Chapter -04 Using Python Libraries

1. Importing modules in a Python Program:

Python provides *import* statement to *import* modules in a program. The ***import statement*** can be used in two forms:

i) To import entire *module*: *the import<module> command*
ii) To import selected *objects*: the *from<module>import<object>* command

i) Importing entire module: -

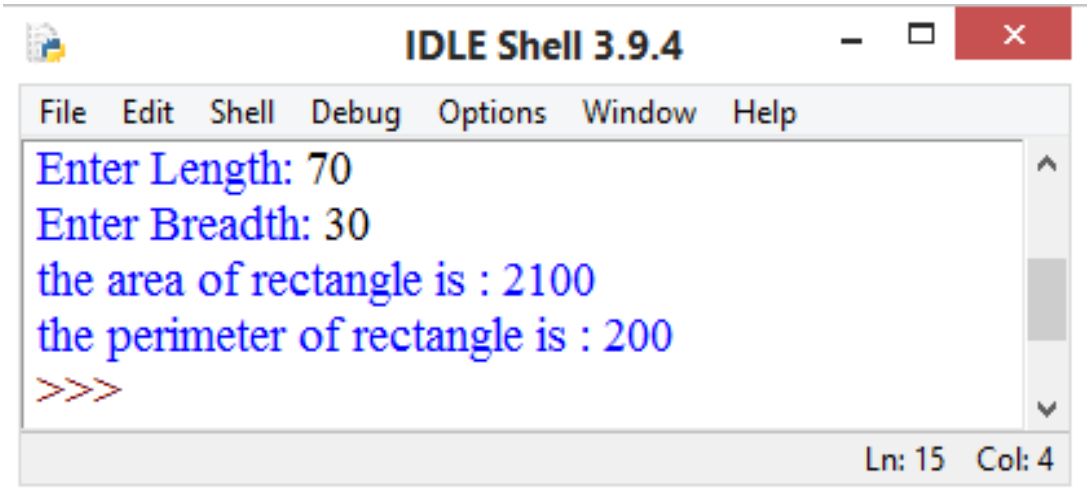
The *import statement* can be used to import entire *module* and *even for importing selected items*. To import *entire module*, the *import statement* can be used as per following syntax:

import module1, module2, module3, ...

Example 1

```
import Rectangle
a=int (input ("Enter Length: "))
b=int (input ("Enter Breadth: "))
print ("the area of rectangle is :", Rectangle.Area_rec(a,b))
print ("the perimeter of rectangle is :", Rectangle.Perimeter_rec(a,b))
```

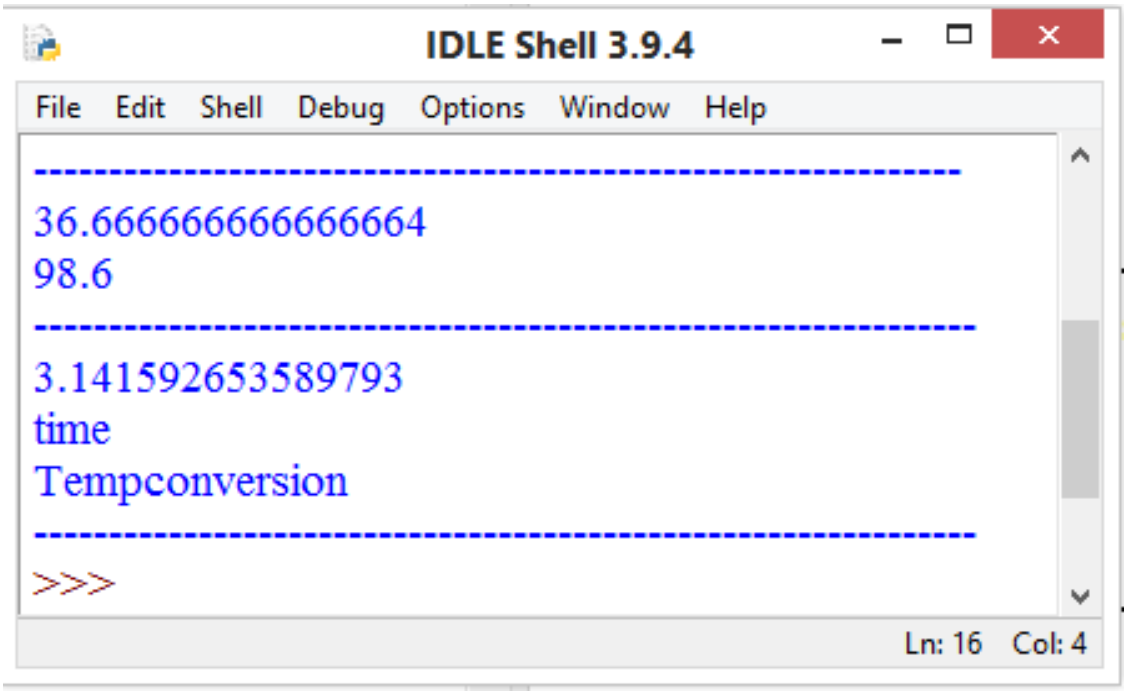
Output:



Example 2

```
print ("\n----------------------------------------------------------------")
import time, math                # Pre-defined module in standard library
import Tempconversion        # User defined module
print(Tempconversion.to_centigrade(98.0))
f=Tempconversion. To_fahrenheit (37.0)
print(f)
print('----------------------------------------------------------------')
print(math.pi)
#The name of a module is stored inside a constant __name__
print(time.__name__)
print(Tempconversion.__name__)
print('----------------------------------------------------------------')
```

Output:



Note 1:-

After importing a module, to access one of the functions, we have to specify the name of the module and the name of the function, separated by a dot (period) this format is called dot notation.

Note 2:- The name of a module is stored inside a constant __name__.

ii) Importing Select Objects from a Module:-

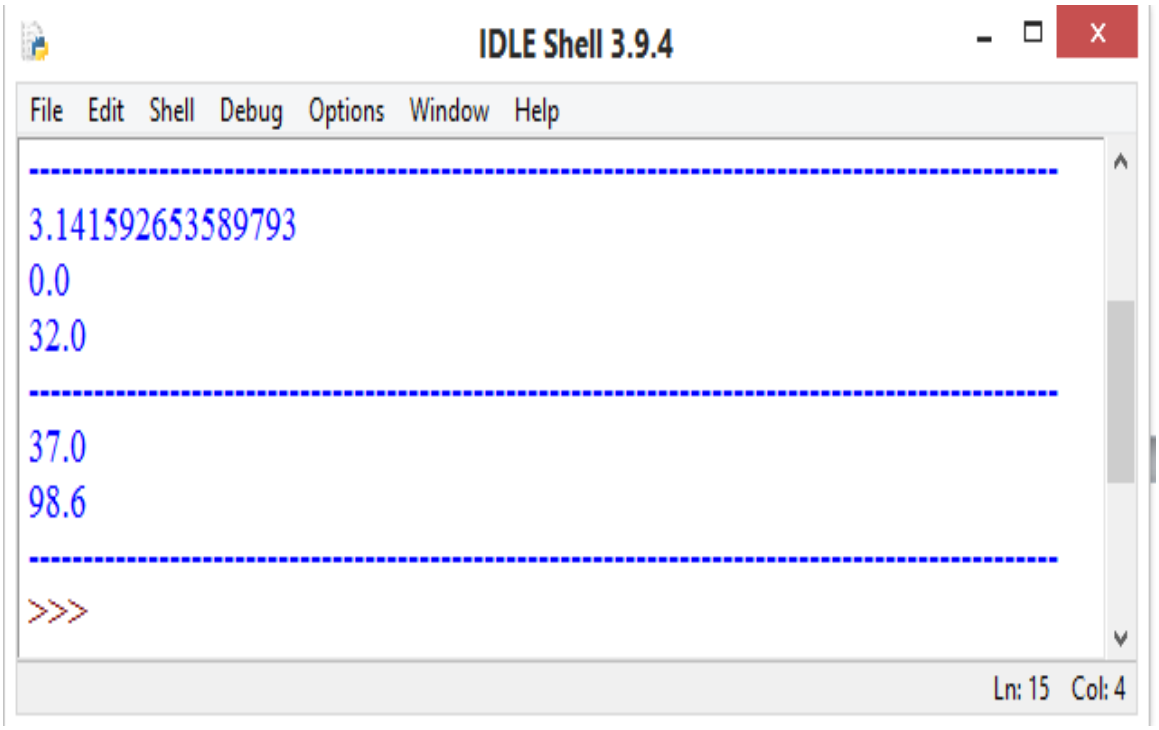
In order to *import* some *selected items*, not all from *module*, then we can use from *<module> import statement* as per following syntax:

from <module> import <objectname>, <object name>, <object name>

Example:-

```
print('\n----------------------------------------------------------------------------------------------------')
from math import pi
from Tempconversion import FREEZING_C, FREEZING_F, to_centigrade, to_fahrenheit
print(pi)
print(FREEZING_C)
print(FREEZING_F)
print('----------------------------------------------------------------------------------------------------')
print(to_centigrade(98.6))
print(to_fahrenheit(37))
print('----------------------------------------------------------------------------------------------------')
```

Output:



Practical Implementation -1

Write a program in Python that calculates the following:

1. *Area of a circle.*
2. *Circumference of a circle.*
3. *Area of a rectangle.*
4. *Perimeter of a rectangle.*
5. *Exit.*

Create respective modules for each of the operations and call them separately using a menu-driven program.

Circle Module:

```
#Circle_module
import math
def area(radius):
    return math.pi * radius ** 2

def circumference(radius):
    return 2 * math.pi*radius
```

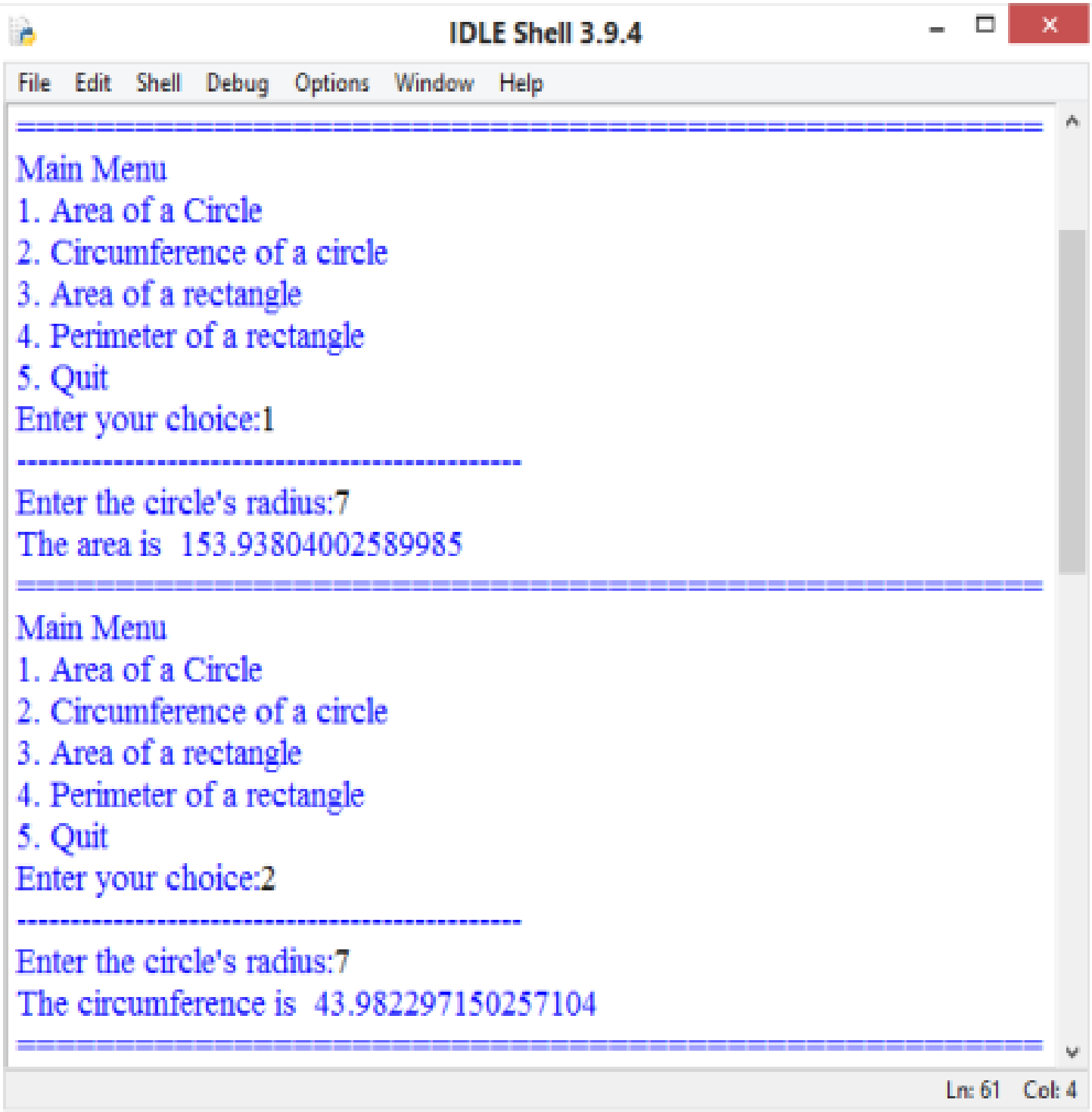
Rectangle Module:

```
#Rectangle_module

def area(width, length):
    return width * length

def perimeter(width, length):
    return 2 * (width + length)
```

Main program importing modules

```
#Import_modules

import Circle_module, Rectangle_module
choice =0
ch ='y'
while (ch =='y' or ch =='Y'):
    print("==================================================")
    print("Main Menu")
    print("1. Area of a Circle")
    print("2. Circumference of a circle")
    print("3. Area of a rectangle")
    print("4. Perimeter of a rectangle")
    print("5. Quit")

    choice =int(input("Enter your choice:"))
    if(choice == 1):
        print("-------------------------------------------")
        rad =int(input("Enter the circle's radius:"))
        print("The area is ", Circle_module.area(rad))

    elif(choice ==2):
        print("-------------------------------------------")
        radius =int(input("Enter the circle's radius:"))
        print("The circumference is ", Circle_module.circumference(radius))

    elif(choice == 3):
        print("-------------------------------------------")
        width =int(input("Enter the rectangle's width:"))
        length =int(input("Enter the rectangle's length:"))
        print("The area is",Rectangle_module.area(width, length))

    elif(choice == 4):
        print("-------------------------------------------")
        width =int(input("Enter the rectangle's width:"))
        length =int(input("Enter the rectangle's length:"))
        print("The perimeter is",Rectangle_module.area(width, length))

    elif (choice == 5):
        print("-------------------------------------------")
        print("Exiting the program .....")
        ch ='F'

    else:
        print("Error -Invalid selection.")
```

Output:


IDLE Shell 3.9.4
File Edit Shell Debug Options Window Help
==========
Main Menu
1. Area of a Circle
2. Circumference of a circle
3. Area of a rectangle
4. Perimeter of a rectangle
5. Quit
Enter your choice:1

Enter the circle's radius:7
The area is 153.93804002589985
==========
Main Menu
1. Area of a Circle
2. Circumference of a circle
3. Area of a rectangle
4. Perimeter of a rectangle
5. Quit
Enter your choice:2

Enter the circle's radius:7
The circumference is 43.982297150257104
==========
Ln: 61 Col: 4


IDLE Shell 3.9.4
File Edit Shell Debug Options Window Help
==========
Main Menu
1. Area of a Circle
2. Circumference of a circle
3. Area of a rectangle
4. Perimeter of a rectangle
5. Quit
Enter your choice:3

Enter the rectangle's width:8
Enter the rectangle's length:9
The area is 72
==========
Main Menu
1. Area of a Circle
2. Circumference of a circle
3. Area of a rectangle
4. Perimeter of a rectangle
5. Quit
Enter your choice:4

Enter the rectangle's width:7
Enter the rectangle's length:10
The perimeter is 70
==========
Main Menu
1. Area of a Circle
2. Circumference of a circle
3. Area of a rectangle
4. Perimeter of a rectangle
5. Quit
Enter your choice:5

Exiting the program .....
>>>
Ln: 63 Col: 4