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:92400133110**

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

```
bvs.py > add
1   def add(a, b):
2       result = a + b
3       return result
4   a = add(4, 5)
5   print(a)

PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

PS C:\Users\LENOVO\mokey> python -u "c:\Users\LENOVO\mokey\bvs.py"
9
PS C:\Users\LENOVO\mokey>
```

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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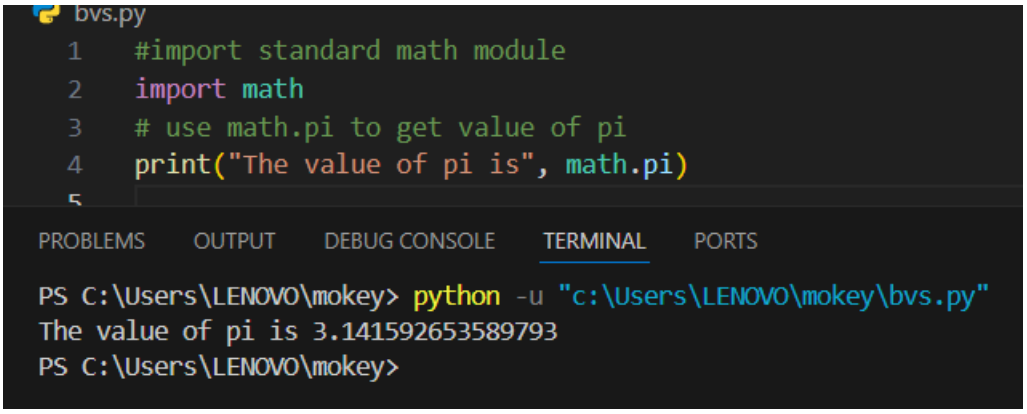
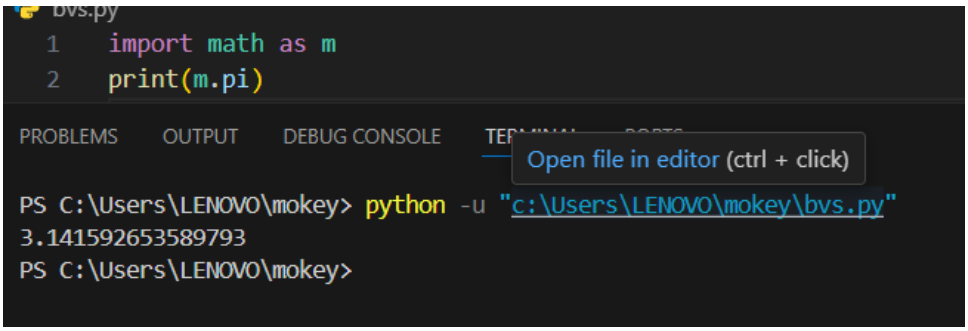


Python import with Renaming

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

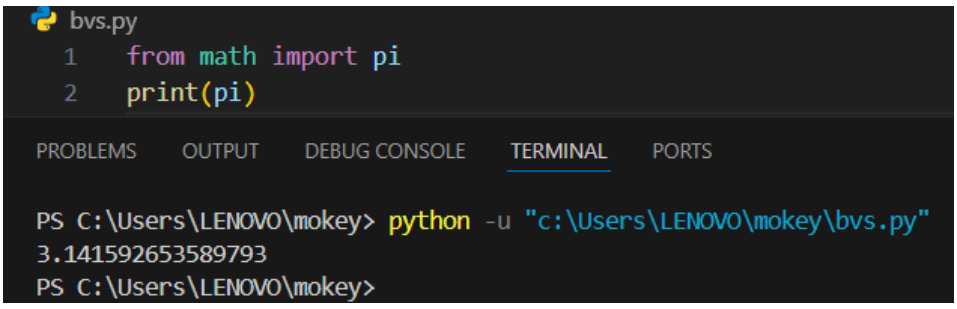
import module by renaming it



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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Import all names

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

```
bvs.py
1   # import all names from the standard module math
2   from math import *
3   print("The value of pi is", pi)

PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

PS C:\Users\LENOVO\mokey> python -u "c:\Users\LENOVO\mokey\bvs.py"
The value of pi is 3.141592653589793
PS C:\Users\LENOVO\mokey>
```

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:

```
bvs.py
1   import math
2   print(dir(math))

PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

PS C:\Users\LENOVO\mokey> python -u "c:\Users\LENOVO\mokey\bvs.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', 'is
close', 'isfinite', 'isinf', 'isnan', 'isqrt', 'lcm', 'ldexp', 'lgamma', 'log', 'log10', 'log1p', 'log2', 'modf', 'nan', 'nextafter', 'perm', 'pi', 'pow', 'prod', 'radi
ans', 'remainder', 'sin', 'sinh', 'sqrt', 'sumprod', 'tan', 'tanh', 'tau', 'trunc', 'ulp']
PS C:\Users\LENOVO\mokey>
```

Built-in modules

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

help('modules')

Output:

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Let's find the area of the circle

$$a = \pi r^2$$

Python Code

bvs.py > ...

```python
import math
def area_of_circle(radius):
    if radius < 0:
        raise ValueError("Radius cannot be negative.")
    return math.pi
try:
    r = float(input("Enter the radius of the circle: "))
    area = area_of_circle(r)
    print(f"The area of the circle with radius {r} is {area:.2f}")
except ValueError as e:
    print(f"Invalid input: {e}")
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
PS C:\Users\LENOVO\mokey> python -u "c:\Users\LENOVO\mokey\bvs.py"
Enter the radius of the circle: 5
The area of the circle with radius 5.0 is 3.14
PS C:\Users\LENOVO\mokey>
```

Print the values of positive and negative infinity.

bvs.py

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

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
PS C:\Users\LENOVO\mokey> python -u "c:\Users\LENOVO\mokey\bvs.py"
inf
-inf
PS C:\Users\LENOVO\mokey>
```

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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)

bvs.py > ...

```
1   from math import *
2   x=int(input("Enter the x value:"))
3   y=int(input("Enter the y value:"))
4   print(pow(x,y))
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
PS C:\Users\LENOVO\mokey> python -u "c:\Users\LENOVO\mokey\bvs.py"
Enter the x value:2
Enter the y value:3
8.0
PS C:\Users\LENOVO\mokey>
```

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Post Lab Exercise:

a. Write a Python program to convert degree to radian

```
1   def Simply(x):
2       y=6*x*x + sin(x)
3       return y
4   from math import sin
5   import bvs as cal
6   x = int(input("Enter the x value:"))
7   result=cal.Simply(x)
8   print("After  evaluation output is: ",result)
```

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

PS C:\Users\LENOVO\mokey> python -u "c:\Users\LENOVO\mokey\bvs.py"
Enter the x value:5
After  evaluation output is:  149.04107572533687
```

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

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

```
bvs.py > ...
1   import math
2   x = 2
3   y = 6 * x**2 + 4 * math.sin(x)
4   print(y)
```

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

PS C:\Users\LENOVO\mokey> python -u "c:\Users\LENOVO\mokey\bvs.py"
27.637189707302728
PS C:\Users\LENOVO\mokey>
```

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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 $x = \pi$

bvs.py > ...

```python
import math
def evaluate_functions(x):
    f = math.cos(2 * x)
    f_prime = -2 * math.sin(2 * x)
    f_double_prime = -4 * math.cos(2 * x)
    return f, f_prime, f_double_prime
x_value = math.pi
f_val, f_prime_val, f_double_prime_val = evaluate_functions(x_value)
print(f"f(π) = {f_val}")
print(f"f'(π) = {f_prime_val}")
print(f"f''(π) = {f_double_prime_val}")
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
PS C:\Users\LENOVO\mokey> python -u "c:\Users\LENOVO\mokey\bvs.py"
f(π) = 1.0
f'(π) = 4.898587196589413e-16
f''(π) = -4.0
PS C:\Users\LENOVO\mokey>
```