CST151 - PROGRAMMING FOR PROBLEM SOLVING
Practice Problem Statements

UNIT-1	
Q1	Write a C program to find the factors of a given integer.
Q2	What is an operating system? What is its function? Give names of at least three operating systems and elaborate differences between them.
Q3	What is the purpose of the main() function? Can we have a program without main()?
Q4	What are the different types of memories which can be connected to a desktop computer ? Describe the features and use of each.
Q5	Write an algorithm to generate prime numbers between 1- and ’n'. Also, construct flowchart.
Q6	Classify C operators based on their utility (action) and number of operands required.
Q7	Write a program to calculate Area of Sphere along with Algorithm and Flowchart
Q8	Write a program to print Data Types in C along with Algorithm and Flowchart
Q9	Write a program to display Name, Roll No., Gender, Address and Percentage of Previous Examination along with Algorithm and Flowchart.
Q10	Write a C Program to print squares of all numbers 1 to 20 and print sum squares.

UNIT-2	
Q1	Write a C program to find whether an entered number is palindrome or not using recursion.
Q2	Write a progarm to compute transpose of a m x n matrix. The transpose of a matrix is obtained by exchanging the elements of each row with the elements of the corresponding column.
Q3	Write a C program to find whether an entered number is palindrome or not using recursion.
Q4	Write a user defined function to convert all the upper case letters to lowercase and lower case letters to upper case in a given string. Write appropriate main ( ) to demonstrate the use of the function above defined.
Q5	WAP to print the following pattern [CO1] E D C B A D C B A C B A B A A
Q6	Write Program to print all Strong number between 1 to 99999. (Note: If the sum of factorial of the digits in any number is equal the given number then the number is called as STRONG number.
Q7	Write Program to print all Perfect number between 1 to 99999(Note: A number is a perfect number if is equal to sum of its proper divisors ex. Divisors of 6 are 1, 2 and 3. Sum of divisors is 6.)
Q8	Write a program to perform arithmetic operations such as '+', '-', '*', '/', '%' on values entered by user.
Q9	Write a program to perform various bitwise operations on two no.s entered by the user.
Q10	Write a program to enter two no.s (say 8 and 10) and evaluate the expression: n1+=n2 * 4 – 7

<table>
<tr><td>Q11</td><td>Write a program to enter a year and to check if the year is a leap year or not. (using if else, nested if else, else if ladder)</td></tr>
<tr><td>Q12</td><td>Write a program to find the roots of quadratic equations.</td></tr>
<tr><td>Q13</td><td>Write a program to print all the uppercase and lowercase letters by using for loop, while loop and do while loop.</td></tr>
<tr><td>Q14</td><td>Write a program to find the average marks of the subject by using goto statement without using for, while and do while loop.</td></tr>
<tr><td>Q15</td><td>Write a program to print following pattern
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<tr><td>Q16</td><td>Write a program to print following pattern
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<tr><td>Q17</td><td>Write a program in C to calculate and print the Electricity bill of a given customer. The customer id., name and unit consumed by the user should be taken from the keyboard and display the total amount to pay to the customer. The charge are as follow :
<table><tr><th>Unit</th><th>Charge/unit</th></tr><tr><td>upto 199</td><td>@1.20</td></tr><tr><td>200 and above but less than 400</td><td>@1.50</td></tr><tr><td>400 and above but less than 600</td><td>@1.80</td></tr><tr><td>600 and above</td><td>@2.00</td></tr></table>If bill exceeds Rs. 400 then a surcharge of 15% will be charged and the minimum bill should be of Rs. 100/-.</td></tr>
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Q18	Write a C program to find the commission on a salesman's total sales. The commission on a salesman's total sales is as follows: a) If sales <100, then there is no commission. b) If 100>=sales <=500, then commission = 10% of sales. c) If sales > 500, then commission = 100+8% of sales above 500. Display details of salesman .
Q19	WAP to print the following pattern A B B C D C D E E D
Q20	Write a 'C' program to take as input 3 floating point numbers. The program then outputs the number with largest magnitude (Largest magnitude number is the largest number obtained after ignoring the sign).
Q21	Write a program to print all prime factors of an input number n (> 0) with repetitions. Sample input and output: Input: 16 Output: 2, 2, 2, 2, Input: 36 Output: 2, 2, 3, 3, Input: 500 Output: 2, 2, 5, 5, 5, Input: 7 Output: 7

Q22	Write a program, which takes a positive integer as input, and prints which powers of 2 does the number lie between. For example, the number 269 lies between 28 (256) and 29 (512). If the input is 269, the output should be 8 9. Borderline cases which are powers of 2, such as 256, should be aligned to the lower limit of the desired range output, i.e. 28 (256). You should not use math functions such as pow.
Q23	Given as input n and m, print the number of digits that are common in n and m. For example, if m =123 and n = 133, then output = 2.
Q24	Write a C program to print the following pattern: * *A* *B*B* *C*C*C* *D*D*D*D* *E*E*E*E*E*E ... till n lines where n is the input and it can’t be more than 27.

UNIT-3	
Q1	Write a program that fills a 5 by 5 matrix (2D array) as follows :— upper triangle with 1 ; diagonal with 0 ; lower triangle with 2.
Q2	Write a C program to compute the addition of all the elements of an array using call by reference.
Q3	Write a C program to multiply a matrix of size m x n with a vector of size n x 1.
Q4	Write a progarm to compute transpose of a m x n matrix. The transpose of a matrix is obtained by exchanging the elements of each row with the elements of the corresponding column.
Q5	Write a program that fills a 5 by 5 matrix (2D array) as follows :— upper triangle with 1 ; diagonal with 0 ; lower triangle with 2.
Q6	Write a C Program using Insertion Sort and Selection Sort. Create a vector(1-D Array) storing N integers in ascending or descending sequence. The User will choose the order before proceeding for sorting.
Q7	Write a function in C which computes the difference between the largest and smallest element in an array of n integers using pointers.
Q8	Write Program to print all Strong numbers between 1 to 99999. (Note: If the sum of factorial of the digits in any number is equal to the given number then the number is called a STRONG number. Ex=1! +4! +5!= 1+24+120 = 145
Q9	Write a program to check if the entered number is Neon Number or not. (Not:- A neon number is a number where the sum of digits of the square of the number is equal to the number. Ex Input : 9 Output : Neon Number Explanation: square is 9*9 = 81 and the sum of the digits of the square is 9.
Q10	Write a program to take 10 elements in an array and replace all even numbers to 1 and all odd numbers to 0.
Q11	Write a C Program to print transpose of matrix.

UNIT-4	
Q1	Write a recursive function to obtain the sum of the first n numbers of a Fibonacci sequence. In a Fibonacci sequence the sum of two successive terms gives the third term.
Q2	Write a C program to compute the addition of all the elements of an array using call by reference.
Q3	A 5 digit positive integer is entered through the keyboard. Write a program to calculate the sum of digits of the 5 - digit number using recursion.
Q4	Can an array be used as an argument to a function ? If yes, explain with examples.
Q5	Write a C program to compute the addition of all the elements of an array using call by reference.
Q6	Write a Program to perform Binary Search by writing a user defined function to check if an element is present in an array or not.
Q7	Write a Program to perform Linear Search by writing a user defined function to check if an element is present in an array or not.
Q8	Write a C program to find diameter, circumference and area of circle using function
Q9	Write a C program to find GCD (HCF) of two numbers using recursion.
Q10	Write a C program to find maximum and minimum elements in an array using recursion.
Q11	Write a program in C to find the first capital letter in a string using recursion
Q12	Enter your car number (only number part) , then enter day number starting from 1 to 7 (day number of the week). Your program should say you should go out in your car or not. All even day numbers are mean for cars with even numbers and odd car numbers are for odd day numbers.
Q13	Ask user to enter three numbers then pass the value to a function. Add three numbers inside the function and return the result to main function. Inside main function display the result by adding 10 to it.
Q14	Find the solutions by using recursive functions User input one positive integer n, Create a function to find sum of all numbers upto n. Sum = n+(n-1)+(n-2)… +2+1+0
Q15	Find the solutions by using recursive function Find out lowest common factor (LCF) or greatest common factor of two input numbers.

UNIT-5	
Q1	Create a structure to specify data on students given below : Roll number. Name, Department, Course and Year of joining. Assume that there are not more than 450 students in the college.
Q2	Write a function to print names of all students who joined in a particular year.
Q3	Write a function to print the data of a student whose roll number is given.
Q4	A record contains the name of a cricketer, his age, number of test matches that he has played and the average runs that he has scored in each test match. Create an array of structures to hold records of 20 such cricketers and then write a program to read these records and arrange them in ascending order by average runs.
Q5	Define a structure type, struct employee that would contain emp_id, emp_name, address and salary. Using this structure, write a program to read information of 100 employees and print the number of employees having salaries greater than 4000.
Q6	Define a structure "student" that would contain rollno, name, marks of three subjects and percentage. Using this structure, write a program to read information of 80 students for rollno, name, and marks of 3 subjects and calculate their equivalent percentage and print the same.
Q7	Write a Program (Using Structure) to create a File named CRICK_FL which will store information of 10 Cricketers. Each cricketer record is comprised as cricketer name, age, test match played, runs in test match, ODI match Played, runs in ODI . Read the CRICK_FL file display the content in it.
Q8	Write a program to calculate and print student wise total for 50 students and 3 subjects using structures. The structure should contain 3 subjects and total. Display the details of students who have a highest total.
Q9	Write a structure to store the name, account number and balance of customers (more than 10) and store their information. 1 - write a function to print the names of all the customers having balance less than $200. 2 - write a function to add $100 in the balance of all the customers having more than $1000 in their balance and then print the incremented value of their balance.
Q10	Write a program to input elements in an array and sort array using pointers array in ascending or descending order using function pointers.

UNIT-6	
Q1	Write a program in C to count a number of lines and characters and tabs or blanks in a file.
Q2	Write a program in C to merge two files and write it in a new file.
Q3	Write a program in C to create a file and write data into file.
Q4	Write a program in C to copy the contents of one file into another file, character by character.
Q5	Write a c program to convert the case of alphabets in a text file. Uppercase letters should be converted to lowercase and vice-versa.
Q6	Write a C program to read data from two files and write the data to a third file.
Q7	Mention the difference between : 1) fwrite and fprintf
Q8	Write a C program to read numbers from a file and write even, odd and prime numbers to separate file.
Q9	Explain the following file function with example: **(i) fopen( )** **(ii) fclose( )** **(iii) feof( )** **(iv) fseek( )**
Q10	On the basis of the given scenario create a file Expenses.txt, Open the file and copy into another Expenses2.txt, Also show output on screen A college has announced the total budget of 50,000Rs.for each game. Games are done four times in a year. Take expenses as an input from user. Calculate the average expenses for a game: If the expenses greater than 80% show as" Very Expensive". If the expenses are greater than 60% and less than 80% than show "Expensive " If the expenses are greater than 50% and less than 60% than show "Less Expensive " If the expenses are greater than 40% and less than 50% than show "Mot Costly". If the expenses are less than 40% than show "Best".