socrative

MergeSort Part 2 Quiz

Score: ______

1. **The exact opposite of concatenation (i.e. joining, or merging) is**

Ⓐ Appending

Ⓑ Inserting

Ⓒ Cutting, Splitting, Slicing

Ⓓ Deleting

2. **Slicing (□□□□□□□) is the opposite of Concatenating.**

Ⓐ True

Ⓑ False

3. **To divide a string into multiple pieces, we use .split() method.**
To divide a list into one or more pieces, we use slice operator ([ ]).

Ⓐ True

Ⓑ False

4. **<u>HEAD PROBLEM</u>**
al = [5, 6, 7, 8]
To get the "head" of alist, we can use the slice al[:1].
What will be the value of it?

Ⓐ [5]

Ⓑ [5, 6, 7]

Ⓒ [ ] (list with no elements)

Ⓓ 5

Ⓔ None of the above

5. **With reference to <u>HEAD PROBLEM,</u> Option A and Option D are re-presented below:**
A. [5]
D. 5

They are both the same.

Ⓐ True

Ⓑ False

6. HEAD AND REST PROBLEM

al = [1, 2, 3, 4].
To divide al into **'head' ([1]) and 'rest' ([2, 3, 4])**, what are the slices to use?

Ⓐ **al[0] , al[0:]**

Ⓑ **al[:1], al[1:]**

Ⓒ **al[0], al[1:]**

Ⓓ None of the above

7. With reference to **HEAD AND REST PROBLEM**, Option B and Option C
are re-presented below:
B a[:1], a[1:]
C al[0], al[1:]

Compare the output of Option C with Option B.
There are at least two reasons why one is more preferable.
What are they?

____

____

____

8. al = [1, 2, 3, 4].
To rotate **al** left is to end up with **al = [2, 3, 4, 1]**.
That is, take the head element and place it at the end of the list.
What is the code which will make this happen?

Ⓐ **al = [2, 3, 4, 1]**

Ⓑ **al = [2, 3, 4] + [1]**

Ⓒ **al = al[1:] + al[:1]**

Ⓓ **al[:] = al[1:] + al[:1]**

Ⓔ **head = al[:1]**
rest = al[1:]
al = rest + head

Ⓕ head = al.**pop**(0)
al.**append**(head)

Ⓖ None of the above

9. al = [1, 2, 3, 4]
What is the result of **al[:2]?**

Ⓐ [1, 2]

Ⓑ [1, 2, 3]

Ⓒ [ ] (list with no elements)

Ⓓ None of the above

10. If **al** = [1, 2, 3, 4], then **al[2:]** is equal to

Ⓐ [2, 1]

Ⓑ [3, 4]

Ⓒ [2, 3, 4]

Ⓓ [2]

Ⓔ None of the above

11. **al** = [1, 2, 3, 4]
What is the result of **al[:2]** + **al[2:]**?

Ⓐ [1, 2]

Ⓑ [1, 2, 3]

Ⓒ [2, 2]

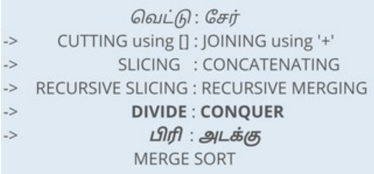
Ⓓ [1, 2, 3, 4]

Ⓔ None of the Above

12. □□□□□□□ : □□□□
-> CUTTING using [] : JOINING using '+'
-> SLICING : CONCATENATING
-> RECURSIVE SLICING : RECURSIVE MERGING
-> **DIVIDE** : **CONQUER**
-> □□□□ : □□□□□□
MERGE SORT

Ⓐ True

Ⓑ False



வெட்டு : சேர்
-> CUTTING using [] : JOINING using '+'
-> SLICING : CONCATENATING
-> RECURSIVE SLICING : RECURSIVE MERGING
-> **DIVIDE** : **CONQUER**
-> பிரி : அடக்கு
MERGE SORT

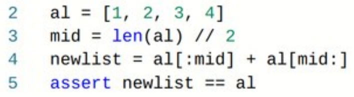
13. The value of **mid** in the given code snippet is

Ⓐ 0

Ⓑ 1

Ⓒ 2

Ⓓ 1.5

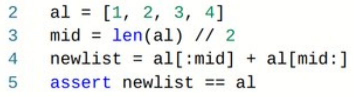


```
2   al = [1, 2, 3, 4]
3   mid = len(al) // 2
4   newlist = al[:mid] + al[mid:]
5   assert newlist == al
```

14. If you replace Line 3 with **mid = int(len(al)/2**),
the value of **mid** will remain the same.

Ⓐ True

Ⓑ False

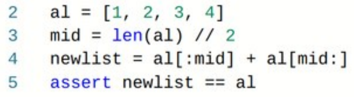


```
2   al = [1, 2, 3, 4]
3   mid = len(al) // 2
4   newlist = al[:mid] + al[mid:]
5   assert newlist == al
```

15. **newlist** will ***not*** contain the same number of elements as **al**.

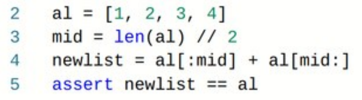
Ⓐ True

Ⓑ False



```
2   al = [1, 2, 3, 4]
3   mid = len(al) // 2
4   newlist = al[:mid] + al[mid:]
5   assert newlist == al
```

16. The assertion in Line 5 will not produce an error.

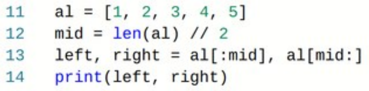


```
2   al = [1, 2, 3, 4]
3   mid = len(al) // 2
4   newlist = al[:mid] + al[mid:]
5   assert newlist == al
```

A True

B False

17. Line number 14 will produce what output?



```
11  al = [1, 2, 3, 4, 5]
12  mid = len(al) // 2
13  left, right = al[:mid], al[mid:]
14  print(left, right)
```

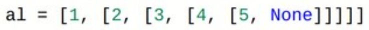
A [1, 2], [1, 2]

B [1, 2], [4, 5]

C [1, 2], [3, 4, 5]

D None of the above

18. The list **al** is an example of nested list. It has a length of



```
al = [1, [2, [3, [4, [5, None]]]]]
```

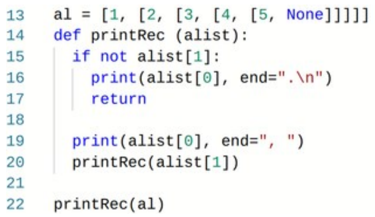
A 5

B 2

C 1

D 4

19. The **printRec** is a valid recursive function and it has one terminal case.

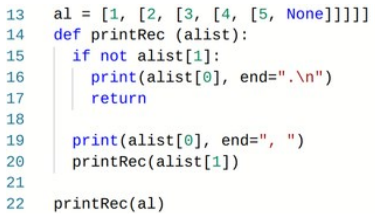


```
al = [1, [2, [3, [4, [5, None]]]]]
def printRec (alist):
  if not alist[1]:
    print(alist[0], end=".\n")
    return

  print(alist[0], end=", ")
  printRec(alist[1])

printRec(al)
```

A True

B False

20. The line number 22 will produce what output?



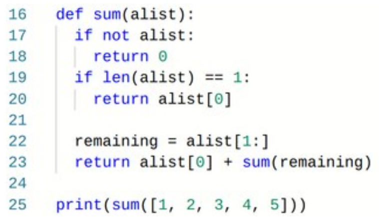
```
13  al = [1, [2, [3, [4, [5, None]]]]]
14  def printRec (alist):
15    if not alist[1]:
16      print(alist[0], end=".\n")
17      return
18
19    print(alist[0], end=", ")
20    printRec(alist[1])
21
22  printRec(al)
```

A **1, 2, 3, 4, 5.**

B **5, 4, 3, 2, 1.**

C None of the above.

21. The sum function is



```
def sum(alist):
  if not alist:
    return 0
  if len(alist) == 1:
    return alist[0]

  remaining = alist[1:]
  return alist[0] + sum(remaining)

print(sum([1, 2, 3, 4, 5]))
```

A a **recursive** function but not a fruitful function

B **a recursive** and **fruitful** function

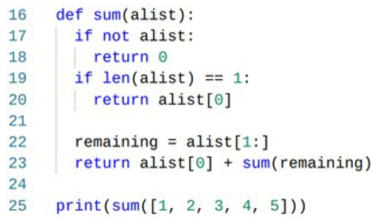
C non-recursive function

D none of the above

22. The **sum** function has one terminal case.

Ⓐ True

Ⓑ False

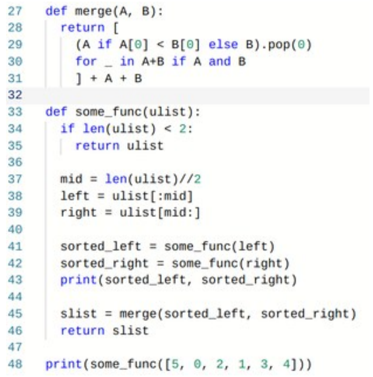


```
16  def sum(alist):
17    if not alist:
18      return 0
19    if len(alist) == 1:
20      return alist[0]
21
22    remaining = alist[1:]
23    return alist[0] + sum(remaining)
24
25  print(sum([1, 2, 3, 4, 5]))
```

23. The recursive **some_func** has only one terminal case.

Ⓐ True

Ⓑ False

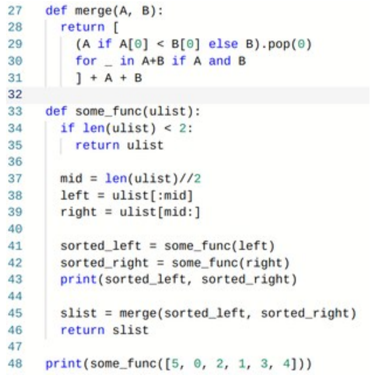


```
27  def merge(A, B):
28    return [
29      (A if A[0] < B[0] else B).pop(0)
30      for _ in A+B if A and B
31      ] + A + B
32
33  def some_func(ulist):
34    if len(ulist) < 2:
35      return ulist
36
37    mid = len(ulist)//2
38    left = ulist[:mid]
39    right = ulist[mid:]
40
41    sorted_left = some_func(left)
42    sorted_right = some_func(right)
43    print(sorted_left, sorted_right)
44
45    slist = merge(sorted_left, sorted_right)
46    return slist
47
48  print(some_func([5, 0, 2, 1, 3, 4]))
```

24. During the first call to **some_func(),**
in Line 38, the value of **left** will be assigned **[5, 0, 2]** and
in Line 39, the value of **right** will be assigned **[1, 3, 4]**.

Ⓐ True

Ⓑ False

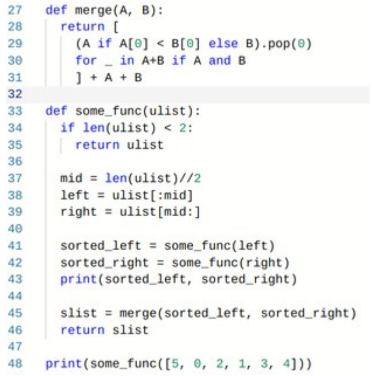


```
27  def merge(A, B):
28    return [
29      (A if A[0] < B[0] else B).pop(0)
30      for _ in A+B if A and B
31      ] + A + B
32
33  def some_func(ulist):
34    if len(ulist) < 2:
35      return ulist
36
37    mid = len(ulist)//2
38    left = ulist[:mid]
39    right = ulist[mid:]
40
41    sorted_left = some_func(left)
42    sorted_right = some_func(right)
43    print(sorted_left, sorted_right)
44
45    slist = merge(sorted_left, sorted_right)
46    return slist
47
48  print(some_func([5, 0, 2, 1, 3, 4]))
```

25. The output from Line 48 will be **[5, 4, 3, 2, 1, 0]**

Ⓐ True

Ⓑ False

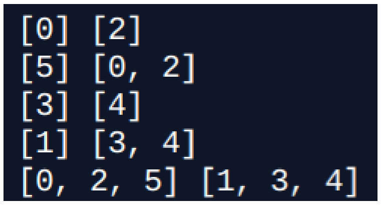


```
27  def merge(A, B):
28    return [
29      (A if A[0] < B[0] else B).pop(0)
30      for _ in A+B if A and B
31      ] + A + B
32
33  def some_func(ulist):
34    if len(ulist) < 2:
35      return ulist
36
37    mid = len(ulist)//2
38    left = ulist[:mid]
39    right = ulist[mid:]
40
41    sorted_left = some_func(left)
42    sorted_right = some_func(right)
43    print(sorted_left, sorted_right)
44
45    slist = merge(sorted_left, sorted_right)
46    return slist
47
48  print(some_func([5, 0, 2, 1, 3, 4]))
```

26. The intermediary output caused by Line 43 will be as shown here.

Ⓐ True

Ⓑ False



```
[0] [2]
[5] [0, 2]
[3] [4]
[1] [3, 4]
[0, 2, 5] [1, 3, 4]
```

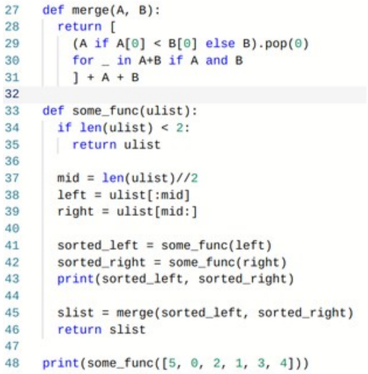
27. The most appropriate name that can replace **some_func()** is

Ⓐ **insertion_sort**

Ⓑ **selection_sort**

Ⓒ **merge_sort**

Ⓓ **histogram**



```
27  def merge(A, B):
28    return [
29      (A if A[0] < B[0] else B).pop(0)
30      for _ in A+B if A and B
31      ] + A + B
32
33  def some_func(ulist):
34    if len(ulist) < 2:
35      return ulist
36
37    mid = len(ulist)//2
38    left = ulist[:mid]
39    right = ulist[mid:]
40
41    sorted_left = some_func(left)
42    sorted_right = some_func(right)
43    print(sorted_left, sorted_right)
44
45    slist = merge(sorted_left, sorted_right)
46    return slist
47
48  print(some_func([5, 0, 2, 1, 3, 4]))
```

28. Assume **al =** [2, 1, 4, 3, 6, 5, 8, 7] and we want to mergesort it.
After the first conquer step, we will have **[1, 2], [3, 4]**, and **[5, 6], [7, 8].**

On visual examination, it is obvious all that needs to be done is ***concatenate*** the sublists to get the sorted list.

This illustrative example can be a source for inspiration to improve the **merge algorithm** so that it can be very efficient when dealing with almost sorted lists. What will you do?

29. Modify the **mergesort** algorithm to eliminate duplicate elements during the process of sorting.
If **al = [4, 5, 6, 1, 2, 1, 2, 3],** then after the sorting is complete the result must be
al = [1, 2, 3, 4, 5, 6].