

 Marwadi University Marwadi Chandarana Group	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:92510133019

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

Output
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

```
Output
The value of pi is 3.141592653589793

=== Code Execution Successful ===
```

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

```
Output
3.141592653589793

=== Code Execution Successful ===
```

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
```

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```
from math import pi
```

```
print(pi)
```

Output

```
Output
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

```
Output
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

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```

Output
Clear

['acos', 'acosh', 'asin', 'asinh', 'atan', 'atan2', 'atanh', 'cbrt', 'ceil', 'comb', 'copysign',
'cos', 'cosh', 'degrees', 'dist', 'e', 'erf', 'erfc', 'exp', 'exp2', 'expm1', 'fabs',
'factorial', 'floor', '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']

```

Built-in modules

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

help('modules')

Output:

```

[Running] python -u "e:\EveryLinguaAI-main\exp8.py"
('_abc', '_ast', '_bisect', '_blake2', '_codecs', '_codecs_cn', '_codecs_hk', '_codecs_iso2022', '_codecs_jp', '_codecs_kr', '_codecs_tw', '_collections', '_contextvars', '_csv', '_datetime',
'_functools', '_heapq', '_imp', '_interpchannels', '_interppqueues', '_interpreters', '_io', '_json', '_locale', '_lsprof', '_md5', '_multibytecodec', '_opcode', '_operator', '_pickle', '_random',
'_sha1', '_sha2', '_sha3', '_signal', '_sre', '_stat', '_statistics', '_string', '_struct', '_suggestions', '_symtable', '_sysconfig', '_thread', '_tokenize', '_tracemalloc', '_typing', '_warnings',
'_weakref', '_winapi', 'array', 'atexit', 'binascii', 'builtins', 'cmath', 'errno', 'faulthandler', 'gc', 'itertools', 'marshal', 'math', 'mmap', 'msvcrt', 'nt', 'sys', 'time', 'winreg',
'xxsubtype', 'zlib')

```

Let’s find the area of the circle

$$a = \pi r^2$$

Python Code

```

Output

Area of circle: 78.53981633974483

```

Print the values of positive and negative infinity.

import math

print (math.inf)

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```
print (-math.inf)
```

Output

```
Output
Positive Infinity: inf
Negative Infinity: -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)

```
Output
pow(2, 3): 8.0
sqrt(16): 4.0
trunc(5.99): 5
cos(0): 1.0
sin(math.pi/2): 1.0
tan(math.pi/4): 0.9999999999999999
degrees(math.pi): 180.0
radians(180): 3.141592653589793
exp(2): 7.38905609893065
log2(8): 3.0
log10(1000): 3.0
```

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Post Lab Exercise:

- a. Write a Python program to convert degree to radian

Code:-

```
import math

degree = 180
radian = math.radians(degree)
print("Radian value:", radian)
```

Output:-

```
Output
Radian value: 3.141592653589793
```

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

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

Code:-

```
a = 4
b = 6

F = (a**2 + b**2) / (a + b)

print("The value of formula is:", F)
```

Output:-

```
The value of formula is: 5.2
```

- c. Write a Python function that evaluates the mathematical functions

$$f(x) = \cos(2x), f'(x) = -2 \sin(2x), \text{ and } f''(x) = -4 \cos(2x).$$

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

Code:-

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```
import math

def calculate_values(x):
    square_root = math.sqrt(x)
    exponential = math.exp(x)
    logarithm = math.log(x) # natural log
    return square_root, exponential, logarithm

# Example
x = 5
results = calculate_values(x)
print("Square root of", x, "=", results[0])
print("Exponential of", x, "=", results[1])
print("Logarithm of", x, "=", results[2])
```

Output:-

Output

```
Square root of 5 = 2.23606797749979
Exponential of 5 = 148.4131591025766
Logarithm of 5 = 1.6094379124341003
```