

## 8. Functions with arguments and return statements

CO3: Implement modular applications using Functions and pointers.

1. Write a C program to find ncr,  $nc_r = \frac{n!}{r!(n-r)!}$
2. Write the definition of a function that takes as input the three numbers. The function returns 1 if the first number to the power of the second number equals the third number; otherwise, it returns 0. Test this function.
3. Write a function named isLeapYear(yr) that takes an integer value representing a year, and returns a Boolean result indicating whether or not the year is a leap year. Use this function to check whether the given year is leap year or not.
4. Write a function to find the GCD of two numbers. Write a program to find the LCM of two numbers using the formula  $LCM = (n1*n2)/GCD$ , where n1 and n2 are two numbers.
5. Write a function to find the smallest of the given three numbers and use it to find the average marks of the best two test marks out of three test marks.

$$marks\ obtained = \frac{(t1 + t2 + t3) - small(t1, t2, t3)}{2}$$

6. The following formula gives the distance between two points (x1, y1) and (x2, y2) in the Cartesian plane:

$$distance = \sqrt{(x2 - x1)^2 + (y2 - y1)^2}$$

Given the center and a point on a circle, you can use this formula to find the radius of the circle. Write a program that prompts the user to enter the center and a point on the circle. The program should then output the circle's radius, diameter, circumference and area. Your program must have at least the following functions:

- a) **distance:** This function takes four numbers as its parameters that represent two points in the plane and returns the distance between them.
  - b) **radius:** This function takes as its parameters four numbers that represent the center and a point on the circle, calls the function distance to find the radius of the circle and returns the circle's radius.
  - c) **circumference:** This function takes as its parameter a number that represents the radius of the circle and returns the circle's circumference. (if r is the radius circumference is  $2*\pi*r$ )
  - d) **area:** This function takes as its parameter a number that represents the radius of the circle and returns the circle's area ( $area=\pi*r*r$ )
7. Create a method name reverseMethod(n) to reverse an integer passed to it. Create another function named isPalindrome(n) to check whether the number passed is palindrome or not. [Note: A number is a palindrome if its reversal is the same as itself]. Write a test program that prompts the user to enter an integer and reports whether the integer is a palindrome.

8. Write a function named `isPrime(n)` to check whether the given number 'n' is prime or not. Using this function print all the prime numbers in the range n1 to n2.
9. Develop a modular interactive program (*menu driven program*) using functions that reads the values of three sides of a triangle and displays either its area or its perimeter as per the request of the user. Given three sides a,b,c.

$$perimeter = a + b + c$$

$$Area = \sqrt{(s-a)(s-b)(s-c)} \text{ where } s = \frac{(a+b+c)}{2}$$

10. Develop a top down modular program(*menu driven program*) to implement a simple calculator. The program should request the user to input two numbers and display one of the following as per the desire of the user:
  - a. Sum of the numbers
  - b. Difference of the numbers
  - c. Product of the numbers
  - d. Division of the numbers

Provide separate functions for performing various tasks such as reading, calculating and displaying.