In [1]:
```
import random
```

In [20]:
```
random.seed(100)
```

In [18]:
```
[random.random() for x in range(10)]
```

Out[18]:
```
[0.1456692551041303,
 0.45492700451402135,
 0.7707838056590222,
 0.705513226934028,
 0.7319589730332557,
 0.43351443489540376,
 0.8000204571334277,
 0.5329014146425713,
 0.08015370917850195,
 0.45594588118356716]
```

In [21]:
```
[random.random() for x in range(10)]
```

Out[21]:
```
[0.1456692551041303,
 0.45492700451402135,
 0.7707838056590222,
 0.705513226934028,
 0.7319589730332557,
 0.43351443489540376,
 0.8000204571334277,
 0.5329014146425713,
 0.08015370917850195,
 0.45594588118356716]
```

In [22]:
```
a=3

while a<10:
    a+=1

print (a)
```

```
10
```

In [24]:
```
a=3
b=a
a=5

print (b)
```

```
3
```

In [25]:
```
def f():
    return 5
```

In [26]:
```
f()
```

Out[26]:
```
5
```

In [27]:
```
a=[1,2,3]
b=a
a.append(4)

print (b)
```

```
[1, 2, 3, 4]
```

Αρχεία!

In [29]:
```
f = open('test.txt', 'r')


f.readline()
```

Out[29]: 'aaaa\n'

In [30]:
```
f.readline()
```

Out[30]: 'bbbb\n'

In [31]:
```
f.readline()
```

Out[31]: 'cccc\n'

In [32]:
```
f.readline()
```

Out[32]: 'dddd'

In [33]:
```
f.readline()
```

Out[33]: ''

In [34]:
```
f.readline()
```

Out[34]: ''

In [37]:
```
f = open('test.txt', 'r')


while True:
    #line = f.readline()
    line = f.readline().strip()
    if not line:
        break
    print(line)
```

```
aaaa
bbbb
cccc
dddd
```

In [38]:
```
'    asdf   a       '.strip()
```

Out[38]: 'asdf   a'

In [41]:
```
f = open('test.txt', 'r')

for line in f:
    print (line.strip())
```

```
aaaa
bbbb
cccc
dddd
```

In [42]:
```
f = open('test.txt', 'r')

k = f.readlines()
```

In [44]:
```
k
```

Out[44]:
```
['aaaa\n', 'bbbb\n', 'cccc\n', 'dddd']
```

In [45]:
```
f = open('test.txt', 'r')

s = f.read()
s
```

Out[45]:
```
'aaaa\nbbbb\ncccc\ndddd'
```

In [46]:
```
print (s)
```

```
aaaa
bbbb
cccc
dddd
```

In [47]:
```
f.close()
```

In [48]:
```
import os

os.getcwd()
```

Out[48]:
```
'/Users/alexandroskanterakis/Downloads'
```

In [49]:
```
f = open('/Users/alexandroskanterakis/HELLO/test2.txt', 'r')
```

In [50]:
```
f.close()
```

In [51]:
```
f = open('/Users/alexandroskanterakis/HELLO/tessertsertsertyt2.txt
', 'r')
```

```
---------------------------------------------------------------------
---------
FileNotFoundError                         Traceback (most recent c
all last)
<ipython-input-51-1f03bdd6cf73> in <module>()
----> 1 f = open('/Users/alexandroskanterakis/HELLO/tessertsertser
tyt2.txt', 'r')

FileNotFoundError: [Errno 2] No such file or directory: '/Users/al
exandroskanterakis/HELLO/tessertsertsertyt2.txt'
```

In [52]:
```
f = open('/Users/alexandroskanterakis/HELLO/test2.txt', 'r')
```

In [53]:
```
l = f.readline()
```

In [54]:
```
f.close()
```

In [63]:
```
f = open('/Users/alexandroskanterakis/HELLO/test2.txt', 'r')
```

In [64]:
```
l = f.readline()
print (l)
```

```
1111
```

In [61]:
```
l = f.readline()
print (l)
```

```
2222
```

In [62]:
```
f.close()
```

In [73]:
```
f = open('/Users/alexandroskanterakis/HELLO/test2.txt', 'w')
```

In [70]:
```
f.write('aaaa\n')
```

Out[70]: 5

In [71]:
```
f.write('bbbb\n')
```

Out[71]: 5

In [72]:
```
f.close()
```

In [74]:
```
f.write('aa {}  aa\n'.format(100))
```

Out[74]: 11

In [76]:
```
f.close()
```

In [77]:
```
f = open('/Users/alexandroskanterakis/HELLO/test_100.txt', 'w')
```

In [78]:
```
f.write('asdfasdfasdfasdf\n')
```

Out[78]: 17

In [79]:
```
f.write('{}\n'.format(123412341234))
```

Out[79]: 13

In [80]:
```
f.close()
```

In [81]:
```
f = open('/Users/alexandroskanterakis/HELLO/test_100.txt', 'a')
```

In [82]:
```
f.write('NEW LINE\n')
```

Out[82]: 9

In [83]:
```
f.close()
```

In [ ]:
```
f = open('/Users/alexandroskanterakis/HELLO/test_100.txt', 'w+')
```

In [84]:
```
f = open('/Users/alexandroskanterakis/HELLO/test_100.txt', 'r+')
```

In [85]:
```
f.write('KATI KAINOURGIO\n')
```

Out[85]: 16

In [86]:
```
f.readline()
```

Out[86]: 'asdfasdfasdfasdf\n'

In [87]:
```
f.readline()
```

Out[87]: '123412341234\n'

In [88]:
```
f.readline()
```

Out[88]: 'NEW LINE\n'

In [89]:
```
f.readline()
```

Out[89]: ''

In [90]:
```
f.close()
```

In [91]:
```
# Python open file modes
```

In [93]:
```
f = open('/Users/alexandroskanterakis/HELLO/test_100.txt', 'r')

for l in f:
    print (l.strip())
f.close()
```

```
asdfasdfasdfasdf
123412341234
NEW LINE
KATI KAINOURGIO
```

In [94]:
```
with open('/Users/alexandroskanterakis/HELLO/test_100.txt', 'r') as
f:
    for l in f:
        print (l.strip())
```

```
asdfasdfasdfasdf
123412341234
NEW LINE
KATI KAINOURGIO
```

In [95]:
```
with open('/Users/alexandroskanterakis/HELLO/test_100.txt', 'w') as
f:
    for l in range(1,101):
        f.write('{}\n'.format(l))
```

In [96]:
```
with open('aaa.txt', 'w') as f1, open ('bbb.txt', 'w') as f2:
    f1.write('sdasdfasdfas\n')
    f2.write('adfasdfasdgadfgn')
```

IMPORT

Method 1

In [1]:
```
import p_lesson
```

In [2]:
```
p_lesson.q
```

Out[2]: 5

In [3]:
```
p_lesson.f(10)
```

Out[3]: 5.0

Method 2

In [1]:
```
from p_lesson import f
```

In [2]:
```
f(10)
```

Out[2]:
```
5.0
```

In [3]:
```
q
```

```
---------------------------------------------------------------------
---------
NameError                                 Traceback (most recent c
all last)
<ipython-input-3-e222fcdf3350> in <module>()
----> 1 q

NameError: name 'q' is not defined
```

Method 3

In [1]:
```
def f():
    return 7
```

In [2]:
```
from p_lesson import f as f2
```

In [3]:
```
f2(10)
```

Out[3]:
```
5.0
```

Method 4

In [1]:
```
from p_lesson import *
```

In [2]:
```
f(10)
```

Out[2]:
```
5.0
```

In [3]:
```
q
```

Out[3]:
```
5
```

Method 5

In [1]:
```
from p_lessson_dir import test
```

In [2]:
```
test.name
```

Out[2]:
```
'alex'
```

Method 6

In [1]:
```
import p_lessson_dir
```

In [3]:
```
p_lessson_dir.l
```

Out[3]: 'python'

Method 7

In [1]:
```
from p_lessson_dir import *
```

In [2]:
```
l
```

Out[2]: 'python'

In [3]:
```
import antigravity
```

In [4]:
```
import itertools
```

In [5]:
```
a = [1,2]
b = ['a','b','c']
```

In [6]:
```
for x, y in itertools.product(a,b):
    print (x,y)
```

```
1 a
1 b
1 c
2 a
2 b
2 c
```

In [7]:
```
a = [1,2,3,4]

c = 0
for x in itertools.cycle(a):
    print (x)
    c += 1
    if c > 20:
        break
```

```
1
2
3
4
1
2
3
4
1
2
3
4
1
2
3
4
1
2
3
4
1
```

In [8]:
```
from collections import Counter, defaultdict
```

In [9]:
```
Counter('sdfasdfasdfasdfasdfa')
```

Out[9]:
```
Counter({'s': 5, 'd': 5, 'f': 5, 'a': 5})
```

In [10]:
```
Counter([3,4,3,2,3,4,3,2,1,2,3,])
```

Out[10]:
```
Counter({3: 5, 4: 2, 2: 3, 1: 1})
```

In [11]:
```
a = Counter('asdfalskdjfhalskdjfhalskdjfh')
```

In [12]:
```
a
```

Out[12]:
```
Counter({'a': 4, 's': 4, 'd': 4, 'f': 4, 'l': 3, 'k': 3, 'j': 3, '
h': 3})
```

In [13]:
```
b = Counter('asdlkfjaoeijfs.dlkvnalskefhas;kldfhj')
```

In [14]:
```
b
```

Out[14]:
```
Counter({'a': 4,
         's': 4,
         'd': 3,
         'l': 4,
         'k': 4,
         'f': 4,
         'j': 3,
         'o': 1,
         'e': 2,
         'i': 1,
         '.': 1,
         'v': 1,
         'n': 1,
         'h': 2,
         ';': 1})
```

In [15]:
```
a+b
```

Out[15]:
```
Counter({'a': 8,
         's': 8,
         'd': 7,
         'f': 8,
         'l': 7,
         'k': 7,
         'j': 6,
         'h': 5,
         'o': 1,
         'e': 2,
         'i': 1,
         '.': 1,
         'v': 1,
         'n': 1,
         ';': 1})
```

In [28]:
```
import random
students = [
    'Tzwrtzina',
    'Andreas',
    'Xristos',
    'Andromaxh',
    'Danah',
    'Antwnia',
    'Aris',
    'Maria',
    'Sofia',
    'Iwanna',
    'Aggelos',
]

def random_student():
    return random.choice(students)

rs = random_student
```

In [ ]:
```

```

In [16]:
```
a
```

Out[16]:
```
Counter({'a': 4, 's': 4, 'd': 4, 'f': 4, 'l': 3, 'k': 3, 'j': 3, '
h': 3})
```

In [17]:
```
a + Counter('a')
```

Out[17]:
```
Counter({'a': 5, 's': 4, 'd': 4, 'f': 4, 'l': 3, 'k': 3, 'j': 3, '
h': 3})
```

Έστω η λίστα:

```
a = [3,4,5,5,6,7,8,7,6,5,4,3,2,1,2,3,4,5,6]
```

Ποιο στοιχείο υπάρχει περισσότερες φορές;

In [18]:
```
a = [3,4,5,5,6,7,8,7,6,5,4,3,2,1,2,3,4,5,6]
```

In [22]:
```
max(Counter(a).items(), key=lambda x:x[1])
```

Out[22]:
```
(5, 4)
```

In [25]:
```
d = {}

for x in a:

    if not x in d:
        d[x] = 0

    d[x] = d[x] + 1

print (d)
```

```
{3: 3, 4: 3, 5: 4, 6: 3, 7: 2, 8: 1, 2: 2, 1: 1}
```

In [26]:
```
d_2 = defaultdict(int)
```

In [27]:
```
d
```

Out[27]:
```
{3: 3, 4: 3, 5: 4, 6: 3, 7: 2, 8: 1, 2: 2, 1: 1}
```

In [30]:
```
d[10]
```

```
---------------------------------------------------------------------
---------
KeyError                                  Traceback (most recent c
all last)
<ipython-input-30-76a0c2738598> in <module>()
----> 1 d[10]

KeyError: 10
```

In [37]:
```
d = defaultdict(int)

for x in a:

#    if not x in d:
#        d[x] = 0

    d[x] = d[x] + 1

print (d)
```

```
defaultdict(<class 'int'>, {3: 3, 4: 3, 5: 4, 6: 3, 7: 2, 8: 1, 2:
2, 1: 1})
```

In [ ]:
```

```

In [32]:
```
d_2['Andromaxh']
```

Out[32]:
```
0
```

In [33]:
```
d_2['Andromaxh'] += 1
```

In [34]:
```
d_2['Andromaxh']
```

Out[34]:
```
1
```

In [35]:
```
d_2['Maria']
```

Out[35]:
```
0
```

In [36]:
```
d_2
```

Out[36]:
```
defaultdict(int, {10: 0, 'Andromaxh': 1, 'Maria': 0})
```

In [29]:
```
rs()
```

Out[29]:
```
'Andromaxh'
```

In [38]:
```
cities = [
 [1, 'Athens', 772072, 745514, 664046, 'Attica'],
 [2, 'Thessaloniki', 383967, 363987, 315196, 'Central Macedonia'],
 [3, 'Patras', 152570, 160400, 167446, 'Western Greece'],
 [4, 'Piraeus', 182671, 175697, 163688, 'Attica'],
 [5, 'Larissa', 112777, 124394, 144651, 'Thessaly'],
 [6, 'Heraklion', 115270, 130914, 140730, 'Crete'],
 [7, 'Peristeri', 137288, 137918, 139981, 'Attica'],
 [8, 'Kallithea', 194233, 109609, 100641, 'Attica'],
 [9, 'Acharnes', 61052, 75329, 99346, 'Attica'],
 [10, 'Kalamaria', 80698, 87255, 91279, 'Central Macedonia'],
 [11, 'Nikaia', 87597, 93086, 89380, 'Attica'],
 [12, 'Glyfada', 63306, 80409, 87305, 'Attica'],
 [13, 'Volos', 77192, 82439, 86046, 'Thessaly'],
 [14, 'Ilio', 78326, 80859, 84793, 'Attica'],
 [15, 'Ilioupoli', 75037, 75904, 78153, 'Attica'],
 [16, 'Keratsini', 71982, 76102, 77077, 'Attica'],
 [17, 'Evosmos', 28821, 52624, 74686, 'Central Macedonia'],
 [18, 'Chalandri', 66285, 71684, 74192, 'Attica'],
 [19, 'Nea Smyrni', 69749, 73986, 73076, 'Attica'],
 [20, 'Marousi', 64092, 69470, 72333, 'Attica'],
 [21, 'Agios Dimitrios', 57574, 65173, 71294, 'Attica'],
 [22, 'Zografou', 80492, 76115, 71026, 'Attica'],
 [23, 'Egaleo', 78563, 74046, 69946, 'Attica'],
 [24, 'Nea Ionia', 60635, 66017, 67134, 'Attica'],
 [25, 'Ioannina', 56699, 61629, 65574, 'Epirus'],
 [26, 'Palaio Faliro', 61371, 64759, 64021, 'Attica'],
 [27, 'Korydallos', 63184, 67456, 63445, 'Attica'],
 [28, 'Trikala', 45835, 48686, 61653, 'Thessaly'],
 [29, 'Vyronas', 58523, 61102, 61308, 'Attica'],
 [30, 'Agia Paraskevi', 47463, 56836, 59704, 'Attica'],
 [31, 'Galatsi', 57230, 58042, 59345, 'Attica'],
 [32, 'Agrinio', 52081, 54523, 59329, 'Western Greece'],
 [33, 'Chalcis', 51646, 53584, 59125, 'Central Greece'],
 [34, 'Petroupoli', 38278, 48327, 58979, 'Attica'],
 [35, 'Serres', 50017, 54266, 58287, 'Central Macedonia'],
 [36, 'Alexandroupoli', 37904, 48885, 57812, 'Eastern Macedonia and
Thrace'],
 [37, 'Xanthi', 37430, 45111, 56122, 'Eastern Macedonia and Thrace
'],
 [38, 'Katerini', 43613, 50510, 55997, 'Central Macedonia'],
 [39, 'Kalamata', 43625, 49154, 54100, 'Peloponnese'],
 [40, 'Kavala', 56571, 58663, 54027, 'Eastern Macedonia and Thrace
'],
 [41, 'Chania', 50077, 53373, 53910, 'Crete'],
 [42, 'Lamia', 44084, 46406, 52006, 'Central Greece'],
 [43, 'Komotini', 37036, 43326, 50990, 'Eastern Macedonia and Thrac
e'],
 [44, 'Irakleio', 42905, 45926, 49642, 'Attica'],
 [45, 'Rhodes', 42400, 52318, 49541, 'South Aegean'],
 [46, 'Kifissia', 39166, 43929, 47332, 'Attica'],
 [47, 'Stavroupoli', 37596, 41653, 46008, 'Central Macedonia'],
 [48, 'Chaidari', 44831, 45227, 45642, 'Attica'],
 [49, 'Drama', 37604, 42501, 44823, 'Eastern Macedonia and Thrace
'],
 [50, 'Veria', 37858, 42794, 43158, 'Central Macedonia'],
 [51, 'Alimos', 32024, 38047, 41720, 'Attica'],
 [52, 'Kozani', 31553, 35242, 41066, 'Western Macedonia'],
 [53, 'Polichni', 27894, 36146, 39332, 'Central Macedonia'],
```

```
 [54, 'Karditsa', 30067, 32031, 38554, 'Thessaly'],
 [55, 'Sykies', 34059, 41726, 37753, 'Central Macedonia'],
 [56, 'Ampelokipoi', 40093, 40959, 37381, 'Central Macedonia'],
 [57, 'Pylaia', 20785, 22744, 34625, 'Central Macedonia'],
 [58, 'Agioi Anargyroi', 30739, 32957, 34168, 'Attica'],
 [59, 'Argyroupoli', 31530, 33158, 34097, 'Attica'],
 [60, 'Ano Liosia', 21397, 26423, 33565, 'Attica'],
 [61, 'Nea Ionia', 27904, 30804, 32661, 'Thessaly'],
 [62, 'Rethymno', 23420, 27868, 32468, 'Crete'],
 [63, 'Ptolemaida', 25125, 28679, 32127, 'Western Macedonia'],
 [64, 'Tripoli', 22429, 25520, 30866, 'Peloponnese'],
 [65, 'Cholargos', 33691, 32166, 30840, 'Attica'],
 [66, 'Vrilissia', 16571, 25582, 30741, 'Attica'],
 [67, 'Aspropyrgos', 15715, 27741, 30251, 'Attica'],
 [68, 'Corinth', 27412, 29787, 30176, 'Peloponnese'],
 [69, 'Gerakas', 8512, 13921, 29939, 'Attica'],
 [70, 'Metamorfosi', 21052, 26448, 29891, 'Attica'],
 [71, 'Giannitsa', 22504, 26296, 29789, 'Central Macedonia'],
 [72, 'Voula', 17998, 25532, 28364, 'Attica'],
 [73, 'Kamatero', 17410, 22234, 28361, 'Attica'],
 [74, 'Mytilene', 23971, 27247, 27871, 'North Aegean'],
 [75, 'Neapoli', 30568, 29995, 27084, 'Central Macedonia'],
 [76, 'Eleftherio-Kordelio', 16549, 21630, 27067, 'Central Macedoni
a'],
 [77, 'Chios', 22894, 23779, 26850, 'North Aegean'],
 [78, 'Agia Varvara', 28706, 30562, 26550, 'Attica'],
 [79, 'Kaisariani', 26701, 26323, 26370, 'Attica'],
 [80, 'Nea Filadelfeia', 25261, 24112, 25734, 'Attica'],
 [81, 'Moschato', 22039, 23153, 25441, 'Attica'],
 [82, 'Perama', 24119, 25720, 25389, 'Attica'],
 [83, 'Salamina', 22567, 25730, 25370, 'Attica'],
 [84, 'Eleusis', 22793, 25863, 24910, 'Attica'],
 [85, 'Corfu', 31359, 28185, 24838, 'Ionian Islands'],
 [86, 'Pyrgos', 28465, 23274, 24359, 'Western Greece'],
 [87, "Megara", 20403, 23032, 23456, 'Attica'],
 [88, 'Kilkis', 12139, 17430, 22914, 'Central Macedonia'],
 [89, 'Dafni', 24152, 23674, 22913, 'Attica'],
 [90, 'Thebes', 19505, 21211, 22883, 'Central Greece'],
 [91, 'Melissia', 13469, 19526, 22741, 'Attica'],
 [92, 'Argos', 21901, 24239, 22209, 'Peloponnese'],
 [93, 'Arta', 19087, 19435, 21895, 'Epirus'],
 [94, 'Artemida', 9485, 17391, 21488, 'Attica'],
 [95, 'Livadeia', 18437, 20061, 21379, 'Central Greece'],
 [96, 'Pefki', 17987, 19887, 21352, 'Attica'],
 [97, 'Oraiokastro', 5458, 11896, 20852, 'Central Macedonia'],
 [98, 'Aigio', 22178, 21061, 20422, 'Western Greece'],
 [99, 'Kos', 14714, 17890, 19432, 'South Aegean'],
 [100, 'Koropi', 12790, 15860, 19164, 'Attica'],
 [101, 'Preveza', 13695, 16321, 19042, 'Epirus'],
 [102, 'Naousa', 19794, 19870, 18882, 'Central Macedonia'],
 [103, 'Orestiada', 12691, 15246, 18426, 'Eastern Macedonia and Thr
ace'],
 [104, 'Peraia', 2949, 13306, 18326, 'Central Macedonia'],
 [105, 'Edessa', 17128, 18253, 18229, 'Central Macedonia'],
 [106, 'Florina', 12355, 14279, 17686, 'Western Macedonia'],
 [107, 'Panorama', 10275, 14552, 17444, 'Central Macedonia'],
 [108, 'Nea Erythraia', 12993, 15439, 17379, 'Attica'],
 [109, 'Elliniko', 13517, 16740, 17259, 'Attica'],
 [110, 'Amaliada', 15232, 18261, 16763, 'Western Greece'],
 [111, 'Pallini', 8021, 12552, 16415, 'Attica'],
```

```
 [112, 'Sparta', 13011, 14817, 16239, 'Peloponnese'],
 [113, 'Agios Ioannis Rentis', 14218, 15060, 16050, 'Attica'],
 [114, 'Thermi', 5156, 11360, 16004, 'Central Macedonia'],
 [115, 'Vari', 8488, 10998, 15855, 'Attica'],
 [116, 'Nea Makri', 12120, 13986, 15554, 'Attica'],
 [117, 'Tavros', 15456, 14963, 14972, 'Attica'],
 [118, 'Alexandreia', 12109, 13229, 14821, 'Central Macedonia'],
 [119, 'Menemeni', 12932, 14910, 14746, 'Central Macedonia'],
 [120, 'Paiania', 9710, 12855, 14595, 'Attica'],
 [121, 'Kalyvia Thorikou', 8488, 12202, 14424, 'Attica'],
 [122, 'Nafplio', 11897, 13822, 14203, 'Peloponnese'],
 [123, 'Drapetsona', 13094, 12944, 13968, 'Attica'],
 [124, 'Efkarpia', 3480, 6598, 13905, 'Central Macedonia'],
 [125, 'Papagou', 13974, 13207, 13699, 'Attica'],
 [126, 'Nafpaktos', 10854, 12924, 13415, 'Western Greece'],
 [127, 'Kastoria', 14775, 14813, 13387, 'Western Macedonia'],
 [128, 'Grevena', 9345, 10177, 13137, 'Western Macedonia'],
 [129, 'Pefka', 3561, 6434, 13052, 'Central Macedonia'],
 [130, 'Nea Alikarnassos', 10683, 11551, 12925, 'Crete'],
 [131, 'Missolonghi', 10916, 12225, 12785, 'Western Greece'],
 [132, 'Gazi', 1395, 8018, 12606, 'Crete'],
 [133, 'Ierapetra', 9541, 11678, 12355, 'Crete'],
 [134, 'Kalymnos', 10543, 10149, 12324, 'South Aegean'],
 [135, 'Rafina', 7752, 11352, 12168, 'Attica'],
 [136, 'Loutraki', 9388, 11383, 11564, 'Peloponnese'],
 [137, 'Agios Nikolaos', 8093, 10080, 11421, 'Crete'],
 [138, 'Ermoupoli', 13030, 11799, 11407, 'South Aegean'],
 [139, 'Ialysos', 7193, 10107, 11331, 'South Aegean'],
 [140, 'Mandra', 10012, 10947, 11327, 'Attica'],
 [141, 'Tyrnavos', 12028, 11116, 11069, 'Thessaly'],
 [142, 'Glyka Nera', 5813, 6623, 11049, 'Attica'],
 [143, 'Ymittos', 11671, 11139, 10715, 'Attica'],
 [144, 'Neo Psychiko', 12023, 10848, 10137, 'Attica'],
]
```

Φτιάξτε ένα dictionary όπου keys είναι περιφέρεια και values είναι μία λίστα με όλες τις πόλεις που έχει.

In [41]:
```
#d = {}
d = defaultdict(list)

for x in cities:
    region = x[5]
    city = x[1]

#    if not region in d:
#        d[region] = []

    d[region].append(city)

d
```

Out[41]:
```
defaultdict(list,
            {'Attica': ['Athens',
              'Piraeus',
              'Peristeri',
              'Kallithea',
              'Acharnes',
              'Nikaia',
              'Glyfada',
              'Ilio',
              'Ilioupoli',
              'Keratsini',
              'Chalandri',
              'Nea Smyrni',
              'Marousi',
              'Agios Dimitrios',
              'Zografou',
              'Egaleo',
              'Nea Ionia',
              'Palaio Faliro',
              'Korydallos',
              'Vyronas',
              'Agia Paraskevi',
              'Galatsi',
              'Petroupoli',
              'Irakleio',
              'Kifissia',
              'Chaidari',
              'Alimos',
              'Agioi Anargyroi',
              'Argyroupoli',
              'Ano Liosia',
              'Cholargos',
              'Vrilissia',
              'Aspropyrgos',
              'Gerakas',
              'Metamorfosi',
              'Voula',
              'Kamatero',
              'Agia Varvara',
              'Kaisariani',
              'Nea Filadelfeia',
              'Moschato',
              'Perama',
              'Salamina',
              'Eleusis',
              'Megara',
              'Dafni',
              'Melissia',
              'Artemida',
              'Pefki',
              'Koropi',
              'Nea Erythraia',
              'Elliniko',
              'Pallini',
              'Agios Ioannis Rentis',
              'Vari',
              'Nea Makri',
              'Tavros',
              'Paiania',
```

```
                         'Kalyvia Thorikou',
                         'Drapetsona',
                         'Papagou',
                         'Rafina',
                         'Mandra',
                         'Glyka Nera',
                         'Ymittos',
                         'Neo Psychiko'],
                        'Central Macedonia': ['Thessaloniki',
                         'Kalamaria',
                         'Evosmos',
                         'Serres',
                         'Katerini',
                         'Stavroupoli',
                         'Veria',
                         'Polichni',
                         'Sykies',
                         'Ampelokipoi',
                         'Pylaia',
                         'Giannitsa',
                         'Neapoli',
                         'Eleftherio-Kordelio',
                         'Kilkis',
                         'Oraiokastro',
                         'Naousa',
                         'Peraia',
                         'Edessa',
                         'Panorama',
                         'Thermi',
                         'Alexandreia',
                         'Menemeni',
                         'Efkarpia',
                         'Pefka'],
                        'Western Greece': ['Patras',
                         'Agrinio',
                         'Pyrgos',
                         'Aigio',
                         'Amaliada',
                         'Nafpaktos',
                         'Missolonghi'],
                        'Thessaly': ['Larissa',
                         'Volos',
                         'Trikala',
                         'Karditsa',
                         'Nea Ionia',
                         'Tyrnavos'],
                        'Crete': ['Heraklion',
                         'Chania',
                         'Rethymno',
                         'Nea Alikarnassos',
                         'Gazi',
                         'Ierapetra',
                         'Agios Nikolaos'],
                        'Epirus': ['Ioannina', 'Arta', 'Preveza'],
                        'Central Greece': ['Chalcis', 'Lamia', 'Thebes', 'Liv
adeia'],
                        'Eastern Macedonia and Thrace': ['Alexandroupoli',
                         'Xanthi',
                         'Kavala',
                         'Komotini',
```

```
 'Drama',
 'Orestiada'],
'Peloponnese': ['Kalamata',
 'Tripoli',
 'Corinth',
 'Argos',
 'Sparta',
 'Nafplio',
 'Loutraki'],
'South Aegean': ['Rhodes',
 'Kos',
 'Kalymnos',
 'Ermoupoli',
 'Ialysos'],
'Western Macedonia': ['Kozani',
 'Ptolemaida',
 'Florina',
 'Kastoria',
 'Grevena'],
'North Aegean': ['Mytilene', 'Chios'],
```

In [42]:
```
d2 = defaultdict(list)
```

In [43]:
```
d2['andromaxh']
```

Out[43]:
```
[]
```

In [44]:
```
import re
```

In [45]:
```
a = 'aaaaaa12345bbbbbb'
```

In [48]:
```
bool(re.search('a', a))
```

Out[48]:
```
True
```

In [49]:
```
bool(re.search('c', a))
```

Out[49]:
```
False
```

In [54]:
```
re.search('[0123456789]', a)
```

Out[54]:
```
<re.Match object; span=(6, 7), match='1'>
```

In [55]:
```
re.search('[0-9]', a)
```

Out[55]:
```
<re.Match object; span=(6, 7), match='1'>
```

In [56]:
```
re.search('[\d]', a)
```

Out[56]:
```
<re.Match object; span=(6, 7), match='1'>
```

In [57]:
```
a = 'aaaaaa12345bbbbbb'
```

In [58]:
```
a[6:7]
```

Out[58]:
```
'1'
```

In [59]:
```
re.search('[\d]+', a) # Μια ή παραπάνω φορές
```

Out[59]:
```
<re.Match object; span=(6, 11), match='12345'>
```

In [60]:
```
a[6:11]
```

Out[60]:
```
'12345'
```

In [61]:
```
re.search('[\d]{3}', a) # Τρια και μόνο τρία
```

Out[61]:
```
<re.Match object; span=(6, 9), match='123'>
```

In [63]:
```
re.search('[\d]{2,10}', a) # από 2 έως 10
```

Out[63]:
```
<re.Match object; span=(6, 11), match='12345'>
```

In [65]:
```
a
```

Out[65]:
```
'aaaaaa12345bbbbbb'
```

In [66]:
```
re.search('[\d]+bb', a)
```

Out[66]:
```
<re.Match object; span=(6, 13), match='12345bb'>
```

In [67]:
```
a[6:13]
```

Out[67]:
```
'12345bb'
```

In [81]:
```
a = 'aaaaaa12345Tbbbbbb'
#a = 'aaaaaa12345bbbbbb'
#a = 'aaaaaa12345TTbbbbbb'
```

In [80]:
```
re.search('[\d]+T?bb', a) # ? mporei na yparxei, mporei kai na mhn yparxei
```

Out[80]:
```
<re.Match object; span=(6, 14), match='12345Tbb'>
```

In [76]:
```
a[6:13]
```

Out[76]:
```
'12345bb'
```

In [84]:
```
a = 'aaaaaa12345TTTTTTTbbbbbb'
re.search('[\d]+T*bb', a) # *= den yparxei, yparxei, yparxei polles fores
```

Out[84]:
```
<re.Match object; span=(6, 20), match='12345TTTTTTTbb'>
```

+ : Υπάρχει 1 ή παραπάνω
? : ΥΠάρχει καμία ή μία
* : Υπάρχει καμία, μία, ή παραπάνω

In [85]:
```
a = 'aaaaaa12345TTTTTTTbbbbbb'

re.search('b', a)
```

Out[85]:
```
<re.Match object; span=(18, 19), match='b'>
```

In [87]:
```
re.search('^a', a)
```

Out[87]:
```
<re.Match object; span=(0, 1), match='a'>
```

In [88]:
```
re.search('a$', a)
```

In [89]:
```
re.search('b$', a)
```

Out[89]:
```
<re.Match object; span=(23, 24), match='b'>
```

In [90]:
```
a = '123'
b = 'abc'
c = 'klm',
```

In [100]:
```
re.search('[\d]+|[a-c]+', c)
```

In [94]:
```
a='Alexandros Kanterakis'
```

In [97]:
```
re.search('[A-Za-z]+ [A-Za-z]+', a)
```

Out[97]:
```
<re.Match object; span=(0, 21), match='Alexandros Kanterakis'>
```

In [98]:
```
re.search('[\w]+ [\w]+', a)
```

Out[98]:
```
<re.Match object; span=(0, 21), match='Alexandros Kanterakis'>
```

In [109]:
```
a='Alexandros          Kanterakis'
re.search('[\w]+ +[\w]+', a)
```

Out[109]:
```
<re.Match object; span=(0, 30), match='Alexandros          Kantera
kis'>
```

In [114]:
```
a='Alexandros        \n\n\n\n    \t\t\t   Kanterakis'
re.search('[\w]+[\s]+[\w]+', a)
```

Out[114]:
```
<re.Match object; span=(0, 42), match='Alexandros        \n\n\n\n
\t\t\t   Kanterakis>
```

\w : word ή λέξεις
\d : digit
\s : whitespace : enter, space, tab
. : Οποιοσδήποτε χαρακτήρας

In [120]:
```
a = '   1234'
b = '9991234'
c = 'aaa9999'
d = '_%$1234'
re.search('...[\d]{4}', d)
```

Out[120]:
```
<re.Match object; span=(0, 7), match='_%$1234'>
```

In [121]:
```
a = 'adfklgtwp34o85utlfghjwl4i58thrfghwi45truhejwoepiurptayoi4r3p9
[puytouihgefjwoe[9ru3py8t4oiugrefjup9r8yt4uhrgefjoruqty48hugrefijur
908yt4ogruhjdefijur90p48ty03988typuhandvkfsrup8y5q74tr'
```

In [122]:
```
a
```

Out[122]:
```
'adfklgtwp34o85utlfghjwl4i58thrfghwi45truhejwoepiurptayoi4r3p9[puy
touihgefjwoe[9ru3py8t4oiugrefjup9r8yt4uhrgefjoruqty48hugrefijur908
yt4ogruhjdefijur90p48ty03988typuhandvkfsrup8y5q74tr'
```

In [124]:
```
re.search('[\d]+',a)
```

Out[124]:
```
<re.Match object; span=(9, 11), match='34'>
```

In [125]:
```
re.findall('[\d]+',a)
```

Out[125]:
```
['34',
 '85',
 '4',
 '58',
 '45',
 '4',
 '3',
 '9',
 '9',
 '3',
 '8',
 '4',
 '9',
 '8',
 '4',
 '48',
 '908',
 '4',
 '90',
 '48',
 '03988',
 '8',
 '5',
 '74']
```

In [132]:
```
a = 'aaaaaa12345TTTTTTTbbbbbb'
s = re.search('([\d]+)(T*)bbb', a)
```

In [133]:
```
s.group(0)
```

Out[133]:
```
'12345TTTTTTTbbb'
```

In [134]:
```
s.group(1)
```

Out[134]: '12345'

In [135]:
```
s.group(2)
```

Out[135]: 'TTTTTTT'

In [140]:
```
a = '3aaaaaaaaaa4bbbbbbbbbb5'
s = re.search(r'[\d]([\w]+)[\d]', a)
print (s)
```

```
<re.Match object; span=(0, 23), match='3aaaaaaaaaa4bbbbbbbbbb5'>
```

In [141]:
```
print (s.group(1))
```

```
aaaaaaaaaa4bbbbbbbbbb
```

In [ ]:

\w : 0-9a-zA-Z

In [138]:
```
a = '3aaaaaaaaaa4bbbbbbbbbb5'
s = re.search(r'[\d]([\w]+?)[\d]', a)
print (s)
```

```
<re.Match object; span=(0, 12), match='3aaaaaaaaaa4'>
```

In [139]:
```
s.group(1)
```

Out[139]: 'aaaaaaaaaa'

In [142]:
```
a = '3aaaaaaaaaa4bbbbbbbbbb5'
s = re.search(r'[\d]([\w]*?)[\d]', a)
print (s)
```

```
<re.Match object; span=(0, 12), match='3aaaaaaaaaa4'>
```

In [143]:
```
a = 'baaa'
s = re.search(r'ba??a', a)
print (s)
```

```
<re.Match object; span=(0, 2), match='ba'>
```

In [144]:
```
a = 'baaa'
s = re.search(r'ba?a', a)
print (s)
```

```
<re.Match object; span=(0, 3), match='baa'>
```

In [145]:
```
a = [
    'aaa',
    'bbb',
    '123',
    '456',
]
```

In [147]:
```
b = []
for x in a:
    if re.search('\d+', x):
        b.append(x)
```

In [149]:
```
b = [x for x in a if re.search('\d+', x)]
```

In [150]:
```
b
```

Out[150]:
```
['123', '456']
```

https://docs.python.org/3/library/re.html (https://docs.python.org/3/library/re.html)

a=1

In [ ]:

In [151]:
```
b=2
```

In [ ]: