**Lab 1**

**Arrays, Dynamic Memory Allocation and Structures**

1. Create an array of integers. *Using pointer arithmetic*, find the sum of all elements in the array without using array indexing
2. Create a structure to represent a complex number. Write functions for adding, subtracting, and multiplying complex numbers
   1. Adding by using call by value
   2. Subtracting and Multiplying by using call by reference
3. Create a structure to represent a book (title, author, price). Dynamically allocate memory for an array of books. Take the input from the user and store the details in the array. Write a function to print the book details.
4. Write a program to perform the following:
   1. Create an array of 5 student structures, each containing name, roll number, and marks.
   2. Write functions to return the student with the highest marks by
      1. call by value
      2. Call by reference.

Write another function to print the student with the highest marks. Note: No global variables should be used.

* 1. Modify the above program so that you read the data of students from file and write the output also to a file. Add a function search in the above program that displays the details of student if the roll number of the student is given.

1. Create a structure to represent a product (name, price, quantity). Read product details from a file into an array of structures. Write the updated product details back to the file.
2. Dynamic allocate memory for a one-dimensional array that stores your input string. Write a program which implements all the given string functions
3. Finding length of a string
4. Converting characters of string into upper case
5. Concatenating two strings to form a new string
6. Appending strings
7. Comparing strings
8. Reversing a string
9. Extracting a substring from the left of a string
10. Extracting a string from the right of a string
11. Extracting a substring from the middle of a string