Assignment IV

Submit all the programs separately against each assignment (i.e. asgn4a, asgn4b, and asgn4c) in the Moodle System 15 minutes before the end of the laboratory session. Provide the result in a separate output file (named, result_<assgn><no>.txt). Use standard output redirection feature to generate the output file.

Hints. If you run the program with the following command

./a.out >result.txt

Output of your program (generated by printf(.) function) will be written in file result.txt. You need to provide input from your input, by remembering the sequence of inputs to be given.

If you execute the program multiple times, you may concatenate the outputs in a single file by using the following redirection command:

./a.out >>result.txt

4(a) Write a function check_prime(.), which takes an integer x and returns 1 if it is prime else returns 0. Write a main function, which reads a number N, and returns its sum of all prime factors. Note that 1 is not considered as a prime factor.

For example, for the number 8, its sum of prime factors: 2+2+2=6.
Provide results for the following set of numbers:
37, 237, 423, 321, 2054

4(b) Write a function named SumDigit(.), which takes an integer x as input and returns its sum of digits if it is positive, otherwise it returns 0.

We define a class number of an integer by performing SumDigit(.) operations on it on succession till it gets a single digit, which is its class number.

For example, class number of 123456 is 3 as it follows:
SumDigit(123456)=21
SumDigit(21)=3
Hence, Class number of 123456 is 3.

Write a function ClassNumber(x) which computes the class number of integer x.

Write a main function, which reads two numbers and prints an appropriate message whether their class numbers are same or not.

Provide results for the following sets of inputs:
(234512, 32678)
(1112, 5054)
(-34567,0)
(28912,12892)

4(c) Write a function named test_fn(.) such that given x, and parameters a, b and c as inputs it computes the following:

$$a.x^2.sin(x)+b.x.ln(x)+c.cosh(x)$$

Write a main function which computes the definite integral of the above function (given its parameters) in the interval [m,n] (m<n) in real axis by using the following computational method.

For a function f(x), the integration of f(x) from x=m to x=n (m<n), is given by as follows:

h=(n-m)/N (for sufficiently large N).

Integral value=h(f(m)+2f(m+h)+2f(m+2h)+….+2f(m+(N-1).h)+f(n))

Provide results for the following set of inputs:

(i) a=-5, b=0, c=20, m=23, n=80

(ii) a=5, b=10, c=2, m=5, n=10

(iii) a=5, b=-10, c=4.5, m=7.8, n=20.5

N.B. All your programs may be tested for other input data.