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: 92510133028**

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

```
[Running] python -u "e:\PWP\harikeshsirexperiment\exp 8.py"
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```

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

```
[Running] python -u "e:\PWP\harikeshsirexperiment\exp 8.py"
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

```
[Running] python -u "e:\PWP\harikeshsirexperiment\exp 8.py"
The value of pi is 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)

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Output

```
[Running] python -u "e:\PWP\harikeshsirexperiment\exp 8.py"
The value of pi is 3.141592653589793
```

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

```
[Running] python -u "e:\PWP\harikeshsirexperiment\exp 8.py"
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

```
[Running] python -u "e:\PWP\harikeshsirexperiment\exp 8.py"
['__doc__', '__loader__', '__name__', '__package__', '__spec__', 'acos', 'acosh', 'asin', 'asinh', 'atan', 'atan2', 'atanh', 'cbrt',
'ceil', 'comb', 'copysign', 'cos', 'cosh', 'degrees', 'dist', 'e', 'erf', 'erfc', 'exp', 'exp2', 'expm1', 'fabs', 'factorial',
'floor', 'fma', 'fmod', 'frexp', 'fsum', 'gamma', 'gcd', 'hypot', 'inf', 'isclose', 'isfinite', 'isinf', 'isnan', 'isqrt', 'lcm',
'ldexp', 'lgamma', 'log', 'log10', 'log1p', 'log2', 'modf', 'nan', 'nextafter', 'perm', 'pi', 'pow', 'prod', 'radians', 'remainder',
'sin', 'sinh', 'sqrt', 'sumprod', 'tan', 'tanh', 'tau', 'trunc', 'ulp']
```

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Built-in modules

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

help('modules')

Output:

```
_string             genericpath         shelve              win32traceutil
_strptime           getopt              shlex               win32transaction
_struct             getpass             showborder          win32ts
_symtable           gettext             shutil              win32ui
_sysconfig          glob                signal              win32uiole
_testbuffer         graphlib            site                win32verstamp
_testcapi           gzip                smtplib             win32wnet
_testclinic         hashlib             socket              winerror
_testclinic_limited heapq               socketserver        winioctlcon
_testconsole        hmac                sqlite3             winnt
_testimportmultiple html                sqlite_database     winperf
_testinternalcapi   http                sqlparse            winreg
_testlimitedcapi    idlelib             sre_compile         winsound
_testmultiphase     idna                sre_constants       winxpgui
_testsinglephase    imaplib             sre_parse           winxptheme
_thread             importlib           ssl                 wsgiref
_threading_local    inspect             sspi                xml
_tkinter            inspector           sspicon             xmlrpc
_tokenize           io                  start_pythonwin     xxsubtype
_tracemalloc        ipaddress           stat                zipapp
_typing             isapi               statistics          zipfile
_uuid               itertools           string              zipimport
_warnings           joycursor           stringprep          zlib
_weakref            json                struct              zoneinfo
_weakrefset         keybinding          subprocess
_webdebugger        keyword             symtable
_win32sysloader     kivy                sys

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

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Let's find the area of the circle

$$a = \pi r^2$$

Python Code

```
import math

r = 5  # radius

a = math.pi * (r ** 2)   # formula: πr²

print("Area of the circle with radius", r, "is", a)
```

```
[Running] python -u "e:\PWP\harikeshsirexperiment\exp 8.py"
Area of the circle with radius 5 is 78.53981633974483
```

Print the values of positive and negative infinity.

```
import math

print (math.inf)

print (-math.inf)
```

Output

```
[Running] python -u "e:\PWP\harikeshsirexperiment\exp 8.py"
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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```
[Running] python -u "e:\PWP\harikeshsirexperiment\exp 8.py"
pow(2, 3) = 8.0
sqrt(16) = 4.0
trunc(5.99) = 5
cos(pi) = -1.0
sin(pi/2) = 1.0
tan(pi/4) = 0.9999999999999999
degrees(pi) = 180.0
radians(180) = 3.141592653589793
exp(2) = 7.38905609893065
log2(8) = 3.0
log10(1000) = 3.0
log(81, 3) = 4.0
pi = 3.141592653589793
e = 2.718281828459045
tau = 6.283185307179586
Positive Infinity = inf
Negative Infinity = -inf
```

Post Lab Exercise:

a. Write a Python program to convert degree to radian

```
import math
degree = 110
radian = math.radians(degree)
print("Radian:", radian)
```

```
[Running] python -u "e:\PWP\harikeshsirexperiment\exp 8.py"
Radian: 1.9198621771937625
```

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

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

```
import math
x = 2  # you can change the value of x
y = 6 * (x ** 2) + 4 * math.sin(x)
print("y =", y)
```

```
[Running] python -u "e:\PWP\harikeshsirexperiment\exp 8.py"
y = 27.637189707302728
```

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

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

```
import math

def funcs(x):
return math.cos(2*x), -2*math.sin(2*x), -4*math.cos(2*x)

f, f1, f2 = funcs(math.pi)
print("f(x) =", f)
print("f'(x) =", f1)
print("f''(x) =", f2)
```

```
[Running] python -u "e:\PWP\harikeshsirexperiment\exp 8.py"
f(x) = 1.0
f'(x) = 4.898587196589413e-16
f''(x) = -4.0
```