Chapter -04 Using Python Libraries

Python Package:

A *package* is a *collection of Python modules* under a common *namespace*, created by placing *different modules on a single directory(folder)* along with some special *files (such as __init__.py)*
In a *directory structure,* in order for a *folder* (containing different modules *i.e., .py files)* to be recognized as a *package,* a special file namely *__init__.py* must also be stored in the *folder,* even if the file *__init__.py* is empty.
Generally *Packages* are *namespaces* which contain *multiple packages* and *modules* themselves. They are simply *directories.*

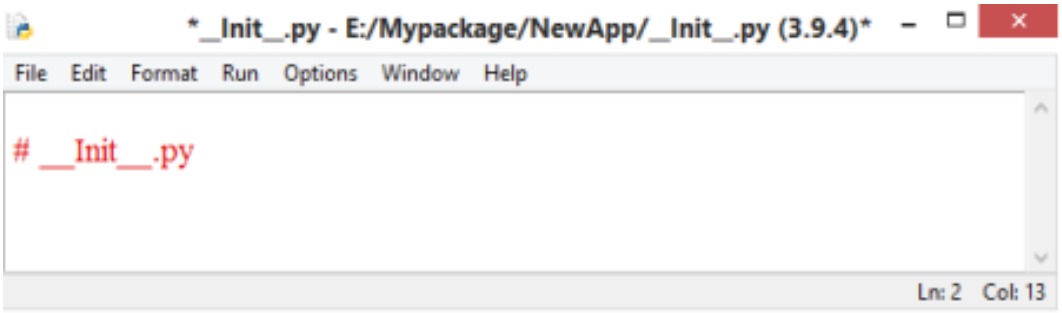
Note:
The file *__init__.py* in a *folder* indicates it is an *importable python package*. Without *__init__.py*, a *folder* is *not considered a Python package*. We can even add an *empty file* having *name* as *__init__.py* in a *folder* to *make it a Python package.*

Steps to create a Python Package:

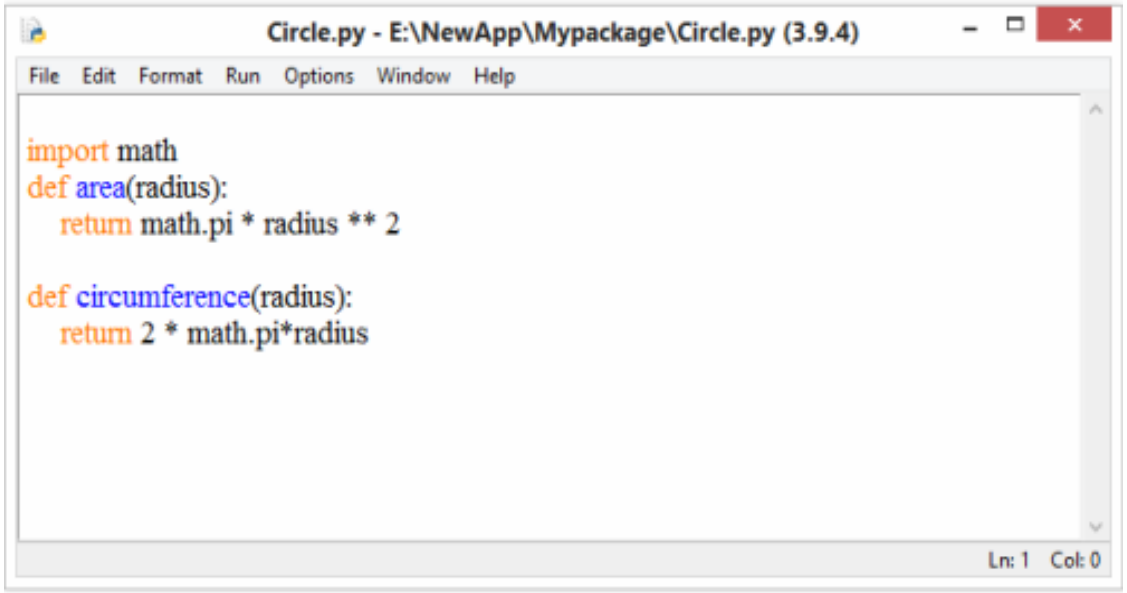
Let's create a package named *Mypackage:*

- Create a new folder named *NewApp* in *E drive (E:\NewApp)*
- Inside *NewApp*, create a *subfolder* with the name *'Mypackage'*.
- Create an empty *__init__.py* file in the *Mypackage* folder.
- Create *modules Circle.py* and *Rectangle.py* with following code

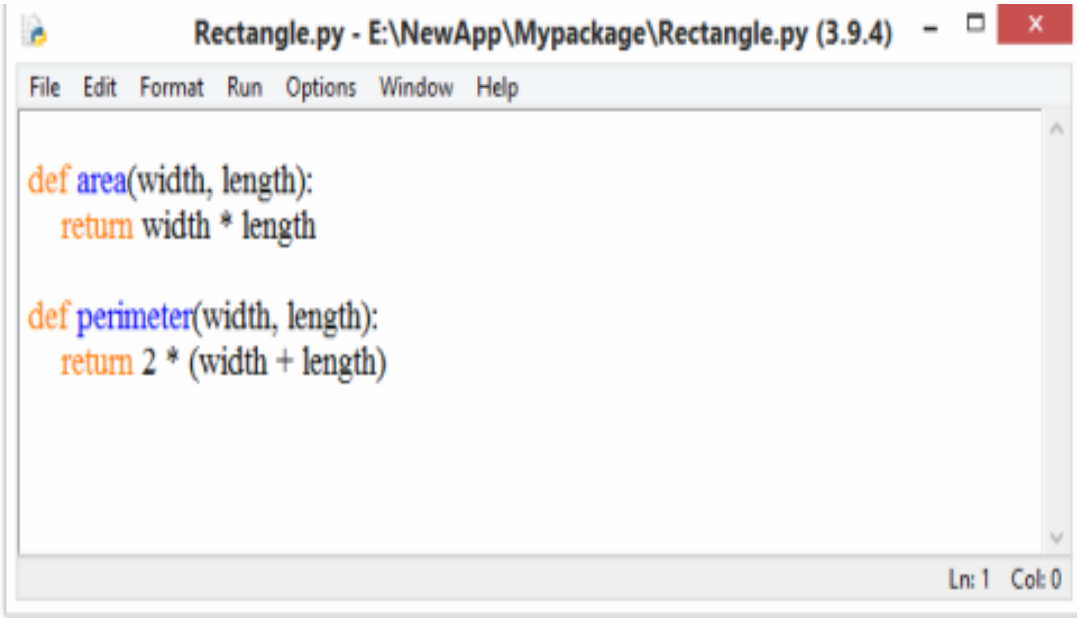
__Init__.py



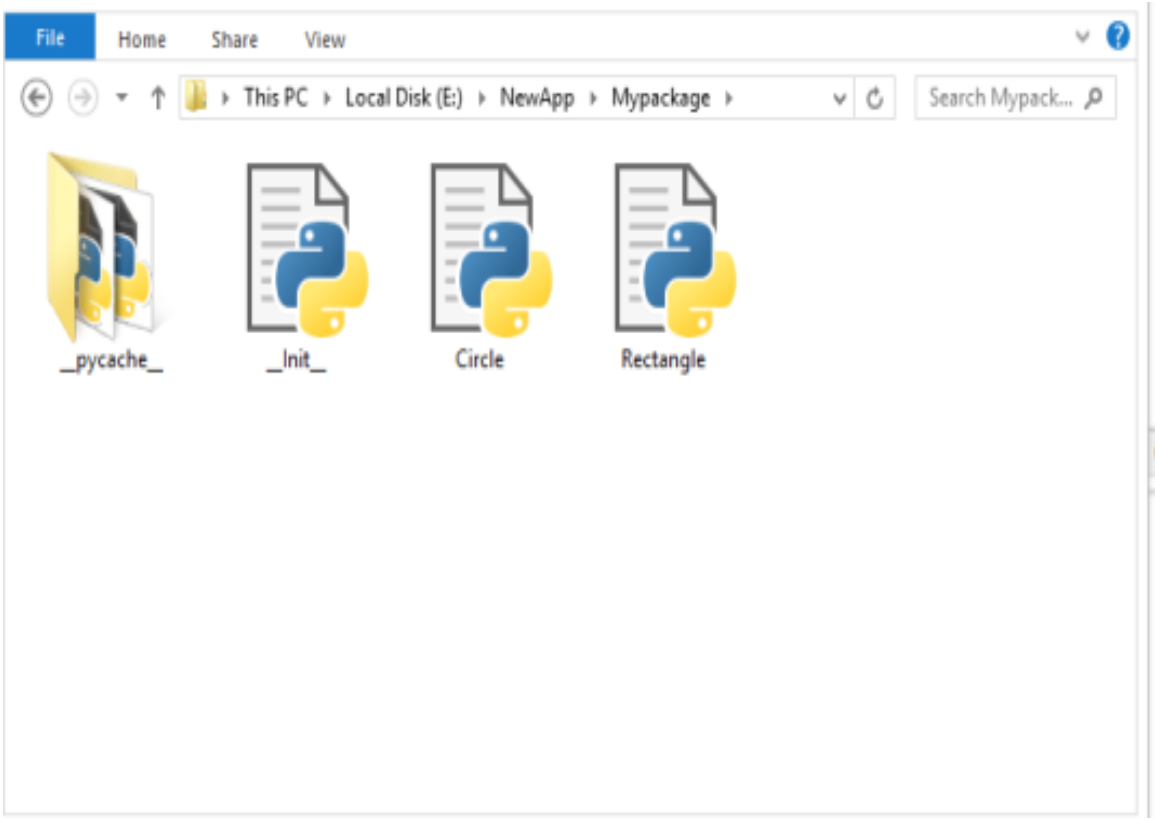
Circle.py



Rectangle.py



Structure of Mypackage will be displayed as:



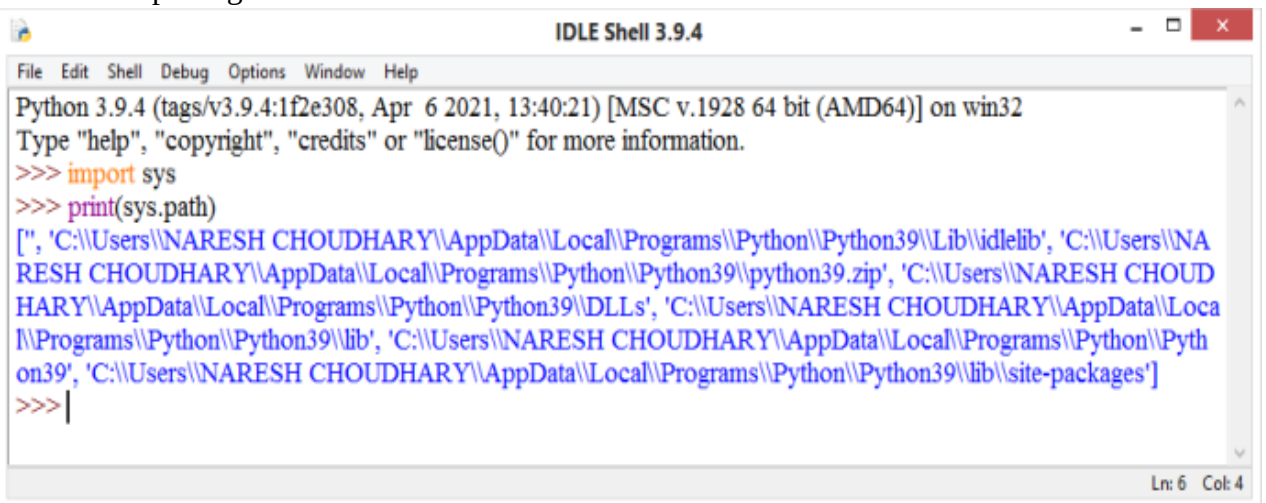
Associate package with Python installation:

Once the *package directory* is ready, we can *associate it with Python by attaching* it to Python's *site-packages* folder of current Python distribution in our computer.

We can import *library* and *package* in Python only if it is attached to its *site-packages* folder.

Steps to associate a package to Python installation:

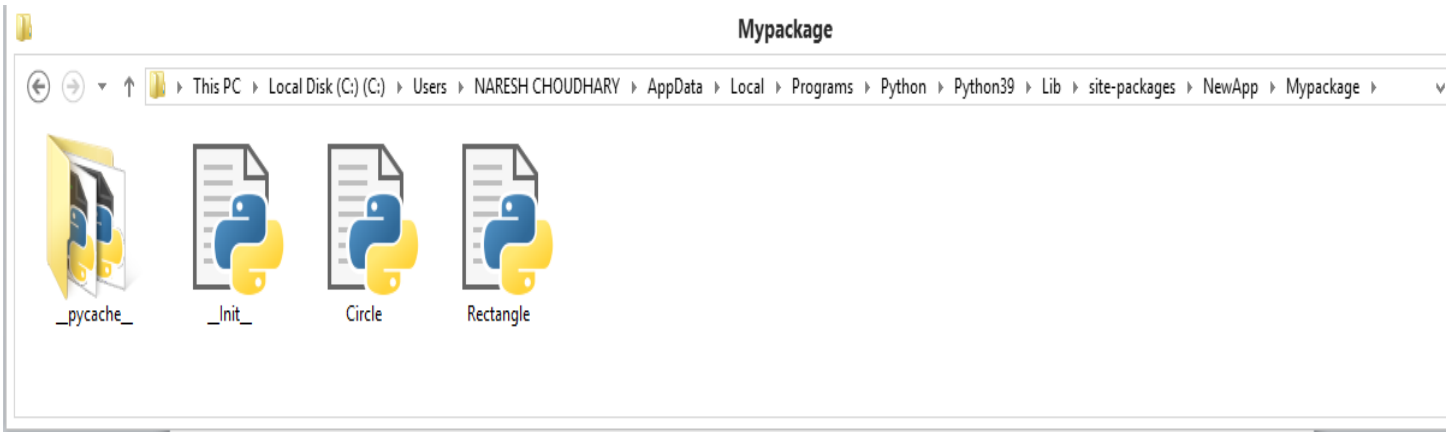
i) In order to check the path of the site-packages folder of Python, on the *Python prompt*, types the following two commands, one after another and try to locate the path of site-packages folder.




```
>>> import sys
>>> print(sys.path)
['', 'C:\\Users\\NARESH
CHOUDHARY\\AppData\\Local\\Programs\\Python\\Python39\\Lib\\idlelib',
'C:\\Users\\NARESH CHOUDHARY \\AppData\\Local\\Programs\\Python
\\Python39\\python39.zip',  'C:\\Users\\NARESH
CHOUDHARY\\AppData\\Local\\Programs\\Python\\Python39\\DLLs',
'C:\\Users\\NARESH CHOUDHARY\\AppData\\Local\\Programs\\Python\\Python39\\lib',
'C:\\Users\\NARESH CHOUDHARY\\AppData\\Local\\Programs\\Python\\Python39',
'C:\\Users\\NARESH CHOUDHARY\\AppData\\Local\\Programs\\Python\\Python39\\lib\\site-
packages']
>>>
```

ii) Copy the *created folder (NewApp)* and paste it into the *site-packages* folder.

iii) After copying *library* folder into the *site-packages* folder in the current Python installation, now it has become a *Python library*. Now we can *import* its *modules* and uses its *functions.*



 # Program illustrate the use of Package

```
import NewApp.Mypackage.Circle
import NewApp.Mypackage.Rectangle

choice =0
ch ='y'
while (ch =='y' or ch =='Y'):
    print("=====================================================")
    print("Main Menu")
    print("1. Area of a Circle")
    print("2. Circumference of a circle")
    print("3. Area of a rectangle")
    print("4. Perimeter of a rectangle")
    print("5. Quit")

    choice =int(input("Enter your choice:"))
    if(choice == 1):
        print("-----------------------------------------------")
        rad =int(input("Enter the circle's radius:"))
        print("The area is ", NewApp.Mypackage.Circle.area(rad))

    elif(choice ==2):
        print("-----------------------------------------------")
        radius =int(input("Enter the circle's radius:"))
        print("The circumference is ", NewApp.Mypackage.Circle.circumference(radius))

    elif(choice == 3):
        print("-----------------------------------------------")
        width =int(input("Enter the rectangle's width:"))
        length =int(input("Enter the rectangle's length:"))
        print("The area is",NewApp.Mypackage.Rectangle.area(width, length))

    elif(choice == 4):
        print("-----------------------------------------------")
        width =int(input("Enter the rectangle's width:"))
        length =int(input("Enter the rectangle's length:"))
        print("The perimeter is",NewApp.Mypackage.Rectangle.perimeter(width, length))

    elif (choice == 5):
        print("-----------------------------------------------")
        print("Exiting the program .....")
        ch ='F'

    else:
        print("Error -Invalid selection.")
```

Output:

```
==========================================================
Main Menu
1. Area of a Circle
2. Circumference of a circle
3. Area of a rectangle
4. Perimeter of a rectangle
5. Quit
Enter your choice:1
----------------------------------------------
Enter the circle's radius:7
The area is  153.93804002589985
==========================================================
Main Menu
1. Area of a Circle
2. Circumference of a circle
3. Area of a rectangle
4. Perimeter of a rectangle
5. Quit
Enter your choice:2
----------------------------------------------
Enter the circle's radius:7
The circumference is  43.982297150257104
==========================================================
```