**Module – 3 (Collections, functions and Modules)**

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

Ans: 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](https://www.w3schools.com/python/python_tuples.asp), [Set](https://www.w3schools.com/python/python_sets.asp), and [Dictionary](https://www.w3schools.com/python/python_dictionaries.asp), all with different qualities and usage.Lists are created using square brackets.In Python, a built-in function called reverse() is used to reverse the list.

2)How will you remove last object from a list?

Ans. Using pop() function.

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

Ans: “and 25”

4) Differentiate between append () and extend () methods?

Ans: The append() method in the programming language Python adds an item to a list that already exists whereas the extend() method adds each of the iterable element which is supplied as a parameter to the end of the original list.

5)Write a Python function to get the largest number, smallest num and sum  
of all from a list.  
6) How will you compare two lists?

7)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.  
8)Write a Python program to remove duplicates from a list.  
9)Write a Python program to check a list is empty or not.  
10)Write a Python function that takes two lists and returns true if they have  
at least one common member.  
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.  
12)Write a Python function that takes a list and returns a new list with unique  
elements of the first list.  
13)Write a Python program to convert a list of characters into a string.  
14) Write a Python program to select an item randomly from a list.  
15) Write a Python program to find the second smallest number in a list.  
16) Write a Python program to get unique values from a list  
17) Write a Python program to check whether a list contains a sub list  
18) Write a Python program to split a list into different variables.  
19) What is tuple? Difference between list and tuple.

Ans: Tuple is one of 4 built-in data types in Python used to store collections of data, the other 3 are [List](https://www.w3schools.com/python/python_lists.asp), [Set](https://www.w3schools.com/python/python_sets.asp), and [Dictionary](https://www.w3schools.com/python/python_dictionaries.asp), all with different qualities and usage.A tuple is a collection which is ordered and **unchangeable**.Tuples are written with round brackets.The primary difference between tuples and lists is that tuples are immutable as opposed to lists which are mutable. Therefore, it is possible to change a list but not a tuple.

20) Write a Python program to create a tuple with different data types.  
21) Write a Python program to create a tuple with numbers.  
22) Write a Python program to convert a tuple to a string.  
23) Write a Python program to check whether an element exists within a  
tuple.  
24)Write a Python program to find the length of a tuple.  
25) Write a Python program to convert a list to a tuple.  
26) Write a Python program to reverse a tuple.  
27) Write a Python program to replace last value of tuples in a list.  
28) Write a Python program to find the repeated items of a tuple.  
29) Write a Python program to remove an empty tuple(s) from a list of tuples.  
30)Write a Python program to unzip a list of tuples into individual lists.  
31) Write a Python program to convert a list of tuples into a dictionary.  
32)How will you create a dictionary using tuples in python?

Ans: Using dict() function

In Python, use the dict() function to convert a tuple to a dictionary. A dictionary object can be created with the dict() function. The dictionary is returned by the dict() method, which takes a tuple of tuples as an argument. A key-value pair is contained in each tuple.

Here in the below code, To create a dictionary, we used the dict() method and gave the dictionary comprehension as an argument. Dictionary comprehension is a technique for converting one dictionary into another. Elements from the original dictionary can be conditionally included in the new dictionary throughout this conversion, and each element can be converted as needed.

The output is a key-value paired dictionary. The first element of a tuple becomes a dictionary key, while the second element of a tuple becomes a dictionary value.

33) Write a Python script to sort (ascending and descending) a dictionary by  
value.  
34)Write a Python script to concatenate following dictionaries to create a  
new one.  
35) Write a Python script to check if a given key already exists in a  
dictionary.  
36)How Do You Traverse Through A Dictionary Object In Python?

Ans: Dictionary in Python is an unordered collection of data values, used to store data values like a map, unlike other Data Types that hold only a single value as an element, Dictionary holds the key: value pair. There are multiple ways to iterate over a dictionary in Python.

* Access key using the build .keys()
* Access key without using a key()
* Iterate through all values using .values()
* Iterate through all key, and value pairs using items()
* Access both key and value without using items()
* Print items in Key-Value in pair

We can use all above methods with for loop.

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

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

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

40) Write a Python script to merge two Python dictionaries

41)Write a Python program to map two lists into a dictionary  
42) Write a Python program to combine two dictionary adding values for  
common keys.  
d1 = {'a': 100, 'b': 200, 'c':300} o d2 = {'a': 300, 'b': 200,’d’:400}  
Sample output: Counter ({'a': 400, 'b': 400,’d’: 400, 'c': 300}).  
43) Write a Python program to print all unique values in a dictionary.

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

Ans: The zip() function returns a zip object, which is an iterator of tuples where the first item in each passed iterator is paired together, and then the second item in each passed iterator are paired together etc.

If the passed iterators have different lengths, the iterator with the least items decides the length of the new iterator.Example given below

a = ("John", "Charles", "Mike")

b = ("Jenny", "Christy", "Monica", "Vicky")

x = zip(a, b)

print(tuple(x))

(('John', 'Jenny'), ('Charles', 'Christy'), ('Mike', 'Monica'))  
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  
46) Write a Python program to find the highest 3 values in a dictionary  
Write a Python program to combine values in python list of dictionaries.  
Sample data: [{'item': 'item1', 'amount': 400}, {'item': 'item2', 'amount':  
300}, o {'item': 'item1', 'amount': 750}]  
Expected Output:  
Counter ({'item1': 1150, 'item2': 300})  
47) 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}  
48)Write a Python function to calculate the factorial of a number (a  
nonnegative integer)  
49)Write a Python function to check whether a number is in a given range

50) Write a Python function to check whether a number is perfect or not.  
51)Write a Python function that checks whether a passed string is  
palindrome or not  
52)How Many Basic Types Of Functions Are Available In Python?

Ans: Functions are the basic building block of any python program, defined as the organized block of reusable code, which can be called whenever required.

A function is used to carry out a specific task. The function might require multiple inputs. When the task is done executing, the function can or can not return one or more values.

There are two types of functions in python:

* **User-Defined Functions** - these types of functions are defined by the user to perform any specific task
* **Built-in Functions** - These are pre-defined functions in python.
* Python Recursion Functions
* Python Lambda Functions

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

Ans: Below are the various methods in python to accomplish this task:

* Using random.choice() method
* Using random.randrange() method
* Using random.randint() method
* Using random.random()
* Using random.sample() method
* Using random.choices() method

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

Ans: Using randrange() and randint() functions of a random module, we can generate a random integer within a range. In this lesson, you’ll learn the following **functions to generate random numbers in Python**. We will see each one of them with examples.

| **Function** | **Description** |
| --- | --- |
| random.randint(0, 9) | Returns any random integer from 0 to 9 |
| random.randrange(20) | Returns a random integer from 0 to 19 |
| random.randrange(2, 20) | Returns a random integer from 2 to 19. |
| random.randrange(100, 1000, 3) | Returns any random integer from 100 to 999 with step 3. For example, any number from 100, 103, 106 … 994, 997. |
| random.randrange(-50, -5) | Returns a random negative integer between -50 to -6. |
| random.sample(range(0, 1000), 10) | Returns a list of random numbers |
| secrets.randbelow(10) | Returns a secure random number |

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

Ans: To generate random number in Python, **randint() function** is used. This function is defined in random module.  
56)How will you set the starting value in generating random numbers?

**Ans: The seed() method** is used to initialize the random number generator. 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.  
57) How will you randomizes the items of a list in place?

Ans: The **shuffle() method** randomizes the items of a list in place.  
58) Write a Python program to read a random line from a file.  
59)Write a Python program to convert degree to radian  
60)Write a Python program to calculate the area of a trapezoid  
61) Write a Python program to calculate the area of a parallelogram  
62)Write a Python program to calculate surface volume and area of a  
cylinder  
63)Write a Python program to returns sum of all divisors of a number  
64)Write a Python program to find the maximum and minimum numbers  
from the specified decimal numb