Programs on Pointers, Recusion, Structures, Unions & Dynamic Memory Allocation

1. Write a C program to pass array to a function and find the average of given array elements.

2. Write a C program to find the largest element in a given array by allocation memory dynamically.

3. Write a C program to print string in reverse using pointers.

4. Write a C program to append one array elements to the end of another array using DMA.

5. Raj is very good at mathematics and he is working with a series s where the next term is the sum of previous three terms. Given the first three terms of the series, a, b and c respectively, but here he simply want to output the nth term of the series using recursion.
The recursive method for calculating the nth term is given below.

$$S(n) = \begin{cases} a & n = 1, \\ b & n = 2, \\ c & n = 3, \\ S(n-1) + S(n-2) + S(n-3) & otherwise \end{cases}$$

6. Define a structure customer to specify data of customer in a bank. The data to be stored is: Account number (integer), Name (character string having at most 50 characters), and Balance in account (integer).

Assume data for all the 10 customers of the bank are stored in the structure array :
struct customer bank[10];

The function, transaction, is used to perform a customer request for withdrawal or deposit to the account. Every such request is represented by the following three quantities: Account number of the customer, request type (0 for deposit and 1 for withdrawal) and amount. The function prototype is as follows:

int transaction (int account_number, int request_type, int amount, struct customer bank[10])

The transaction function returns 0 if the transaction fails and 1 otherwise. The transaction fails only when the account balance is less than the withdrawal amount requested. The array bank (defined above) is another input to the transaction function and is suitably updated after every request. In case of a failed transaction no change is made in the bank array.

Write a main() function which populates the array bank with values for 5 customers. Also, the main() should take a withdrawal request from the user (i.e., read values for account number, amount), and call the transaction function, and thereby print if it is a valid transaction. If valid, it should print the balance after the withdrawal.

7. Write a program to implement the concept of bit fields.

8. Write a program to create a union for a student, read his name, marks and roll number. Calculate the percentage of 5 subject marks and print it.

9. Write a C program to implement structure inside a structure. [Read the values and print them]

10. Write a C program to find the Greatest Common Divisor (GCD) of two numbers using recursion.