Data structures in python

LISTS

```python
#creating list
a=[1,2,3,4,5,6,7,8,9]
print(a)

[1, 2, 3, 4, 5, 6, 7, 8, 9]

b=[1,2,3,'lohi']
print(b)

[1, 2, 3, 'lohi']
```

List operation

```python
#accessing items
print(a[0])
print(b[3])

1
lohi

#modifing items
a[2]=7
a

[1, 2, 7, 4, 5, 6, 7, 8, 9]

#adding items
#append
a.append(4)
a

[1, 2, 7, 4, 5, 6, 7, 8, 9, 4]

#insert
a.insert(9,8)
a

[1, 2, 7, 4, 5, 6, 7, 8, 9, 8, 4]

#removing items
#remove
a.remove(6)
a

[1, 2, 7, 4, 5, 7, 8, 9, 8, 4]
```

```python
#pop
a.pop(3)
a
```

```
[1, 2, 7, 5, 7, 8, 9, 8, 4]
```

```python
#other operating system
x=[2,3,7,8,5,0,6]
len(x)
```

```
7
```

iterating through list

```python
for i in a:
  print(a)
```

```
[3, 5, 8, 9, 1]
[3, 5, 8, 9, 1]
[3, 5, 8, 9, 1]
[3, 5, 8, 9, 1]
[3, 5, 8, 9, 1]
```

TUPLES

```python
#creating tuple
spam=(10,30,29,50)
print(spam)
```

```
(10, 30, 29, 50)
```

```python
#accessing items
spam[2]
```

```
29
```

DICTIONARIES

```python
#creating dictionary
pan={'name':'Alice',
'age':30,
     'marks':40
     }
pan
```

```
{'name': 'Alice', 'age': 30, 'marks': 40}
```

```python
#accessing and modifying
#accessing
pan['age']
```

```
30

#modifying
pan['name']='bob'
pan

{'name': 'bob', 'age': 30, 'marks': 40}

pan['grade']='A'
pan

{'name': 'bob', 'marks': 40, 'brand': 'lol', 'grade': 'A'}

#adding
pan['brand']='lol'
pan

{'name': 'bob', 'age': 30, 'marks': 40, 'brand': 'lol'}

#remove
del pan['age']
pan

{'name': 'bob', 'marks': 40, 'brand': 'lol'}

#iterating through a dictionary
for key,value in pan.items():
    print(key,value)

name bob
marks 40
brand lol
```

SETS

```
#creating set
num={1,2,3,4,5,6,}
num

{1, 2, 3, 4, 5, 6}

#set operation
#add items
num.add(8)
num

{1, 2, 3, 4, 5, 6, 8}

#remove
num.remove(4)
num
```

```
{1, 2, 3, 5, 6, 8}

#union
a={1,2,3,4,5}
b={4,5,6,7,8}
a|b

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

#intersection
a&b

{4, 5}

#difference
a-b

{1, 2, 3}
```

merge of two list

```
a=[1,3,5,6,8,7]
b=[3,4,6,8,9,0]
c=a+b
c

[1, 3, 5, 6, 8, 7, 3, 4, 6, 8, 9, 0]
```

dictionary operations

```
student={'name':'john','age':45,'marks':86}
print('name:',student['name'])
student['marks']=90
print('marks:',student['marks'])

name: john
marks: 90
```

find the max and min in list

```
num=[1,2,3,4,5,6,7,8,9]
print('maximum:',max(num))
print('minimum:',min(num))

maximum: 9
minimum: 1
```

count frequency of elements in list

```python
num=[10,20,30,40,50,40,60]
frequency={}
for i in num:
  frequency[i]=frequency.get(i,0)+1
print(frequency)
```

```
{10: 1, 20: 1, 30: 1, 40: 2, 50: 1, 60: 1}
```

sort a list of tuples by second element

```python
tuples=[(1,'apple'),(2,'banana'),(3,'orange')]
sortedtuples=sorted(tuples,key=lambda x:x[1])
print('sorted tuples:',sortedtuples)
```

```
sorted tuples: [(1, 'apple'), (2, 'banana'), (3, 'orange')]
```

reverse a list

```python
num=[1,2,4,6,8]
num.sort()
num
```

```
[1, 2, 4, 6, 8]
```

```python
num.reverse()
num
```

```
[8, 6, 4, 2, 1]
```

Palindrome number

```python
num=int(input('enter the number'))
reversenum=0
temp=num
while temp>0:
  digit=temp%10
  reversenum=reversenum*10+digit
  temp=temp//10
if num==reversenum:
  print(f'{num} is palindrome numbers')
else:
  print(f'{num} is not palindrome numbers')
```

```
enter the number121
121 is palindrome numbers
```

```python
class Solution(object):
    def isPalindrome(self, x):
        if x < 0 or (x % 10 == 0 and x != 0):
            return False
```

```python
        reverse = 0
        while x > reverse:
            reverse = reverse * 10 + x % 10
            x //= 10
        return x == reverse or x == reverse // 10
solution = Solution()
print(solution.isPalindrome(121))
print(solution.isPalindrome(-121))
print(solution.isPalindrome(10))
print(solution.isPalindrome(0))
```

```
True
False
False
True
```

```python
class Solution(object):
    def isPalindrome(self, x):
        if x < 0 or (x % 10 == 0 and x != 0):
            return False
        reverse = 0
        while x > reverse:
            reverse = reverse * 10 + x % 10
            x //= 10
        return x == reverse or x == reverse // 10
```

```python
text='hello'
text[3]
```

```
{"type":"string"}
```

```python
copy=ram
copy=[1,2,3]
copy[0]=67
copy
```

```
[67, 2, 3]
```

```python
import pprint
data={'name':'lohi','age':20}
pprint.pprint(data)
```

```
{'age': 20, 'name': 'lohi'}
```

magic8 ball with list

```python
import random
response=["It is certain",
    "It is decidedly so",
    "Without a doubt",
    "Yes definitely",
```

```python
        "You may rely on it",
        "As I see it, yes",
        "Most likely",
        "Outlook good",
        "Yes",
        "Signs point to yes",]
print('ask the magic 8 ball a question:')
input()
print(random.choice(response))
```

```
ask the magic 8 ball a question:

Signs point to yes
```