mid_exam

April 21, 2021

1 Mid-term Exam

1. You may use internet search engines such as google or stackoverflow to get help on-line.
2. Failure of uploading the solution copy is your fault.
3. You must not communicate with any living creature online.
4. You must not talk.

2 1. Make a python code that prints out your name and student id number ( )

Your solution must be provided in the following cell.

[3]:
```
# your program must be provided here.
```

3 2. Make a function tha computes the sum of the numbers in the list.

[4]:
```
input_list = [1, 3, 5, 7, 9]
```

[5]:
```
def sum_function(in_list):  # do not change the function definition
    # your program must be provided below.
    pass
```

[6]:
```
print(sum_function(input_list))
```

```
None
```

End.

4 3. Age difference

Your function takes two arguments:

1. current father's age (years)
2. current age of his son (years)

alculate how many years ago the father was twice as old as his son (or in how many years he will be twice as old).

[8]:
```
def twice_as_old(dad, son):  # do not change function definition.
    # your solution here
    pass
```

[9]:
```
print(twice_as_old(36, 7))  # output must be 22
```

```
None
```

[10]:
```
print(twice_as_old(22, 1))  # output must be 20
```

```
None
```

5 4. Add Two Arrays

Create a function called `addTwoArrays()` that combines two arrays of equal length, summing each element of the first with the corresponding element in the second, returning the "combined" summed array.

[12]:
```
def addTwoArrays(a, b):
    pass
```

[13]:
```
print(addTwoArrays([1, 2], [3, 4]))  # => [5, 7]
```

```
None
```

[14]:
```
print(addTwoArrays(['a'], ['b']))  # => ['ab']
```

```
None
```

6 5. Binary Number

Given an array of ones and zeroes, convert the equivalent binary value to an integer.

Eg: `[0, 0, 0, 1]` is treated as 0001 which is the binary representation of 1. - Testing: `[0, 0, 1, 0]` ==> 2 - Testing: `[0, 1, 0, 1]` ==> 5 - Testing: `[1, 0, 0, 1]` ==> 9

[15]:
```
def binary2int(array):
    pass
```

[16]:
```
print(binary2int([0,0,1,0]))
```

```
None
```

[19]:
```
b = [1, 0, 0, 0, 1]
n = binary2int(b)
print(f'N={n} for b={b}')
```

```
N=None for b=[1, 0, 0, 0, 1]
```

7 6. Miles to kilometers

Sometimes, I want to quickly be able to convert miles per imperial gallon into kilometers per liter.

Create an application that will display the number of kilometers per liter (output) based on the number of miles per imperial gallon (input).

Make sure to round off the result to two decimal points. If the answer ends with a 0, it should be rounded off without the 0. So instead of 5.50, we should get 5.5.

Some useful associations relevant to this kata: 1 Imperial Gallon = 4.54609188 litres 1 Mile = 1.609344 kilometres

[20]:
```
def miles2km(mile_per_gallon):
    pass
```

[21]:
```
print( miles2km(12) )  # => 4.25
```

```
None
```

[22]:
```
print( miles2km(36) )  # => 12.74
```

```
None
```

8 7. Rock Paper Scissors

The function has to return which player won! In case of a draw return `Draw!`

[23]:
```
def rps_play (player1, player2):
    pass
```

[24]:
```
print(rps_play('rock', 'scissors'))  # 'player 1 won!'
```

```
None
```

[25]:
```
print(rps_play('paper', 'paper'))  # 'Draw!'
```

```
None
```

[26]:
```
print(rps_play('scissors', 'rock'))  # 'player 2 won!'
```

```
None
```

9 8. Character Counter.

Make a function `char_count(char, string)` that calculates how many times the character appears in the given text.

For example, - `char_count('o', 'hello')` returns 1 because 'hello' has one occurance of 'o' - `char_count('d', 'good morning dear')` returns 2 because there are two 'd's in the input string.

[33]:
```
def char_count(char, string):
    # your code here
    pass
```

[35]:
```
# do not toch this string!
string_pride = '''It is a truth universally acknowledged, that a single man in
      possession of a good fortune, must be in want of a wife.

      However little known the feelings or views of such a man may be
      on his first entering a neighbourhood, this truth is so well
      fixed in the minds of the surrounding families, that he is
      considered the rightful property of some one or other of their
      daughters.

      "My dear Mr. Bennet," said his lady to him one day, "have you
      heard that Netherfield Park is let at last?"

      Mr. Bennet replied that he had not.

      "But it is," returned she; "for Mrs. Long has just been here, and
      she told me all about it."

      Mr. Bennet made no answer.

      "Do you not want to know who has taken it?" cried his wife
      impatiently.

      "_You_ want to tell me, and I have no objection to hearing it."

      This was invitation enough.

      "Why, my dear, you must know, Mrs. Long says that Netherfield is
      taken by a young man of large fortune from the north of England;
      that he came down on Monday in a chaise and four to see the
      place, and was so much delighted with it, that he agreed with Mr.
      Morris immediately; that he is to take possession before
      Michaelmas, and some of his servants are to be in the house by
      the end of next week.'''
```

[36]:
```
print( char_count('i', string_pride))
```

```
None
```

[37]:
```
string_soho = '''

          .
                .
```

```
          ,              .
                   .

 .                      .

 .
          ,

                         .

    .
  .
           .
   .


   .
             .
   .           .


          .

      .
 .                   .
'''
```

[38]:
```python
print( char_count(' ', string_soho))
```

None

[43]:
```python
string_laodong = """
Đề xuất của Bộ Lao động, Thương binh và Xã hội rất có lợi cho người lao động. Tất nhiên, nếu đóng với thời gian ngắn hơn, người lao động phải chấp nhận hưởng mức lương hưu ít hơn" - ông Thọ nhận định.

Khi phóng viên đặt câu hỏi, việc người lao động được nhận lương hưu sớm có gây ảnh hưởng đến việc cân bằng quỹ BHXH hay không? Ông Thọ cho biết, đây cũng là bài toán về cách tính hưởng lương hưu một khi đề xuất của Bộ Lao động, Thương binh và Xã hội được các cơ quan chức năng đồng ý.

"Bộ Lao động, Thương binh và Xã hội đã có đề xuất thì chắc bộ sẽ có phương án để thay đổi cách tính lương hưu cho hợp lý, đảm bảo quỹ BHXH không bị ảnh hưởng. Theo tôi, Ban soạn thảo cần phải tính toán, nghiên cứu kỹ số năm đóng và số năm hưởng để đưa ra công thức tính lương hưu cho phù hợp" - ông Thọ nêu ý kiến.
```

```
Theo thạc sĩ Luật Uông Quang Huy - Phó Chủ tịch Công đoàn Điện lực Việt Nam,␣
↪hiện nay, việc tiếp cận với chính sách lương hưu của người lao động khi về␣
↪già là quá khó khăn khi điều kiện về số năm đóng BHXH quá dài (20 năm) và␣
↪đặc biệt sau khi nâng tuổi nghỉ hưu từ năm 2021.
"""
```

[44]:
```python
print( char_count('v', string_laodong))
```

None

[45]:
```python
string_Dostoevsky = """

07      2021
        «               ,                       »
15      - 27    2021
19:00 - 20:30

        ,  .     , 4,       271

 2021                        200-         .  .       .                   ␣
↪                            .                          ,          ␣
↪                ,          .                                    ␣
↪              .

       «   »              «      »         Storytel                      ␣
↪     ,                                                             .

     :

15     .     1. «               (          )»

       -                  ,            .                         ,         ␣
↪          :       ,                             ,                 ,       ␣
↪                                         .                            ,␣
↪    ,                    .                         ,    ,       ,  ␣
↪       ,                                                 ,                ␣
↪    ,                      :                  ,                          ␣
↪                              .
"""
```

[51]:
```python
print( char_count(' ', string_Dostoevsky) )
```

None

10 9. Calculate the sum of the unicodes of all the characters in the string.

[54]:
```
def unicode_sum(string):
    pass
```

[56]:
```
string_Dostoevsky.__spec__
```

```
---------------------------------------------------------------------------
AttributeError                            Traceback (most recent call last)
<ipython-input-56-7d70f8c922a4> in <module>
----> 1 string_Dostoevsky.__spec__

AttributeError: 'str' object has no attribute '__spec__'
```

[62]:
```
n1 = unicode_sum(string_pride)
print(f'The sum of unicodes of the string is ', n1)
```

```
The sum of unicodes of the string is  None
```

[63]:
```
n2 = unicode_sum(string_laodong)
print(f'The sum of unicodes of the string is ', n2)
```

```
The sum of unicodes of the string is
```

[64]:
```
n3 = unicode_sum(string_soho)
print(f'The sum of unicodes of the string is ', n3)
```

```
The sum of unicodes of the string is  None
```

[65]:
```
n4 = unicode_sum(string_Dostoevsky)
print(f'The sum of unicodes of the string is ', n4)
```

```
The sum of unicodes of the string is  None
```

[67]:
```
# Do not touch!
# It will produce proper output when the function is ready.
print(f'The sum of all the 4 sums is {n1 + n2 + n3 + n4}')
```

```
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
<ipython-input-67-7de223843672> in <module>
      1 # Do not touch!
----> 2 print(f'The sum of all the 4 sums is {n1 + n2 + n3 + n4}')

TypeError: unsupported operand type(s) for +: 'NoneType' and 'NoneType'
```

11 10. Traffic light

You're writing code to control your town's traffic lights. You need a function to handle each change from `green`, to `yellow`, to `red`, and then to `green` again.

Complete the function that takes a string as an argument representing the current state of the light and returns a string representing the state the light should change to.

For example, update_light('green') should return 'yellow'.

[69]:
```
def update_light(current_light):
    # your code
    pass
```

[71]:
```
print(update_light('green'))  # => 'yellow'
```

```
None
```

[72]:
```
print(update_light('red'))  # => 'green'
```

```
None
```

[73]:
```
print(update_light('yellow'))  # => 'red
```

```
None
```

12 Extra Point. Traffic light with python's dictionary data type

Make another version of `update_light()` that uses dictionary.

Correctly solving this problem gives you extra point.

[74]:
```
def update_light_dictionary(current_light):
    pass
```

[75]:
```
print(update_light_dictionary('green'))
```

```
None
```

[76]:
```
print(update_light_dictionary('yello'))
```

```
None
```

[77]:
```
print(update_light_dictionary('red'))
```

```
None
```

13 End.

Check.

- You must provide correct solution for Problem 1. Otherwise, you will fail.

Warnings - No cheating is allowed. - On sight cheating will result in F. - If any report about bad behavoirs of someone is reported, the person will be asked to have an additional face-to-face oral examination to test his/her skill level of python programming. If the level is not found to match the expectation given by the exam score, his/her final grade will result in F.

[ ]: