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.).

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Mandatory : Please print the output of each question below your code

Lists

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

```
In [1]: #your code here
        a = []
        a

Out[1]: []
```

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
i = 1
while i <= 100:
    a.append(i)
    i = i + 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 = []
i = 2
while i <= 46:
    a2.append(i)
    i = i + 0.5
a2
```

```
Out[3]: [2,
         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
temp = [2 * i for i in a]
a = temp
a
```

Out[4]:
```
[2,
 8,
 14,
 20,
 26,
 32,
 38,
 44,
 50,
 56,
 62,
 68,
 74,
 80,
 86,
 92,
 98,
 104,
 110,
 116,
 122,
 128,
 134,
 140,
 146,
 152,
 158,
 164,
 170,
 176,
 182,
 188,
 194,
 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 and similarly for the 21st element).

In [5]:
```
#your code here
sum(a) - (a[1] + a[20])
```

Out[5]:
```
3304
```

1.6 Calculate the mean of 'a'.

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

Out[6]: 101.0

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

In [7]:
```
#your code here
temp = []
for i in range(len(a)):
    if float(a[i]) <= m:
        temp.append(a[i])
a = temp
a
```

Out[7]: [2, 8, 14, 20, 26, 32, 38, 44, 50, 56, 62, 68, 74, 80, 86, 92, 98]

Strings

2.1 Create an empty list called 'b'.

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

Out[8]: []

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
s = 'I am so excited about Data-X. It is important to be able to work wi
th data.'
b = s.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_e = 0
for i in b:
    count_e = count_e + i.count('e')
count_e
```

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)):
    x = b[i].replace('i', '1').replace('I', '1')
    b[i] = x
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.")
b
```

Out[12]:
```
['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 [13]:
```
#your code here
temp = [i[::-1] for i in b]
res = ' '.join(reversed(temp))
print(res)
```

```
.WH tsrif eht fo dne eht si sihT .atad ht1w krow ot elba eb ot tnatropm
1 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
d = {1001: 'Alpha', 1002: 'Beta', 1003: 'Gamma', 1004: 'Delta', 1005: 'T
au'}
for k, v in d.items():
    t = v.lower()
    d[k] = t
d
```

Out[14]:
```
{1001: 'alpha', 1002: 'beta', 1003: 'gamma', 1004: 'delta', 1005: 'ta
u'}
```

3.2 Delete 'alpha' from the dictionary.

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

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 = [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 = [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 = list(set(c) | set(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
f = list(set(c) & set(d))
f
```

Out[19]: [5]