**MODULE-3**

1. What is List? How will you reverse a list?

Lists are **used to store multiple items in a single variable**. Lists are one of 4 built-in data types in Python used to store collections of data, the other 3 are Tuple, Set, and Dictionary, all with different qualities and usage.

* list=[10,20,30,40,50]
* print(list[::-1])

[50, 40, 30, 20, 10]

1. How will you remove last object from a list?

list=[10,20,30,40,50]

print(list.pop(-1))

50

1. Suppose list1 is [2, 33, 222, 14, and 25], what is list1 [-1]?

list1=[2,33,222,14,25]

print(list1[-1])

25

1. Differentiate between append () and extend () methods?

-Python **append()** method adds an element to a list, and the **extend()** method concatenates the first list with another list.

1. Write a Python function to get the largest number, smallest num and sum of all from a list.

mylst=[]

num=int(input("enter how many numbers:"))

for n in range(num):

nums=int(input("enter a numbers:"))

mylst.append(nums)

print('maximum element in the list is:',max(mylst),'\n minimum elementin the list is',min(mylst),'\n sum of all from list is',sum(mylst))

enter how many numbers:6

enter a numbers:12

enter a numbers:45

enter a numbers:78

enter a numbers:93

enter a numbers:67

enter a numbers:43

maximum element in the list is: 93

minimum element in the list is 12

sum of all from list is 338

1. How will you compare two lists?

list1 = [11, 12, 13, 14, 15]

list2 = [12, 13, 11, 15, 14]

a = set(list1)

b = set(list2)

if a == b:

print("The list1 and list2 are equal")

else:

("The list1 and list2 are not equal")

The list1 and list2 are equal

1. Write a Python program to count the number of strings where the string length is 2 or more and the first and last character are same from a given list of strings.

ls= ['abc', 'xyz', 'aba', '1221']

def match\_words(ls):

ctr = 0

for string in ls:

if len(string) > 2 and string[0] == string[-1]:

ctr += 1

return ctr

print(match\_words(['abc', 'xyz', 'aba', '1221']))

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1. Write a Python program to remove duplicates from a list.

def Remove(duplicate):

final\_list = []

for num in duplicate:

if num not in final\_list:

  final\_list.append(num)

return final\_list

duplicate = [2, 4, 10, 20, 5, 2, 20, 4]

print(Remove(duplicate))

[2, 4, 10, 20, 5]

1. Write a Python program to check a list is empty or not.

lis1 = [12,34,3]

if len(lis1) == 0:

  print("Empty List")

else:

print("The list is not empty")

The list is not empty

10) Write a Python function that takes two lists and returns true if they have at least one common member.

def common\_data(list1, list2):

     result = False

     for x in list1:

         for y in list2:

             if x == y:

                 result = True

                 return result

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

list2=[5,6,7,8,9]

print(common\_data(list1,list2))

True

11) Write a Python program to generate and print a list of first and last 5 elements where the values are square of numbers between 1 and 30.

def printValues():

    l = list()

    for i in range(1,21):

        l.append(i\*\*2)

    print(l[:5])

    print(l[-5:])

printValues()

[1, 4, 9, 16, 25]

[256, 289, 324, 361, 400]

1. Write a Python function that takes a list and returns a new list with unique elements of the first list.

def unique\_list(l):

  x = []

  for a in l:

    if a not in x:

      x.append(a)

  return x

print(unique\_list([1,2,3,3,3,3,4,5]))

[1, 2, 3, 4, 5]

1. Write a Python program to convert a list of characters into a string.

s = ['a', 'b', 'c', 'd']

str1 = ''.join(s)

print(str1)

abcd

14) Write a Python program to select an item randomly from a list

import random

color\_list = ['Red', 'Blue', 'Green', 'White', 'Black']

print(random.choice(color\_list))

White

15) Write a Python program to find the second smallest number in a list.

list=[21, 44, 10, 200, 51, 23, 20, 14]

list.sort()

print("The sorted list: ", list)

print("The second smallest value of this list: ",list[1])

The sorted list: [10, 14, 20, 21, 23, 44, 51, 200]

The second smallest value of this list: 14

16) Write a Python program to get unique values from a list.

my\_list = [10, 20, 30, 40, 20, 50, 60, 40]

print("Original List : ",my\_list)

my\_set = set(my\_list)

my\_new\_list = list(my\_set)

print("List of unique numbers : ",my\_new\_list)

Original List : [10, 20, 30, 40, 20, 50, 60, 40]

List of unique numbers : [40, 10, 50, 20, 60, 30]

17) Write a Python program to check whether a list contains a sub list.

def is\_Sublist(l, s):

    sub\_set = False

    if s == []:

        sub\_set = True

    elif s == l:

        sub\_set = True

    elif len(s) > len(l):

        sub\_set = False

    else:

        for i in range(len(l)):

            if l[i] == s[0]:

                n = 1

                while (n < len(s)) and (l[i+n] == s[n]):

                    n += 1

                if n == len(s):

                    sub\_set = True

    return sub\_set

a = [2,4,3,5,7]

b = [4,3]

c = [3,7]

print(is\_Sublist(a, b))

print(is\_Sublist(a, c))

True

False

18) Write a Python program to split a list into different variables.

color = [("Black", "#000000", "rgb(0, 0, 0)"), ("Red", "#FF0000", "rgb(255, 0, 0)"),

 ("Yellow", "#FFFF00", "rgb(255, 255, 0)")]

var1, var2, var3 = color

print(var1)

print(var2)

print(var3)

('Black', '#000000', 'rgb(0, 0, 0)')

('Red', '#FF0000', 'rgb(255, 0, 0)')

('Yellow', '#FFFF00', 'rgb(255, 255, 0)')

19) What is tuple? Difference between list and tuple.

The key difference between the tuples and lists is that **while the tuples are immutable objects the lists are mutable**. This means that tuples cannot be changed while the lists can be modified. Tuples are more memory efficient than the lists.

20) Write a Python program to create a tuple with different data types.

tuplex = ("tuple", False, 3.2, 1)

print(tuplex)

('tuple', False, 3.2, 1)

21) Write a Python program to create a tuple with numbers.

numTuple = (10, 20, 40, 60, 80, 100)

print("Tuple Items = ", numTuple)

Tuple Items = (10, 20, 40, 60, 80, 100)

22) Write a Python program to convert a tuple to a string.

tup = ('e', 'x', 'e', 'r', 'c', 'i', 's', 'e', 's')

str =  ''.join(tup)

print(str)

exercises

23) Write a Python program to check whether an element exists within a tuple.

tuplex = ( "r", "e", "s", "o", "u", "r", "c", "e")

print("s" in tuplex)

print(5 in tuplex)

True

False

24) Write a Python program to find the length of a tuple.

tuplex = tuple("resource")

print(tuplex)

print(len(tuplex))

('r', 'e', 's', 'o', 'u', 'r', 'c', 'e')

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25) Write a Python program to convert a list to a tuple.

listx = [5, 10, 7, 4, 15, 3]

print(listx)

tuplex = tuple(listx)

print(tuplex)

[5, 10, 7, 4, 15, 3]

(5, 10, 7, 4, 15, 3)

26) Write a Python program to reverse a tuple.

x = ("resource")

y = reversed(x)

print(tuple(y))

('e', 'c', 'r', 'u', 'o', 's', 'e', 'r')

27) Write a Python program to replace last value of tuples in a list.

l = [(10, 20, 40), (40, 50, 60), (70, 80, 90)]

print([t[:-1] + (100,) for t in l])

[(10, 20, 100), (40, 50, 100), (70, 80, 100)]

28) Write a Python program to find the repeated items of a tuple.

tuplex = 2, 4, 5, 6, 2, 3, 4, 4, 7

print(tuplex)

count = tuplex.count(4)

print(count)

(2, 4, 5, 6, 2, 3, 4, 4, 7)

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29) Write a Python program to remove an empty tuple(s) from a list of tuples.

L = [(), (), ('',), ('a', 'b'), ('a', 'b', 'c'), ('d')]

L = [t for t in L if t]

print(L)

[('',), ('a', 'b'), ('a', 'b', 'c'), 'd']

30) Write a Python program to unzip a list of tuples into individual lists.

l = [(1,2), (3,4), (8,9)]

print(list(zip(\*l)))

[(1, 3, 8), (2, 4, 9)]

31) Write a Python program to convert a list of tuples into a dictionary.

l = [("x", 1), ("x", 2), ("x", 3), ("y",1), ("y", 2), ("z", 1)]

d = {}

for a, b in l:

    d.setdefault(a, []).append(b)

print (d)

{'x': [1, 2, 3], 'y': [1, 2], 'z': [1]}

32) How will you create a dictionary using tuples in python?

To convert a tuple to dictionary in Python, **use the dict() method**. A dictionary object can be constructed using a dict() function. The dict() function takes a tuple of tuples as an argument and returns the dictionary.

33) Write a Python script to sort (ascending and descending) a dictionary by value.

import operator

d = {1: 2, 3: 4, 4: 3, 2: 1, 0: 0}

print('Original dictionary : ',d)

sorted\_d = sorted(d.items(), key=operator.itemgetter(1))

print('in ascending order by value : ',sorted\_d)

sorted\_d = dict( sorted(d.items(), key=operator.itemgetter(1),reverse=True))

print('in descending order by value : ',sorted\_d)

Original dictionary : {1: 2, 3: 4, 4: 3, 2: 1, 0: 0}

in ascending order by value : [(0, 0), (2, 1), (1, 2), (4, 3), (3, 4)]

in descending order by value : {3: 4, 4: 3, 1: 2, 2: 1, 0: 0}

34) Write a Python script to concatenate following dictionaries to create a new one.

dic1={1:10, 2:20}

dic2={3:30, 4:40}

dic3={5:50,6:60}

dic4 = {}

for d in (dic1, dic2, dic3): dic4.update(d)

print(dic4)

{1: 10, 2: 20, 3: 30, 4: 40, 5: 50, 6: 60}

35) Write a Python script to check if a given key already exists in a dictionary.

d = {1: 10, 2: 20, 3: 30, 4: 40, 5: 50,}

def is\_key\_present(x):

  if x in d:

      print('Key is present in dictionary')

  else:

      print('Key is not present in dictionary')

is\_key\_present(5)

is\_key\_present(9)

Key is present in the dictionary

Key is not present in the dictionary

36) How Do You Traverse Through A Dictionary Object In Python?

here are two ways of iterating through a Python dictionary object. One is to **fetch associated value for each key in keys() list**. There is also items() method of dictionary object which returns list of tuples, each tuple having key and value.

37) How Do You Check The Presence Of A Key In A Dictionary?

**Using has\_key() method returns true if a given key is available in the dictionary, otherwise, it returns a false**. With the Inbuilt method has\_key(), use the if statement to check if the key is present in the dictionary or not.

38) Write a Python script to print a dictionary where the keys are numbers between 1 and 15.

d=dict()

for x in range(1,16):

    d[x]=x\*\*2

print(d)

{1: 1, 2: 4, 3: 9, 4: 16, 5: 25, 6: 36, 7: 49, 8: 64, 9: 81, 10: 100, 11: 121, 12: 144, 13: 169, 14: 196, 15: 225}

39) Write a Python program to check multiple keys exists in a dictionary

student = {

  'name': 'Alex',

  'class': 'V',

  'roll\_id': '2'

}

print(student.keys() >= {'class', 'name'})

print(student.keys() >= {'name', 'Alex'})

print(student.keys() >= {'roll\_id','name'})

True

False

True

40) Write a Python script to merge two Python dictionaries.

d1 = {'a': 100, 'b': 200}

d2 = {'x': 300, 'y': 200}

d = d1.copy()

d.update(d2)

print(d)

{'a': 100, 'b': 200, 'x': 300, 'y': 200}

41) Write a Python program to map two lists into a dictionary.

keys = ['red', 'green', 'blue']

values = ['#FF0000','#008000', '#0000FF']

color\_dictionary = dict(zip(keys, values))

print(color\_dictionary)

{'red': '#FF0000', 'green': '#008000', 'blue': '#0000FF'}

42) Write a Python program to combine two dictionary adding values for common keys.

d1 = {'a': 100, 'b': 200, 'c':300}

d2 = {'a': 300, 'b': 200,’d’:400}

from collections import Counter

d1 = {'a': 100, 'b': 200, 'c':300}

d2 = {'a': 300, 'b': 200, 'd':400}

d = Counter(d1) + Counter(d2)

print(d)

Counter({'a': 400, 'b': 400, 'd': 400, 'c': 300})

43) Write a Python program to print all unique values in a dictionary.

L = [{"V":"S001"}, {"V": "S002"}, {"VI": "S001"}, {"VI": "S005"}, {"VII":"S005"},{"VIII":"S007"}]

print("Original List: ",L)

u\_value = set( val for dic in L for val in dic.values())

print("Unique Values: ",u\_value)

Original List: [{'V': 'S001'}, {'V': 'S002'}, {'VI': 'S001'}, {'VI': 'S005'}, {'VII': 'S005'}, {'VIII': 'S007'}]

Unique Values: {'S007', 'S005', 'S002', 'S001'}

44) Why Do You Use the Zip () Method in Python?

Python's zip() function **creates an iterator that will aggregate elements from two or more iterables**. You can use the resulting iterator to quickly and consistently solve common programming problems, like creating dictionaries.

45) Write a Python program to create and display all combinations of letters, selecting each letter from a different key in a dictionary.

Sample data: {'1': ['a','b'], '2': ['c','d']}

Expected Output: ac ad bc bd

import itertools

d ={'1':['a','b'], '2':['c','d']}

for combo in itertools.product(\*[d[k] for k in sorted(d.keys())]):

    print(''.join(combo))

ac

ad

bc

bd

46) Write a Python program to find the highest 3 values in a dictionary.

from heapq import nlargest

my\_dict = {'a':500, 'b':5874, 'c': 560,'d':400, 'e':5874, 'f': 20}

three\_largest = nlargest(3, my\_dict, key=my\_dict.get)

print(three\_largest)

['b', 'e', 'c']

47) Write a Python program to combine values in python list of dictionaries.

Sample data: [{'item': 'item1', 'amount': 400}, {'item': 'item2', 'amount': 300},

{'item': 'item1', 'amount': 750}]

Expected Output: Counter ({'item1': 1150, 'item2': 300})

from collections import Counter

item\_list = [{'item': 'item1', 'amount': 400}, {'item': 'item2', 'amount': 300}, {'item': 'item1', 'amount': 750}]

result = Counter()

for d in item\_list:

    result[d['item']] += d['amount']

print(result)

Counter({'item1': 1150, 'item2': 300})

48) Write a Python program to create a dictionary from a string.

Note: Track the count of the letters from the string. Sample string: 'w3resource'

Expected output: {'3': 1,’s’: 1, 'r': 2, 'u': 1, 'w': 1, 'c': 1, 'e': 2, 'o': 1}

from collections import defaultdict, Counter

str1 = 'w3resource'

my\_dict = {}

for letter in str1:

    my\_dict[letter] = my\_dict.get(letter, 0) + 1

print(my\_dict)

{'w': 1, '3': 1, 'r': 2, 'e': 2, 's': 1, 'o': 1, 'u': 1, 'c': 1}

49) Write a Python function to calculate the factorial of a number (a nonnegative integer).

def factorial(n):

    if n == 0:

        return 1

    else:

        return n \* factorial(n-1)

n=int(input("Input a number to compute the factiorial : "))

print(factorial(n))

Input a number to compute the factiorial : 5

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50) Write a Python function to check whether a number is in a given range.

def test\_range(n):

    if n in range(3,9):

        print(" %s is in the range"%str(n))

    else :

        print("The number is outside the given range.")

test\_range(5)

5 is in the range

51) Write a Python function to check whether a number is perfect or not.

def perfect\_number(n):

    sum = 0

    for x in range(1, n):

        if n % x == 0:

            sum += x

    return sum == n

print(perfect\_number(6))

True

52) Write a Python function that checks whether a passed string is palindrome or not.

def isPalindrome(string):

    left\_pos = 0

    right\_pos = len(string) - 1

    while right\_pos >= left\_pos:

        if not string[left\_pos] == string[right\_pos]:

            return False

        left\_pos += 1

        right\_pos -= 1

    return True

print(isPalindrome('121'))

True

53) How do you perform pattern matching in Python? Explain.

PEP 634 introduced structural pattern matching to Python. Pattern matching involves **providing a pattern and an associated action to be taken if the data fits the pattern**. At its simplest, pattern matching works like the switch statement in C/ C++/ JavaScript or Java. Matching a subject value against one or more cases.

54) What is lambda function in python? What we call a function which is incomplete version of a function?

A Lambda Function in Python programming is **an anonymous function or a function having no name**. It is a small and restricted function having no more than one line. Just like a normal function, a Lambda function can have multiple arguments with one expression.

55) How Many Basic Types Of Functions Are Available In Python?

There are **two** basic types of functions: built-in functions and user defined functions. The built-in functions are part of the Python language; for instance dir , len , or abs . The user defined functions are functions created with the def keyword.

56) How can you pick a random item from a list or tuple?

In Python, you can randomly sample elements from a list with **choice() , sample() , and choices() of the random module**. These functions can also be applied to a string and tuple. choice() returns one random element, and sample() and choices() return a list of multiple random elements.

57) How can you pick a random item from a range?

**Use randrnage() to generate random integer within a range**

Use a random. randrange() function to get a random integer number from the given exclusive range by specifying the increment. For example, random. randrange(0, 10, 2) will return any random number between 0 and 20 (like 0, 2, 4, 6, 8).

58) How can you get a random number in python?

To generate random number in Python, **randint() function** is used. This function is defined in random module.

59) How will you set the starting value in generating random numbers?

The random number generator needs a number to start with (a seed value), to be able to generate a random number. By default the random number generator uses the current system time. **Use the seed() method to customize the start number of the random number generator**.

60) How will you randomizes the items of a list in place?

The **shuffle() method** randomizes the items of a list in place.

61) Write a Python program to read a random line from a file.

import random

def random\_line(fname):

    lines = open(fname).read().splitlines()

    return random.choice(lines)

print(random\_line('test.txt'))

Append this text.

62) Write a Python program to convert degree to radian.

pi = 22/7

degrees = 5

radians = degrees \* pi / 180

print(radians)

0.0873015873015873

63) Write a Python program to calculate the area of a trapezoid.

base\_1 = 5

base\_2 = 6

height = float(input("Height of trapezoid: "))

base\_1 = float(input('Base one value: '))

base\_2 = float(input('Base two value: '))

area = ((base\_1 + base\_2) / 2) \* height

print("Area is:", area)

Height of trapezoid: 7

Base one value: 4

Base two value: 5

Area is: 31.5

64) Write a Python program to calculate the area of a parallelogram.

base = float(input('Length of base: '))

height = float(input('Measurement of height: '))

area = base \* height

print("Area is: ", area)

Length of base: 9

Measurement of height: 8

Area is: 72.0

65) Write a Python program to calculate surface volume and area of a cylinder.

pi=22/7

height = float(input('Height of cylinder: '))

radian = float(input('Radius of cylinder: '))

volume = pi \* radian \* radian \* height

sur\_area = ((2\*pi\*radian) \* height) + ((pi\*radian\*\*2)\*2)

print("Volume is: ", volume)

print("Surface Area is: ", sur\_area)

Height of cylinder: 12

Radius of cylinder: 9

Volume is: 3054.8571428571427

Surface Area is: 1188.0

66) Write a Python program to returns sum of all divisors of a number.

def sum\_div(number):

    divisors = [1]

    for i in range(2, number):

        if (number % i)==0:

            divisors.append(i)

    return sum(divisors)

print(sum\_div(8))

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67) Write a Python program to find the maximum and minimum numbers from the specified decimal numbers.

from decimal import \*

data = list(map(Decimal, '2.45 2.69 2.45 3.45 2.00 0.04 7.25'.split()))

print("Maximum: ", max(data))

print("Minimum: ", min(data))

Maximum: 7.25

Minimum: 0.04