# Practical No.8

**Aim:**Write a python program to create a package.

**Theory:**Python packages are a fundamental mechanism for organizing and distributing Python code. They allow developers to structure related modules (individual Python files) into a hierarchical directory structure, making code more manageable, reusable, and shareable.

**Directory-based structure:**

A package is essentially a directory containing one or more Python modules.

__init__.py file:

A special file named __init__.py (which can be empty) must be present in a directory for Python to recognize it as a package. This file is executed when the package is imported and can be used to define package-level variables or perform initialization tasks.

**Modularity and reusability:**

Packages promote modularity by grouping related functionality, making it easier to manage large codebases and reuse components across different projects.

**Distribution:**

Packages are the standard way to distribute Python software, often through repositories like the Python Package Index (PyPI).

**Import mechanism:**

Modules and sub-packages within a package can be imported using dot notation, for example, import package_name.module_name or from package_name import module_name.

**Folder Structure**

```
shapes_package/
│
│    ├── __init__.py
│    ├── circle.py
│    ├── rectangle.py
│
└── shapes_main.py
```

## Program:

**__init__.py**

```
# Initialization file for shapes package
# You can import all modules from here if desired
from . import circle
from . import rectangle
```

**circle.py**

```
import math
def area(radius):
    """Return the area of a circle."""
    return math.pi * radius ** 2
def circumference(radius):
    """Return the circumference of a circle."""
    return 2 * math.pi * radius
```

**rectangle.py**

```
def area(length, width):
    """Return the area of a rectangle."""
    return length * width

def perimeter(length, width):
    """Return the perimeter of a rectangle."""
    return 2 * (length + width)
```

**shapes_main.py**

```
from shapes_package import circle, rectangle
print("=== Circle ===")
print("Area:", circle.area(5))
print("Circumference:", circle.circumference(5))
print("\n=== Rectangle ===")
print("Area:", rectangle.area(10, 4))
print("Perimeter:", rectangle.perimeter(10, 4))

#run in Jupyter notebook
!python shapes_main.py
```

## Output:

```
===  Circle  ===
Area:  78.53981633974483
Circumference:  31.41592653589793
===  Rectangle  ===
Area:  40
Perimeter:  28
```

**Result:** Thus we have successfully created a package in python.