In [ ]:
```
Strings write up

Assignment on strings
```

In [ ]:
```
- Read the strings

- type

- max

- min

- len

- in (for loop)

- range

- index

- mutable

- slice

- methods
```

- array of elements

In [1]:
```
string1='python'
```

In [2]:
```
list1=[1,2,3,4]
list1 # You can write numbers
```

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

In [3]:
```
list2=['A','B','C','D']
list2 # you can write strings
```

Out[3]:
```
['A', 'B', 'C', 'D']
```

In [4]:
```
list3=[1,2,3,4,'A','B','C','D']
list3
```

Out[4]:
```
[1, 2, 3, 4, 'A', 'B', 'C', 'D']
```

In [6]:
```
list4=[1,'Apple',10.5,10+20j,True]
list4
```

Out[6]:
```
[1, 'Apple', 10.5, (10+20j), True]
```

In [7]:
```
list5=[100,100,100]
list5
```

Out[7]:
```
[100, 100, 100]
```

In [8]:
```
list6=[[1,2,3,4]]
list6
```

Out[8]:
```
[[1, 2, 3, 4]]
```

- list is an array of elements
- list elements heterogeneous(different) data types are allowed
- duplicates are allowed
- list in list also works

type

In [9]:
```
type(list3)
```

Out[9]:
```
list
```

max

In [10]:
```
list1
```

Out[10]:
```
[1, 2, 3, 4]
```

In [11]:
```
list2
```

Out[11]:
```
['A', 'B', 'C', 'D']
```

In [12]:
```
print(max(list1)) # 4
print(max(list2)) # D ====== > ascii ord
print(max(list3)) # error we cant compare different data types
```

```
4
D

---------------------------------------------------------------------------
-
TypeError                                 Traceback (most recent call las
t)
Cell In[12], line 3
      1 print(max(list1)) # 4
      2 print(max(list2)) # D ====== > ascii ord
----> 3 print(max(list3))

TypeError: '>' not supported between instances of 'str' and 'int'
```

min

In [13]:
```
print(min(list1)) # 1
print(min(list2)) # A ====== > ascii ord
print(min(list3)) # error we cant compare different data types
```

```
1
A

---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call las
t)
Cell In[13], line 3
      1 print(min(list1)) # 1
      2 print(min(list2)) # A ====== > ascii ord
----> 3 print(min(list3))

TypeError: '<' not supported between instances of 'str' and 'int'
```

len

In [14]:
```
print(len(list1))  # 4
print(len(list2)) # 4
print(len(list3)) #8
```

```
4
4
8
```

sum

In [16]:
```
print(list1)
print(sum(list1))
```

```
[1, 2, 3, 4]
10
```

In [17]:
```
print(list2)
print(sum(list2))
```

```
['A', 'B', 'C', 'D']

---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call las
t)
Cell In[17], line 2
      1 print(list2)
----> 2 print(sum(list2))

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

- sum
- eval
- range

in

In [18]:
```
list1
```

Out[18]:
```
[1, 2, 3, 4]
```

In [21]:
```
1 in list1
2 in list1
3 in list1
4 in list1

i in list1

# can i iterate through for loop
```

Out[21]:
```
False
```

In [22]:
```
for i in list1:
    print(i)
```

```
1
2
3
4
```

Concatenation

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

Out[23]:
```
[1, 2, 3, 4]
```

In [24]:
```
list2
```

Out[24]:
```
['A', 'B', 'C', 'D']
```

In [25]:
```
print(list1+list2)
print(list2+list1)
```

```
[1, 2, 3, 4, 'A', 'B', 'C', 'D']
['A', 'B', 'C', 'D', 1, 2, 3, 4]
```

In [26]:
```
new_list=list1+list2
```

In [27]:
```
new_list
```

Out[27]:
```
[1, 2, 3, 4, 'A', 'B', 'C', 'D']
```

In [28]:
```
list1*3  # list1+list1+list1
```

Out[28]:
```
[1, 2, 3, 4, 1, 2, 3, 4, 1, 2, 3, 4]
```

In [ ]:
```
list1-list2  # Fail
list1*list2  # Fail
list1/list2  # Fail

#'a'/'b'
```

In [ ]:
```
96 ====== laptop

techshame
```

Index

In [29]:
```
list3
```

Out[29]:
```
[1, 2, 3, 4, 'A', 'B', 'C', 'D']
```

In [33]:
```
# python index start with zero
list3[0],list3[1],list3[2],list3[3]

# list3[i]
# i=0 1 2 3
```

Out[33]:
```
(1, 2, 3, 4)
```

In [37]:
```
list3[-1]

-8  -7  -6  -5  -4  -3  -2  -1
1   2   3   4    A   B   C  D
0   1   2   3    4   5   6  7
```

Out[37]:
```
'D'
```

In [39]:
```
for i in range(len(list3)):
    print('postive index is: {} and negative index is {}: for an element {}
```

```
postive index is: 0 and negative index is -8: for an element 1
postive index is: 1 and negative index is -7: for an element 2
postive index is: 2 and negative index is -6: for an element 3
postive index is: 3 and negative index is -5: for an element 4
postive index is: 4 and negative index is -4: for an element A
postive index is: 5 and negative index is -3: for an element B
postive index is: 6 and negative index is -2: for an element C
postive index is: 7 and negative index is -1: for an element D
```

In [42]:
```
#WAP find the elements which are having len<3
# list=['Apple','Ball','Cat','Ab','Cd','Ef']

# step-1:  iterate the list using for loop
# step-2:  apply the if condition len(<element>)<3:
# step-3:            print(element)

list1=['Apple','Ball','Cat','Ab','Cd','Ef']
for i in range(len(list1)):
    if len(list1[i])<3:
        print(list1[i])


for i in list1:
    if len(i)<3:
        print(i)
```

```
Ab
Cd
Ef
Ab
Cd
Ef
```

In [43]:
```
#WAP find the elements which are having #
# list=['App#e','B#ll','C#t','Ab','Cd','Ef']

# step-1:  iterate the list using for loop
# step-2:  apply the if condition:
# step-3:            print(element)

list1=['App#e','B#ll','C#t','Ab','Cd','Ef']
for i in list1:
    if '#' in i:
        print(i)
```

```
App#e
B#ll
C#t
```

In [44]:
```
list1=['App#e','B#ll','C#t','Ab','Cd','Ef']
count=0
for i in list1:
    if '#' in i:
        count=count+1

print(count)
```

```
3
```

In [46]:
```
list1=[1,2,3,['Apple','Ball']]

# retrive the ball using index
# In the given list how many elements are there: 4
list1[3][1]
```

Out[46]:
```
'Ball'
```

In [53]:
```
list2=[[[[[[['Cherry']]]]]]]
list2[0][0][0][0][0][0][0]
```

Out[53]:
```
'Cherry'
```

In [ ]:
```
list3=[[[['A','B',[[[1,2,3,['Car']]]]]]]]
# retrive the car
```

In [54]:
```
list3=[[[['A','B',[[[1,2,3,['car']]]]]]]]
list3[0][0][0][2][0][0][3][0]
```

Out[54]:
```
'car'
```

Mutabel

In [56]:
```
string1='welcome'
# 'l'  to 'L'
string1[2]='L'

# strings are immutable
```

```
---------------------------------------------------------------------------
-
TypeError                                 Traceback (most recent call las
t)
Cell In[56], line 3
      1 string1='welcome'
      2 # 'l'  to 'L'
----> 3 string1[2]='L'

TypeError: 'str' object does not support item assignment
```

In [58]:
```
list1=['A','B','C']
list1[0]=100
list1
```

Out[58]:
```
[100, 'B', 'C']
```

slice

In [59]:
```
list1=[10,20,30,40,50,'P','Y','T','H','O','N','a','b','c','D']

print(list1[2:14:3])   # p
print(list1[2:14:-3])  # np
print(list1[2:-14:3])  # np
print(list1[2:-14:-3]) # p
print(list1[-2:14:3])  # p
print(list1[-2:-14:3])  # np
print(list1[-2:-14:-3])  # p
print(list1[-2:14:-3])  # np
```

```
[30, 'P', 'H', 'a']
[]
[]
[30]
['c']
[]
['c', 'N', 'T', 50]
[]
```

- Reading a list
- Different ways to provide elements
- type/min/max/sum/len
- in
- concatenation
- index
- mutable
- slice

List methods

In [60]:
```
dir([])
```

Out[60]:
```
['__add__',
 '__class__',
 '__class_getitem__',
 '__contains__',
 '__delattr__',
 '__delitem__',
 '__dir__',
 '__doc__',
 '__eq__',
 '__format__',
 '__ge__',
 '__getattribute__',
 '__getitem__',
 '__getstate__',
 '__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']
```

clear-copy

In [62]:
```
list1=[1,2,3,4]

# I wanat copy these elements in a list2

list2=list1.copy()

list1.clear()

print('list1:',list1)  # []
print('list2:',list2)  # [1,2,3,4]
```

```
list1: []
list2: [1, 2, 3, 4]
```

In [ ]:
```
# Side heading

# write the code

# insight/observation from above code
```

append

In [3]:
```
# add (something) to the end of a written document.

list1=[100,200]

# [100,200,300]

list1.append(300)
list1
```

Out[3]:
```
[100, 200, 300]
```

In [4]:
```
list1=[]
list1.append(100)
list1.append(200)
list1.append(300)
list1
```

Out[4]:
```
[100, 200, 300]
```

In [6]:
```
list1.append([100,200])
```

In [7]:
```
list1
```

Out[7]:
```
[100, 200, 300, [100, 200]]
```

In [8]:
```
list1.append('apple')
```

In [9]:
```
list1
```

Out[9]:
```
[100, 200, 300, [100, 200], 'apple']
```

In [10]:
```
# Input list= [1,2,3,4,5]
# create a new list = [1,4,9,16,25]

# write normal python code
list1=[1,2,3,4,5]
for i in list1:
    print(i*i)

# I dont want print the values, i want save the output in a list
```

```
1
4
9
16
25
```

In [11]:
```
list1=[1,2,3,4,5]
output=[]
for i in list1:
    output.append(i*i)

output
```

Out[11]:
```
[1, 4, 9, 16, 25]
```

In [19]:
```
list2=['hyd','bengaluru','delhi']
# output=['Hyd','Bengaluru','Delhi']
output=[]
for i in list2:
    output.append(i.capitalize())

output
```

Out[19]:
```
['Hyd', 'Bengaluru', 'Delhi']
```

In [22]:
```
list3=['h#d','beng#luru','delhi']
# output=['h#d','beng#luru']

output=[]
for i in list3:
    if '#' in i:
        output.append(i)

output
```

Out[22]:
```
['h#d', 'beng#luru']
```

list comprehenshion

In [24]:
```
# code in a single line ===== > speed the process
list1=[1,2,3,4,5] # input

output=[]
for i in list1:
    output.append(i*i)

output

# step-1: intilaized the list  output=[]
# step-2:  iterate the loop
# step-3: you save the output

output1=[i*i for i in list1]
output1

# [<output> <forloop>]
```

Out[24]:
```
[1, 4, 9, 16, 25]
```

In [26]:
```
list2=['hyd','bengaluru','delhi']
# output=['Hyd','Bengaluru','Delhi']
output=[]
for i in list2:
    output.append(i.capitalize())

output

# [<output> <forloop>]
output1=[i.capitalize() for i in list2]
output1
```

Out[26]:
```
['Hyd', 'Bengaluru', 'Delhi']
```

In [29]:
```
# create the list of 20 numbers from 1 to 20

###################################M-1
#for i in range(1,21):
    #print(i)

################################### M-2
numbers=[]
for i in range(1,21):
    numbers.append(i)
numbers

################################### M-3

numbers1=[i for i in range(1,21)]
numbers1
```

Out[29]:
```
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20]
```

In [ ]:
```
# list comprehenshion with if condition
```

In [30]:
```
list3=['h#d','beng#luru','delhi']
# output=['h#d','beng#luru']

output=[]
for i in list3:
    if '#' in i:
        output.append(i)

output

#[<o/p> <forloop> <if_condition>]

output1=[i for i in list3 if '#' in i]
output1
```

Out[30]:
```
['h#d', 'beng#luru']
```

In [ ]:
```
list4=['abcd','abc','ac','a']
# elemnts less than 3
# ['ac','a']
```

In [32]:
```
list4=["abcd","abc","ac","a"]

output=[i for i in list4 if len(i)<3]
output
```

Out[32]:
```
['ac', 'a']
```

In [34]:
```
# if else

list1=[1,2,3,4,5,6]

for i in list1:
    if i%2==0:
        print("even:{}".format(i))

    else:
        print("odd:{}".format(i))
```

```
odd:1
even:2
odd:3
even:4
odd:5
even:6
```

In [35]:
```
list1=[1,2,3,4,5,6]

output=[]

for i in list1:
    if i%2==0:
        output.append("even:{}".format(i))

    else:
        output.append("odd:{}".format(i))

output
```

Out[35]: ['odd:1', 'even:2', 'odd:3', 'even:4', 'odd:5', 'even:6']

In [36]:
```
#[<if_output> <if_condition> else <else_ouput> <for loop>]
["even:{}".format(i) if i%2==0 else "odd:{}".format(i) for i in list1]
```

Out[36]: ['odd:1', 'even:2', 'odd:3', 'even:4', 'odd:5', 'even:6']

count

In [40]:
```
list1=[1,2,3,'A','B','B','B','C']
list1.count('B')
```

Out[40]: 3

In [41]:
```
count=0
for i in list1:
    if i=='B':
        count=count+1

print(count)
```

3

Extend

In [43]:
```
list1=['A','B','C']
list2=[1,2,3]

list1.extend(list2)
list1

# here the list1 will be updated with list2 values
```

Out[43]: ['A', 'B', 'C', 1, 2, 3]

In [48]:
```
list1=['A','B','C']
list2=[1,2,3]
list1.append(list2) # ['A','B','C',[1,2,3]]
list1
```

Out[48]: ['A', 'B', 'C', [1, 2, 3]]

In [46]:
```
list1=['A','B','C']
list2=[1,2,3]
list1=list1+list2

print(list1)
```

```
['A', 'B', 'C']
```

append vs **extend** vs **concat**

- append will add the element at last , that element can be any type
    - list1=[1,2,3]
    - list2 =['A','B']
    - list1.append(list2)=[1,2,3,['A','B']]
- Extend will update the list by adding new elements, the result also save in a same list
    - list1=[1,2,3]
    - list2 =['A','B']
    - list1.extend(list2)=[1,2,3,'A','B']
- Concat will add two list, but the result will not update in a same list
    - list1=[1,2,3]
    - list2 =['A','B']
    - list1+list2=[1,2,3,'A','B']

iterator

- iterator word ======= > loop
- the elements we can print using for loop
- string='python' we can print each letter using for loop
- list1=[1,2,3] we can print each element using for loop

In [52]:
```
val=reversed('python')
val
```

Out[52]:
```
<reversed at 0x21e9cac50f0>
```

In [51]:
```
for i in val:
    print(i)
```

```
n
o
h
t
y
p
```

In [57]:
```
list1=[1,2,3]
list1.extend('python')
list1.append('python')
list1
```

Out[57]:
```
[1, 2, 3, 'p', 'y', 't', 'h', 'o', 'n', 'python']
```

pop-remove-del

In [58]:
```
list1
```

Out[58]:
```
[1, 2, 3, 'p', 'y', 't', 'h', 'o', 'n', 'python']
```

In [59]:
```
list1.pop()
```

Out[59]:
```
'python'
```

In [60]:
```
list1
```

Out[60]:
```
[1, 2, 3, 'p', 'y', 't', 'h', 'o', 'n']
```

In [62]:
```
list1
list1.pop(5)  # list1.pop(list1.index('t'))

# in side bracket default aragument is there  index=-1
# -1 means last value
# if you not provide any value
# it will remove last value
# if i provide any index, it will reove that element

# it is also returning , which element it is removing
```

Out[62]:
```
't'
```

In [64]:
```
list1.pop(100)
```

```
---------------------------------------------------------------------------
IndexError                                Traceback (most recent call las
t)
Cell In[64], line 1
----> 1 list1.pop(100)

IndexError: pop index out of range
```

In [66]:
```
list1=[100,200,100,300] # duplicates are allowed
list1.remove(100)       # first occurence will gone
list1                   # it will not return any value
```

Out[66]:
```
[200, 100, 300]
```

In [67]:
```
del(list1)
```

In [68]:
```
list1
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
Cell In[68], line 1
----> 1 list1

NameError: name 'list1' is not defined
```

In [69]:
```
list1=[100,200,100,300]
del list1[2]

list1
```

Out[69]:
```
[100, 200, 300]
```

In [70]:
```
dir(list1)
```

Out[70]:
```
['__add__',
 '__class__',
 '__class_getitem__',
 '__contains__',
 '__delattr__',
 '__delitem__',
 '__dir__',
 '__doc__',
 '__eq__',
 '__format__',
 '__ge__',
 '__getattribute__',
 '__getitem__',
 '__getstate__',
 '__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 [ ]:
```
- index   vs  multiple values

- insert  vs append

- reverse ascending and descending ======= reversed

- sort  ========== sorted

- difference between reverse and sort

# get all the differences all the information
# share your screenshot
```

In [73]:
```
list1=[1,2,3,4,2,6]
f_i=list1.index(2)
list1.index(2,f_i+1)
```

Out[73]: 4

zip

In [77]:
```
list1=['Ram','Robert','Raheem']
list2=[25,30,35]

# 'Ram age is 25'
# 'Robert age is 30'
# 'Raheem age is 35'
for i,j in zip(list1,list2):
    print("{} age is {}".format(i,j))
```

```
Ram age is 25
Robert age is 30
Raheem age is 35
```

In [ ]:
```
list1=[100,200,300]
list2=[25,30,35]

# output=[125,230,335]

output=[i+j for i,j in zip(list1,list2)]
output
```

In [ ]:
```
# take 5 questions in list1
# take corresponding 5 answers in another list2
# iterate through list1
# every quetion should print
# answer=input("tell the answer")
# answer will check in list2
# if it is there : marks=marks+1
# else: No marks

# how many write answers you made, how may answers you got

########################################
# list1=['Who is PM of india','What is the capital of india','Who is Preside
# list2=['Modi','Delhi','Draupadi']
# marks=0
# correct_answr=0
# for i in range(len(list1)):
#   print('Q1:'<>)
#   answer=input("enter the answer")
#   if answer.lower()==list2.index(i):
#          marks+=1
#
```