

Date:- 20/8/25

Task 3:- Importing and creating python modules and packages in python program

Aim:- To implement and demonstrate the process of importing built-in modules, creating user-defined modules and organizing code in packages in python, thereby promoting code reusability, modularity and maintainability

3.1

1. perform Common math and random operations
2. work with operating system (create/change directories) and read the python version
3. Compute basic statistics (mean, median, mode, standard deviation)

Algorithm:-

1. import required modules: Math, random, os, sys, statistics, Pathlib.
2. Math & random:
 - Compute sqrt(5), radians(80), a random float in [0,0,1,0), a random integer in [2,6] (inclusive), pi, ceil(2,3), floor(2,3), factorial(5), gcd(5,15), abs(-10), pow(3,5), log base 3 of 2 log 10 (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:\pythonslots if not present and change the current working directory to it
 - list all files / directories in the new current directory
 - Print python interpreter version
 - On lists [5,6,8,10] and [2,5,3,2,8,3,9,4,2,5,6], Compute mean, median, mode, stdev.
- 5) Print neatly formatted results.

Program :-

```
import math  
import random  
import os  
import sys  
import statistics as stats  
from pathlib import Path
```

```
Print("In -- 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) = ", random.randint(2,6)) # inclusive
```

```
Print("pi = ", math.pi)
```

```
Print("ceil(2.3) = ", math.ceil(2.3))
```

```
Print("floor(2.3) = ", math.floor(2.3))
```

```
Print("factorial(5) = ", 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.log(a_val))
```

```
inf_val = float('inf')
```

```
nan_val = float('nan')
```

```
Print(f'isinf({inf}) = {math.isinf(inf_val)} , isnan({nan}) = {math.isnan(nan_val)}')
```

```
Print("In -- OS & SYS --")
```

```
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:\python\lots2L4')
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("In -- 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:-

```

-- MATH & Random --
sqrt(5) = 2.23606797749979
random() = 0.5235987755982988
random() in [0,1] = 0.37444887175646646 <- will vary
radians(2,6) = 6
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(infinity) = True, isnan(nan) = True

```

-- OS & sys --

Created / ensured : C:\Pythonlab

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

Directory Contents of C:\python\lots2L4: []

Python version : 3.8.5 (... details ...)

-- Statistics --

mean([5, 6, 8, 10]) = 7.25 mode([2, 5, 3, 2, 8, 3, 9, 4, 2, 5, 6]) = 2

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

Task 3.2 Create a python package named Cardpack
Containing a module Cardfun that imports the random
module. Assign a range of cards, call a function from
the module, and display a random sample of cards.

Algorithm:-

Step 1: Start

Step 2:- To create a package Cardpack

Step3:- To Create a module Cardfun. and import random
function

Step4: Assign a cards range

Step5: Call a module function

Step6: Display the random sample cards

Step7: Stop

program:-

Card fun

```
import random
```

```
def fun():
```

```
Cards = []
```

```
for i in range (1,53):
```

```
Cards.append(i)
```

```
Shuffled Cards = random.sample(Cards, k=52)
```

```
print ("In\n", Shuffled Cards, "\nIn")
```

Mymod.py

```
import Card fun
```

```
Card.fun().func()
```

Output :-

Restart:

```
[5, 24, 13, 22, 20, 41, 38, 51, 4, 7, 34, 49, 14, 50, 37, 40, 18,  
35, 11, 18, 33, 39, 36, 42, 12, 6, 16, 19, 48, 29, 2, 27, 11, 8, 46,  
28, 21, 32, 8, 25, 30, 23, 26, 10, 43, 47, 3, 44, 52, 1, 45, 9]
```

Task 3.3

You are task with developing a modular calculator application in python. The calculator should support basic arithmetic operations addition, subtraction, multiplication and division. Each operation should be implementation in a separate module.

Algorithm:-

1. Define function for addition, subtraction, multiplication, division
2. Handle division by zero by raising an error if the divisor is zero
3. Import the module (mymath) containing these 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:-

```
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))
```

Output:-

Addition: 15

Subtraction: 5

Multiplication: 50

Division: 2.0

Task 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 packages pack1 and pack2 with two modules: math-functions and area-functions. Demonstrate the use of the functions by performing a few calculations and printing the results.

Algorithm:-

1. Create math-functions.py module:

2. Create area-functions.py module:

3. Create main.py:

4. print the output as expected

Program

- 1 Create the math-functions.py module

```
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:
```

```
        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
```

- 3 Create the main.py file

```
import math_functions
```

```
import area_functions
```

```
print("Addition:", math_functions.add(10,5))
```

```
print("Subtraction:", math_functions.subtract(10,5))
```

```
print("Multiplication:", math_functions.multiply(10,5))
```

```
print("Division:", math_functions.divide(10,5))
```

using area functions

```
Print("Circle Area(radius=7):", area-function . circle-area());
Print("Rectangle Area(sx10):", area-function . rectangle-area());
Print("Triangle Area (base=6, height=8):", area-functions . triangle-area());
```

Output:-

Addition: 15

Subtraction: 5

Multiplication: 50

Division : 2.0

Circle area (radius=7) : 153.93804002589985

Rectangle area (sx10) : 50

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

Thaumatochela *longitarsis*

VEL TECH	
EX NO.	3
PERFORMANCE (5)	5
RESULT AND ANALYSIS (5)	5
VIVA VOCE (5)	5
RECORD (5)	5
GRATUITY (10)	15
DATE / MONTH / YEAR	15

Result:-

Thus, the program for importing python modules and packages was successfully executed and the outputs were verified.