Write the Example, Analysis, Code and Processing for the following questions. (Solve using user defined function)

ARRAY QUESTION SET

1. Enter n elements and display the first and last element of that array
2. Read 10 elements and display the sum and average of all elements of that array
3. Input n elements of an array and count even and odd numbers in that array
4. **Find the maximum and minimum element of an array with n elements**
5. Read n elements and double each element which is even. Display the final updated array.
6. In an array of n data, change every negative number to zero. And display the final changed array.
7. **Reverse the position of elements in an array of n elements**
8. **Sort the given array elements in ascending order**
9. Read n elements in an array. Calculate the sum of digits for each element. And display the final array. Example: {923, 435, 291, 231, 738} ➔ {14, 12, 12, 6, 18};
10. Count the number of prime numbers in an array list with n data
11. Remove the desired element for the array list. Ask user a position of the data to be removed and display the final truncated array
12. Remove the duplicate elements from the list of an array with n elements
13. Insert three elements at the end of the n element array
14. Insert five elements at the middle of an array list
15. **Insert m number of elements in the position defined by the user in an array list**
16. Delete m number of elements from the position defined by user of an array with n elements.
17. **Determine the high frequency element and its count in an array list**
18. Read 3 x 3 matrices and add all elements.
19. Read n x n matrices and calculate the sum of diagonal elements
20. Enter m x n matrix and determine the sum of each row and display the result
21. **Determine the largest of each row in a matrix.**
22. Sort elements of each row of a two-dimensional array
23. Find the smallest and largest element of a two-dimensional array
24. **Read n x n matrix. Count even and odd elements in that matrix**
25. Input n x n matrices and change all odd elements to zero. And display the final matrix.
26. **Check if the given matrix is identity or not**
27. **Check if the given square matrix is symmetric or not**
28. **Determine the transpose of the given matrix**
29. **Read two n x n matrices and calculate the sum of corresponding elements and display the resulting matrix**
30. **Input two matrices of order m x n and p x q. Multiply the matrices and display the result**
31. Determine the determinant of a 3 x 3 matrix

STRING QUESTION SETS

1. Check whether a string contains alphabet or not.
2. Check whether a line of text contains uppercase character or not.
3. Input a string and count number of spaces in that string
4. **Enter a text and calculate the number of words in that text.**
5. Read a line of text and display the count of alphabets and digits in that string.

6. Read a text from user and display the count of vowels and consonants in that string.

7. In a given line of text, convert all alphabets into uppercase characters.

8. In a string, convert lowercase characters into uppercase characters and vice versa.

9. Read two strings from user and display that string whose length is more.

10. Read two strings from user. And display that string whose number of consonants is more.

11. Check whether the characters in two strings are same or not.

12. Check whether the given string is palindrome or not.

13. Enter a string from user, copy only the vowels into another string, and display both strings.

14. Read a text from user. And remove all digits from that string. And display the final string.

15. Remove that character which is given by user from a line of text.

16. Read two strings and combine them into one.

17. Insert a character into a string at the position given by user.

18. Input a line of text, and determine the maximum repeating character in that string.

19. Sort the characters of a string alphabetically.

20. Read n names from user. Display those names whose name starts from vowel.

21. Read 10 names. Display the names in alphabetical order.

22. Enter names until user wants to. Count the number of names whose starting character is 'A'.

STRUCTURE QUESTION SETS

1. Create a structure for a complex number. Read a complex number and calculate its magnitude

2. Create a structure time with members: hour, min and second. Read a time and convert into equivalent seconds.

3. Create a structure for a height with member, inch and feet. Read height of a student. Convert into equivalent inches.

4. Create a structure memory with member: bits and bytes. Input a memory and convert into equivalent bytes.

5. Create a structure rectangle with members: length and breadth. Determine area and perimeter of a rectangle.

6. Calculate sum of two complex numbers.	11. Calculate difference of two complex numbers.
7. Calculate sum of two heights.	12. Calculate difference in height of two students.
8. Calculate sum of two time periods	13. Calculate difference of two time periods
9. Calculate sum of two memory	14. Read a date in BS. Convert it into equivalent AD.
10. Calculate multiplication of two complex numbers	15. Subtract one memory from another

16. Read two complex numbers and display that complex number whose magnitude is greater.

17. Create structure employee with member name, post and salary. Read record of two employees and display that record whose salary is higher.

18. Read records of 50 students. Create a structure student with member name, address and roll. Display the record of nth student where n is given by user.

19. Read records of n goalkeepers. Create a structure keeper with member name, club and clean sheets. Display the record of goalkeeper who has highest number of clean sheets.

20. Create a structure player with member name, match played and goal scored. Read records until user wants to continue to enter records. And display the record of highest goal scorer and lowest goal scorer.

21. Create a structure student with member name, age and roll. Read records of n students and display those records whose name starts with 'A'.

22. Create a structure book with member name, price and author. Read records of n books and display those records whose author name is "WILEY".

23. Read records of 24 goalkeepers. Create a structure keeper with member name and match played. Display those records of goalkeeper who name starts from vowel.

24. Create structure employee with member name and salary. Read records of maximum 100 employees and display those records whose salary is greater than 50000.

25. Create structure employee with member name, post and salary. Read records of 10 employees and display the records in alphabetical order.

26. Create a structure defender with member name, match played and number of red cards. Read records until user wants to continue. Sort and display the records based on number of red cards.

27. Create a structure circle with members: radius, area and circumference. Calculate area and circumference of 10 circles. Display the result in tabular form. (SN   Radius   Area   Circumference)

28. Create structure student with member name, roll, marks of three subjects, total and average marks. Read records of students until user says yes to continue. Display all records in tabular form.

29. Create a structure product with members name, rate, quantity, total price. Read records of n products, calculate the total price of each product. Add 13% VAT and 10% Delivery charge for each product. Display result in tabular form.

30. Show the concept of nested structure. Read record for 48 students (name, address and date of birth). Display all records.

31. Create a structure player with member name, match played and goal scoring time. Read records of n players. Display the record of those players who scored in first half (45min, 00sec) of the match. Demonstrate concept of nested structure.

32. Use the concept of nested structure. Read record of n employee (name, post and date of birth). Display those records whose month of birth is on March.

FILE QUESTION SET

1. Read characters from a file demo.txt and calculate the number of digits in that file.

2. Open a text file and count the number of vowels in that file. And display the count.

3. Copy the content of one text file into another. OR Copy all characters of one file into another.

4. Read characters from a file and copy only alphabets into another file.

5. Read characters from user until user enters newline. Write all lowercase characters into lower.txt

6. Enter a line of text and write all vowels into vowel.txt and consonants into consonant.txt.

7. Read characters from user until user enters newline. Write all characters into a file test.txt. Again, read the content of that file and write all uppercase characters into upper.txt and lower case characters into lower.txt.

8. Read characters from user until user enters newline. Write all characters into a file demo.txt. Again, read the content of that file, convert all alphabets into upper case characters and write into upper.txt.

9. A text file contains list of integer numbers. Read the numbers from that file and display the count of single digit numbers

10. Read a text file with 100 integers. Display all numbers which are divisible by 3 but not by 5.

11. Read numbers from a file number.txt. Sort then in ascending order. Write them into another file sort.txt.

12. Read a string from user. And calculate the count of digits, alphabets and spaces. Write the counts into a file count.txt.

13. Read numbers from user until user wants to. And write even numbers into even.txt and odd numbers into odd.txt.

14. Read 100 numbers from user. Write all positive numbers into positive.txt and display the count of negative numbers.

15. Read n numbers from user. Write them into a file number.txt. Read the numbers from that file and transfer all even numbers into even.txt.

16. Read records of 10 students. Write all records into a file. Create a structure student with members: name, age and roll.

17. Read records of n employees. Write those records who earn greater than 25000 into high.dat and others into low.dat.

18. Read records of players until user want to. Sort the records alphabetically and write the records into sorted.dat.

19. There are records of book in a binary file record.dat. Read all the records from that file and display those records whose book name starts with 'C'. Create structure with appropriate members.

20. A binary file record.dat contains records of 48 students. Read the records from that file and display all records. Also write all records into another file albert.dat whose name is "Albert".

21. Read records of students from a binary file. Display the records alphabetically. Create a structure with members name and age.

22. Read n records of goalkeepers. Write all records into record.dat. Again, open that file and read the content of file. Display the record of highest match playing goalkeeper. Create structure keeper with members: name, match played, clean sheets.

23. Create a structure player with members: name, age and goal scored. Read records of as many players as user wants to. Write all records into a file player.dat. From same file, read the content and sort records alphabetically. Write sorted data into sort.dat

24. Create a structure with members: name, age and roll. Read records of 20 students and write those records into student.dat. Read the records from that file and write all even aged students into even.dat and all odd aged students into odd.dat.

25. Create a structure player with members: name, match played and goal scored. Read records of as many players as user wants to. Write records into record.dat. Read record from that binary file and write records into professional.txt if goal scored is greater than 25 else write records into beginner.txt

26. Create a structure with members: name, age. Read records of n students and write those records into student.dat. Read the records from that file and sort the record based on age. And write the sorted data into text file: sort.txt.

LAB REPORT

For each problem, write appropriate example, analysis, requirements, flowchart, algorithm, code,

Operation of loop, and output

1. Determine factorial of a long integer.
2. Check whether the given number is Prime or not.
3. Determine the HCF and LCM of three numbers.
4. Read an integer value and check whether it is Armstrong or not.
5. Enter a binary number (base 2) and convert it into equivalent decimal number (base 10).
6. Ask numbers from user until user wants to. And determine the average of all positive numbers. Give user (y/n) option to read numbers.

7. List all palindrome numbers between the range (lower and upper limit) given by user.
8. Read a long integer from user. And Calculate sum of digits until final sum is single digit.
9. Read n numbers from user. Determine count of all triangular number entered by user.
10. Calculate sum of cubes of odd digits of a given integer value. Also, calculate the sum of factors of determined sum.

Evaluation from submission of report carries **10 marks** of Lab

CONTROL STATEMENTS – THEORY QUESTIONS

- Define selective and repetitive structures with example.
- Compare switch case with else if ladder structure.
- Explain the role of break statement in switch case.
- Differentiate between while loop and do while loop.
- When can we use for loop? And how it differs from while loop?
- Explain briefly about break and continue statement with example
- What are nested loops? When are they used?
- What conditions will cause a loop to run infinite times? Explain with examples
- Write syntax, flow diagram and example of simple if, if else, else if ladder, nested if, for loop, while loop, do while loop and nested loop.

Practice some more programs

- Check whether a number is triangular number or not.
- Read 10 ages of students from user. Determine and display the age of the youngest and oldest student.
- Read n characters from user, and count the number of uppercase characters, lowercase characters, digits and other characters entered by the user
- Display terms of Fibonacci series until the final term is less 60.
- Evaluate the following series
  - $F(x) = x/1! + x^2/2! + x^3/3! + x^4/4!....$ till the term is greater than 0.001
- List all the prime numbers between the range (lower and upper limit) given by user.
- Read numbers until user wants to stop. And count the number of palindrome numbers entered by user.