

Homework 2

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.).

Please print the output of each question in a new cell below your code

Lists

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

```
In [3]: a = list()
```

```
In [5]: print(a)
```

```
[]
```

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

```
In [17]: a = list(range(1, 101, 3))
```

```
In [18]: print(a)
```

```
[1, 4, 7, 10, 13, 16, 19, 22, 25, 28, 31, 34, 37, 40, 43, 46, 49, 52, 55, 58, 61, 64, 67, 70, 73, 76, 79, 82, 85, 88, 91, 94, 97, 100]
```

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

```
In [31]: a2 = [2+i*0.5 for i in range(int((46-2)/0.5)+1)]
```

```
In [32]: print(a2)
```

```
[2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, 6.0, 6.5, 7.0, 7.5, 8.0, 8.5, 9.0, 9.5, 10.0, 10.5, 11.0, 11.5, 12.0, 12.5, 13.0, 13.5, 14.0, 14.5, 15.0, 15.5, 16.0, 16.5, 17.0, 17.5, 18.0, 18.5, 19.0, 19.5, 20.0, 20.5, 21.0, 21.5, 22.0, 22.5, 23.0, 23.5, 24.0, 24.5, 25.0, 25.5, 26.0, 26.5, 27.0, 27.5, 28.0, 28.5, 29.0, 29.5, 30.0, 30.5, 31.0, 31.5, 32.0, 32.5, 33.0, 33.5, 34.0, 34.5, 35.0, 35.5, 36.0, 36.5, 37.0, 37.5, 38.0, 38.5, 39.0, 39.5, 40.0, 40.5, 41.0, 41.5, 42.0, 42.5, 43.0, 43.5, 44.0, 44.5, 45.0, 45.5, 46.0]
```

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

```
In [36]: a = [x+x*((x+1)%2) for x in a]
```

```
In [37]: print(a)
```

```
[1, 8, 7, 20, 13, 32, 19, 44, 25, 56, 31, 68, 37, 80, 43, 92, 49, 104, 55, 116, 61, 128, 67, 140, 73, 152, 79, 164, 85, 176, 91, 188, 97, 200]
```

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

```
In [38]: s = sum(a)-a[1]-a[20]
```

```
In [39]: print(s)
```

```
2532
```

1.6 Calculate the mean of 'a'.

```
In [40]: mean = sum(a)/len(a)
```

```
In [41]: print(mean)
```

```
76.5
```

1.7 Delete all elements greater than the mean value from list 'a'

```
In [44]: a = [x for x in a if x <= mean]
```

```
In [45]: print(a)
```

```
[1, 8, 7, 20, 13, 32, 19, 44, 25, 56, 31, 68, 37, 43, 49, 55, 61, 67, 73]
```

Strings

2.1 Create an empty list called 'b'.

```
In [46]: b = list()
```

```
In [47]: print(b)
```

```
[]
```

2.2 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 [104]: string = 'I am so excited about Data-X. It is important to be able to work with data'
string = string.replace('.', '')
b = string.split(' ')
```

```
In [105]: print(b)

['I', 'am', 'so', 'excited', 'about', 'Data-X', 'It', 'is', 'important', 'to', 'be', 'able', 'to', 'work', 'with', 'data']
```

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

```
In [106]: count = 0
for s in b:
    count = count + s.count('e')
```

```
In [107]: print(count)
```

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

```
In [108]: for i,s in enumerate(b):
    b[i] = s.replace('I','1')
    b[i] = b[i].replace('i','1')
```

```
In [109]: print(b)

['1', 'am', 'so', 'exc1ted', 'about', 'Data-X', '1t', '1s', '1mportant', 'to', 'be', 'able', 'to', 'work', 'w1th', 'data']
```

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

```
In [110]: b.append('This is the end of the first HW.')
```

```
In [111]: print(b)

['1', 'am', 'so', 'exc1ted', 'about', 'Data-X', '1t', '1s', '1mportant', 'to', 'be', 'able', 'to', 'work', 'w1th', 'data', 'This is the end of the first HW.']
```

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

```
In [118]: string = ' '.join(b)
string = string.replace('.', '')
string[::-1]
```

```
Out[118]: 'WH tsrif eht fo dne eht si sihT atad ht1w krow ot elba eb ot tnatropm1 s
1 t1 X-ataD tuoba det1cxe os ma 1'
```

Dictionaries

3.1 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 [124]: codes = {1001: 'Alpha', 1002: 'Beta',  
                  1003: 'Gamma', 1004: 'Delta',  
                  1005: 'Tau'}
```

```
In [125]: print(codes)  
  
{1001: 'Alpha', 1002: 'Beta', 1003: 'Gamma', 1004: 'Delta', 1005: 'Tau'}
```

3.2 Delete 'alpha' from the dictionary.

```
In [ ]: codes.pop(1001)
```

```
In [131]: print(codes)  
  
{1002: 'Beta', 1003: 'Gamma', 1004: 'Delta', 1005: 'Tau'}
```

Sets

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

```
In [132]: c = set(range(1,10,2))
```

```
In [133]: print(c)  
  
{1, 3, 5, 7, 9}
```

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

```
In [137]: d = {2, 5, 10, 30}
```

```
In [138]: print(d)  
  
{2, 10, 5, 30}
```

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

```
In [141]: e = c.union(d)
```

```
In [142]: print(e)
```

```
{1, 2, 3, 5, 7, 9, 10, 30}
```

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

```
In [146]: f = c.intersection(d)
```

```
In [148]: print(f)
```

```
{5}
```