

M3-R5: Programming and Problem Solving through Python Language

Programming and Problem Solving Through Python (M3-R5)

- i. Write a program to print all Armstrong numbers in a given range. Note: An Armstrong number is a number whose sum of cubes of digits is equal to the number itself. E.g. $370=3^3+7^3+0^3$
- ii. Write a function to obtain sum n terms of the following series for any positive integer value of X
 $X + X^3/3! + X^5/5! + X^7/7! + \dots$
- iii. Write a function to obtain sum n terms of the following series for any positive integer value of X
 $1+x/1!+x^2/2!+x^3/3!+\dots$
- iv. Write a program to multiply two numbers by repeated addition e.g.
 $6*7 = 6+6+6+6+6+6+6$
- v. Write a program to compute the wages of a daily laborer as per the following rules :-
Hours Worked Rate Applicable Upto first 8 hrs Rs100/-
 - a) For next 4 hrs Rs30/- per hr extra
 - b) For next 4 hrs Rs40/- per hr extra
 - c) For next 4 hrs Rs50/- per hr extra
 - d) For rest Rs60/- per hr extra
- vi. Accept the name of the labourer and no. of hours worked. Calculate and display the wages. The program should run for N number of labourers as specified by the user.
- vii. Write a function that takes a string as parameter and returns a string with every successive repetitive character replaced by '?' e.g. school may become scho?!.
- viii. Write a program that takes in a sentence as input and displays the number of words, number of capital letters, no. of small letters and number of special symbols.
- ix. Write a Python program that takes list of numbers as input from the user and produces a cumulative list where each element in the list at any position n is sum of all elements at positions upto n-1.
- x. Write a program which takes list of numbers as input and finds:
 - a) The largest number in the list
 - b) The smallest number in the list
 - c) Product of all the items in the list
- xi. Write a Python function that takes two lists and returns True if they have at least one common item.
- xii. Write a Python program to combine two dictionary adding values for common keys.
`d1 = {'a': 100, 'b': 200, 'c':300}`
`d2 = {'a': 300, 'b': 200, 'd':400}`
Sample output: Counter({'a': 400, 'b': 400, 'd': 400, 'c': 300})
- xiii. Write a program that takes sentence as input from the user and computes the frequency of each letter. Use a variable of dictionary type to maintain and show the frequency of each letter.
- xiv. Apply recursive call to do the following:
 - a) Product of two numbers using repetitive addition
 - b) Print Fibonacci series upto term n
- xv. Write a program to input two numbers as input and compute the greatest common divisor
- xvi. Write a function that takes two filenames f1 and f2 as input. The function should read the contents of f1 line by line and write them onto f2.
- xvii. Write a function that reads the contents of the file f3.txt and counts the number of alphabets, blank spaces, lowercase letters, number of words starting with a vowel and number of occurrences of a word "hello".
- xviii. Write a program to replace 'a' with 'b', 'b' with 'c', ..., 'z' with 'a' and similarly for 'A' with 'B', 'B' with 'C', ..., 'Z' with 'A' in a file. The other characters should remain unchanged.
- xix. Write a NumPy program to find the most frequent value in an array.
- xx. Take two NumPy arrays having two dimensions. Concatenate the arrays on axis 1.