

Programming Exercises

1. Write a program display "Hello World!".
2. Write a program to find sum of two numbers using command line arguments.
3. Write a program to find sum of two numbers. Use input() function to take input from the user.
4. Write a program to calculate discount on the basis of following assumption:
 - a) If purchased amount is greater than or equal to 1000, discount is 5%
5. Write a program to calculate discount on the basis of following assumption:
 - a) If purchased amount is greater than or equal to 1000, discount is 5%
 - b) If purchased amount is less than 1000, discount is 3%
6. Write a program to calculate discount on the basis of following assumption:
 - a) If purchased amount is greater than or equal to 5000, discount is 10%
 - b) If purchased amount is greater than or equal to 4000 and less than 5000, discount is 7%
 - c) If purchased amount is greater than or equal to 3000 and less than 4000, discount is 5%
 - d) If purchased amount is greater than or equal to 2000 and less than 3000, discount is 3%
 - e) If purchased amount is less than 2000, discount is 2%
7. Write a program to calculate the simple interest on the basis of following assumption:
 - a) If balance is greater than or equal to 100000, interest is 7 %
 - b) If balance is greater than or equal to 50000 and less than 100000 interest is 5 %
 - c) If balance is less than 50000, interest is 3%
8. Write a program to test whether a number entered is even or odd.
9. Admission to a professional course is subject to the following conditions:
 - a) Marks in mathematics ≥ 60
 - b) Marks in physics ≥ 50
 - c) Marks in chemistry ≥ 40
 - d) Total in all three subjects ≥ 200

Or

Total in mathematics and physics ≥ 150

Given the marks in three subjects, write a program to process the applications to list eligible candidates.

10. The rates of tax on gross salary are as shown below:

Income	Tax
Less than 10,000	Nil
Rs. 10,000 to 19,999	10%
Rs. 20,000 to 39,999	15%
Rs. 40,000 to above	20%

Write a program to compute the net salary after deducting the tax for the given information and print the same.

11. Write a program to check whether a year entered is leap or not.
12. Write a program using match-case statement to develop a simple calculator.
13. Write a program to display "MDS" 10 times.
14. Write a program to check whether a number entered is prime or not.
15. Write a program to display prime numbers up to 100.
16. Write a program to find sum of digits of a number.
17. Write a program to check whether a number is palindrome or not.

18. Write a program to check if a number is Armstrong Number or not.
19. Write a program to count number of vowels in a string.
20. Write a program to count number of alphabets, digits, and whitespaces in a string.
21. Write a program to find sum and average of 10 numbers stored in a list.
22. Write a program to find smallest and largest number among 10 numbers stored in a list.
23. Write a program to count even numbers and odd numbers stored in a list.
24. Write a program to find sum of two matrices.
25. Write a program to find product of two matrices.
26. Write a program using list comprehension to find sum of only even numbers.
27. Write a program using function with return type to find sum of two numbers.
28. Write a program using recursive function to find factorial of a number.
29. Write a program using recursive function to find n^{th} Fibonacci number.
30. Create a class Rectangle containing instance variables length and breadth. The class also contains two instance methods area() and perimeter() to find area and perimeter of rectangles respectively. Use this class to find area and perimeter of two different rectangles.
31. Create a class Circle containing an instance variable radius. The class also contains two instance methods area() and circumference() to find area and circumference of circles respectively. Use this class to find area and circumference of two different circles. Use PI as a class variable.
32. Create a class Box with instance variables width, height and depth. The class also contains instance methods volume() and surface_area() to find volume and surface area of boxes respectively. Use this class to find volume and surface area of two different boxes.
33. Create a class Time with three instance variables hours, minutes, and seconds. Add instance methods display() to display the time in hh:mm:ss format and add() to add two time objects. Use this class to add and display two different time objects.
34. Create a class Distance containing instance variables feet and inches. The class also contains instance methods add() and compare() to add and compare two distance objects respectively. Use this class to create two different distance objects and add and compare these two distance objects.
35. Create a class Student with instance variables name, roll_number, and marks in five subjects. Add three instance methods in this class to calculate total(), percentage(), and division() of the marks obtained by the students. Use this class to find total marks obtained, percentage, and division of five students.
36. Create a parent class Bonus with instance variables sales_id and sales_amount. Add get_bonus method that calculates a salesperson's bonus using the formula $bonus = sales * 0.05$. Create a child class named PremiumBonus from Bonus. The child class's get_premium_bonus() method should calculate the bonus using the formula $bonus = sales * 0.05 + (sales - 2500) * 0.01$. Now, create an object of PremiumBonus class and use this object to find both bonus and premium bonus.
37. Overload + operator in Q.N.32 to add two distance objects.
38. Write a program that reads a text file and displays the following:
 - a. Number of characters
 - b. Number of vowels
 - c. Number of consonants
 - d. Number of words
 - e. Number of lines

39. Write a program that reads a text file and writes its output in another text file. The output should contain
 - a. Number of letters
 - b. Number of digits, and
 - c. Number of other characters
40. Write a program that reads the file containing texts and counts the number of whitespaces.
41. Write a program to find sum and average of numbers stored in a file. Create a separate file to write output.
42. Write a program to find sum and average of 10 numbers stored in a numpy array.
43. Write a program to find sum of each row of a matrix stored in a numpy array.