CS 101: COMPUTER PROGRAMMING (2-1-2 : 4)

Computer Fundamentals:

- Organization of a Computer;
- Concept of Programming and Programing Languages.

Introduction to Programming:

- Concept of Algorithm, Flow Chart, Pseudocode, Illustrative Problem Solving Examples.
- Features of a Programming Language: Character Set, Identifiers, Keywords, Data Types, Variables, Declarations, Operators & Expressions; Statements: Assignment, Input/Output; Flow Control- Conditionals and Branching; Iteration; Functions, Function Types, Scope Rule; Recursion; Arrays, Pointers, Structures. (A programming language like C/C++ shall be used as a basis language. The same language is to be used for the laboratory).

1. Write a C program to print the paragraph as shown below.

   " Hello World "

   % Hello World %

   \\ Hello World \\

2. Write a C program to print the result of given arithmetic equation where a=4 , b= 5.

$$\frac{5a + ab^a}{\sqrt{a^2+9}}$$

3. Write a C program to check a given number is odd or even and positive or negative.
4. Write a C program to read three numbers and find the greatest one.
5. Write a C program to read 5 numbers and find the second smallest number.
6. Write a C program to print the following patterns:

   a)
   ```
   * * * * *
   * * * *
   * * *
   * *
   *
   ```

   b)
   ```
   *
   * *
   * * *
   * * * *
   * * * * *
   ```

   c)
   ```
   *
   * *
   * * *
   * * * *
   * * * * *
   ```

7. Write a C program to find GCD and LCM of two numbers.
8. Write a C program to swap the value of two variables with and without using a 3rd variable.
9. Write a C program to store **N** numbers in an array and find the average.
10. Write a C program to store 10 numbers in an array and find the largest and smallest.
11. Write a C program to store **N** numbers in an array. Count the total positive, negative, odd and even numbers. [0 < **N** < 11]
12. Write a C program to check whether a given number is prime or not.
13. Write a C program to print first **N** numbers of Fibonacci series.
14. Write a C program to print
    a) first **N** prime numbers.
    b) all prime number between a given range **N1**& **N2** where **N1**< **N2.**
    c) all numbers between a given range **N1**& **N2** which are not prime , where **N1**< **N2.**
15. Write a C program to implement to sort **n** numbers in ascending order.
16. Write a C program to implement searching of a **key** from **n** numbers (given in Descending order) using Binary search.
17. Write a C program to find a **key** from **n** numbers using sequential search (Linear search)

& if found, show the position.

18. Implement an algorithm to insert an element at any arbitrary position in an array of integer numbers and also implement an algorithm to display the condition of the array before and after insertion.
19. Implement an algorithm to delete an element in an array of integer numbers and also implement an algorithm to display the condition of the array before and after deletion.
20. Implement an algorithm to reverse the elements of an array of integer numbers and also implement an algorithm to display the condition of the array before and after reversal.
21. Write a C program to solve Tower of Hanoi problem for n disks.
22. Write a C program to generate **n** Fibonacci numbers using both recursive and non-recursive methods.
23. Write a C program to implement a swap function to swap the values of two variables.
24. Write a C program to store the name, roll number, marks, grades of 5 students using array of structure.
25. Write a c program to create a file, named "StudentDatabase" . Store the the name, roll number, phone number and average marks of **N** students, where **N** is a natural number between 2 to 10.

Text Books:

1. Programming in C, Balaguruswamy.
2. Fundamentals of Computers, Rajaram, V.

References:

1. Let us C, Kanetkar Y.
2. Programming in C, Gotfreid, McGrawHill
3. The Elements of Programming Style, Kerningham, B. W.
4. Techniques of Program Structures and Design, Yourdon, E.
5. Theory and Problems of Computers and Programming, Schied, F. S.
6. The C Programming Language, Kerningham & Ritchie.