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 [1]:
```
#your code here
a = list()
```

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

In [2]:
```
#your code here
a = list(range(1,101,3))
a
```

```
Out[2]: [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 [3]: #your code here
        a2 = [x * 0.5 for x in range(4,93)]
        a2
```

```
Out[3]: [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 [4]:
```
#your code here
for i in range(len(a)):
    if a[i] % 2 == 0:
        a[i] = a[i]*2
a
```

Out[4]:
```
[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 [5]:
```
#your code here
#remove 8,61
a.pop(20)
a.pop(1)
sum(a)
```

Out[5]: 2532

1.6 Calculate the mean of 'a'.

In [6]:
```
#your code here
mean_a = sum(a) / len(a)
mean_a
```

Out[6]: 79.125

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

In [7]:
```
#your code here
a = [x for x in a if x <= mean_a]
a
```

Out[7]: [1, 7, 20, 13, 32, 19, 44, 25, 56, 31, 68, 37, 43, 49, 55, 67, 73, 79]

Strings

2.1 Create an empty list called 'b'.

In [8]:
```
#your code here
b = list()
```

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 [9]:
```
#your code here
b = 'I am so excited about Data-X. It is important to be able to work
with data.'
b= b.split()
b
```

Out[9]:
```
['I',
 'am',
 'so',
 'excited',
 'about',
 'Data-X.',
 'It',
 'is',
 'important',
 'to',
 'be',
 'able',
 'to',
 'work',
 'with',
 'data.']
```

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

In [10]:
```
#your code here
count = 0
e = 0

for i in range(len(b)):
    e = b[i].count("e")
    count = count + e
count
```

Out[10]:
```
4
```

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

In [11]:
```
#your code here
for i in range(len(b)):
    b[i] = b[i].replace("i","1")
    b[i] = b[i].replace("I","1")
b
```

Out[11]:
```
['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 [12]:
```
#your code here
b.append('This is the end of the first HW.')
```

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

In [13]:
```
#your code here
for i in range(len(b)):
    b[i] = b[i][::-1]
b[::-1]
```

Out[13]:
```
['.WH tsrif eht fo dne eht si sihT',
 '.atad',
 'ht1w',
 'krow',
 'ot',
 'elba',
 'eb',
 'ot',
 'tnatropm1',
 's1',
 '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 [14]:
```
#your code here
codes = {1001: 'Alpha', 1002: 'Beta', 1003:'Gamma', 1004:'Delta', 1005
:'Tau'}
for k, v in codes.items():
    print(k)
codes = {k : v.lower() for k, v in codes.items()}
codes
```

```
1001
1002
1003
1004
1005
```

Out[14]:
```
{1001: 'alpha', 1002: 'beta', 1003: 'gamma', 1004: 'delta', 1005: 't
au'}
```

3.2 Delete 'alpha' from the dictionary.

In [15]:
```
#your code here
{k: v for k, v in codes.items() if v != 'alpha'}
```

Out[15]:
```
{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 [16]:
```
#your code here
c = set([1, 3, 5, 7, 9])
c
```

Out[16]:
```
{1, 3, 5, 7, 9}
```

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

In [17]:
```
#your code here
d = set([2, 5, 10, 30])
d
```

Out[17]:
```
{2, 5, 10, 30}
```

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

In [18]:
```
#your code here
e = set.union(c,d)
e
```

Out[18]: {1, 2, 3, 5, 7, 9, 10, 30}

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

In [19]:
```
#your code here
set.intersection(c,d)
```

Out[19]: {5}