

LIST OF EXPERIMENTS

1. INTRODUCTION TO PYTHON IDLE (DEMONSTRATION)
 - a. Installation of python, vscode, jupyter-notebook
 - b. Basic Arithmetic operations
2. STRING MANIPULATION
3. LOOP CONTROL INSTRUCTIONS
4. INTRODUCTION TO CONTAINER TYPES – LIST AND LIST COMPREHENSION, SET OPERATIONS
5. TUPLE AND DICTIONARY
6. FUNCTIONS AND SPECIAL FUNCTIONS- LAMBDA, MAP AND FILTER MODULES
7. PLOTTING DATA USING MATPLOTLIB
8. NUMPY AND MULTIDIMENSIONAL ARRAYS
9. PANDAS AND DATAFRAME
10. FILE MANIPULATIONS

Questions will be updated in this sheet before every Lab session.

Lab-1

1. Write a program to find the:

- a. Sum,
- b. Difference,
- c. Product,
- d. Integer quotient,
- e. Remainder
- f. Fractional quotient

of two numbers. Enter the numbers on run time. Display the input data and results in neat format

2. Write python program to find

(a) Area and perimeter of a triangle when all three sides are given.

Hint: (Use Heron's Equation)

(b) Find all three angles of the triangle given in (a)

Display the input data and results in proper format.

3. Write a program to find:

- a. The equivalent impedance when two impedances Z_1 and Z_2 are connected in parallel.
- b. Display Z_1 and Z_2 in complex form.
- c. Display the real part and imaginary part of the result in separate lines.

Lab-2 STRING MANIPULATION

1. If the given string S1= "Maha Bharat", generate the following strings by manipulating S1.
 - a. "mAHA bHARAT"
 - b. "Bharat"
 - c. "BharatBharatBharat"
 - d. "Mera Bharat"
 - e. "Mera Bharat Mahan"

2. For the given string S="Ba Ba Black Sheep", determine the following using built in functions:
 - a. The length of the string S
 - b. The first occurrence of the letter 'e'
 - c. The total number of occurrences of 'a'
 - d. Generate "Ta Ta Black Sheep"

3. Write a python script to enter any string at run time and check whether it is a palindrome or not.

4. Enter the following details of a student at run time: - Name, Roll number and marks secured for Mathematics Examination out of 100. Write a python script to display student details as shown:
Name:
Roll Number:
Marks:
Grade Point:
Remark:

The criteria for awarding grade point and remark are as given in the table:

S. No.	Range of Marks	Grade Point	Remark
1	≥ 90	10	OUTSTANDING
2	$90 > \text{Marks} \geq 80$	9	VERY GOOD
3	$80 > \text{Marks} \geq 70$	8	GOOD
4	$70 > \text{Marks} \geq 60$	7	AVERAGE
5	$60 > \text{Marks} \geq 50$	6	PASS
6	$\text{Marks} < 50$	0	FAIL

5. Write a program to find the roots of a quadratic equation when the coefficients a , b and c are given (assume that a , b and c are integers)

Hint: find the discriminant $d = b^2 - 4ac$

If $d = 0$, the equation has one real repeated root (both roots are the same):

$$R1 = R2 = -b/(2a)$$

If $d > 0$, the equation has two distinct real roots.

$$R1 = (-b + \sqrt{d})/2a$$

$$R2 = (-b - \sqrt{d})/2a$$

If $d < 0$, the equation has two complex roots.

$$\text{real_part} = -b / (2 * a)$$

$$\text{imaginary_part} = \text{math.sqrt}(-\text{discriminant}) / (2 * a)$$

LAB SESSION 3:

LOOP CONTROL INSTRUCTIONS

1. Write a python script to find the squares of first n natural numbers. Display both the number and the square as shown below. Use while loop

Number	Square
1	1
2	4
...	...
n	n

2. Write a python script to find the sum of the digits of the given number using a while loop. Display the number and the sum.
3. Write a python script to print the first n terms of the Fibonacci series using while loop
4. Write a python script to print the multiplication table of a given number up to the specified limit using a for loop.
5. Write a python script to check whether all the characters present in a string are alphanumeric (uppercase letters, lowercase letters or digits) using **for**. Print **True** if all characters are alphanumeric. Otherwise print **False**.
6. Write a python script to find the number of occurrences of a particular character present in the given string using a loop. (Don't use string methods).

LAB SESSION 4 CONTAINER TYPES IN PYTHON – LIST , SET

1. Find the number of palindrome words in the given sentence without defining any new function (feel free to use python's in-built functions).
2. Create a list of int using list comprehension [multiple input from keyboard]. Find the **mean**, **median**, and **mode** of the given list (*usage of specific modules such as statistics is strictly prohibited*. Lab problems are for you to build-up logic and strengthen your understanding of the topic & its concepts).
3. Generate 2 lists (course code and course name). create a new list with both course code and name like["CS1001:Python",...]
4. Generate two sets – first for all singers and second for all dancers of the class using set comprehension. Perform set operations to generate the following sets
 - a. of all artists of the class
 - b. allrounders of the class
 - c. dancers but not singers
 - d. singers but not dancers
 - e. dancers but not singers cum singers but not dancers

LAB SESSION 5: TUPLES AND DICTIONARY

1. Generate two tuples to represent two distinct points in space. (Three dimensional geometry). Determine the Euclidian distance between the two.
2. Generate three lists using list comprehension. List of names, list of Roll nos and list of marks for Physics exam for all students of the class. Create a list of tuples using the zip function where each tuple carries individual student details. Sort the list of tuples using a sorted function by keeping Marks as the key for sorting.
3. Redo question 2 without using zip and sorted functions.
4. Enter a string. Determine the count of each letter present in the string using the concept of a dictionary.
5. Create a dictionary containing user-inputted names and marks (in percentage) for 5 students. Write a Python program that classifies these students into three categories: **"High Performers"** (marks ≥ 85), **"Average Performers"** ($60 \leq \text{marks} < 85$), and **"Low Performers"** (marks < 60). The program should print the number of students in each category along with their names. Finally, identify and display the name of the student with the highest marks.
6. Create a program that manages employee salaries in a company using a dictionary. The dictionary should contain at least 5 employees, with their names as keys and their respective salaries as values [take user input data]. Implement a sorting algorithm to arrange the employees in descending order based on their salaries without using any built-in sorting functions, and display the sorted list along with their salaries and rank (highest salary first and so on). [Hint: check the second parameter of the enumerate function].

E.g.,

1. Cummins: Rs. 5000

2. Head: Rs. 4500

3. Maxwell: Rs. 2500

4. Narine: Rs. 1100

5. Rashid: Rs. 890