In [ ]:
```
"""
   dictionary
"""
```

In [ ]:
```
d = {
     'brand' : 'cherry' ,
     'model' : 'arizo5' ,
     'color' : 'white'
     }
print(type(d))    # <class dict>
print(len(d))     # 3
```

In [ ]:
```
d1 = dict( brand = 'cherry' , model='arizo5' , color = 'white')
```

In [ ]:
```
d['year'] = '2010'
```

In [ ]:
```
print( d['model'])  # arizo5
```

In [ ]:
```
x = d.get('model')
print(x)           # arizo5
```

In [ ]:
```
x = d.get('cylinder')
print(x)           # None
```

In [ ]:
```
x = d.get('cylinder',-1)
print(x)           # -1
```

In [ ]:
```
print(list(d.keys()))    # ['brand', 'model', 'color', 'year']
```

In [ ]:
```
print(list(d.values()))  # ['cherry', 'arizo5', 'white', '2010']
```

In [ ]:
```
print(list(d.items()))
#[('brand', 'cherry'), ('model', 'arizo5'), ('color', 'white'), ('year', '201
```

In [ ]:
```
for k,v in d.items():
    print(k,':',v)
```

In [ ]:
```
d.pop('model')
print(d)     # {'brand': 'cherry', 'color': 'white', 'year': '2010'}
```

In [ ]:
```
d.popitem()
print(d)     # {'brand': 'cherry', 'color': 'white'}
```

In [ ]:
```
d.popitem()
print(d)     # {'brand': 'cherry'}
```

In [ ]:
```
d.clear()
print(d)    # {}
```

In [ ]:
```
del d
```

In [ ]:
```
a = ['x', 'y', 'x', 'z', 'y', 'x']
d = {}
for i in a :
    if i not in d:
        d[i] = 1
    else:
        d[i] += 1
print(d)           # {'x': 3, 'y': 2, 'z': 1}
```

In [ ]:
```
# or
d1 = {}
for i in a:
    d1[i] = d1.get(i,0) +1

print(d1)
```

In [ ]:
```
d2 = d.copy()
```

In [ ]:
```
s = 'abfabdcaa'
d = {}
for i in s:
    d[i] = d.get(i,0) + 1

print(d)  #{'a': 4, 'b': 2, 'f': 1, 'd': 1, 'c': 1}
```

In [ ]:
```
line ='a dictionary is a datastructure.'
d = {}
s = line.split()
print(s)  # ['a', 'dictionary', 'is', 'a', 'datastructure.']
for i in s:
    d[i] = d.get(i,0) + 1

print(d)
# {'a': 2, 'dictionary': 1, 'is': 1, 'datastructure.': 1}
```

In [ ]:
```
d = {'a': 4, 'b': 2, 'f': 1, 'd': 1, 'c': 1}
s = 0
for i in d:
    s += d[i]
print(s)       # 9
```

In [ ]:
```
# or
print(sum(d.values()))  # 9
```

In [ ]:
```
print('# sort #')
d = {'a': 4, 'b': 2, 'f': 1, 'd': 1, 'c': 1}
import operator
k= operator.itemgetter(1)
print(sorted(d.items(),key = k))
# [('f', 1), ('d', 1), ('c', 1), ('b', 2), ('a', 4)]

k= operator.itemgetter(0)
print(sorted(d.items(),key = k))
# [('a', 4), ('b', 2), ('c', 1), ('d', 1), ('f', 1)]
```

In [ ]:
```
num ={
      'ali' : [12,13,8],
      'sara': [15,7,14],
      'taha': [5,18,13]
      }

d = {k : sorted(v)  for k,v in num.items()}

print(d)

# {'ali': [8, 12, 13], 'sara': [7, 14, 15], 'taha': [5, 13, 18]}
```

In [ ]:
```
# combine

d1 = {'x' : 3 , 'y': 2 , 'z':1}
d2 = {'w' : 8 , 't': 7 }

d = {}
d = d1.copy()
d.update(d2)
print(d)
# {'x': 3, 'y': 2, 'z': 1, 'w': 8, 't': 7}
```

In [ ]:
```
# or
d = {}
for i in (d1,d2):
    d.update(i)
print(d)
```

In [ ]:
```
# or
d = {**d1 , **d2}
print(d)
```

In [ ]:
```
# Map two lists into a dict
k = ['red' , 'green']
v = ['#FF0000' , '#008000']

z = zip(k,v)
d = dict(z)

print(d)   # {'red': '#FF0000', 'green': '#008000'}
```

In [ ]:
```
s = 'alireza'
x = ['a', 'r']
d = {}

for i in s:
    if i in x:
        d.setdefault(i,0)
        d[i] +=1

print(d)         # {'a': 2, 'r': 1}
```

In [ ]:
```
d = {
     'h' : 0 ,
     't' : 0
     }

import random

for i in range(17):
    d[random.choice(list(d.keys()))] +=1

print(d)
```

In [ ]:
```
students = [
             {'id':123 , 'name' : 'ali'  , 's': True},
             {'id':378 , 'name' : 'taha' , 's': False},
             {'id':934 , 'name' : 'sara' , 's': True}
            ]

print(sum(d['s']  for d in students))   #2

print(students[1])  # {'id': 378, 'name': 'taha', 's': False}
```

In [ ]:
```
### Nested dict
myfamily = {
        'child1':{'name':'taha'  , 'age' : 8}  ,
        'child2':{'name':'mahsa' , 'age' : 20}
        }

print(myfamily)
```

In [ ]:
```
# or
d1 = {'name':'taha'  , 'age' : 8}
d2 = {'name':'mahsa' , 'age' : 20}

myfamily1 = {
        'child1':d1 ,
        'child2':d2
        }
```

In [ ]:
```
tel = {
       'home' : '021-4455' ,
       'mobile' : '0912-1972028'
       }

person ={
         'name'     : 'farshid' ,
         'age'      : 48 ,
         'children' : ['mahsa' , 'taha'],
         'phone'    : tel
        }

print(len(person))  # 4

print(person['phone']) # {'home': '021-4455', 'mobile': '0912-1972028'}

print(person['phone']['mobile']) #0912-1972028

print(person['children'])     # ['mahsa', 'taha']
print(person['children'][0])  # mahsa

print(person.pop('age'))
```

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Codes and Projects (click here) (https://github.com/Amin-Golzari-Oskouei/Python-Programming-Course-Basic-2021) slides and videos (click here) (https://drive.google.com/drive/folders/1ZsQjBJJ4UAAp9zrGxm3c4qrhnvGBUYHw)