**XIST – Xanthron Industrial Software Training**

**Module 4**

**Modules**

Modules are python files with one or more python functions. Modules can be imported to our python programs or to another python module.

To import a module to our program use command import.

For example

import math

import sys

import re

The **math** and **sys** modules are directly incorporated into Python interpreter. It means these modules are builtin.

**To get the list of builtin modules do the following**

import sys

sys.builtin\_module\_names

**You will get an output as follows**

('\_\_builtin\_\_', '\_\_main\_\_', '\_ast', '\_bisect', '\_codecs', '\_collections', '\_functools', '\_heapq', '\_io', '\_locale', '\_md5', '\_random', '\_sha', '\_sha256', '\_sha512',

'\_socket', '\_sre', '\_struct', '\_symtable', '\_warnings', '\_weakref', 'array', 'binascii','cPickle', 'cStringIO', 'cmath', 'datetime', 'errno', 'exceptions', 'fcntl', 'gc', 'grp','imp', 'itertools', 'marshal', 'math', 'operator', 'posix', 'pwd', 'select', 'signal','spwd', 'strop', 'sys', 'syslog', 'thread', 'time', 'unicodedata', 'xxsubtype',

'zipimport', 'zlib')

re is not in the above list, means module re is not a builtin module.

You can find out re.py in

/usr/lib/python3.6 folder of linux os.

Module math contain some important mathematical functions like sqrt(),sin(),cos() etc.

Import math

x= 10

y = math.sqrt(x)

print(y)

Note that how we use the sqrt function. It is a function in the imported math module. We can use this function as math.sqrt(x).

So many mathematical functions are available in math module. Some of them are listed below.

Sqrt(), ceil(), sin(), tan(), factorial(), trunc(), floor(), exp(), log(), pow(), sin(), cos(), asin(), radians(), gamma(), pi, e etc.

If you want to import a specific function only the import command can be used as follows.

from math import sqrt,sin

x = 10

y = sqrt(x)

print (y)

In this case we can call sqrt function as given above.

**Packages**

Packages are actually multiple packages or multiple modules. We can create packages from more than one modules. In practical it is just a folder containing more than one modules.

If we create a folder named pack and create a module named mad inside this folder then we can call this module as follows

import pack.mad

or

from pack import mad

**Exercises**

**Questions**

1. Write a short note on python implementation of the following

a. set

b. arrays

c. Matrix

2. Explain the following

a. import math

b. from math import sqrt, sin

c. from math import \*

d. X = \_\_import\_\_(‘math’)e. import math as m

**Assignment**

3. Study python modules os, math and numpy and write a tutorial on this.

4. Write a note on how to write modules and packages in python

**Programs**

5. Write a program which finds all the words beginning with “m” in a list and prints them out. It also should say how many words it has found beginning with “m”.

6. Write a program to implement the following sorting algorithms.

a. bubble sort

b. selection sort

c. Merge sort

d. insertion sort

7. Write a Python program to concatenate 3 dictionaries to create a new one.

8. Write a Python program to sum all the items in a dictionary.