Task 3: Importing and Creating Python modules and Package in python Program.

Aim: To implement and demonstrate the Process of importing built-in modules, creating user-defined modules, and organising into Packages, their by Promoting Code reusibility and maintainability

3.1:-

1. Perform common math and random operations
2. Work with operating System (create/change directories, list contents) and read the Python version.
3. Compute basic statistics (mean, median, mode, Standard deviation).

Algorithm:

1. Import required modules: math, random, os, sys, pathlib.
2. math & random:

- Compute sqrt(5); radians(30), a random float in [0,0.0), a random integer in (2,6) (inclusive), π, ceil(2.3), floor(2.3) factorial(5), gcd(5,15), abs(-10), pow(3,5), log base 3 of 2, log10(a) for a=100 and check Nan & Infinity.

3). os & sys:

- Create C:\Pythonlab if not Present and Print the current working directory.
- Create C:\Pythonlab\test24 if not present and change the current working directory to it.
- Print Python interpreter version.

Expected output:

--- Math & RANDOM ---

sqrt(5) = 2.23606797749979

radians(30) = 0.5235987755982988

random() in [0,1) = 0.3744488719756466 46 ← will vary

randint(2,6) = 6 ← inclusive; will vary.

pi = 3.141592653589793

ceil(2.3) = 3

floor(2.3) = 2

factorial(5) = 120

gcd(5,15) = 5

abs(-10) = 10

pow(3,5) = 243

log base 3 of 2 = 0.6309297535714574

log10(100) = 2.0

isinf(∞) = True, isnan(NaN) = True

--- OS & SYS ---

Created/ensured: C:\Pythonlab

Current working directory: C:\...(your current path)

Created/ensured & changed into: C:\Pythonslots24

Directory contents of C:\Pythonslots24: []

Python version: 3.x.x (... details ...)

--- Statistics ---

mean([5,6,8,10]) = 7.25

median([5,6,8,10]) = 7.0

mode([2,5,3,2,8,3,9,4,2,5,6]) = 2

stdev([2,5,3,2,8,3,9,4,2,5,6]) = 2.2715833382201093

4. Statistics:

- on list i [5,6,8,10] and [2,5,3,2,8,3,9,4,2,5,6] Compute mean, median, mode, stdev.

5. Printf neatly formatted results.

Program:

```
import math
import random
import os
import sys
import statistics as stats
from pathlib import Path
Print("\n---MATH & RANDOM---")
Print("sqrt(5) = ", math.sqrt(5))
Print("radians(30) =", math.radians(30))
Print("random() in [0,1) = ", random.random())
Print("randint(2,6) = ", ~~math.ceil(2.3)~~ random.randint(2,6))
~~Print("floor(2.6) = math.floor(2.3)")~~
Print(" pi = ", math.pi
Print("ceil(2.3) = ", math.ceil(2.3))
Print("floor(2.3) =", math.floor(2.3))
Print("factorial(5) = ", math.factorial(5))
Print("gcd(5,15) = ", math.gcd(5,15))
Print("abs(-10) = ", abs(-10)
Print("Pow(3,5) =", pow(3,5))
Print("log base 3 of 2 =", math.~~log~~(2,3))
a_val = 100
Print(f"log10({a_val}) =", math.log10(a_val))
inf_val = float('inf')
nan_val = float("nan")
Print(f"isinf(∞) = {math.isinf(inf_val)}, isnan(NaN)
                = {math.isnan(nan_val)}")
Print("\n---OS & SYS---")
```

```
Path("n---5.
Path_Pythonlab = Path(r"C:\Pythonlab")
Path_Pythonlab.mkdir(parents = True, exist_ok = True)
Print(f"Created/ensured: {Path_Pythonlab}")
Print("Current working directory:", os.getcwd())
target_dir = Path(r"C:\Pythonslot5\L4")
target_dir.mkdir(parents = True, exist_ok = True)
os.chdir(target_dir)
Print(f"Changed into: {target_dir}")
Print("Directory contents:", os.listdir())
Print("Python version:", sys.version)

Print("\n--- STATISTICS ---")
data1 = [5,6,8,10]
data2 = [2,5,3,2,8,3,9,4,2,5,6]
Print(f"mean({data1}) =", stats.mean(data1))
print(f"median({data1}) =", stats.median(data1))
Print(f"mode({data2}) =", stats.mode(data2))
Print(f"Stdev({data2}) =", stats.stdev(data2))
```

Output:

Addition : 15
Subtraction : 5
Multiplication : 50
Divide : 2.0

33. You are tasked with developing a modular calculator application in Python. The calculator should support basic arithmetic operations: addition, subtraction, multiplication, and division. Each operation should be implemented in a seperate module.

Additionally, you should create a main program to handle user input, call the appropriate module, and display the result.

Algorithm:

1. Define function for addition, subtraction, multiplication, and division.
2. Handle division by zero by raising an error if the divisor is zero.
3. Import the module (mymath) containing those functions
4. Initialize two numbers (a=10, b=5)
5. Call each function using mymath.<function_name>(a,b)
6. Print the results of all operations

Program: (my)math

```
def add (a,b):
return a+b
def subtract (a,b):
 return a-b
 def multiply (a,b):
 return a*b
def divide (a,b):
 if b=0:
raise ValueError ("cannot divide by zero")
return a/b
import mymath
a=10
b=5
Print ("Addition:", mymath.add (a,b))
Print ("subtraction:", mymath.subtract (a,b))
Print ("Multiplication:", mymath.multiply (a,b))
Print ("Division:", mymath.divide (a,b))
```

3.4 You are working on a Python project that requires you to perform various mathematical operations and geometric area calculations. To organize your code better, you decide to create a package named mypackage which includes sub package Pack1 and Pack2 with two modules: math function and areafunctions. Demonstrate the use of the functions by performing a few calculations and printing the results

Algorithm:

1. Create mathfunctions.py module:
2. Create areafunctions.py module:
3. Create main.py:
4. Print the output as expected.
5.

Program:-

1. Create the mathfunctions.py module

```
def add(a,b):
return a+b
def subtract(a,b):
 return a-b.
 def multiply(a,b):
 if b==0:
 return "Error! Division by zero":
 return a/b.
```

2. Create the area functions.py module

```
import math
def circle_area(radius):
return math.pi*radius*radius
def rectangle_area(length,width):
return length*width
def triangle_area(base,height):
return 0.5*base*height.
```

Output:

Addition : 15

Subtraction : 5

Multiplication : 50

Division : 2.0

Circle Area (radius = 7) = 153.93804002589915

Rectangle Area (5x10) = 50

Triangle Area (base = 6, height = 8) : 24.0

3. Create the main.py file

```
import mathfunct
def Circle_area(radius)
 import areafunctions
#using mathfunctions
Print ("Addition :", mathfunctions.add(10,5))
Print ("Subtraction:", mathfunctions. Subtract(10,5))
Print ("Multiplication:", mathfunctions. multiply (10,5))
Print ("Division:", mathfunction. divide (10,5))
```

using area functions

```
Print ("Circle Area (radius = 7) :", areafunctioncircle_area(7))
Print ("Rectangle Area (5x10) :", areafunction. rectangle_area (5,10))
Print ("Triangle Area (base = 6, height = 8):", areafunctiontriangle_area(6,8))
```

VEL TECH - CSE	
EX NO.	3
PERFORMANCE (5)	5
RESULT AND ANALYSIS (5)	5
VIVA VOCE (5)	5
RECORD (5)	
TOTAL (20)	15 | 15
SIGN WITH DATE	

Result:

Thus the Program for importing Python modules and Packages was Successfully executed and the output was verified.