

Computer Programming Laboratory

B.Tech. 1st Semester



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Ramaiah University of Applied Sciences

Private University Established in Karnataka State by Act No. 15 of 2013

Faculty	Engineering & Technology
Programme	B. Tech. in Computer Science and Engineering
Year/Semester	1 st Year / 1 st Semester
Name of the Laboratory	Computer Programming Laboratory
Laboratory Code	18ESL109A

List of Experiments

1. Introduction to Python programming environment
2. Variables, data types, operators and expressions
3. Input output operations
4. Logic operations and decision making
5. Loop statements
6. Character and string operations
7. Functions
8. File handling
9. Data structures
10. Libraries

Index Sheet

No .	Lab Experiment	Performing the experiment (7)	Document (7)	Viva (6)	Total Marks (20)
1	Introduction to Python programming environment				
2	Variables, data types, operators and expressions				
3	Input output operations				
4	Logic operations and decision making				
5	Loop statements				
6	Character and string operations				
7	Functions				
8	File handling				
9	Data structures				
10	Libraries				
11	Lab Internal Test conducted along the lines of SEE and valued for 50 Marks and reduced for 20 Marks				
	Total Marks				

Lab Internal Marks =**Signature of the Staff In-charge**

Laboratory 2

Title of the Laboratory Exercise: Variables, data types, operators and expressions

1. Introduction and Purpose of Experiment

Variables are the basic data objects that are manipulated in a program. Every value in Python has a datatype. Operators specify what is to be done to them. Expressions combine variables and constants to produce new values. These building blocks are the topics of this Lab. By solving the given programming problems, the students will be able to apply the concepts of variables, data types, operators and expressions.

2. Aim and Objectives

Aim

- To develop programs using variables of basic data types and compute simple expressions involving operators

Objectives

At the end of this lab, the student will be able to

- Use variables of the basic data types
- Apply various operators in expressions
- Create Python programs to solve simple numeric problems

3. Experimental Procedure

- i. Analyse the problem statement
- ii. Design an algorithm for the given problem statement and develop a flowchart/pseudo-code
- iii. Implement the algorithm in Python language
- iv. Execute the Python program
- v. Test the implemented program
- vi. Document the Results
- vii. Analyse and discuss the outcomes of the experiment

4. Questions

- a. Write a program to swap two numbers
 - i. Using temporary variable

- ii. Without using temporary variable
- b. Write a program to find the simple interest
- c. Write a program to find the area and circumference of a circle

5. Algorithms

5.1 Algorithm of program to swap two numbers

5.1.1 Using temporary variable

Step1 : start

Step2 : read two variables of type int , say a and b

Step3 : temp := a

a := b

b := temp

step4 : write the values of a and b

step5 : stop

5.1.2 Without using temporary variable

Step1 : start

Step2 : read two variables of type int , say a and b

Step3 : a := a + b

b := a - b

a := a - b

step4 : write the values of a and b

step5 : stop

5.2 Algorithm of program to find the simple interest

Step1 : start

Step2 : read variable principle_amuont of type int

Step3 : read variable rate of type int

Step4 : read variable time of type int

Step5 : simple_interest := ((principle_amount * rate * time) / 100)

Step6 : write the value of principle_amount

Step7 : stop

5.3 Algorithm of program to find the area and circumference of a circle

Step1 : start

Step2 : read variable radius of type int

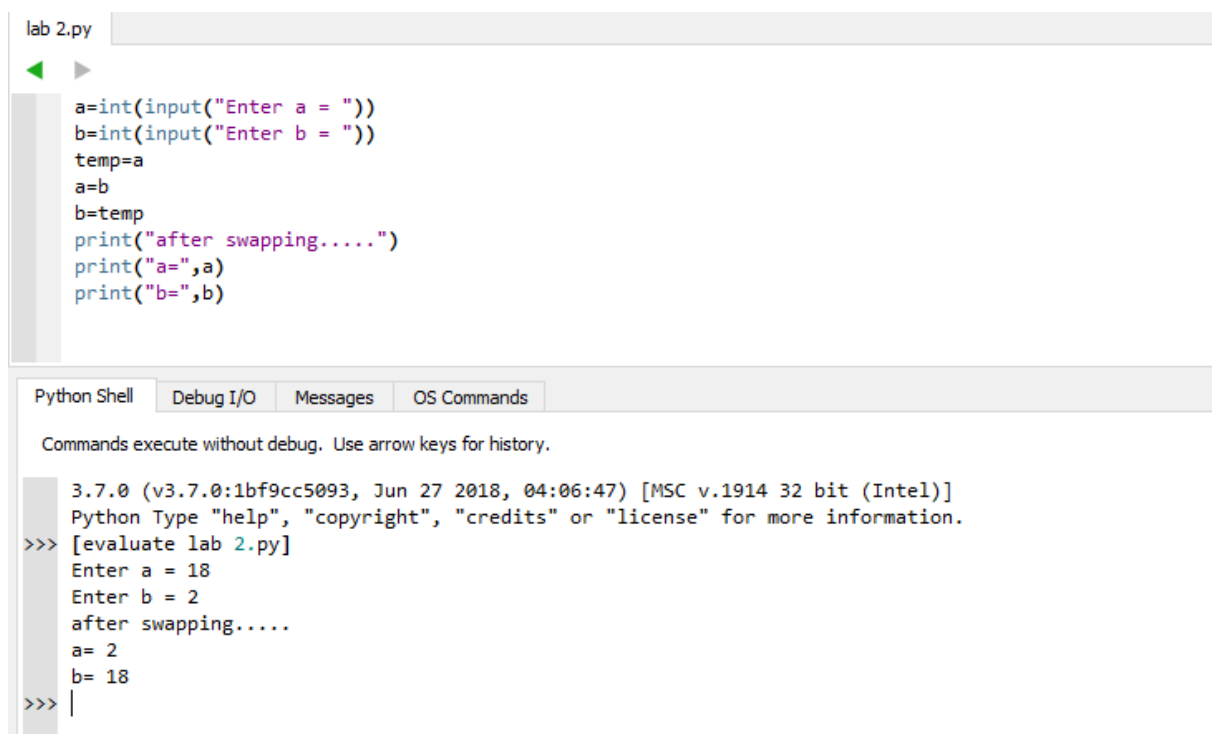
Step3 : circumference := $2 * 3.14 * \text{radius}$

Area := $3.14 * \text{radius} * \text{radius}$

step4 : write the values of circumference and area

step5 : stop

6. Presentation of Results

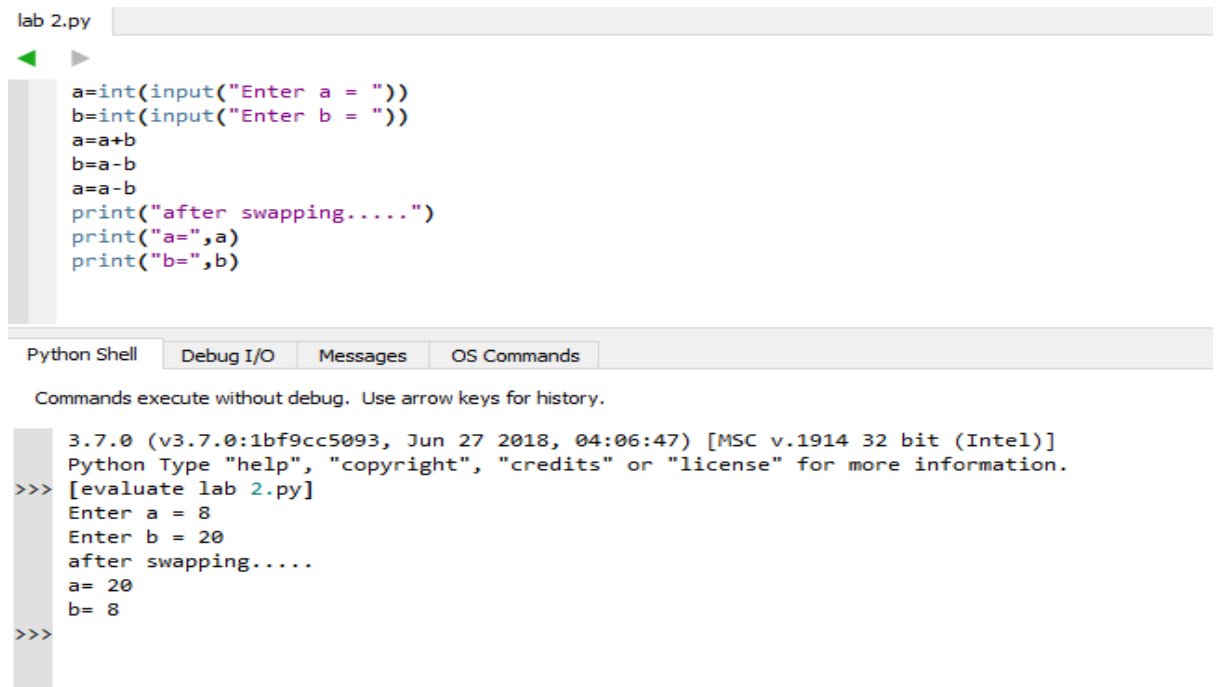


```
lab 2.py
a=int(input("Enter a = "))
b=int(input("Enter b = "))
temp=a
a=b
b=temp
print("after swapping.....")
print("a=",a)
print("b=",b)

Python Shell  Debug I/O  Messages  OS Commands
Commands execute without debug. Use arrow keys for history.
3.7.0 (v3.7.0:1bf9cc5093, Jun 27 2018, 04:06:47) [MSC v.1914 32 bit (Intel)]
Python Type "help", "copyright", "credits" or "license" for more information.
>>> [evaluate lab 2.py]
Enter a = 18
Enter b = 2
after swapping.....
a= 2
b= 18
>>> |
```

Figure 6.1

Figure 6.1 Output of program to swap two numbers using temporary variable



```
lab 2.py
a=int(input("Enter a = "))
b=int(input("Enter b = "))
a=a+b
b=a-b
a=a-b
print("after swapping.....")
print("a=",a)
print("b=",b)
```

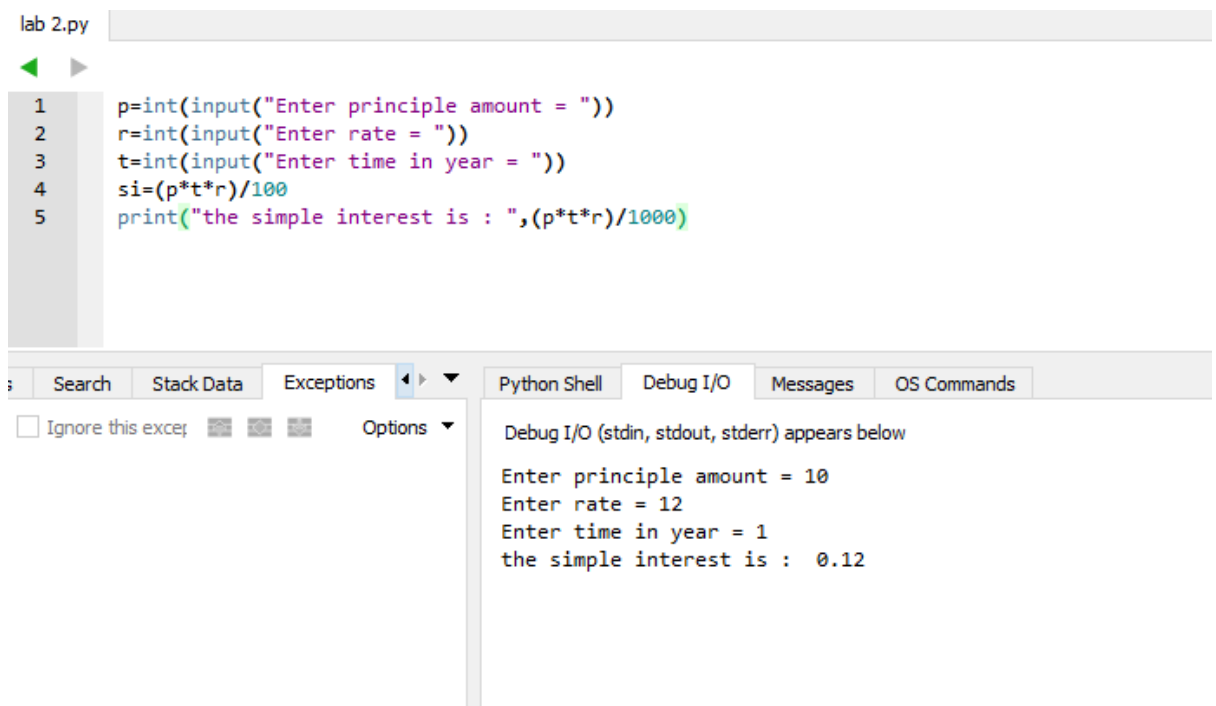
Python Shell Debug I/O Messages OS Commands

Commands execute without debug. Use arrow keys for history.

```
3.7.0 (v3.7.0:1bf9cc5093, Jun 27 2018, 04:06:47) [MSC v.1914 32 bit (Intel)]
Python Type "help", "copyright", "credits" or "license" for more information.
>>> [evaluate lab 2.py]
Enter a = 8
Enter b = 20
after swapping.....
a= 20
b= 8
>>>
```

Figure 6.2

Figure 6.2 Output of program to swap two numbers without using temporary variable



```
lab 2.py
1 p=int(input("Enter principle amount = "))
2 r=int(input("Enter rate = "))
3 t=int(input("Enter time in year = "))
4 si=(p*t*r)/100
5 print("the simple interest is : ",(p*t*r)/1000)
```

Search Stack Data Exceptions Python Shell Debug I/O Messages OS Commands

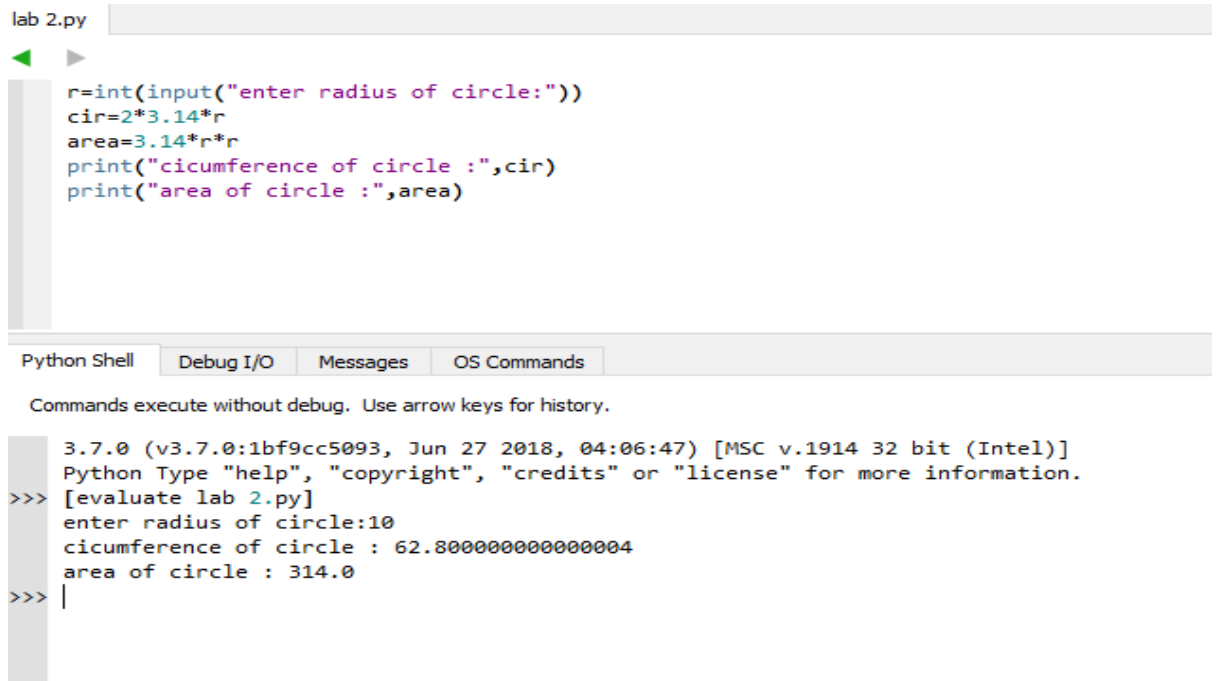
☐ Ignore this exception Options

Debug I/O (stdin, stdout, stderr) appears below

```
Enter principle amount = 10
Enter rate = 12
Enter time in year = 1
the simple interest is : 0.12
```

Figure 6.3

Figure 6.3 Output of program to find the simple interest



```
lab 2.py
r=int(input("enter radius of circle:"))
cir=2*3.14*r
area=3.14*r*r
print("cicumference of circle :",cir)
print("area of circle :",area)

Python Shell  Debug I/O  Messages  OS Commands

Commands execute without debug. Use arrow keys for history.

3.7.0 (v3.7.0:1bf9cc5093, Jun 27 2018, 04:06:47) [MSC v.1914 32 bit (Intel)]
Python Type "help", "copyright", "credits" or "license" for more information.
>>> [evaluate lab 2.py]
enter radius of circle:10
cicumference of circle : 62.800000000000004
area of circle : 314.0
>>> |
```

Figure 6.4

Figure 6.4 Output of program to find the area and circumference of a circle

7. Analysis and Discussions

7.1 program to swap two numbers

7.1.1 using temporary variable

First, user inputs the values of two variables, say 'a' and 'b'. then we assign the value of 'a' to a third variable 'temp'. The value of 'b' is assigned to 'a'. Then value of 'temp' is assigned to 'b'. Thus, the swapping of two numbers using temp variable executes. At last, the values of 'a' and 'b' is printed.

7.1.2 without using temporary variable

First, user inputs the values of two variables, say 'a' and 'b'. then we assign the value of sum of 'a' and 'b' in 'a'. The difference of 'a' and 'b' is assigned to 'b'. Then again, the difference of 'a' and 'b' is assigned to 'a'. Thus, the swapping of two variables without using temporary variable happens. At last, the values of 'a' and 'b' is printed.

7.2 Program to find the simple interest

User inputs the values of principle amount, rate and time for calculating simple interest. Then using the formula

$$\text{simple interest} = \frac{(\text{principle amount} + \text{rate} + \text{time})}{100}$$

Value of simple interest is calculated. At last, the value of simple interest is printed.

7.3 Program to find the area and circumference of a circle

User inputs the value of radius of circle. Then using the formulas

$$\text{area of circle} = \pi * \text{radius} * \text{radius}$$

$$\text{circumference of circle} = 2 * \pi * \text{radius}$$

the circumference and area of the circle is calculated. At last, the area and circumference are printed.

8. Conclusions

The concepts of variables, data types, operators and expressions is learnt.

9. Comments

1. Limitations of Experiments

If any user inputs the values of 'a', 'b', 'radius' or any other integer value in decimal, there will be some error in the result.

2. Limitations of Results

3. Learning happened

Learned to develop programs using variables of basic data types and compute simple expressions involving operators.

4. Recommendations

This concept can be applied to solve various numerical problems.