

task: 3 : 20/8/25

Importing and creating python modules and packages in python program.

Aim: to implement and (destroy) demonstrate the process of importing built-in modules, creating user defined modules, and organizing code into packages in python, thereby promoting code reusability, modularity and maintainability.

3.1

- 1) perform common math and random operations
- 2) work with the 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, statistics, pathlib.

2) math & random:

- compute $\sqrt{5}$, radians(30), a random float in $[0.0, 1.0)$, 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:\python lab if not present and print the current working directory.

- create C:\python\slots\4 if not present and print the current working directory to it.

- List all the files / directories in the new current directory.
- print python interpreter version.

4) Statistics:

- 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))
```

```
print("pi = ", math.pi) # inclusive
```

```
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-pythonlab = path(r"C:\pythonlab")
path-pythonlab.mkdir(parent=True, exist_ok=True)
print(f"Created/ensured: {path-pythonlab}")
print("Current working directory:", os.getcwd())
target-dir = path(r"C:\python\07SL4")
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))

```


Expected Sample Output:

- MATH & RANDOM -

$\text{sqrt}(5) = 2.23606797749979$ radians(30) =

0.5235987755982988 random() in (0,1) =

0.3744887175646646 ← will vary random
(2,6) = 6

← inclusive; will vary

$\pi = 3.141592653589793$ ceil(2.3) = 3

floor(2.3) = 2 factorial(5) = 120 gcd(5,5) = 5

abs(-10) = 10 pow(3,5) = 243 log base 3 of 2 =

0.6309297535714574

$\log_{10}(100) = 2.0$ isinf(∞) = True,

is nan(NaN) = True

- OS & SYS -

Created / ensured: c:\python1

current working directory: (:) ← (your current path)

Created / ensured & changed into: c:\python
5224.

Directory contents of c:\python5224: []

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]) =

2.2715633383201098

✓
Result: To implement and demonstrate the process of importing built in modules is verified successfully.

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

Step 3: To create a module CardFun and import
random function.

Step 4: Assign a Cards range.

Step 5: Call a module function.

Step 6: Display the random sample Cards

Step 7: Stop.

Program:

CardFun

```
import random
```

```
def fun():
```

```
    Cards = []
```

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

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

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

```
    print("\n\n", Shuffled_Cards, "\n\n")
```

```
my mode: i'y
```

```
import CardFun
```

```
CardFun.fun()
```

Result: To create a python package named cardpack
containing a module CardFun that imports &
verified successfully.

Output:

RESTART:

C:\Users\Student.MAT2VC6833\AppData\Local
Programs\Python\Python311\Lib\site-packages\

card pack\my mod.py

[5, 24, 13, 22, 20, 41, 38, 51, 4, 7, 34, 49, 14, 50, 37,
40, 15, 35, 17, 18, 33, 39, 36, 42, 12, 6, 16, 19, 48,
29, 2, 27, 11, 31, 46, 28, 21, 32, 8, 25, 30, 23, 26,
10, 43, 47, 3, 44, 52, 1, 45, 9]

Task: 3.3

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 separate module additionally you should create main program to handle user input call the appropriate module and display the result:

Aim: To create a main program to handle user input call appropriate module, and display results.

Algorithm:

1. Define functions for addition subtraction multiplication and division.
2. Handle division by zero by raising an error if division is zero.
3. Import the module (my math) containing these function)
4. Initialize two number ($a=10$, $b=5$)
5. call each function using my math function name $x(a, b)$
6. print the result of all operations.

Output:

Addition: 15

Subtraction: 5

multiplication: 50

Division: 2.0

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 math
```

```
a=10
```

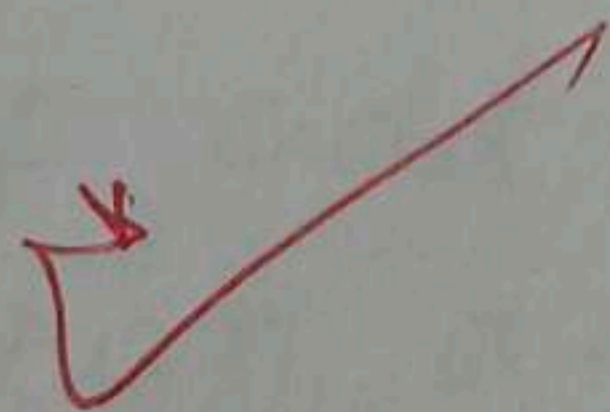
```
b=5
```

```
print("Addition:", mymath.add(a,b))
```

```
print("Subtraction:", mymath.subtract(a,b))
```

```
print("multiplication", mymath.multiply(a,b))
```

```
print("Division:", mymath.divide(a,b))
```



Result: Thus to create a main program to handle user input call appropriate module is verified successfully.

3.4
you are working on a python project that require you to perform various mathematical operations and geometric area calculation to organize your code better you decide to two create a package named my package which includ sub package.

the use of the function by performing of a few calculating and printing the result.

Aim:

Algorithm:

1. Create mathfunction.py module
2. create area function.py module
3. create main.py:
4. print the output as expected.

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):
    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
```

```
#using math functions
```

```
printf ("Addition: ", math functions add(10,5))
```

```
print ("Subtraction", math function subtract(10,5))
```

```
print ("Division:", math function division(10, 5))
```

```
# using are function
```

```
printf ("circle Area (radius: 7): " area function
```

```
circle area (7))
```

```
print ("Rectangle area (5x10): " area functions
```

```
rectangle: are (5, 10))
```


Output:

Addition: 15

Subtraction: 5

multiplication: 50

Division: 2.0

Circle Area (radius=7): 153.93804002589985

Rectangle Area (5x10)=50

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


```
print("Triangle Area(base = 6 height = 8):")  
area functions totangle - area(6,8)
```

VEL TECH	
EX No.	3
PERFORMANCE (5)	5
RESULT AND ANALYSIS (5)	5
VIVA VOCE (3)	5
RECORD (4)	
TOTAL (15)	
SIGN WITH DATE	15

Result: Thus the program for importing python modules and package was successfully executed and the output was verified.