In [ ]:
```
# print sum of the given numbers into single digit

#input : 123   123==1+2+3
#output : 6
#input: 12345 =15
# output:6
```

In [13]:
```
def sumofdigits(number):
    number = str(number)
    t = 0

    for i in number:
        t = t+int(i)
    #print(t)
    if t>9:
        return sumofdigits(t)
    return t


sumofdigits(12356)
```

Out[13]: 8

DataStructures:

- List
- Tuple
- Dictionary
- set

List

- List is a group of items or collection of items.
  - we can create a list by different ways
    - default function list()
    - by using symbol [] square brackets

In [14]:
```
m = list()
```

In [15]:
```
print(type(m))
```

```
<class 'list'>
```

In [16]:
```
names = ["supriya","aihika","hemanth","chandana"]
names
```

Out[16]: ['supriya', 'aihika', 'hemanth', 'chandana']

In [17]:
```
print(type(names))
```

```
<class 'list'>
```

In [18]:
```
len(names)
```

Out[18]: 4

In [19]:
```
len(m)
```

Out[19]: 0

In [20]:
```
list1 =  [1,"apssdc",56.7,"hii"]
```

In [21]:
```
list1
```

Out[21]: [1, 'apssdc', 56.7, 'hii']

List Indexing

- Forward indexing ---> 0 to len(items)-1
- reverse indexing ----> -len() to -1

In [22]:
```
list1[-1]
```

Out[22]: 'hii'

In [23]:
```
list1[0]
```

Out[23]: 1

In [24]:
```
list1[-(len(list1))]
```

Out[24]: 1

In [25]:
```
# nested list

a = ["hii","hello",[12,34],["apssdc",89,67]]
a
```

Out[25]: ['hii', 'hello', [12, 34], ['apssdc', 89, 67]]

In [26]:
```
len(a)
```

Out[26]: 4

In [27]:
```
a[3]
```

Out[27]: ['apssdc', 89, 67]

In [29]:
```
a[3][1]
```

Out[29]: 89

In [30]:
```
a[3,1]
```

```
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
<ipython-input-30-a092fcc6ef03> in <module>
----> 1 a[3,1]

TypeError: list indices must be integers or slices, not tuple
```

In [32]:
```
a[2][2]
```

```
---------------------------------------------------------------------------
IndexError                                Traceback (most recent call last)
<ipython-input-32-37330756d27d> in <module>
----> 1 a[2][2]

IndexError: list index out of range
```

In [34]:
```
a[2][1]
```

Out[34]: 34

In [35]:
```
a[2][-1]
```

Out[35]: 34

List Slicing

In [36]:
```
names
```

Out[36]: ['supriya', 'aihika', 'hemanth', 'chandana']

listslicing[starting:ending:step]

In [38]:
```
names[1:3]
```

Out[38]: ['aihika', 'hemanth']

In [40]:
```
names[2]
```

Out[40]: 'hemanth'

In [44]:
```
names[:3]
```

Out[44]: ['supriya', 'aihika', 'hemanth']

In [45]:
```
names[2:]
```

Out[45]:
```
['hemanth', 'chandana']
```

In [46]:
```
names[::2]
```

Out[46]:
```
['supriya', 'hemanth']
```

In [47]:
```
names
```

Out[47]:
```
['supriya', 'aihika', 'hemanth', 'chandana']
```

In [48]:
```
names[::3]
```

Out[48]:
```
['supriya', 'chandana']
```

In [49]:
```
names[-1::]
```

Out[49]:
```
['chandana']
```

In [50]:
```
names[-2:]
```

Out[50]:
```
['hemanth', 'chandana']
```

- List is mutable
- mutable means we can change or modify the data

In [52]:
```
print(dir(list))
```

```
['__add__', '__class__', '__contains__', '__delattr__', '__delitem__', '__dir__', '__doc__', '__eq__', '__form
at__', '__ge__', '__getattribute__', '__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', 'rev
erse', 'sort']
```

- append - listvar.append(new item)
- we can add the data into existing list at the ending

In [53]:
```
names
```

Out[53]:
```
['supriya', 'aihika', 'hemanth', 'chandana']
```

In [54]:
```
names.append("jahnavi")
```

In [55]:
```
names
```

Out[55]:
```
['supriya', 'aihika', 'hemanth', 'chandana', 'jahnavi']
```

In [56]:
```
names.append()
```

```
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
<ipython-input-56-25652057c62f> in <module>
----> 1 names.append()

TypeError: append() takes exactly one argument (0 given)
```

In [63]:
```
m1 = [12,34,56]
m2 = m1
```

In [64]:
```
print(m1)
print(m2)
```

```
[12, 34, 56]
[12, 34, 56]
```

In [65]:
```
m1.append(78)
```

In [66]:
```
m1
```

Out[66]:
```
[12, 34, 56, 78]
```

In [67]:
```
m2
```

Out[67]:
```
[12, 34, 56, 78]
```

In [68]:
```
m2.append(90)
```

In [69]:
```
m2
```

Out[69]:
```
[12, 34, 56, 78, 90]
```

In [70]:
```
m1
```

Out[70]:
```
[12, 34, 56, 78, 90]
```

- copy()

In [71]:
```
a1 = [56,45,90]
a2 = a1.copy()
```

In [72]:
```
print(a1)
print(a2)
```

```
[56, 45, 90]
[56, 45, 90]
```

In [73]:
```
a1.append(67)
print(a1)
```

```
[56, 45, 90, 67]
```

In [74]:
```
a2
```

Out[74]:
```
[56, 45, 90]
```

In [75]:
```
a2.append(100)
print(a2)
print(a1)
```

```
[56, 45, 90, 100]
[56, 45, 90, 67]
```

- Extend

In [76]:
```
names
```

Out[76]:
```
['supriya', 'aihika', 'hemanth', 'chandana', 'jahnavi']
```

In [77]:
```
names1 = ["apssdc","python","programming"]
```

In [78]:
```
names.extend(names1)
```

In [80]:
```
print(names)
```

```
['supriya', 'aihika', 'hemanth', 'chandana', 'jahnavi', 'apssdc', 'python', 'programming']
```

In [81]:
```
names1.extend(names)
```

In [82]:
```
print(names1)
```

```
['apssdc', 'python', 'programming', 'supriya', 'aihika', 'hemanth', 'chandana', 'jahnavi', 'apssdc', 'python',
'programming']
```

- count

In [84]:
```
print(names)
```

```
['supriya', 'aihika', 'hemanth', 'chandana', 'jahnavi', 'apssdc', 'python', 'programming']
```

In [91]:
```
names.count('supriya')
```

Out[91]:
```
1
```

In [86]:
```
c = [1,2,3,4,1,1,2,3,5]
c
```

Out[86]:
```
[1, 2, 3, 4, 1, 1, 2, 3, 5]
```

In [89]:
```
c.count(1)
```

Out[89]:
```
3
```

- index(item)

In [93]:
```
print(names)
```

```
['supriya', 'aihika', 'hemanth', 'chandana', 'jahnavi', 'apssdc', 'python', 'programming']
```

In [94]:
```
names.index("chandana")
```

Out[94]:
```
3
```

In [95]:
```
c
```

Out[95]:
```
[1, 2, 3, 4, 1, 1, 2, 3, 5]
```

In [96]:
```
c.index(1)
```

Out[96]:
```
0
```

index(item,index_of_search_starting,ending)

In [100]:
```
c.index(1,5,7)
```

Out[100]:
```
5
```

In [101]:
```
c.index(1,6,8)
```

```
---------------------------------------------------------------------------
ValueError                                Traceback (most recent call last)
<ipython-input-101-1b84ca8078e2> in <module>
----> 1 c.index(1,6,8)

ValueError: 1 is not in list
```

- insert(index,item)

In [102]:
```
t = ["python","programming","online","apssdc"]
t
```

Out[102]:
```
['python', 'programming', 'online', 'apssdc']
```

In [103]:
```
t.insert(3,"conducting")
```

In [104]:
```
t
```

Out[104]:
```
['python', 'programming', 'online', 'conducting', 'apssdc']
```

- updating the item

In [106]:
```
t[2]="offline"
print(t)
```

```
['python', 'programming', 'offline', 'conducting', 'apssdc']
```

- to remove the item at particular index
- pop(index)

In [109]:
```
t
```

Out[109]:
```
['python', 'programming', 'offline', 'conducting', 'apssdc']
```

In [110]:
```
t.pop(3)
```

Out[110]:
```
'conducting'
```

In [111]:
```
t
```

Out[111]:
```
['python', 'programming', 'offline', 'apssdc']
```

In [112]:
```
t.pop()
```

Out[112]:
```
'apssdc'
```

In [113]:
```
t
```

Out[113]:
```
['python', 'programming', 'offline']
```

- remove(item)

In [114]:
```
t
```

Out[114]:
```
['python', 'programming', 'offline']
```

In [115]:
```
t.remove("offline")
```

In [116]:
```
t
```

Out[116]:
```
['python', 'programming']
```

In [117]:
```
t.remove("apssdc")
```

```
---------------------------------------------------------------------------
ValueError                                Traceback (most recent call last)
<ipython-input-117-0a7acf0a5821> in <module>
----> 1 t.remove("apssdc")

ValueError: list.remove(x): x not in list
```

- sort()
- sort in an order

In [119]:
```
x = [12,34,23,67,90,45,34]
x.sort()
print(x)
```

```
[12, 23, 34, 34, 45, 67, 90]
```

- reverse()

In [120]:
```
x
```

Out[120]:
```
[12, 23, 34, 34, 45, 67, 90]
```

In [123]:
```
x.reverse()
print(x)
```

```
[90, 67, 45, 34, 34, 23, 12]
```

In [127]:
```
x1 = [45,23,12,456,89]
x1.sort(reverse=False)
print(x1)
```

```
[12, 23, 45, 89, 456]
```

In [126]:
```
x1 = [45,23,12,456,89]
x1.sort(reverse=True)
print(x1)
```

```
[456, 89, 45, 23, 12]
```

In [128]:
```
names
```

Out[128]:
```
['supriya',
 'aihika',
 'hemanth',
 'chandana',
 'jahnavi',
 'apssdc',
 'python',
 'programming']
```

In [130]:
```
names.sort()
print(names)
```

```
['aihika', 'apssdc', 'chandana', 'hemanth', 'jahnavi', 'programming', 'python', 'supriya']
```

In [131]:
```
names.sort(reverse=True)
print(names)
```

```
['supriya', 'python', 'programming', 'jahnavi', 'hemanth', 'chandana', 'apssdc', 'aihika']
```

In [132]:
```
len(names)
```

Out[132]:
```
8
```

In [133]:
```
min(names)
```

Out[133]: 'aihika'

In [134]:
```
max(names)
```

Out[134]: 'supriya'

In [135]:
```
sum(names)
```

```
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
<ipython-input-135-de28af056606> in <module>
----> 1 sum(names)

TypeError: unsupported operand type(s) for +: 'int' and 'str'
```

In [136]:
```
sum(x1)
```

Out[136]: 625

In [137]:
```
#converting string to list
a = "apssdc is conducting online workshops"
#["apssdc","is","conducting","online","workshops"]
type(a)
```

Out[137]: str

In [139]:
```
c = a.split()
print(c)
print(type(c))
```

```
['apssdc', 'is', 'conducting', 'online', 'workshops']
<class 'list'>
```

In [146]:
```
a = "bcagvahvafv"
a.split("a")
```

Out[146]: ['bc', 'gv', 'hv', 'fv']

In [147]:
```
a = "abcagvahvaf"
a.split("v")
```

Out[147]: ['abcag', 'ah', 'af']

In [148]:
```
c
```

Out[148]: ['apssdc', 'is', 'conducting', 'online', 'workshops']

In [149]:
```
"".join(c)
```

Out[149]: 'apssdcisconductingonlineworkshops'

In [150]:
```
" ".join(c)
```

Out[150]: 'apssdc is conducting online workshops'

In [151]:
```
"@".join(c)
```

Out[151]: 'apssdc@is@conducting@online@workshops'

In [ ]:
```
1)#x = "list is mutable so we can change the data"
# convert string to list
# output
# x = ["list","is","mutable","so","we","can","change","the","data"]
2) # x1 = ["students","are","not","listening","the","class"]
#convert list to string
# output:
#"Students are not listening the class"
```

In [162]:
```
# write a program to print numbers of specified list after removing even numbers from it.
l1 = []
l = [23,45,67,12,34,78,89]
for i in l:
    if i%2!=0:
        l1.append(i)
print(l1)
```

```
[23, 45, 67, 89]
```

In [152]:
```
l = [23,45,67,12,34,78,89]
l
```

Out[152]: [23, 45, 67, 12, 34, 78, 89]

In [153]:
```
for i in l:
    print(i)
```

```
23
45
67
12
34
78
89
```

In [155]:
```
for i in range(len(l)):
    print(l[i])
```

```
23
45
67
12
34
78
89
```

In [156]:
```
a = "apssdc"
for i in a:
    print(i)
```

```
a
p
s
s
d
c
```

In [157]:
```
for i in l:
    print(i)
```

```
23
45
67
12
34
78
89
```

In [159]:
```
for i in range(len(l)):
    print(l[i])
```

```
23
45
67
12
34
78
89
```

In [ ]:
```
# find the sum of the given numbers
l = ["apssdc",23,90,56,"Python",True]
#output
# 23 +90 +56 ==>169
```

In [168]:
```
L=['l', 2,4,5,'sl']
Sum=0
for i in L:
     if str(i).isdigit() == True:
            print(i)
            Sum=Sum+i

print(Sum)
```

```
2
4
5
11
```

In [170]:
```
x="list is mutable so we can change the data"
type(x)
list(x.split())
```

Out[170]:
```
['list', 'is', 'mutable', 'so', 'we', 'can', 'change', 'the', 'data']
```

In [171]:
```
x1=["students","are","not","listening","the","class"]
str(x1)
" ".join(x1)
```

Out[171]:
```
'students are not listening the class'
```

In [175]:
```
L=['l', 2,4,5,'sl']
Sum=0
for i in L:
     if str(i).isdigit():
            Z=int(i)
            Sum=Sum+Z
     #Return Sum
print(Sum)
```

```
11
```

In [174]:
```
print(dir(str))
```

```
['__add__', '__class__', '__contains__', '__delattr__', '__dir__', '__doc__', '__eq__', '__format__', '__ge_
_', '__getattribute__', '__getitem__', '__getnewargs__', '__gt__', '__hash__', '__init__', '__init_subclass_
_', '__iter__', '__le__', '__len__', '__lt__', '__mod__', '__mul__', '__ne__', '__new__', '__reduce__', '__red
uce_ex__', '__repr__', '__rmod__', '__rmul__', '__setattr__', '__sizeof__', '__str__', '__subclasshook__', 'ca
pitalize', 'casefold', 'center', 'count', 'encode', 'endswith', 'expandtabs', 'find', 'format', 'format_map',
'index', 'isalnum', 'isalpha', 'isascii', 'isdecimal', 'isdigit', 'isidentifier', 'islower', 'isnumeric', 'isp
rintable', 'isspace', 'istitle', 'isupper', 'join', 'ljust', 'lower', 'lstrip', 'maketrans', 'partition', 'rep
lace', 'rfind', 'rindex', 'rjust', 'rpartition', 'rsplit', 'rstrip', 'split', 'splitlines', 'startswith', 'str
ip', 'swapcase', 'title', 'translate', 'upper', 'zfill']
```

In [ ]:

In [ ]: