

**MCA Lab Assignment Set B**  
**Topics :-- Functions and pointers**

- 1) Write a function to take one n elements 1-D integer array and find the third maximum, the fifth minimum & the middle element of the array (in any order). Special credit will be given if you can do it without sorting the array.
- 2) Write a function named random partition() which will accept an 1-D array as input and randomly choose one of the array elements as X and partition the array into two parts where one part contains all elements less than X and another parts contain all elements greater than X. Do it without sorting the list.
- 3) Write only one function which will accept multi-sentence text as input and do the following.
  - a) Count the number of articles (a, an, the, A, An, The) and
  - b) Count the number of words whose initial characters are in uppercase letters.

Do not print anything from inside the function. Write a program to read a multi-sentence text containing more than 80 words terminated by "#" and use the function in main() to print the counts.

For example, input text: **Bengali**, or **Bangla**, is an **Indo-Aryan** language spoken predominantly in **Bangladesh** and in the **Indian** states of **West Bengal** and **Tripura** by approximately 200 million people. The language has a rich literary heritage and underwent a renaissance in the late 19th century.

- 4) Write a function to take one string then print it in the reverse order. Write a recursive and non-recursive versions both.
- 5) Write a function to read a matrix, transpose a matrix, multiply two matrices and use these functions in main() to check whether an input matrix is orthogonal or not.
- 6) Write a function to take two 2-D arrays, sort those two arrays, then merge them into a third array that will also be sorted.
- 7) Write a menu driven program, consisting of following functions (on string). For each of the following, write your own function. Use character pointers as the arguments for implementing the functions and do not use any library function. Strlen() , Strcpy(), Strcat(), Strrev(), Strcmp()
- 8) Write a recursive function for each of the following problems
  - a) to generate Fibonacci numbers.
  - b) to find the GCD of two numbers.
  - c) to generate permutations of n numbers
  - d) to find the sum of the digits of any number.
  - e) to convert from decimal to binary representation
  - f) To compute Cos series up to n terms.

- 9) Write a function to convert a decimal number to any other base given by the user..
- 10) Write a function which will accept two strings and check whether the second string is present in the first one. If it is, it returns the starting position else returns 0. Write a program which dynamically allocates memory for two strings taken from the keyboard and uses the above function for searching one string into another.
- 11) Write a program to store the country names and sort them in alphabetical order. Use an array of pointers to store the country names and pass the array to the function sort().
- 12) Write a program to create a linked list of n integers. Write a menu driven program to do the following
- a) Insert a new node
  - b) Delete a node specified by the user
  - c) Print the list
  - d) Search for an element in the list.