks each

91. How many times does the loop execute in the following code fragment?

```
for i in  range(0, 50, 4) :
  print(i)
```

1. 11
2. 12
3. 13
4. 14

92. How many times does the following code snippet display "Loop Execution"?

```
for i in range(0, 10) :
  print("Loop Execution")
```

1. Ten times.
2. The code snippet does not run because of a compile error.
3. Infinite loop.
4. Only one time.

93. Which of the following is considered an equivalent while loop for this for loop?

```
s = 0
for i in range(1, 10) :
```

```
s = s + i
```

1.

```
s =  0
i = 0
while i <= 10 :
    s = s + i
    i = i + 1
```

2.

```
s =  0
i = 1
while i < 10 :
    s = s + i
    i = i + 1
```

3.

```
s =  0
i = 1
while i <= 10 :
    s = s + i
    i = i + 1
```

4.

```
s =  0
i = 0
while i < 10 :
    s = s + i
    i = i + 1
```

94. Which statement about this code snippet is accurate?

```
years = 50
balance = 10000
targetBalance = 20000
rate = 3
for i in range(1 , years + 1) :
  if balance  >= targetBalance :
    i = years +  1
  else :
    interest =  balance * rate / 100
  balance =  balance + interest
```

1. The loop will run 50 times.
2. The loop will never stop.
3. The loop will run at most 50 times, but may stop earlier when balance exceeds or equals targetBalance.
4. There is a compilation error.

95. What values does counter variable i assume when this loop executes?

```
for i in range(20, 2, -6) :
  print(i, end = ", ")
```

1. 20, 14, 8, 2
2. 20, 14, 8, 2, -4
3. 20, 14, 8
4. 14, 8, 2

96. Which of the following for loops is illegal?

1. |for i in range(0,) : |
2. |for i in range(0) : |
3. |for i in range(0, k) : |
4. |for i in range(,) : |

97. What is the output of the following code snippet?

```
f1 = 0
f2 = 1
print(f1, " ")
print(f2, " ")
for i in range(1, 11) :
  fRes = f1 + f2
  print(fRes, end = " ")
  f1 = f2
  f2 = fRes
print()
```

1. 0 1 5 7 9 11 13 15 17 19 55
2. 0 1 1 2 3 5 8 13 21 34 55 89
3. 0 1 4 6 8 10 12 14 16 18 34
4. 0 1 6 7 9 12 14 17 19 21 55

98. How many iterations does the following loop carry out?

```
for i in range (-10, 11, 2) :
```

1. infinite
2. None because of compilation error
3. 11 times
4. 20 times

99. How many times does the following loop execute?

```
for d in range(1, 10) :
  d = d / 3
  print(d , " ")
```

1. 10

2. 9

3. 8

4. An infinite number of times

100. Which of the following for loops will run the loop body 5 times?

1. |for i in range(0, 4) :|
2. |for i in range(0, 5) :|
3. |for i in range(0, 6) :|
4. |for i in range(1, 5) :|

101. Which of the following for loops will run the loop body 5 times?

1. |for i in range(4, 0, -1) :|
2. |for i in range(5, 0, -1) :|
3. |for i in range(5, 1, -1) :|
4. |for i in range(6, 0, -1) :|

102. What is the value of |j| at the end of the following code segment?

```
j = 0
for i in range(0, 4) :
  j = j + i
```

1. 4
2. 6
3. 8
4. 10

103. What is the value of |j| at the end of the following code segment?

```
j = 0
for i in range(1, 10) :
  if j < 10 :
```

```
    j = j + i
```

1. 0
2. 1
3. 9
4. 10

104. Consider the following |for| loop:

```
for i in range(0, 10) :
  print(i)
```

Which of the following |while| loops will generate the same output?

1.

```
i = 0
while i < 10 :
  print(i)
  i = i + 1
```

2.

```
i = 0
while i <= 10 :
  print(i)
  i = i + 1
```

3.

```
i = 1
while i < 10 :
  print(i)
  i = i + 1
```

4.

```
i = 1
while i <= 10 :
  print(i)
  i = i + 1
```

105. Consider the following |while| loop:

```
j = 10
while j >= 5 :
  print("X")
  j = j - 1
```

Which of the following |for| loops will generate the same output?

1.

```
for j in range(10, 5) :
  print("X")
```

2.

```
for j in range(10, 5, -1) :
  print("X")
```

3.

```
for j in range(10, -1, -2) :
  print("X")
```

4.

```
for j in range(0, 5) :
  print("X")
```

106. When does the execution switch from the inner to the outer loop?

```
j = 1
for i in  range(0, 10) :
```

```
while(j < 5) :
  print("Hello")
  if j == 2 :
    j = 6
  j = j + 1
print("switch  from inner to outer", i, "  ", j)
```

1. When the value of j becomes 6
2. When the program executes completely
3. When the condition for the outer loop is met
4. When the value of i is incremented

107. A loop inside another loop is called:

1. A sentinel loop
2. A nested loop
3. A parallel loop
4. A while loop

108. What is the first and last value of i to be displayed by the following code snippet?

```
n = 20
for i in range(0, n) :
  for  j in range(0, i) :
    print(i)
```

1. 0 and 20
2. 1 and 20
3. 0 and 19
4. 1 and 19

109. How many times will the output line be printed in the following code snippet?

```
for num2 in range(1, 4) :
  for num1 in range(0, 3) :
    print(num2, " ", num1)
```

1. 3 times
2. 6 times
3. 9 times
4. 12 times

110. What is the last output line of the code snippet given below?

```
for i in range(3) :
  for j in  range(5) :
    if i % 2 ==  j % 2 :
      print("*", end="")
    else :
      print(" ", end="")
  print()
```

1. No output
2. * * * * * * ... infinite loop
3. * * * *
4. * * *

111. What is the last output line of the code snippet given below?

```
i = 0
j = 0
while i  < 10 :
  num = 1
  j = i
  while j > 1 :
    print(j, end = " ")
```

```
    num = num * 2
    j = j -  1
  print("***")
  i = i + 1
```

1. 3 2 ***
2. 9 8 7 6 5 4 3 2 ***
3. 8 7 6 5 4 3 2 ***
4. 2 ***

112. What does the following code snippet display?

```
for n in  range(1, 11) :
  for x in range(1, 11) :
    print(n*x, end = " ")
  print()
```

1. It displays a multiplication table for numbers 1-10 times 1-10
2. Nothing because it has compilation error.
3. It displays a table of all numbers squared from 1-10
4. It displays a multiplication table for numbers 1-11 times 1-11

113. Which for loop prints data across each row in the following code snippet?

```
for i in range(1, 4) :
  for j in range(1, 4) :
    print("X", end="")
  print("")
```

1. The inner for loop
2. The outer for loop
3. Both for loops
4. Another missing for loop

114. What will be the output of the following code snippet?

```
for i in range(0,7) :
  for j in range(7, i, -1) :
    print("*", end="")
  print("")
```

1. A rectangle with six rows and seven columns of asterisks. The number of rows increments by one on completion of one iteration of the inner loop.

2. A right triangle with six rows and seven columns of asterisks. The number of columns increments by one on completion of one iteration of the inner loop.

3. A rectangle with seven rows and six columns of asterisks. The number of rows increments by one on completion of one iteration of the inner loop.

4. A right triangle with seven rows and seven columns of asterisks. The number of columns decrements by one on completion of one iteration of the inner loop.

115. In the following code snippet, how many times will "Hello" be printed?

```
for i in range(0, 10) :
  for j in range(1, 5) :
    print("Hello")
```

1. 40

2. 15

3. 39

4. 14

116. Which of the following code segments is an example of a nested loop?

1.

```
while i < 0 :
  if x == 10 :
```

2.

```
while i < 0 :
    while x == 10 :
```

3.

```
if i < 0 :
    while x == 10 :
```

4.

```
if i < 0 :
    if x == 10 :
```

117. Consider the following code segment:

```
for i in range(4) :
    _____
    print("*", end="")
  print()
```

It is supposed to generate the following output:

```
***
***
***
***
```

Which line of code should be placed in the blank to achieve this goal?

1. |for j in range(3) :|
2. |for j in range(4) :|
3. |for j in range(i) :|
4. |for j in range(j) :|

118. How many copies of the letter |A| will the following code segment

display?

```
for i in range(100) :
  for j in range(5) :
    print("A")
```

1. 400
2. 495
3. 500
4. 605

119. What is the output of this code snippet?

```
str = "ABCabc"
i = 0
while i < len(str) :
  ch = str[i]
  if ch.islower() :
    print(i ,  " ")
  else :
    i = i + 1
```

1. 3 4 5
2. 3
3. 3 3 3 3 3 ... (infinite loop)
4. 0 1 2

120. Consider the following code segment. It is supposed to count the number of digits (0 - 9) in a string, |text|.

```
count = 0
for char in text :
  _____
    count = count + 1
```

What line of code should be placed in the blank to achieve this goal?

1. |if text[char] >= "0" and text[char] <= "9" :|
2. |if text[count] >= "0" and text[count] <= "9" :|
3. |if char >= "0" and char <= "9" :|
4. |if text >= "0" and char <= "9" :|

121. Is the code snippet written below legal?

```
s = "1234"
for i in range (0, 4) :
  print(s[i], s[i + 1])
```

1. Yes.
2. No; there should not be a colon at the end of line 2.
3. No; |for i = 3, s[i + 1]| will result in an string index out of range error.
4. No; |for i = 0, s[i]| will result in an string index out of range error

122. Consider the following code segment:

```
found = False
position = 0
text = "Hello World!"
while not found and position < len(text) :
  if text[position] == "o" :
    found = True
  else :
    position = position + 1
```

What is the value of |position| at the end of this code segment?

1. 4
2. 5
3. 7

4. 8

123. Consider the following code segment. It is designed to identify the first location within a string, |text| where two adjacent characters are the same.

```
i = 1
found = False
while not found and i < len(text) :
  _____ :
    found = True
  else :
    i = i + 1
```

What line of code should be placed in the blank to achieve this goal?

1. |if text[i] == text[0] :|
2. |if text[i] == text[i - 1] :|
3. |if text[i] == text[i] :|
4. |if text[i] == text[i + 1] :|

124. What will be the range of the random numbers generated by the following code snippet?

```
from random import randint
randomNum = randint(1,50)
```

1. Between 1 and 49
2. Between 0 and 50
3. Between 0 and 49
4. Between 1 and 50

125. Which of the following is the correct code snippet for throwing a pair of dice to get a sum of the numbers on two dice between 2 and 12 with the same probability as when throwing actual dice?

1.

   randint(1, 6)

2.

   randint(2, 12)

3.

   randint(1, 6) + randint(1, 6)

4.

   randint(1, 12) - 2

126. Suppose that a program asks a user to enter multiple integers, either positive or negative, to do some calculation. The data entry will stop when the user enters a certain value to indicate the end of the data. What value should the code use as the sentinel?

1. 0
2. -1
3. 999
4. An alphabetic character

127. Which of the following activities can be simulated using a computer?

I. Waiting time in a line at a restaurant

II. Tossing a coin

III. Shuffling cards for a card game

1. I only
2. II only
3. I and II only
4. I, II, and III

128. What range of numbers are generated by the random() function?

1. greater than or equal to zero and less than one
2. greater than zero and less than one
3. greater than zero and less than or equal to one
4. greater than or equal to zero and less than or equal to one

129. What does the following code do?

```
from random import randint

sum = 0
COUNT = 1000
for i in range(1,COUNT + 1) :
  sum = sum + randint(0, 100)
print(sum / COUNT)
```

1. It simulates the outcome of throwing a coin.
2. It calculates the average of 1000 random numbers between 0 and 100.
3. It performs a Monte Carlo fluid dynamics simulation.
4. It calculates the average of 1000 random numbers between 1 and 101.

130. Which of the following loops executes exactly 10 times?

1.

```
for i in range(1, 11) :
  i =  1
```

2.

```
found = False
while i < 10 and found != True :
  i = i + 1
  if i % 10 == 0 :
    found = True
```

3.

```
i =  0
while i <= 10 :
  i = i + 1
```

4.

```
i = 0
for i in range (1, 10)  :
  print(i)
```

131. Which of the following statements correctly prints the result of simulating the toss of a pair of coins to get 0 (heads) or 1 (tails) for each coin?

1.

```
print(randint(0, 1))
```

2.

```
print(randint(1, 1))
```

3.

```
print(randint(0, 2), randint(0, 2))
```

4.

```
print(randint(0, 1), randint(0, 1))
```

132. Which of the following code snippets will generate a random number between 0 and 79?

1.

```
val = int(random() % 80)
```

2.

```
val = int(random() * 80 - 1)
```

3.

```
val = int(random() % 79)
```

4.

```
val = int(random() * 80)
```

133. When will the loop in the following code snippet stop?

```
sum = 0
count = 1
str = input("Enter values, Q to quit: ")
while count < 100 and str != "Q" :
  value = float(str)
  sum = sum + value
  count = count + 1
  str = input("Enter values, Q to quit: ")
```

I. When the user enters an integer

II. When the user enters the character Q

III. After the user enters 100 numbers

1. I or II
2. II only
3. III only
4. II or III

134. Which of the following expressions will generate a random integer in the range -20 to 20, inclusive, where each value has an equal chance of being generated?

1. |randint (-20, 20) |
2. |randint(20) - 41 |
3. |randint (-20) + 40 |
4. |randint(41) - 20 |

135. Assume the following variable has been declared and given a value as shown:

```
from random import randint
number  = randint(0, 27) * 2 + 3
```

What are the smallest and largest values that may be assigned to number?

1. 3, 55
2. 0, 27
3. 3, 57
4. 0, 26

136. Assume the following variable has been declared and given a value as shown:

```
from random import random
number = random() * 2 + 3
```

What are the smallest and largest values that may be assigned to number?

1. 3.0, 5.0 (excluding 5.0)

2. 0.0, 6.0 (excluding 6.0)
3. -3.0, 3.0 (including 3.0)
4. 0.0, 3.0 (including 3.0)

137. Which line of code will generate a random integer from 1 up to and including 10, and store it in |x|? Assume that the |randint| function has been imported from the |random| module.
1. |x = randint(0, 10)|
2. |x = randint(0, 11)|
3. |x = randint(1, 10)|
4. |x = randint(1, 11)|

138. Which line of code will generate a random floating-point number between 0 and 6, and store it in |x|? Assume that the |random| function has been imported from the |random| module.
1. |x = random()|
2. |x = random() * 6|
3. |x = random(6)|
4. |x = random(0, 6)|

139. What type of chart shows the distribution of data across a fixed number of categories?
1. A Grade Chart
2. A Height Chart
3. A Histogram
4. A Plot

140. Using computer algorithms to manipulate digital images is known as:
1. Computer vision
2. Data compression

3. Digital photography

4. Image processing

141. A digital image is a collection of _____ arranged in a grid of rows and columns.

1. canvases
2. dots
3. elementary elements
4. pixels

142. In an RGB color model, what color is represented by 255, 255, 255?

1. black
2. green
3. white
4. yellow

143. What RGB values represent green?

1. 0, 0, 255
2. 0, 255, 0
3. 128, 128, 128
4. 255, 0, 0

144. Which statement loads an image from a file and stores it in a variable? Assume that the |ezgraphics| module has already been imported using the statement:

from ezgraphics import GraphicsImage, GraphicsWindow

1. |graphicsImage = Load("mountain.gif")|
2. |Image("mountain.gif")|
3. |image = ("mountain.gif")|
4. |image = GraphicsImage("mountain.gif")|

145. What programming language structure is used iterate over all of the individual pixels in an image?

1. A for loop (not nested)
2. A nested for loop
3. A nested if statement
4. A while loop (not nested)

146. Which of the following image processing operations changes the grid structure of the image without modifying the pixel values?

1. Converting an image to grayscale
2. Darkening an image
3. Replacing an image with its negative
4. Rotating an image

147. Which of the following is *not* a benefit of solving a simpler problem first?

1. It can be difficult to figure out how to get started when solving a large task.
2. Solving the simpler problem first will motivate you to solve the harder problem.
3. Usually, you learn something useful from solving the simpler task.
4. When the simpler problem is solved first it reduces the amount of time the computer needs to compute the answer for the larger problem.

148. What term is used to describe a loop where the number of times that the loop will execute is known before the body of the loop executes for the first time?

1. Definite
2. Fiscal
3. Indefinite

4. Infinite

149. The value that denotes the end of an input sequence is known as a:

1. Sedimentary value
2. Sentimental value
3. Sentinel value
4. Sequential value

150. Which of the following command lines starts the python program |sum.py| so that it will read its input from |values.txt| instead of the keyboard?

1. |python sum.py < values.txt|
2. |python sum.py > values.txt|
3. |python values.txt < sum.py|
4. |python values.txt > sum.py|

151. Consider the following code segment:

```
s = "Hello World!"
_____
  print(ch)
```

What should be placed in the blank so that the letters of |s| are printed out with one letter appearing on each line?

1. |for ch in range(s) : |
2. |for ch in s :|
3. |for range(ch, s) :|
4. |for s in ch : |

152. Which print statement displays the value of |s| without starting a new line?

1. |print(end="s")|

2. |print(s, end="")|
3. |print(s)|
4. |print("s")|