Marwadi University Marwadi Chandarana Group NAAC A+	**Marwadi University** **Faculty of Engineering & Technology** **Department of Information and Communication Technology**	
Subject: Programming With Python (01CT1309)	**Aim:** Write a python program to define a module and import a specific function in that module to another program	
Experiment No: 08	**Date:**	**Enrollment No:92510133011**

Aim: Write a python program to define a module and import a specific function in that module to another program

IDE:

Python Modules

As our program grows bigger, it may contain many lines of code. Instead of putting everything in a single file, we can use modules to separate codes in separate files as per their functionality. This makes our code organized and easier to maintain.

Module is a file that contains code to perform a specific task. A module may contain variables, functions, classes etc. Let's see an example,

Let us create a module. Type the following and save it as example.py

```
def add(a,b):
    result = a+b
    return result
```

```
import example as addition

a = addition.add(4,5)

print(a)
```

Output:

```
PS C:\Users\trupa\OneDrive\Documents\PWP> & C:/Users/trupa/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/trupa/OneDrive/Documents/PWP/PWP EXP 8"
9
```

Import Python Standard Library Modules

The Python standard library contains well over 200 modules. We can import a module according to our needs. Suppose we want to get the value of pi, first we import the math module and use math.pi. For example,

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#import standard math module

import math

use math.pi to get value of pi

print("The value of pi is", math.pi)

Output:

```
PS C:\Users\trupa\OneDrive\Documents\PWP> & C:/Users/trupa/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/trupa/OneDrive/Documents/PWP/PWP EXP 8"
The value of pi is 3.141592653589793
```

Python import with Renaming

In Python, we can also import a module by renaming it. For example,

import module by renaming it

import math as m

print(m.pi)

Output:

```
PS C:\Users\trupa\OneDrive\Documents\PWP> & C:/Users/trupa/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/trupa/OneDrive/Documents/PWP/PWP EXP 8"
3.141592653589793
```

Python from...import statement

We can import specific names from a module without importing the module as a whole. For example,

import only pi from math module

from math import pi

print(pi)

Output:

```
PS C:\Users\trupa\OneDrive\Documents\PWP> & C:/Users/trupa/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/trupa/OneDrive/Documents/PWP/PWP EXP 8"
3.141592653589793
```

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Import all names

In Python, we can import all names(definitions) from a module using the following construct:

import all names from the standard module math

from math import *

print("The value of pi is", pi)

Output:

```
PS C:\Users\trupa\OneDrive\Documents\PWP> & C:/Users/trupa/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/trupa/OneDrive/Document
s/PWP/PWP EXP 8"
The value of pi is 3.141592653589793
```

The dir() built-in function

In Python, we can use the dir() function to list all the function names in a module.

We can use dir in math module in the following way:

print(dir(math))

Output:

```
PS C:\Users\trupa\OneDrive\Documents\PWP> & C:/Users/trupa/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/trupa/OneDrive/Document
s/PWP/PWP EXP 8"
['__doc__', '__loader__', '__name__', '__package__', '__spec__', 'acos', 'acosh', 'asin', 'asinh', 'atan', 'atan2', 'atanh', 'cbrt', 'ceil', 'c
omb', 'copysign', 'cos', 'cosh', 'degrees', 'dist', 'e', 'erf', 'erfc', 'exp', 'exp2', 'expm1', 'fabs', 'factorial', 'floor', 'fma', 'fmod', 'f
rexp', 'fsum', 'gamma', 'gcd', 'hypot', 'inf', 'isclose', 'isfinite', 'isinf', 'isnan', 'isqrt', 'lcm', 'ldexp', 'lgamma', 'log', 'log10', 'log
1p', 'log2', 'modf', 'nan', 'nextafter', 'perm', 'pi', 'pow', 'prod', 'radians', 'remainder', 'sin', 'sinh', 'sqrt', 'sumprod', 'tan', 'tanh',
'tau', 'trunc', 'ulp']
```

Built-in modules

Some examples of Python built-in modules include “os”, “sys”, “math”, and “datetime”.

help('modules')

Output:

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```
Enter any module name to get more help.  Or, type "modules spam" to search
for modules whose name or summary contain the string "spam".

PS C:\Users\trupa\OneDrive\Documents\PWP> "os"
os
PS C:\Users\trupa\OneDrive\Documents\PWP> "math"
math
PS C:\Users\trupa\OneDrive\Documents\PWP> "sys"
sys
PS C:\Users\trupa\OneDrive\Documents\PWP> "datetime"
datetime
```

Let's find the area of the circle

$$a = \pi r^2$$

Python Code:

```
import math  # for π (pi)
r = float(input("Enter radius of circle: "))
area = math.pi * r ** 2
print("Area of circle =", area)
```

output:

```
PS C:\Users\trupa\OneDrive\Documents\PWP> & C:/Users/trupa/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/trupa/OneDrive/Document
s/PWP/PWP EXP 8"
Enter radius of circle: 6
Area of circle = 113.09733552923255
```

Print the values of positive and negative infinity.

```
import math

print (math.inf)

print (-math.inf)
```

Output:

```
PS C:\Users\trupa\OneDrive\Documents\PWP> & C:/Users/trupa/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/trupa/OneDrive/Document
s/PWP/PWP EXP 8"
inf
-inf
```

List of Mathematical function in Math Module

pow(x,y), sqrt(x), trunc(x), cos(x), sin(x), tan(x), degrees(x), radians(x), exp(x), log2(x), log10(x)

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Post Lab Exercise:

a. Write a Python program to convert degree to radian

```
import math   # for pi value
degree = float(input("Enter angle in degrees: "))
radian = degree * math.pi / 180
print("Angle in radians =", radian)
```

output:

```
PS C:\Users\trupa\OneDrive\Documents\PWP> & C:/Users/trupa/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/trupa/OneDrive/Documents/PWP/PWP EXP 8"
Enter angle in degrees: 60
Angle in radians = 1.0471975511965976
```

b. Make a simplest possible Python program that calculates and prints the value of the formula

$$y = 6x^2 + 4sin(x)$$

```
import math

x = float(input("Enter value of x: "))
y = 6 * x**2 + 4 * math.sin(x)
print("y =", y)
```

output:

```
PS C:\Users\trupa\OneDrive\Documents\PWP> & C:/Users/trupa/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/trupa/OneDrive/Documents/PWP/PWP EXP 8"
Enter value of x: 11
y = 722.0000391737972
```

c. Write a Python function that evaluates the mathematical functions $f(x) = cos(2x), f'(x) = -2\sin(2x)$, $and\ f''(x) = -4\cos(2x)$.

```
import math

def functions(x):
   f = math.cos(2*x)
   f1 = -2 * math.sin(2*x)
   f2 = -4 * math.cos(2*x)
   return f, f1, f2

x = float(input("Enter value of x: "))
f, f1, f2 = functions(x)
print("f(x)  =", f)
print("f'(x) =", f1)
```

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```
print("f''(x) =", f2)
```

output:

```
PS C:\Users\trupa\OneDrive\Documents\PWP> & C:/Users/trupa/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/trupa/OneDrive/Documents/PWP/PWP EXP 8"
Enter value of x: 12
f(x)   = 0.424179007336997
f'(x) = 1.8111567240132476
f''(x) = -1.696716029347988
```

Return these three values. Write out the results of these values for $x = \pi$

```
import math

def functions(x):
f = math.cos(2*x)
f1 = -2 * math.sin(2*x)
f2 = -4 * math.cos(2*x)
return f, f1, f2

x = math.pi
f1, f2 = functions(x)

print("f(π)  =", f)
print("f'(π) =", f1)
print("f''(π) =", f2)
```

output:

```
PS C:\Users\trupa\OneDrive\Documents\PWP> & C:/Users/trupa/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/trupa/OneDrive/Documents/PWP/PWP EXP 8"
f(π)   = 1.0
f'(π) = 4.898587196589413e-16
f''(π) = -4.0
```