

# lists

- combination of elements that are belongs to same kind or heterogenous
- list is related to array

```
In [1]: 1 data1=[2,"hanuman",2.5]
```

```
In [2]: 1 data1
```

```
Out[2]: [2, 'hanuman', 2.5]
```

```
In [3]: 1 data2=[3,"ramu",3.5]
```

```
In [4]: 1 data2
```

```
Out[4]: [3, 'ramu', 3.5]
```

```
In [5]: 1 print(data1+data2)
```

```
[2, 'hanuman', 2.5, 3, 'ramu', 3.5]
```

```
In [9]: 1 data2[2]="nvz"
```

```
In [11]: 1 data2
```

```
Out[11]: [3, 'ramu', 'nvz']
```

```
In [12]: 1 dir(list)
```

```
Out[12]: ['__add__',
          '__class__',
          '__contains__',
          '__delattr__',
          '__delitem__',
          '__dir__',
          '__doc__',
          '__eq__',
          '__format__',
          '__ge__',
          '__getattr__',
          '__getitem__',
          '__gt__',
          '__hash__',
          '__iadd__',
          '__imul__',
          '__init__',
          '__init_subclass__',
          '__iter__',
          '__le__',
          '__len__',
          '__lt__',
          '__mul__',
          '__ne__',
          '__new__',
          '__reduce__',
          '__reduce_ex__',
          '__repr__',
          '__reversed__',
          '__rmul__',
          '__setattr__',
          '__setitem__',
          '__sizeof__',
          '__str__',
          '__subclasshook__',
          'append',
          'clear',
          'copy',
          'count',
          'extend',
          'index',
          'insert',
          'pop',
          'remove',
          'reverse',
          'sort']
```

```
In [17]: 1 data3=[10,20,30,40,50]
```

```
In [18]: 1 data3
```

```
Out[18]: [10, 20, 30, 40, 50]
```

```
In [19]: 1 data3.append(10)
```

```
In [20]: 1 data3
```

```
Out[20]: [10, 20, 30, 40, 50, 10]
```

```
In [21]: 1 data3.extend([12,13])
```

```
In [22]: 1 data3
```

```
Out[22]: [10, 20, 30, 40, 50, 10, 12, 13]
```

```
In [23]: 1 data3
```

```
Out[23]: [10, 20, 30, 40, 50, 10, 12, 13]
```

```
In [24]: 1 data3.index(30)
```

```
Out[24]: 2
```

```
In [25]: 1 data3.index(10)
```

```
Out[25]: 0
```

```
In [29]: 1 data3.count(30)
```

```
Out[29]: 1
```

```
In [27]: 1 data3
```

```
Out[27]: [10, 20, 30, 40, 50, 10, 12, 13]
```

```
In [40]: 1 data3.insert(0,"vijay")
```

```
In [41]: 1 data3
```

```
Out[41]: ['vijay', 10, 20, 30, 100, 'vijay', 'ravi', 'ravi', 100, 40, 50, 10, 12, 13]
```

```
In [48]: 1 data4=[10,30,40,50,90,47]
```

```
In [49]: 1 data4
```

```
Out[49]: [10, 30, 40, 50, 90, 47]
```

```
In [50]: 1 data4.reverse()
```

In [52]: 1 data4

Out[52]: [47, 90, 50, 40, 30, 10]

In [56]: 1 data4.sort(reverse=True)

In [57]: 1 data4

Out[57]: [90, 50, 47, 40, 30, 10]

In [55]: 1 print(len(data4))

6

In [58]: 1 data4

Out[58]: [90, 50, 47, 40, 30, 10]

In [59]: 1 print(min(data4))

10

In [60]: 1 print(max(data4))

90

In [80]: 1 s=input().split()  
2 # s=s.split('@')  
3 print(type(s))  
4 print(s)

1 2 23 234 23 4234 213 123  
<class 'list'>  
['1', '2', '23', '234', '23', '4234', '213', '123']

In [74]: 1 s.split(' ')

Out[74]: ['10,20,30,40,50']

In [66]: 1 s

Out[66]: '10,20,30,40,50'

```
In [91]: 1 # input: 5
2 #       1 3 4 5 6
3 #       4 5 6 2 4
4 # Output:
5 #       5 8 10 7 10
6
7
8 n = int(input())
9 f = input().split()
10 s = input().split()
11 fr = []
12 sc = []
13 for i in range(len(f)):
14     fr.append(int(f[i]))
15 for i in range(len(s)):
16     sc.append(int(s[i]))
17 for i in range(len(fr)):
18     print(fr[i]+sc[i],end=" ")
```

```
3
1 3 4 5 6 7 8 9
1 3 40 0 0 0 0
2 6 44 5 6 7 8
```

```
-----
IndexError                                Traceback (most recent call last)
<ipython-input-91-7daf624f67a0> in <module>
    16     sc.append(int(s[i]))
    17 for i in range(len(fr)):
----> 18     print(fr[i]+sc[i],end=" ")
```

**IndexError:** list index out of range

```
In [96]: 1 ke =[2,4,54,5,34,5,23,4,2,34]
2 print(type(ke))
3 print(ke)
```

```
<class 'list'>
[2, 4, 54, 5, 34, 5, 23, 4, 2, 34]
```

```
In [97]: 1 print(dir(list))
```

```
['__add__', '__class__', '__contains__', '__delattr__', '__delitem__', '__dir__'
, '__doc__', '__eq__', '__format__', '__ge__', '__getattribute__', '__getitem__'
, '__gt__', '__hash__', '__iadd__', '__imul__', '__init__', '__init_subclass__'
, '__iter__', '__le__', '__len__', '__lt__', '__mul__', '__ne__', '__new__',
 '__reduce__', '__reduce_ex__', '__repr__', '__reversed__', '__rmul__', '__setat
tr__', '__setitem__', '__sizeof__', '__str__', '__subclasshook__', 'append', 'c
lear', 'copy', 'count', 'extend', 'index', 'insert', 'pop', 'remove', 'revers
e', 'sort']
```

```
In [104]: 1 k = [2,23,234234,23,42,34,23423,5235]
```

```
In [105]: 1 k
```

```
Out[105]: [2, 23, 234234, 23, 42, 34, 23423, 5235]
```

```
In [106]: 1 print(k.pop())
```

```
5235
```

```
In [107]: 1 k
```

```
Out[107]: [2, 23, 234234, 23, 42, 34, 23423]
```

```
In [109]: 1 k.remove(23)
```

```
In [110]: 1 k
```

```
Out[110]: [2, 234234, 23, 42, 34, 23423]
```

```
In [112]: 1 k[::-1]
```

```
Out[112]: [23423, 34, 42, 23, 234234, 2]
```

```
In [113]: 1 k[0]
```

```
Out[113]: 2
```

```
In [114]: 1 k[4:6]
```

```
Out[114]: [34, 23423]
```

```
In [115]: 1 k.clear()
```

```
In [116]: 1 k
```

```
Out[116]: []
```

```
In [117]: 1 k
```

```
Out[117]: []
```

```
In [119]: 1 del k
```

## Tuples:

- IMMutable (Doesn't Changes) => Static Values
- Indexing (slicing can be performed)
- tuple() or ()

In [121]: 1 `print(dir(tuple))`

```
['__add__', '__class__', '__contains__', '__delattr__', '__dir__', '__doc__',
 '__eq__', '__format__', '__ge__', '__getattribute__', '__getitem__', '__getnewa
rgs__', '__gt__', '__hash__', '__init__', '__init_subclass__', '__iter__', '__l
e__', '__len__', '__lt__', '__mul__', '__ne__', '__new__', '__reduce__', '__red
uce_ex__', '__repr__', '__rmul__', '__setattr__', '__sizeof__', '__str__', '__s
ubclasshook__', 'count', 'index']
```

In [4]: 1 `s =(1,123,'sdasdasdad',943857834,45.0)`

In [5]: 1 `s`

Out[5]: (1, 123, 'sdasdasdad', 943857834, 45.0)

In [12]: 1 `ki=list(s)`

In [13]: 1 `ki.remove(1)`

In [14]: 1 `print(ki)`

```
[123, 'sdasdasdad', 943857834, 45.0]
```

In [15]: 1 `s = tuple(ki)`  
2 `s`

Out[15]: (123, 'sdasdasdad', 943857834, 45.0)

In [16]: 1 `s.index(123)`

Out[16]: 0

In [20]: 1 `s[::-1]`

Out[20]: (45.0, 943857834, 'sdasdasdad', 123)

## Sets:

- Denotes with { , } .
- Un-ordered Data structure
  - Doesn't have index
- Mutable (Ability to manipulate)
- Doesn't allow duplicate values.

```
In [21]: 1 s={}
        2 type(s)
```

Out[21]: dict

```
In [22]: 1 s={1:2,2:3}
        2 type(s)
```

Out[22]: dict

```
In [24]: 1 s={1,2,3,4,"Hello",2.4}
        2 type(s)
```

Out[24]: set

```
In [25]: 1 print(dir(s))
```

```
['__and__', '__class__', '__contains__', '__delattr__', '__dir__', '__doc__',
 '__eq__', '__format__', '__ge__', '__getattr__', '__gt__', '__hash__', '__i
and__', '__init__', '__init_subclass__', '__ior__', '__isub__', '__iter__', '
_ixor__', '__le__', '__len__', '__lt__', '__ne__', '__new__', '__or__', '__r
and__', '__reduce__', '__reduce_ex__', '__repr__', '__ror__', '__rsub__', '__r
xor__', '__setattr__', '__sizeof__', '__str__', '__sub__', '__subclasshook__',
 '__xor__', 'add', 'clear', 'copy', 'difference', 'difference_update', 'discard', 'i
ntersection', 'intersection_update', 'isdisjoint', 'issubset', 'issuperset', 'p
op', 'remove', 'symmetric_difference', 'symmetric_difference_update', 'union',
 'update']
```

```
In [29]: 1 s1={1,2,3,4,7,9,0,54,11,21}
        2 s1.add(5)
        3 s1
```

Out[29]: {0, 1, 2, 3, 4, 5, 7, 9, 11, 21, 54}

```
In [30]: 1 l1=[1,2,3,4,54,11,12,"Anu","LOL","Hello",7.6]
        2 l1
```

Out[30]: [1, 2, 3, 4, 54, 11, 12, 'Anu', 'LOL', 'Hello', 7.6]

```
In [34]: 1 l1=set(l1)
        2 l1
```

Out[34]: {1, 11, 12, 2, 3, 4, 54, 7.6, 'Anu', 'Hello', 'LOL'}

```
In [35]: 1 l1
```

Out[35]: {1, 11, 12, 2, 3, 4, 54, 7.6, 'Anu', 'Hello', 'LOL'}

```
In [36]: 1 l2=l1.copy()
```



In [37]:

1	12
---	----

Out[37]: {1, 11, 12, 2, 3, 4, 54, 7.6, 'Anu', 'Hello', 'LOL'}

In [38]:

1	13=12
2	13

Out[38]: {1, 11, 12, 2, 3, 4, 54, 7.6, 'Anu', 'Hello', 'LOL'}

In [45]:

1	s1={1,2,3,4,5,7}
2	s2={6,7,8}
3	s2.difference(s1)
4	s1

Out[45]: {1, 2, 3, 4, 5, 7}

In [46]:

1	s2.difference_update(s1)
2	s1

Out[46]: {1, 2, 3, 4, 5, 7}

In [44]:

1	s2
---	----

Out[44]: {6, 8}

In [47]:

1	s1
---	----

Out[47]: {1, 2, 3, 4, 5, 7}

In [54]:

1	s1.discard(3)
---	---------------

In [49]:

1	s1
---	----

Out[49]: {1, 2, 4, 5, 7}

In [53]:

1	s1.remove(4)
---	--------------

```
-----  
KeyError                                Traceback (most recent call last)  
<ipython-input-53-c000b6ac3c0c> in <module>  
----> 1 s1.remove(4)  
  
KeyError: 4
```

In [52]:

1	s1
---	----

Out[52]: {1, 2, 5, 7}

```
In [56]: 1 s1={1,2,3,4,5}
          2 s2={2,3,4,1,2}
          3 s1.intersection_update(s2)
```

```
In [57]: 1 s1
```

```
Out[57]: {1, 2, 3, 4}
```

```
In [58]: 1 s2
```

```
Out[58]: {1, 2, 3, 4}
```

```
In [61]: 1 s1={1,2,3,4}
          2 s2={5}
          3 s1.isdisjoint(s2)
```

```
Out[61]: True
```

```
In [62]: 1 s1
```

```
Out[62]: {1, 2, 3, 4}
```

```
In [66]: 1 s2={1,2,3,4,5}
          2 s2.issubset(s1)
```

```
Out[66]: False
```

```
In [67]: 1 s1
```

```
Out[67]: {1, 2, 3, 4}
```

```
In [68]: 1 s2
```

```
Out[68]: {1, 2, 3, 4, 5}
```

```
In [70]: 1 s1.issuperset(s2)
```

```
Out[70]: False
```

```
In [71]: 1 s1
```

```
Out[71]: {1, 2, 3, 4}
```

```
In [72]: 1 s1.pop()
```

```
Out[72]: 1
```

```
In [76]: 1 s1.add(5)
         2 s1
```

```
Out[76]: {2, 3, 4, 5}
```

```
In [77]: 1 s1
```

```
Out[77]: {2, 3, 4, 5}
```

```
In [78]: 1 s2
```

```
Out[78]: {1, 2, 3, 4, 5}
```

```
In [80]: 1 s1.symmetric_difference_update(s2)
```

```
In [81]: 1 s1
```

```
Out[81]: {1}
```

```
In [82]: 1 s1
```

```
Out[82]: {1}
```

```
In [83]: 1 s2
```

```
Out[83]: {1, 2, 3, 4, 5}
```

```
In [84]: 1 s3={5,6,7,8,9,10}
         2 s2.union(s3)
```

```
Out[84]: {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}
```

```
In [85]: 1 s2
```

```
Out[85]: {1, 2, 3, 4, 5}
```

```
In [86]: 1 s2.update([6,7,8,9])
```

```
In [87]: 1 s2
```

```
Out[87]: {1, 2, 3, 4, 5, 6, 7, 8, 9}
```

```
In [88]: 1 s2.update({10,11})
```

```
In [89]: 1 s2
```

```
Out[89]: {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11}
```

```
In [91]: 1 s4={21,22,23,3,4,5}
        2 s5={20,22,33,31}
        3 s4.symmetric_difference_update(s5)
```

```
In [92]: 1 s4
```

```
Out[92]: {3, 4, 5, 20, 21, 23, 31, 33}
```

## Dictionary:

- dict(), (keys:value) -> items()
- example: s = {'name':'Rajesh','age':25,'sal':3400}
- ss = {'name':['rajesh','suresh']}

```
In [93]: 1 s = {'name':'Rajesh','age':25,'sal':3400}
        2 s
```

```
Out[93]: {'name': 'Rajesh', 'age': 25, 'sal': 3400}
```

```
In [94]: 1 print(s['name'])
```

Rajesh

```
In [95]: 1 s.keys()
```

```
Out[95]: dict_keys(['name', 'age', 'sal'])
```

```
In [96]: 1 s.values()
```

```
Out[96]: dict_values(['Rajesh', 25, 3400])
```

```
In [98]: 1 for i in s.keys():
        2     print(i,end=" ")
```

name age sal

```
In [99]: 1 for i in s.values():
        2     print(i,end=" ")
```

Rajesh 25 3400

```
In [100]: 1 s.items()
```

```
Out[100]: dict_items([('name', 'Rajesh'), ('age', 25), ('sal', 3400)])
```

```
In [101]: 1 for i in s.items():  
          2     print(i)
```

```
('name', 'Rajesh')  
('age', 25)  
('sal', 3400)
```

```
In [105]: 1 dir(dict)
```

```
Out[105]: ['__class__',  
           '__contains__',  
           '__delattr__',  
           '__delitem__',  
           '__dir__',  
           '__doc__',  
           '__eq__',  
           '__format__',  
           '__ge__',  
           '__getattr__',  
           '__getitem__',  
           '__gt__',  
           '__hash__',  
           '__init__',  
           '__init_subclass__',  
           '__iter__',  
           '__le__',  
           '__len__',  
           '__lt__',  
           '__ne__',  
           '__new__',  
           '__reduce__',  
           '__reduce_ex__',  
           '__repr__',  
           '__setattr__',  
           '__setitem__',  
           '__sizeof__',  
           '__str__',  
           '__subclasshook__',  
           'clear',  
           'copy',  
           'fromkeys',  
           'get',  
           'items',  
           'keys',  
           'pop',  
           'popitem',  
           'setdefault',  
           'update',  
           'values']
```

```
In [106]: 1 s
```

```
Out[106]: {'name': 'Rajesh', 'age': 25, 'sal': 3400}
```

```
In [107]: 1 s.update({'sub':['maths','social','english']})
```

```
In [108]: 1 s
```

```
Out[108]: {'name': 'Rajesh',  
          'age': 25,  
          'sal': 3400,  
          'sub': ['maths', 'social', 'english']}
```

```
In [109]: 1 print(s)
```

```
{'name': 'Rajesh', 'age': 25, 'sal': 3400, 'sub': ['maths', 'social', 'english']}
```

```
In [111]: 1 s.get('name')
```

```
Out[111]: 'Rajesh'
```

```
In [112]: 1 s.get('sub')
```

```
Out[112]: ['maths', 'social', 'english']
```

```
In [114]: 1 s.pop('name')
```

```
Out[114]: 'Rajesh'
```

```
In [115]: 1 s
```

```
Out[115]: {'age': 25, 'sal': 3400, 'sub': ['maths', 'social', 'english']}
```

```
In [116]: 1 s1 = s.copy()  
2 print(s1)
```

```
{'age': 25, 'sal': 3400, 'sub': ['maths', 'social', 'english']}
```

```
In [119]: 1 s.popitem()
```

```
Out[119]: ('sal', 3400)
```

```
In [120]: 1 s
```

```
Out[120]: {'age': 25}
```

```
In [121]: 1 s1
```

```
Out[121]: {'age': 25, 'sal': 3400, 'sub': ['maths', 'social', 'english']}
```

```
In [129]: 1 s1
```

```
Out[129]: {'age': 25,  
          'sal': 3400,  
          'sub': ['maths', 'social', 'english'],  
          ('key1', 'key2'): 0}
```

```
In [130]: 1 s1.setdefault('sal')
```

```
Out[130]: 3400
```

```
In [135]: 1 s1.setdefault('mobile', "Nothing")
```

```
In [134]: 1 s1
```

```
Out[134]: {'age': 25,  
          'sal': 3400,  
          'sub': ['maths', 'social', 'english'],  
          ('key1', 'key2'): 0,  
          'mobile': None}
```

```
In [136]: 1 s1.setdefault('None', 'Nothing')
```

```
Out[136]: 'Nothing'
```

```
In [137]: 1 s1
```

```
Out[137]: {'age': 25,  
          'sal': 3400,  
          'sub': ['maths', 'social', 'english'],  
          ('key1', 'key2'): 0,  
          'mobile': None,  
          'None': 'Nothing'}
```

```
In [138]: 1 s1.popitem()
```

```
Out[138]: ('None', 'Nothing')
```

```
In [139]: 1 s1
```

```
Out[139]: {'age': 25,  
          'sal': 3400,  
          'sub': ['maths', 'social', 'english'],  
          ('key1', 'key2'): 0,  
          'mobile': None}
```

```
In [150]: 1 s1
```

```
Out[150]: {'age': 25,  
          'sal': 3400,  
          'sub': ['maths', 'social', 'english'],  
          ('key1', 'key2'): 0,  
          'mobile': None}
```

```
In [140]: 1 s1.fromkeys('sub')
```

```
Out[140]: {'s': None, 'u': None, 'b': None}
```

```
In [144]: 1 dict = {'a':2,'b':'hello','c':'hai'}
```

```
In [145]: 1 dict
```

```
Out[145]: {'a': 2, 'b': 'hello', 'c': 'hai'}
```

```
In [153]: 1 print(dict.fromkeys('c'))
```

```
{'c': None}
```

```
In [148]: 1 dict['c']
```

```
Out[148]: 'hai'
```

```
In [154]: 1 s1
```

```
Out[154]: {'age': 25,  
          'sal': 3400,  
          'sub': ['maths', 'social', 'english'],  
          ('key1', 'key2'): 0,  
          'mobile': None}
```

```
In [155]: 1 s1
```

```
Out[155]: {'age': 25,  
          'sal': 3400,  
          'sub': ['maths', 'social', 'english'],  
          ('key1', 'key2'): 0,  
          'mobile': None}
```

```
In [156]: 1 s1.setdefault('age')
```

```
Out[156]: 25
```

```
In [160]: 1 s1.setdefault('student1')
```



```
In [161]: 1 s1
```

```
Out[161]: {'age': 25,
           'sal': 3400,
           'sub': ['maths', 'social', 'english'],
           ('key1', 'key2'): 0,
           'mobile': None,
           'student': 'Ramu',
           'student1': None}
```

```
In [162]: 1 s1.setdefault('course', 'B-Tech')
```

```
Out[162]: 'B-Tech'
```

```
In [163]: 1 s1
```

```
Out[163]: {'age': 25,
           'sal': 3400,
           'sub': ['maths', 'social', 'english'],
           ('key1', 'key2'): 0,
           'mobile': None,
           'student': 'Ramu',
           'student1': None,
           'course': 'B-Tech'}
```

```
In [164]: 1 s1['student1']="Ravi"
```

```
In [165]: 1 s1
```

```
Out[165]: {'age': 25,
           'sal': 3400,
           'sub': ['maths', 'social', 'english'],
           ('key1', 'key2'): 0,
           'mobile': None,
           'student': 'Ramu',
           'student1': 'Ravi',
           'course': 'B-Tech'}
```

```
In [174]: 1 d1={}
          2 li=["name","role","Course"]
          3 li1=["Hello","Hi","Bye"]
          4 d1=d1.fromkeys(li,li1)
```

```
In [175]: 1 d1
```

```
Out[175]: {'name': ['Hello', 'Hi', 'Bye'],
           'role': ['Hello', 'Hi', 'Bye'],
           'Course': ['Hello', 'Hi', 'Bye']}
```

## Packages and Modules:



```
In [220]: 1 dc = cc = sc = 0
          2 for i in s:
          3     if i.isdigit():
          4         dc+=1
          5     elif i.isalpha():
          6         cc+=1
          7     else:
          8         sc+=1
          9 print(dc,sc,cc)
```

6 4 10

```
In [ ]: 1
```

```
In [ ]: 1
```

Input: 5

Output:

```
*****
*   *
*   *
*   *
*   *
*****
```

```
In [3]: 1 s = 'amazon nazaom'
```

```
In [4]: 1 s = s.split()
```

```
In [5]: 1 s
```

Out[5]: ['amazon', 'nazaom']

```
In [6]: 1 if s[0] == s[1]:
          2     print('yes')
          3 else:
          4     print('no')
```

no

```
In [229]: 1 import math
```

In [230]: 1 math.\_\_doc\_\_

Out[230]: 'This module provides access to the mathematical functions\ndefined by the C standard.'

In [231]: 1 len.\_\_doc\_\_

Out[231]: 'Return the number of items in a container.'

```
In [1]: 1 def Evenlist(s):
2         '''Sample Example to print the even numebrs
3         in a list by using Modules'''
4         p = []
5         for i in range(len(s)):
6             if int(s[i])%2==0:
7                 p.append(int(s[i]))
8         return p
9         n = input().split()
10        print(Evenlist(n))
```

2 4 5 66  
[2, 4, 66]

In [5]: 1 import math  
2 math.\_\_doc\_\_

Out[5]: 'This module provides access to the mathematical functions\ndefined by the C standard.'

In [7]: 1 print(print.\_\_doc\_\_)

print(value, ..., sep=' ', end='\n', file=sys.stdout, flush=False)

Prints the values to a stream, or to sys.stdout by default.

Optional keyword arguments:

file: a file-like object (stream); defaults to the current sys.stdout.

sep: string inserted between values, default a space.

end: string appended after the last value, default a newline.

flush: whether to forcibly flush the stream.

In [9]: 1 print(Evenlist.\_\_doc\_\_)

Sample Example to print the even numebrs  
in a list by using Modules

In [1]: 1 from IVC2 import second

In [2]: 1 second.\_\_doc\_\_

Out[2]: ' EvenList function'

```
In [7]: 1 s=input().split(" ")
        2 if(sorted(s[0])==sorted(s[1])):
        3     print("Yes")
        4 else:
        5     print("No")
```

amazon naazom

Yes

```
In [8]: 1 s="amazon"
        2 sorted(s)
```

Out[8]: ['a', 'a', 'm', 'n', 'o', 'z']

```
In [9]: 1 s1="naazom"
        2 sorted(s1)
```

Out[9]: ['a', 'a', 'm', 'n', 'o', 'z']

```
In [ ]: 1
```