

[G] Attempt the following:

- (a) Write a function that receives 5 integers and returns the sum, average and standard deviation of these numbers. Call this function from **main()** and print the results in **main()**.
- (b) Write a function that receives marks received by a student in 3 subjects and returns the average and percentage of these marks. Call this function from **main()** and print the results in **main()**.
- (c) A 5-digit positive integer is entered through the keyboard, write a recursive and a non-recursive function to calculate sum of digits of the 5-digit number.
- (d) A positive integer is entered through the keyboard, write a program to obtain the prime factors of the number. Modify the function suitably to obtain the prime factors recursively.
- (e) Write a recursive function to obtain the first 25 numbers of a Fibonacci sequence. In a Fibonacci sequence the sum of two successive terms gives the third term. Following are the first few terms of the Fibonacci sequence:
1 1 2 3 5 8 13 21 34 55 89...
- (f) A positive integer is entered through the keyboard, write a function to find the binary equivalent of this number :
 - (1) Without using recursion
 - (2) Using recursion

- (g) Write a recursive function to obtain the running sum of first 25 natural numbers.

- (h) Write a C function to evaluate the series

$$\sin(x) = x - (x^3 / 3!) + (x^5 / 5!) - (x^7 / 7!) + \dots$$

to five significant digits.

- (i) Given three variables **x**, **y**, **z** write a function to circularly shift their values to right. In other words if $x = 5$, $y = 8$, $z = 10$, after circular shift $y = 5$, $z = 8$, $x = 10$. Call the function with variables **a**, **b**, **c** to circularly shift values.

- (j) If the lengths of the sides of a triangle are denoted by **a**, **b**, and **c**, then area of triangle is given by

$$\text{area} = \sqrt{S(S-a)(S-b)(S-c)}$$

where, $S = (a + b + c) / 2$. Write a function to calculate the area of the triangle.

- (k) Write a function to compute the distance between two points and use it to develop another function that will compute the area of the triangle whose vertices are **A(x1, y1)**, **B(x2, y2)**, and **C(x3, y3)**. Use these functions to develop a function which returns a value 1 if the point **(x, y)** lies inside the triangle ABC, otherwise returns a value 0.

- (l) Write a function to compute the greatest common divisor given by Euclid's algorithm, exemplified for $J = 1980$, $K = 1617$ as follows:

$$1980 / 1617 = 1$$

$$1617 / 363 = 4$$

$$363 / 165 = 2$$

$$5 / 33 = 5$$

$$1980 - 1 * 1617 = 363$$

$$1617 - 4 * 363 = 165$$

$$363 - 2 * 165 = 33$$

$$165 - 5 * 33 = 0$$

Thus, the greatest common divisor is 33.