CHAPTER - 03
PYTHON LIBRARIES

Class XII

Unit I

Programming and Computational Thinking (PCT-2)

(80 Theory + 70 Practical)

Prepared by

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INTRODUCTION

A Module is a file containing python definitions, functions, variables, classes and statements with .py extension.

Python package is a directory of python module.

A Library is a collection of various packages. There is no difference between library and python package. Library is used to loosely describe a collection of core or main modules.

COMPONENTS OF PYTHON PROGRAM

COMPONENTS OF PYTHON PROGRAM

A Module is a file that contains python code.

The python program comprises of three main components

i)   Library or Package

ii)   Module

iii)   Functions/Sub-Modules

ADVANTAGES OF MODULES

ADVANTAGES OF MODULES

1. Reusability

2. Clarity

3. Classification/ Grouping of code

4. Easy to understand

IMPORTING MODULES

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Python module files have an extension .py

These modules can be imported in the following ways:

1)   **import statement**

2)   **from statement**

3)   **from * statement**

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IMPORTING MODULES- import

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import statement is used to include the modules in other programs.

syntax :   import   <filename>

example: import math

more   than   one   module   can   be inserted in a python program

syntax :   import   <filename> ,<filename>, <filename>……..

for example: import math,os

IMPORTING MODULES- import

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using import statement one can view all the functions and other attributes of a particular module

for example: import math

dir(math)

```
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Type "copyright", "credits" or "license()" for more information.
>>> import math
>>> dir (math)
['__doc__', '__loader__', '__name__', '__package__', '__spec__', 'acos', 'acosh', 'asin', '
', 'atan', 'atan2', 'atanh', 'ceil', 'copysign', 'cos', 'cosh', 'degrees', 'e', 'erf', 'erfc', 'exp', '
1', 'fabs', 'factorial', 'floor', 'fmod', 'frexp', 'fsum', 'gamma', 'hypot', 'isfinite', 'isinf', 'isnar
exp', 'lgamma', 'log', 'log10', 'log1p', 'log2', 'modf', 'pi', 'pow', 'radians', 'sin', 'sinh', 'sqr
n', 'tanh', 'trunc']
>>> import os
>>> dir(os)
['F_OK', 'MutableMapping', 'O_APPEND', 'O_BINARY', 'O_CREAT', 'O_EXCL', 'O_NOINHE
O_RANDOM', 'O_RDONLY', 'O_RDWR', 'O_SEQUENTIAL', 'O_SHORT_LIVED', 'O_TEMPORA
O_TEXT', 'O_TRUNC', 'O_WRONLY', 'P_DETACH', 'P_NOWAIT', 'P_NOWAITO', 'P_OVERLAY'
WAIT', 'R_OK', 'SEEK_CUR', 'SEEK_END', 'SEEK_SET', 'TMP_MAX', 'W_OK', 'X_OK', '_Environ',
I__', '__builtins__', '__cached__', '__doc__', '__file__', '__loader__', '__name__', '__packa
', '__spec__', '_execvpe', '_exists', '_exit', '_get_exports_list', '_get_masked_mode', '_pu
, '_unsetenv', '_wrap_close', 'abort', 'access', 'altsep', 'chdir', 'chmod', 'close', 'closera
'cpu_count', 'curdir', 'defpath', 'device_encoding', 'devnull', 'dup', 'dup2', 'environ', 'er
```

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importing module can be done using from statement specific attributes can be included in other programs.

syntax :

from <filename> import function name

example:

from math import math.sqrt

IMPORTING MODULES- from*

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from* statement can be used to import all names from the module in to the current calling name space.

syntax :

from <filename> import *

example:

from math import *

math.sqrt(4)

we can access any function by using dot notation.

NAMESPACES

NAMESPACES

When we import modules in a particular program these modules will become part of that program and are called as namespace.

Python impliments namespaces in the form of dictionaries. It maintains a name to object mapping.

There are three types of namespaces

1)   Global

2)   Local

3)   Built in

NAMESPACES

Built in name space

Global name space

Local name space

NAME RESOLUTION

NAME RESOLUTION

Already we know the scope rules of python programming.

For every name reference within a program when you access a variable python follows name resolution rule i.e LEGB (Local, Enclosed, Global, Built-in)

MODULE ALIASING

One can create an alias while importing module in a program

syntax:

import <filename> as <alias name>

for example: import math as m

m.sqrt(4)

MEMBER ALIASING

MEMBER ALIASING

Like module aliasing members are also aliased

syntax:

import <filename> as <alias name>, member as alias name

for example: import test as t, add as sum

test.py is module file and is referred to as t and add is the function, it is referred to as sum.

PACKAGE/LIBRARY

PACKAGE/LIBRARY

Python packages are the collection of related modules. You can import a package or create your own.

The main difference between a module and a package is that package is a collection of modules and has an __init__.py file

PACKAGE/LIBRARY

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Python package is a simply directory of python modules

Steps to create and import a package

1. create a directory named 'Gemetry'

2. add modules area.py and volume.py

3. create a file __init__.py in directory 'Geometry'. The __init__.py files are required to make python treat the directory as containing package
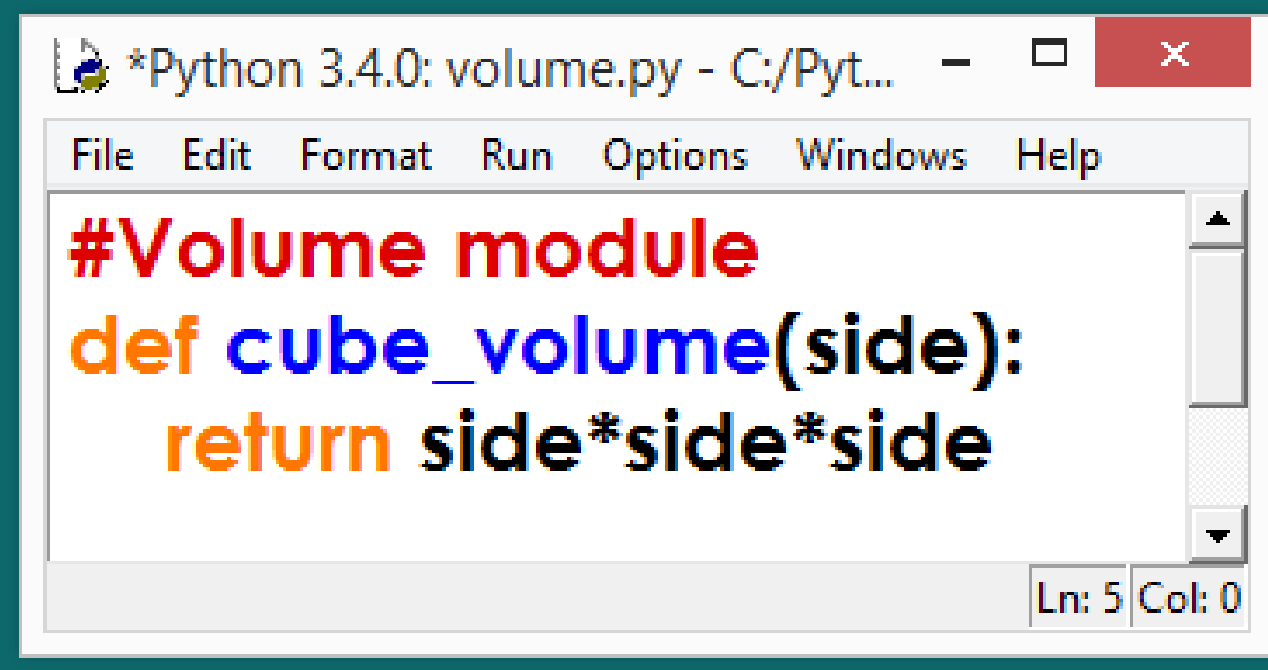
PACKAGE/LIBRARY

Python 3.4.0: area_module.py - C:/Python34/Geom...

File   Edit   Format   Run   Options   Windows   Help

```python
#area module
def rectangle_area(length,breadth):
    return length*breadth
```

Ln: 3   Col: 25

AREA MODULE IS CREATED

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PACKAGE/LIBRARY

```
*Python 3.4.0: volume.py - C:/Pyt...

File   Edit   Format   Run   Options   Windows   Help

#Volume module
def cube_volume(side):
    return side*side*side

Ln: 5  Col: 0
```
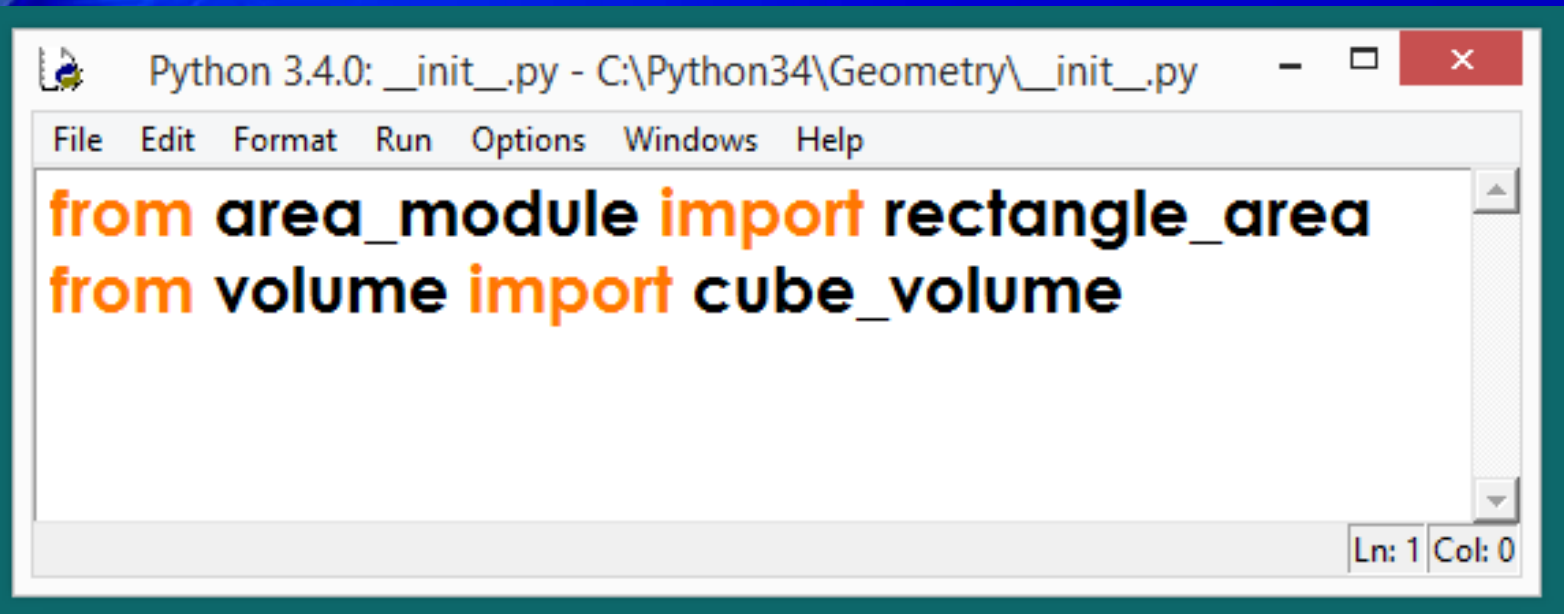
VOLUME MODULE IS CREATED

PACKAGE/LIBRARY

CREATING __init__.py FILE

Python 3.4.0: __init__.py - C:\Python34\Geometry__init__.py

File   Edit   Format   Run   Options   Windows   Help

```python
from area_module import rectangle_area
from volume import cube_volume
```

Ln: 1   Col: 0

PACKAGE/LIBRARY

__init___.py FILE

What is __init___.py file?

__init___.py is simply a file used to consider directories on the disk as package of python.

It is basically used to initilize the python package

LOCATING MODULES

Python searches module in the following manner

1) **Searches in current directory**
2) **If the module is not found then searches each directory in the shell variable PYTHONPATH**
3) **If all else fails, python checks the default path which is the installation location of the python**

PACKAGE/LIBRARY

Python searches module in the following manner
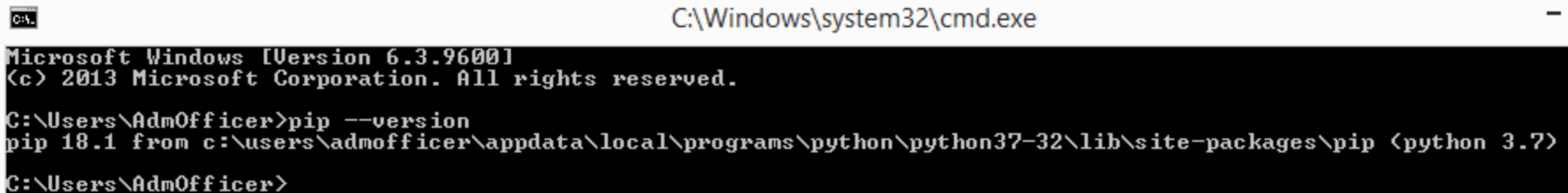
1) **Searches in current directory**
2) **If the module is not found then searches each directory in the shell variable PYTHONPATH**
3) **If all else fails, python checks the default path which is the installation location of the python**

pip

What is pip?

pip is a package-management system used to install and manage software packages written in Python.

```
C:\Windows\system32\cmd.exe                                             _

Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.

C:\Users\AdmOfficer>pip --version
pip 18.1 from c:\users\admofficer\appdata\local\programs\python\python37-32\lib\site-packages\pip (python 3.7)

C:\Users\AdmOfficer>
```

To check pip version run,
pip --version at dos prompt

PYTHON STANDARD LIBRARY

DATE AND TIME MODULE.

```
import datetime
v_date=datetime.date.today()
vyear       =       v_date.year()
vmonth   =       v_date.month()
vday        =       v_date.day()
```

PYTHON STANDARD LIBRARY

DATE AND TIME MODULE.

```
import datetime
v_date=datetime.date.today()
vnow      =      v_date.now()
vhour     =      v_date.hour()
vmin      =      v_date.minute()
vsec      =      v_date.second()
```

CLASS TEST

Class : XII   **Time: 40 Min**

Topic: Python Libraries   **Max Marks: 40**

Each Question carries 5 Marks

1. What are the components of python program.
2. Explain the ways to import a module in python program.
3. What is namespace? Explain in detail
4. What is python package? Write down the steps to create a python package and also write a programs and create a package.

Thank You