Data-X HW0 Sp18

January 24, 2018

1 Homework 0

In this homework you will complete a couple of simple exercises in order to show your understanding with Python. If these exercises are challenging or new to you, you may want to reconsider taking the class and/or brush up on your Python skills. For the following exercises you are not allowed to use any Python packages (i.e. Numpy, Pandas, etc.).

1.0.1 Lists

Create an empty Python list called 'a' in the cell below.

```
In [7]: a = list()
        print('The new object a: ', a)

The new object a:  []
```

Store all values between 1-100 (inclusive) with increments of 3 (i.e. 1, 4, 7...) in 'a'.

```
In [8]: for i in range(1,101,3):
            a.append(i)
        print('Now the list "a" is: ', a)

Now the list "a" is:  [1, 4, 7, 10, 13, 16, 19, 22, 25, 28, 31, 34, 37, 40, 43, 46, 49, 52, 55,
```

Create another list called 'a2' with numbers from 2-46 (inclusive) with increments of 0.5 (i.e. 2, 2.5, 3...).

```
In [9]: # With Numpy
        # import numpy as np
        # a2 = list(np.arange(2,46.5,0.5))

        # Without Numpy
        a2 = list()
        for i in range(2,46):
            a2.append(i)
            a2.append(float(i+0.5))
```

```
        a2.append(46)


        print('The list a2 is: ', a2)
```

```
The list a2 is:  [2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7, 7.5, 8, 8.5, 9, 9.5, 10, 10.5, 11,
```

Double every even integer element from list 'a'. Store the results back in 'a'.

```
In [10]: # Way 1
         a = [x*2 for x in a]

         # Way 2
         # for pos, e in enumerate(a):
            # a[pos] = e*2

         print('The "new" list "a" is: ', a)
```

```
The "new" list "a" is:  [2, 8, 14, 20, 26, 32, 38, 44, 50, 56, 62, 68, 74, 80, 86, 92, 98, 104,
```

Add all numbers in 'a' except for the 2nd and 21st elements (the 2nd element here means the element at list index 1).

```
In [12]: aux = int()
         for pos, i in enumerate(a):
             if (pos != 1) and (pos != 20):
                 aux += i
         print('The sum is: ', aux)
```

```
The sum is:  3304
```

Calculate the mean of 'a'.

```
In [15]: if len(a) > 0:
             print (float(sum(a)/len(a)))
         else:
             print('The list a don\'t have any element.')
```

```
101.0
```

1.0.2 Strings

Create an empty list called 'b'.

```
In [16]: b = list()
         print('The new object b: ', b)
```

```
The new object b:  []
```

Store the words in the sentence below as elements into the list 'b'.
'I am so excited about Data-X. It is important to be able to work with data.'

```
In [17]: b = 'I am so excited about Data-X. It is important to be able to work with data.'.split
         print('Now the list b is: ', b)
```

```
Now the list b is:  ['I', 'am', 'so', 'excited', 'about', 'Data-X.', 'It', 'is', 'important', 't
```

Return the count of the occurences of the lower-case letter 'e' in the list 'b'.

```
In [18]: ocurrences = int()
         for e in b:
             if 'e' in e:
                 ocurrences += e.count('e')
         print("The number of ocurrences of the lowe-case letter 'e': ", ocurrences)
```

```
The number of ocurrences of the lowe-case letter 'e':  4
```

Replace every lower- or upper-case letter 'i' in the list b with a '1'.

```
In [19]: for pos, e in enumerate(b):
             if 'i' in e:
                 b[pos] = e.replace('i', '1')
             if 'I' in e:
                 b[pos] = e.replace('I', '1')
         print('My new list "b" is: ', b)
```

```
My new list "b" is:  ['1', 'am', 'so', 'exc1ted', 'about', 'Data-X.', '1t', '1s', '1mportant', '
```

Append the string "This is the end of the first HW." to the list 'b'.

```
In [26]: b.append("This is the end of the first HW.")
         print("The new list 'b' is: ", b)
```

```
The new list 'b' is:  ['1', 'am', 'so', 'exc1ted', 'about', 'Data-X.', '1t', '1s', '1mportant',
```

Print 'b' as ONE string backwards (starting with "WH tsrif...").

```
In [35]: out = str()
         for i in (b[::-1]):
             out += i[::-1]
         print("the string backwards is: ", out)
```

```
.WH tsrif eht fo dne eht si sihT.atadht1wkrowotelbaebottnatropm1s1t1.X-ataDtuobadet1cxeosma1
```

1.0.3 Dictionaries

Put the following in a dictionary called 'codes':
Keys: 1001, 1002, 1003, 1004, 1005
Values: 'Alpha', Beta, 'Gamma, 'Delta', 'Tau'
then traverse the dictionary by its keys and change every value to be all lower case.

```
In [33]: codes = {1001:'Alpha', 1002:'Beta', 1003:'Gamma', 1004:'Delta', 1005:'Tau'}
         for k in codes:
             codes[k] = codes[k].lower()
         print('The codes dictionary in lower-case: ', codes)
```

```
The codes dictionary in lower-case:  {1001: 'alpha', 1002: 'beta', 1003: 'gamma', 1004: 'delta',
```

Delete 'alpha' from the dictionary.

```
In [21]: # if we know the key of alpha
         # del codes[1001]

         # If we don't know the key of alpha:
         for k in codes:
             if codes[k] == 'alpha':
                 del codes[k]
                 break
         print('Now codes dictionary is: ', codes)
```

```
Now codes dictionary is:  {1002: 'beta', 1003: 'gamma', 1004: 'delta', 1005: 'tau'}
```

1.0.4 Sets

Create a set called 'c' with the all the odd numbers less than 10.

```
In [22]: c = set([x for x in range(1,10,2)])
         print('My new set "c" is: ', c)
```

```
My new set "c" is:  {1, 3, 5, 7, 9}
```

Create another set called 'd' with elements 2, 5, 10, 30.

```
In [23]: d = set([2,5,10,30])
         print('My new set "d" is: ', d)
```

```
My new set "d" is:  {2, 10, 5, 30}
```

Find the union between sets 'c' and 'd' and store this in a new set called 'e'.

```
In [24]: e = c.union(d)
         print('My new set "e" is: ', e)
```

```
My new set "e" is:  {1, 2, 3, 5, 7, 9, 10, 30}
```

Find the intersection between sets 'c' and 'd'.

```
In [25]: print('The intersection between sets "c" and "d" is: ', c.intersection(d))
```

```
The intersection between sets "c" and "d" is:  {5}
```