Name.....Student ID.....Sec..... 3

1. What is the output of the following program?

```
1: randomList = [0, 2, 'a']
2: for entry in randomList:
3:   print("The entry is", entry)
4:   r = 1/int(entry)
5:   print("1/",entry,"is",r)
```

1) The program prints `1/0 is infinite` and finishes without any error.
2) The program prints `1/0 is ZeroDivisionError` and finishes without any error.
3) The program prints `The entry is 0` and finishes without any error.
4) The program prints `The entry is 0` and finishes with an ZeroDivisionError error.
5) The program does not print anything and finishes without any error.

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

```
1: a = ['Hello',' World', 2017]
2:   print(a[0])
```

1) `Hello World 2017`
2) `Hello`
3) `H`
4) `HW2`
5) None of the above choices is correct.

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

```
1: for x in [1,2,3]:
2:   print(x, end=' ')
```

1) `xxx`
2) `123`
3) `H`
4) `HW2`
5) None of the above choices is correct.

<u>Use the following code fragment to answer the next 3 questions.</u>

```
1:  def magic(str):
2:    length = len(str)
3:    if length > 2:
4:      tmp = ''
5:      for i in range(length-3,length):
6:        tmp = tmp+str[i]
7:      if tmp == 'ing':
8:        str = str+'ly'
9:      else:
10:       str = str+'ing'
11:   return str
12: print(magic(input()))
```

4. What is the output when the user's input string is `"Ting"`?
1) `Ting`
2) `Tly`
3) `Tingly`
4) `gniT`
5) None of the above choices is correct.

5. What is the output when the user's input string is `"ab"`?
1) `ab`
2) `ably`
3) `abingly`
4) `baing`
5) None of the above choices is correct.

6. What is the output when the user's input string is `"Love"`?
1) `Loving`
2) `Lovely`
3) `Love`
4) `evoLing`
5) None of the above choices is correct.

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

```
1: def num(seq):
2:   x = seq[0]
3:   for a in seq:
4:     if a < x:
5:       x = a
6:   return x
7: print(num([1, 2, -8, 0]))
```

1) `1`
2) `2`
3) `-8`
4) `0`
5) None of the above choices is correct.

8. What is the correct Python expression to represent the following mathematical expression?

$$\frac{(6+3)\times 2a}{5} - m$$

1) `(6 + 3) * 2a / 5 - m`
2) `6 + 3 * 2 * a / 5 - m`
3) `((6 + 3) * 2a / 5) - m`
4) `(6 + 3 * 2 * a) / 5 - m`
5) `(6 + 3) * 2 * a / 5 - m`

9. Which choice correctly calculates the expression:

$$\frac{1}{1}+\frac{1}{2}+\frac{1}{3}$$

1)
```
total = 0
for x in [1, 2, 3]:
  total = total + 1/x
print(total)
```

2)
```
total = 0
for x in range(3):
  total = total + 1/x
print(total)
```

3)
```
a = [1, 2, 3]
for x in a:
  x = 1/x
  total = sum(a)
print(total)
```

4)
```
a = [1, 2, 3]
a = 1/a
total = sum(a)
print(total)
```

5)
```
a = [1, 2, 3]
for x in range(3):
  a[x] = a[x]/x
  total = sum(a)
print(total)
```

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

```
1: n = 4
2: i = 0
3: while i < n:
4:   print(i,n-i)
5:   i = i+1
```

1)
```
0 4
1 3
2 2
3 1
```

2)
```
0 4
1 3
2 2
3 1
4 0
```

3)
```
0 0
1 1
2 2
3 3
4 4
```

4)
```
4 0
3 1
2 2
1 3
```

5)
```
0 1
1 2
2 3
3 4
4 5
```

11. What should the user input if he/she wants the following code to print `This is it.`

```
1: x = int(input())
2: y = int(input())
3: if x > y:
4:   print("No, no.")
5: else:
6:   if x < 15:
7:     print("This is it.")
8:   else:
9:     print("Na, Na.")
```

1)
```
10
7
```

2)
```
100
90
```

3)
```
10
10
```

4)
```
50
55
```

5)
```
20
40
```

12. Which choice is NOT a valid statement?

1) `isprime = False`
2) `Class = int("10")`
3) `function = input("Enter number: ")`
4) `string = "hello"*3`
5) All of the above choices

13. Consider the following statements:

A:
```
print(2*3)
```

B:
```
print(2**3)
```

C:
```
print(power(2,3))
```

D:
```
import math
print(math.power(2,3))
```

E:
```
import Math
print(Math.power(2,3))
```

What is the one to compute "two, raised to the third power", (i.e., 2^3)?

1) Only **A**
2) Only **B**
3) **B**, **C**, and **D**
4) **B**, **C**, and **E**
5) None of the above choices

14. What is the output of the following program if the user enters **190342** as an input?

```
1:  num = input("Enter a number: ")
2:  a = 0
3:  b = 0
4:  for i in range(len(num)):
5:    mod = num[i] % 2
6:    if mod > 0:
7:      a = a+1
8:    else:
9:      b = b+1
10: print (a,b)
```

1) `0 0`
2) `3 3`
3) `5 1`
4) An error occurs at line 5.
5) Two errors occur at lines 4 and 5.

15. What is the output of the following program if the user enters **6** as an input?

```
1:  my_list = [1,2,3,5,8,13,15,20,25,29]
2:  n = int(input("Choose a number: "))
3:  new_list = []
4:  for i in my_list:
5:    if i < n:
6:      new_list.append(my_list[i])
7:  print(new_list)
```

1) `[]`
2) `[1, 2, 3, 5]`
3) `[2, 3, 5, 13]`
4) `[1, 2, 3, 5, 8, 13]`
5) The program has an error.

16. What is the output of the following program?

```
1:  def list_call(lst):
2:    return [lst[1], lst[len(lst)-1]]
3:
4:  lst = [1,2,3,4,5,6]
5:  lst = list_call(lst)
6:  print(lst)
```

1) `[]`
2) `2, 6`
3) `[2, 6]`
4) `[[2, 6]]`
5) The program has an error.

17. Suppose that we have a text file, containing 4 lines:

data.txt

```
Hello my
World !
Computer
Programming
```

What is the output of the following program?

```
1:  lines = open('data.txt').read()
              .splitlines()
2:  for i in range(len(lines)-1,0,-1):
3:    if i%2 == 0:
4:      print(lines[i])
5:    else:
6:      pass
```

1) `Programming`
   `World !`
2) `Computer`
   `Hello my`
3) `Programming`
   `World`
   `my`
4) `Computer`
   `World`
5) `Computer`

18. We want to write a Python program to draw a triangle using * characters as shown below:

```
----*
---***
--*****
-*******
*********
```

Which are the correct expressions to be filled into the blanks **(A)** and **(B)** below?

```
1:  for i in range(5):
2:    dashes = '-'*(____(A)____)
3:    stars = '*'*(____(B)____)
4:    print(dashes + stars)
```

1) `(A): 5-i`
   `(B): 2*i-1`
2) `(A): i`
   `(B): 2*i`
3) `(A): 4-i`
   `(B): 2*i+1`
4) `(A): i`
   `(B): 2*i+1`
5) `(A): 4-i`
   `(B): 2*(4-i)+1`

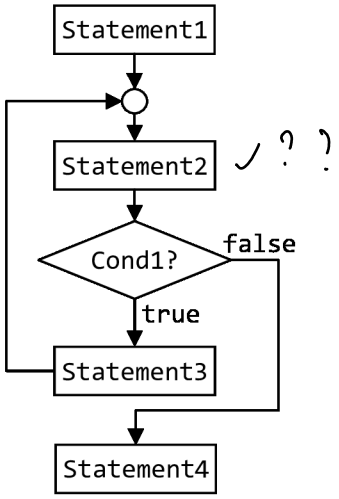
19. Let the list **X** be defined with the statement:

```
X = [1,2,3,4,5]
```

Which statement creates another list **Y** containing `[2,6,10]`?

1) `Y = [x*2 for x in X]`
2) `Y = [x*2 for x in X if x%2 == 0]`
3) `Y = [x*2 for x in X if x%2 == 1]`
4) `Y = [x for x in X if x>2]`
5) `Y = [x for x in X*2 if x%2 == 1]`

Use the flowchart below to answer the following 2 questions.



20. Which choice is correct about the flowchart?
    1) `Statement2` gets executed only once.
    2) `Statement2` gets executed at least once.
    3) `Statement3` gets executed only once.
    4) `Statement3` gets executed at least once.
    5) `Statement4` gets executed only once.

21. Which Python code segment is corresponding to the flowchart?

    1)
```
Statement1
Statement2
while Cond1:
  Statement3
Statement4
```

    2)
```
Statement1
Statement2
while not Cond1:
  Statement3
Statement4
```

    3)
```
Statement1
while True:
  Statement2
  if Cond1:
    break
  Statement3
Statement4
```

    4)
```
Statement1
while True:
  Statement2
  if not Cond1:
    break
  Statement3
Statement4
```

    5)
```
Statement1
Statement2
if not Cond1:
  Statement4
else:
  Statement3
```

22. Given two sequences, $A = (a_1, a_2, \ldots, a_n)$ and $B = (b_1, b_2, \ldots, b_n)$. The *mean squared error* (MSE) between A and B is defined as:

$$MSE = \frac{1}{n}\sum_{i=1}^{n}(a_i - b_i)^2$$

Suppose A and B are already defined as NumPy arrays, which expression correctly computes the MSE above?

    1) `sum((A-B)**2)/n`
    2) `sum(A**2-B**2)/n`
    3) `(1/n)*sum(A-B)**2`
    4) `(1/n)*(sum(A)-sum(B))**2`
    5) `(sum(A-B)/n)**2`

23. Consider the following Python shell session:

```
>>> import numpy as np
>>> data = np.loadtxt("data.txt",delimiter=",")
>>> data.size
6
>>> data.shape
(2, 3)
>>> data[1]
array([ 56.,  27.,  61.])
>>> data.T[1]
array([ 17.,  27.])
```

Which contents of the file `data.txt` would give the above results?

    1)
```
17,17,79
56,27,61
32,26,88
```

    2)
```
56,27,61
17,27,90
```

    3)
```
56,17
27,27
61,90
```

    4)
```
34,56
17,27
83,61
```

    5)
```
34,17,83
56,27,61
```

24. Given a Python shell session:

```
>>> list(range(____(A)____))
[5, 3, 1, -1, -3, -5]
```

Which choice should be used to fill in the blank (A) to get the result shown?

1) 5,-5
2) 5,-5,-1
3) 5,-6,2
4) 5,-5,-2
5) 5,-6,-2

range (start, end, step)

25. What is the output of the following program.

```
1: a = [1,2,3]
2: b = a + 4
3: print(b[2])
```

1) 2
2) 3
3) 4
4) 6
5) An error occurred.

26. What is the output of the following program.

```
1: a = [1,0,2,0,3,0,4,0]
2: i = 1
3: sum = 0
4: while i < 5:
5:   sum = sum+a[i]
6:   if i > 3:
7:     break
8:   i = i+1
9: print(sum)
```

1) 2
2) 3
3) 5
4) 6
5) 9

27. What is the output of the following program.

```
1: a = [[0,1,2],[0,1,2,3],[0,1,2,3,4]]
2: sum = 0
3: for i in range(1,3):
4:   for j in range(2,4):
5:     sum = sum+a[i][j]
6: print(sum)
```

1) 6
2) 9
3) 10
4) 16
5) Error occurred. Index out of range.

28. What choice filled in blank (A) will make the program output 6?

```
1: def M(x):
2:   sum = 0
3:   for i in range(len(x)):
4:     sum = sum+i
5:   return sum
6:
7: a = [[0],[1],[1,2],[1,2,3]]
8: ___(A)___
```

1) print(M(a))
2) print(M(a[1]))
3) print(M(a[2]))
4) print(M(a[3]))
5) print(M(a[4]))

Use the following code fragment to answer the next 2 questions.

A:
```
sum = 0
for i in range(0,11):
  sum = sum+i
print(sum)
```

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

C:
```
sum = 0
for i in range(10,0,-1):
  sum = sum+i
print(sum)
```

D:
```
sum = 0
for i in range(11,1,-1):
  sum = sum+i
print(sum)
```

29. Which pair of programs give the same output?

1) A and C
2) A and D
3) B and C
4) B and D
5) All code fragments give different outputs.

30. Which pair of programs run with the same number of iterations in the for loop (จำนวนรอบในคำสั่ง for)?

1) A and B
2) B and C
3) C and D
4) D and A
5) None of the above pairs.

31. What is the print out of the following program?

```
1: name='Good Morning'
2: print(name[-len(name)])
```

1) G
2) M
3) d
4) g
5) None of the above

32. What is the print out of the following program?

```
1: import numpy as np
2: a = np.array([1,2,3,5,8])
3: b = np.array([0,3,4,2,1])
4: c = a+b
5: c = c*a
6: print(c[2])
```

1) 7
2) 10
3) 12
4) 21
5) 28

33. What is the print out of the following program?

```
1: import numpy as np
2: a = np.array([0,1,0])
3: a = a+3
4: b = a+3
5: print(a[1]+b[2])
```

1) 2
2) 8
3) 10
4) 14
5) None of the above

34. What is the print out of the following program?

```
1: numbers = [1,2,3,4]
2: numbers.append('01204111')
3: print(len(numbers))
```

1) 4
2) 5
3) 8
4) 12
5) None of the above

35. What needs to be filled in blank **(A)** at line 6 to get the output as shown at line 8?

```
1: >>> table
2: array([[ 1,  2,  3,  4],
3:        [ 5,  6,  7,  8],
4:        [ 9, 10, 11, 12],
5:        [13, 14, 15, 16]])
6: >>> table2 =    (A)
7: >>> table2
8: [1, 6, 11, 16]
```

1) [table[i][i]
   for i in range(len(table))]
2) [table[i][i]
   for i in range(len(table[0]))]
3) [table[i][i]
   for i in range(len(table.shape))]
4) [table[i][i]
   for i in range(len(table.shape[0]))]
5) Both 1) and 2) are correct.

36. Consider the following list assignment:

```
a = [[1,2],[4,5],[7,8]]
```

which choice INCORRECTLY refers to a member of the above list?

1) a[0][0]
2) a[1][1]
3) a[1][2]
4) a[2][1]
5) More than one of the above choices

37. Consider the following array assignment:

```
import numpy as np
a = np.array([[1,2,3],[4,5,6]])
```

which choice INCORRECTLY refers to a member of the above array?

1) a[1][1]
2) a[1][2]
3) a[1][3]
4) a[2][2]
5) More than one of the above choices

38. Consider the following list assignment:

```
a = [1, 5, 8, 16, 5, 7, 2, 3]
```

which choice gives a different result from the others?

1) `print(a[1])`
2) `print(a[3]-a[len(a)-1])`
3) `print(a[-4])`
4) `print(a[3]-11)`
5) `print(a[int(4**(1/2))-1])`

39. Which '+' sign has a different meaning from the others?

1) `a = 1 + 2`
2) `b = 2.0 + 4.0`
3) `c = int('3') + int('6')`
4) `d = '4' + '8'`
5) `e = float('5') + float('10')`

40. Suppose user enters the values as in the following command lines.

```
n = int(input('Enter n: '))
m = int(input('Enter m: '))
```

Which choice gives the result of the following math series?

$$total = \sum_{i=m}^{n} \frac{1}{i}$$

1)
```
total = 0
for i in range(m,n+1):
  total = total + 1/i
```

2)
```
total = sum(
  [1/x for x in range(m,n+1)])
```

3)
```
nlist = list(range(m,n+1))
alist = [1/x for x in nlist]
total = sum(alist)
```

4)
```
import numpy as np
nlist = np.array(range(m,n+1))
total = sum(1/nlist)
```

5) All of the above answers are correct.

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

```
1: list1 = [1,2,3]
2: list2 = 'Num'
3: print(list1+list2)
```

1) `[1,2,3,'Num']`
2) `[1,2,3,'N','u','m']`
3) `[1,2,3]`
4) `'Num'`
5) Compilation error

Use the following code fragment to answer the next 4 questions.

Complete the fragment of this program which aims to find the greatest common divisor (หารร่วมมาก) or gcd (ห.ร.ม.) of **8** and **6**. For an example, the gcd of 12 and 8 is 4.

```
1: def find_gcd(n1,n2):
2:   found = False
3:   for n in range(____(A)____):
4:     if ____(B)____:
5:       ____(C)____
6:   if found:
7:     print(f"{n}")
8:
9: find_gcd(8,6)
```

42. Which choice should be filled in the blank **(A)**?

1) `n2,1,-1`
2) `n1,1`
3) `1,n2`
4) `1,n1`
5) `n1,0,-1`

43. Which choice should be filled in the blank **(B)**?

1) `n1%n2 == 0`
2) `n1%n == 0 and n2%n == 0`
3) `n2%n1 == 0`
4) `n2%n1 == 0 or n1%n2 == 0`
5) `n%n1 == 0 and n%n2 == 0`

44. Which choice should be filled in the blank **(C)**?

1)
```
break
found = false
```
2) `break`
3) `found = True`
4)
```
found = True
break
```
5) `pass`

45. What is the correct result printed on the screen?

1) `1`
2) `2`
3) `3`
4) `4`
5) `6`

46. Which choice is NOT a valid expression?
    1) `int(10)`
    2) `float(10)`
    3) `pow(10) -2 args`
    4) `abs(10)`
    5) All the above choices are invalid expressions.

47. Which choice gives a different answer from the others?
    1)
    ```
    word = "HelloWorld"
    for ch in range(10):
      print(word[ch])
    ```
    2)
    ```
    word = "HelloWorld"
    for ch in range(len(word)):
      print(word[ch])
    ```
    3)
    ```
    word = "HelloWorld"
    for ch in word:
      print(word[ch])
    ```
    Error
    4)
    ```
    word = "HelloWorld"
    for ch in word:
      print(ch)
    ```
    5) All the above choices give the same answer.

48. Which choice has the same meaning (can work in the same manner) as the following "for loop"?
    ```
    1: for i in range(1,10,3):
    2:   print(i)
    ```
    1 4 7
    1)
    ```
    while True:
      i = 1
      if i > 10:
        break
      print(i)
      i = i + 3
    ```
    always 1, ∞ loop
    2)
    ```
    i = 1
    while True:
      if i > 10:
        break
      print(i)
      i = i + 3
    ```
    should be >=
    3)
    ```
    while i < 10:
      i = 1
      print(i)
      i = i + 3
    ```
    ∞ loop
    4)
    ```
    i = 1
    while i < 10:
      print(i)
      i = i + 3
    ```
    1, 4, 7 / 4 7 10
    5) None of the above choices is correct.

49. Which choice is the correct definition of function `circle_area()` so that the code fragment below can work properly?
    ```
    1: import math
    2: r = float(input("Enter a radius"))
    3: area = circle_area(r)
    4: print(f"Area is {area:.2f}")
    ```
    1)
    ```
    def circle_area(r):
      print(float(math.pi*r*r))
    ```
    2)
    ```
    def circle_area(r):
      print(math.pi*math.pow(r,2))
    ```
    3)
    ```
    def circle_area(r):
      return(int(math.pi*r*r))
    ```
    4)
    ```
    def circle_area(r):
      return(math.pi*r*r)
    ```
    5) None of the above choices is correct.

50. What is the output of the following program?
    ```
    1: def selector(inp, x, offset):
    2:   str_len = len(inp)
    3:   result = 0
    4:   while offset < str_len:
    5:     if inp[offset] == x:
    6:       result = offset
    7:     offset = offset + 1
    8:   return result
    9:
    10: inp = "HelloWorld"
    11: a = selector(inp, 'l', 3)
    12: print(a)
    ```
    10
    3 4 5 .. 8
    1) 0
    2) 2
    3) 3
    4) 8
    5) 10

51. Which is the output of the following commands?
    ```
    1: n = 0
    2: for i in range(1,3):
    3:   for j in range(i):
    4:     n = n+j
    5:   n = n-i
    6: print(n)
    ```
    1 2 / 0 0 1 / 0 -1 0 / -1 -2
    1) 0
    2) 1
    3) -2
    4) 2
    5) No correct answer

52. Consider the following variable declaration:

```
a = [2,5,11,13,0,-5]
```

What is the value of `min(a)+max(a)+sum(a)`?

1) 8
2) 13
3) 26
4) 34
5) 44

53. Which is the output of the following program?

```
1: def add(a,b):
2:   a = a+10
3:   b = b+20
4: i = 2
5: j = 2
6: add(i,j)
7: print(i+j)
```

1) 4
2) 12
3) 14
4) 34
5) Compilation error

54. Which is the output of the following program?

```
1: a = [ 9, 8, 2, 5, 4 ]
2: b = []
3: for i in range(5):
4:   b.append(a[i]%5)
5: print(b)
```

1) [1.8, 1.6, 0.4, 1.0, 0.8]
2) [4, 3, 2, 0, 4]
3) [1, 1, 0, 1, 0]
4) [4, 3, -3, 0, -1]
5) No correct answer

55. Which is the output of the following program?

```
1: sum = 0
2: num1 = 25
3: num2 = 10
4: def find_sum():
5:   sum = num1+num2
6: find_sum()
7: print(sum)
```

1) 0
2) 10
3) 25
4) 35
5) No correct answer

56. Which is the output of the following program?

```
1: sum = 0
2: num1 = 25
3: num2 = 10
4: def find_sum():
5:   sum = num1+num2
6:   print(sum)
7: find_sum()
```

1) 0
2) 10
3) 25
4) 35
5) No correct answer

57. Which is the summation of members in each sub-list of list **a** to store in list **b**, and the output is as follows:

```
[3, 5, 7]
```

1)
```
a = [[1,2],[2,3],[3,4]]
b = []
for i in range(3):
  x = 0
  for j in range(2):
    x = x+a[i][j]
  b.append(x)
print(b)
```

2)
```
a = [[1,2],[2,3],[3,4]]
for i in range(3):
  x = 0
  for j in range(2):
    x = x+a[i][j]
  b.append(x)
print(b)
```

3)
```
a = [[1,2],[2,3],[3,4]]
b = []
for i in range(2):
  x = 0
  for j in range(3):
    x = x+a[i][j]
  b.append(x)
print(b)
```

4)
```
a = [[1,2],[2,3],[3,4]]
b = []
for i in range(3):
  x = 0
  for j in range(2):
    x = x+a[j][i]
  b.append(x)
print(b)
```

5) No correct answer

58. How many iterations (จำนวนรอบ) will the following code fragment run before it stops?

```
1: while True:
2:   n = int(input('Enter an integer: '))
3:   if n < 0:
4:     break
5:   print('Binary number is',dec_to_bin(n))
6: print('Bye!')
```

1) Infinite iterations: it will never stop because it's a forever Loop.
2) Ten iterations: **dec_to_bin()** means it will only accept 10 integer values.
3) Zero iteration: the **break** command will always stop the whole program.
4) Unknown: it depends on how **dec_to_bin()** handles integer values.
5) Unknown: it depends on the user's input.

59. What does the following code fragment do?

```
1: full_score = 100
2: raw_score = [31,56,73,49]
3: p = [x/full_score for x in raw_score]
4: NF = [1 for x in p if x >= 0.5]
5: print('The number is', len(p)-len(NF))
```

1) Find the maximum number of digits in the student's scores.
2) Find the minimum number of digits in the student's scores.
3) Find the average number of digits in the student's scores.
4) Count the number of students who score less than 50%.
5) Count the number of students who score 50% or more.

60. What does the following code fragment do?

```
1: a = []
2: b = []
3: raw_score = [31,56,73,49]
4: for x in raw_score:
5:   if (x%2 == 0):
       a.append(x)
6:   else:
7:     b.append(x)
8: print(a)
9: print(b)
```

1) Separate students with score less than 50% into one list and the others into another list.
2) Separate students with odd raw score into one list and the others into another list.
3) Separate students in the front half into one list and the others into another list.
4) Separate the No. 1 student into the first list, the No. 2 student into the second list, the No. 3 student into the first list, the No. 4 student into the second list, etc.
5) Separate student(s) with maximum score into one list and the others into another list.