Batch: G3	**Roll No.:**	**16010421063**
Experiment / assignment / tutorial No.		
Grade: AA / AB / BB / BC / CC / CD /DD		

Signature of the Staff In-charge with date

TITLE: Basic concepts in python

AIM: 1) Program to find volume of a rectangular prism and diagonal length
2) Program to perform string operations.

Expected OUTCOME of Experiment: Use of input output function, arithmetic operators in python and different operations on string.

Resource Needed: Python IDE

Theory:

How the input function works in Python:

- When input() function executes program flow will be stopped until the user has given an input.
- The text or message display on the output screen to ask a user to enter input value is optional i.e. the prompt, will be printed on the screen is optional.
- Whatever you enter as input, input function convert it into a string. If you enter an integer value still input() function convert it into a string. You need to explicitly convert it into an integer in your code using typecasting.

Example:

```
Name=input("Enter your name")
print('Hello, ' + Name)
```

Output:-

```
Enter your name Mahesh
Hello,  Mahesh
```

Python Arithmetic Operators:
Assume variable **a** holds 10 and variable **b** holds 20, then

Operator	Description	Example
+ Addition	Adds values on either side of the operator.	a + b = 30
- Subtraction	Subtracts right hand operand from left hand operand.	a – b = -10
* Multiplication	Multiplies values on either side of the operator	a * b = 200
/ Division	Divides left hand operand by right hand operand	b / a = 2
% Modulus	Divides left hand operand by right hand operand and returns remainder	b % a = 0
** Exponent	Performs exponential (power) calculation on operators	a**b =10 to the power 20
//	Floor Division - The division of operands where the result is the quotient in which the digits after the decimal point are removed. But if one of the operands is negative, the result is floored, i.e., rounded away from zero (towards negative infinity) −	9//2 = 4 and 9.0//2.0 = 4.0, -11//3 = -4, -11.0//3 = -4.0

Strings:
We can create string simply by enclosing characters in quotes. Python treats single quotes the same as double quotes. Creating strings is as simple as assigning a value to a variable.

Example:-
var1= “Hello World”
var2=”Python Programming”

String Special Operators:

Assume string variable **a** holds 'Hello' and variable **b** holds 'Python', then

Operator	Description	Example
+	Concatenation - Adds values on either side of the operator	a + b will give HelloPython
*	Repetition - Creates new strings, concatenating multiple copies of the same string	a*2 will give -HelloHello
[]	Slice - Gives the character from the given index	a[1] will give e
[:]	Range Slice - Gives the characters from the given range	a[1:4] will give ell
in	Membership - Returns true if a character exists in the given string	H in a will give 1
not in	Membership - Returns true if a character does not exist in the given string	M not in a will give 1

String Methods:

Function Name	Description
capitalize()	Converts the first character of the string to a capital (uppercase) letter
casefold()	Implements caseless string matching
center()	Pad the string with the specified character.
count()	Returns the number of occurrences of a substring in the string.
encode()	Encodes strings with the specified encoded scheme
endswith()	Returns “True” if a string ends with the given suffix
expandtabs()	Specifies the amount of space to be substituted with the “\t” symbol in the string
find()	Returns the lowest index of the substring if it is found
format()	Formats the string for printing it to console
format_map()	Formats specified values in a string using a dictionary

Function Name	Description
index()	Returns the position of the first occurrence of a substring in a string
isalnum()	Checks whether all the characters in a given string is alphanumeric or not
isalpha()	Returns “True” if all characters in the string are alphabets
isdecimal()	Returns true if all characters in a string are decimal
isdigit()	Returns “True” if all characters in the string are digits
isidentifier()	Check whether a string is a valid identifier or not
islower()	Checks if all characters in the string are lowercase
isnumeric()	Returns “True” if all characters in the string are numeric characters
isprintable()	Returns “True” if all characters in the string are printable or the string is empty
isspace()	Returns “True” if all characters in the string are whitespace characters

Function Name	Description
istitle()	Returns “True” if the string is a title cased string
isupper()	Checks if all characters in the string are uppercase
join()	Returns a concatenated String
ljust()	Left aligns the string according to the width specified
lower()	Converts all uppercase characters in a string into lowercase
lstrip()	Returns the string with leading characters removed
maketrans()	Returns a translation table
partition()	Splits the string at the first occurrence of the separator
replace()	Replaces all occurrences of a substring with another substring
rfind()	Returns the highest index of the substring
rindex()	Returns the highest index of the substring inside the string

Function Name	Description
rjust()	Right aligns the string according to the width specified
rpartition()	Split the given string into three parts
rsplit()	Split the string from the right by the specified separator
rstrip()	Removes trailing characters
splitlines()	Split the lines at line boundaries
startswith()	Returns “True” if a string starts with the given prefix
strip()	Returns the string with both leading and trailing characters
swapcase()	Converts all uppercase characters to lowercase and vice versa
title()	Convert string to title case
translate()	Modify string according to given translation mappings
upper()	Converts all lowercase characters in a string into uppercase

Function Name	Description
zfill()	Returns a copy of the string with '0' characters padded to the left side of the string

Problem Definition:

1) Create four variables representing length, width, height and unit. Assign each of them a value as user input using the input() function. Calculate volume and diagonal length of rectangular prism by using operators in python and basic built in math functions.
Finally, use print() to display "The volume of the rectangular prism is [calculated volume] cubic [unit]." "Diagonal length of the rectangular cube is [diagonal length] [unit]" in the output.

2) a) Create a variable and assign it the string "Python programming"
b) Access the "i" from the variable by index and print it
c) Find the length of the string
d) Print the slice "Python" from the variable
e) Print the slice "program" from the variable
f) Get the string "thing" from the variable
g) Convert string into uppercase.
h) Create another variable and assign it the string " is interesting" now concatenate both the strings
i) Apply different string methods given in table.

Implementation details:

```
import math

#getting length breadth and height
x,y,z=map(float,input("Enter length breadth and height of box
").split())
unit=input("Enter unit of measurement ")

#printing the volume of the box
volume=format(x*y*z,'.2f')
print(f"The volume of the rectangular prism is {volume} cubic
{unit}")

#printing the diagonal of the box
d=format(math.sqrt(x**2+y**2+z**2),'.2f')
print(f"Diagonal length of the rectangular cube is {d} {unit}")
```

```
#defining the string
string="Python programming"

#accessing "i"
print(string[-3])

#print lenght of string
print(len(string))

#print "Python"
print(string[0:6])

#print "program"
print(string[7:-4])

#print "thing"
print(string[2:4]+string[-3:])

#To make the string upper case
print(string.upper())
```

```
#concatenate two strings
new=" is interesting"
print(string+new)

#check if string is upper case
print("using 'isupper()':"+str(string.isupper())+ " as all elements
are not upper case")

#check if string is lower case
print("using 'islower()':"+str(string.islower())+ " as all elements
are not lower case")

#convert to swap case
print("using 'swapcase()':"+string.swapcase())

#first occurence of 'n'
print("using 'index()':"+str(string.index('n')))

#convert to upper case
print("using 'upper()':"+string.upper())

#zfill adds 0 to the left of the string until the string reaches
the specified length
print('using "zfill()":'+string.zfill(50))
```

Output(s):

```
PS D:\testing> & C:/Users/ARYA/AppData/Local/Microsoft/WindowsApp
Enter length breadth and height of box 1 2 3
Enter unit of measurement feet
The volume of the rectangular prism is 6.00 cubic feet
Diagonal length of the rectangular cube is 3.74 feet
PS D:\testing>
```

```
PS D:\testing> & C:/Users/ARYA/AppData/Local/Microsoft/WindowsApps/PythonSoftware
i
18
Python
program
thing
PYTHON PROGRAMMING
Python programming is interesting
using 'isupper()':False as all elements are not upper case
using 'islower()':False as all elements are not lower case
using 'swapcase()':pYTHON PROGRAMMING
using 'index()':5
using 'upper()':PYTHON PROGRAMMING
using "zfill()":000000000000000000000000000000Python programming
PS D:\testing>
```

Conclusion:
Experiment 1 has been completed and in doing so we have understood the basic concepts of python.

Post Lab Descriptive Questions:-

1. **What is the difference in the C language and Python?**

C	**Python**
C is structure orientated language	Python is Object orientated language
C is compiled language	Python is an interpreted language.

There is a limited number of built-in functions available in C.	There is a large library of built-in functions in Python. Also, a lot of third party libraries
Pointers are available in C language.	No pointers functionality is available in Python.

2. Explain different data types in python.

1. Python Numbers

Complex numbers are defined as a complex class, floating point numbers are defined as float and integers are defined as an int in Python. There is one more type of datatype in this category, and that is long. It is used to hold longer integers.

2. Python List

An ordered sequence of items is called List. It is a very flexible data type in Python. There is no need for the value in the list to be of the same data type.

3. Python Tuple

A Tuple is a sequence of items that are in order, and it is not possible to modify the Tuples. Tuples are generally faster than the list data type in Python because it cannot be changed or modified like list datatype.

4. Python Strings

A String is a sequence of Unicode characters. In Python, String is called str. Strings are represented by using Double quotes or single quotes.

5. Python Set

The Collection of Unique items that are not in order is called Set. Braces {} are used to defined set and a comma is used to separate values. One will find that the items are unordered in a set data type.

6. Python Dictionary

Dictionary is a type of python data type in which collections are unordered, and values are in pairs called key-value pairs. This type of data type is useful when there is a high volume of data.

7. Boolean Type

There can be only two types of value in the Boolean data type of Python, and that is True or False.

Books/ Journals/ Websites referred:

1. Reema Thareja, *Python Programming: Using Problem Solving Approach*, Oxford University Press, First Edition 2017, India
2. Sheetal Taneja and Naveen Kumar, *Python Programming: A modular Approach*, Pearson India, Second Edition 2018,India
3. https://www.geeksforgeeks.org/python-strings/?ref=lbp

Date: _____ **Signature of faculty in-charge**