SCHOOL OF ENGINEERING & TECHNOLOGY

BACHELOR OF TECHNOLOGY

DATA STRUCTURE

3RD SEMESTER

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

# Laboratory Manual

# TABLE OF CONTENT

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| | *The Binary value is : 1000001*<br><br>7. Write a program in C to check armstrong and perfect numbers using the function.<br>*Test Data :*<br>*Input any number: 371*<br>*Expected Output :*<br><br>*The 371 is an Armstrong number.*<br>*The 371 is not a Perfect number.*<br>8. Write a program in C to get the largest element of an array using the function.<br>*Test Data :*<br>*Input the number of elements to be stored in the array :5*<br>*Input 5 elements in the array :*<br>*element - 0 : 1*<br>*element - 1 : 2*<br>*element - 2 : 3*<br>*element - 3 : 4*<br>*element - 4 : 5*<br>*Expected Output :*<br><br>*The largest element in the array is : 5*<br><br>9. Write a program in C to print all perfect numbers in given range using the function.<br>*Test Data :*<br>*Input lowest search limit of perfect numbers : 1*<br>*Input lowest search limit of perfect numbers : 100*<br>*Expected Output :*<br><br>*The perfect numbers between 1 to 100 are :*<br>*6 28* | | |
| 2 | **Write Program based on Array**<br><br>1. Write a program in C to read n number of values in an array and display it in reverse order.<br><br>*Input the number of elements to store in the array :3*<br>*Input 3 number of elements in the array :*<br>*element - 0 : 2*<br>*element - 1 : 5*<br>*element - 2 : 7*<br>*Expected Output :*<br>*The values store into the array are :*<br>*2 5 7*<br>*The values store into the array in reverse are :*<br>*7 5 2* | | |

2. Write a program in C to count a total number of duplicate elements in an array.

*Test Data :*
*Input the number of elements to be stored in the array :3*
*Input 3 elements in the array :*
*element - 0 : 5*
*element - 1 : 1*
*element - 2 : 1*
*Expected Output :*
*Total number of duplicate elements found in the array is : 1*

3. Write a program in C to separate odd and even integers in separate arrays.

*Test Data :*
*Input the number of elements to be stored in the array :5*
*Input 5 elements in the array :*
*element - 0 : 25*
*element - 1 : 47*
*element - 2 : 42*
*element - 3 : 56*
*element - 4 : 32*
*Expected Output :*
*The Even elements are :*
*42 56 32*
*The Odd elements are :*
*25 47*

4. Write a program in C to count the frequency of each element of an array.

*Test Data :*
*Input the number of elements to be stored in the array :3*
*Input 3 elements in the array :*
*element - 0 : 25*
*element - 1 : 12*
*element - 2 : 43*
*Expected Output :*
*The frequency of all elements of an array :*
*25 occurs 1 times*
*12 occurs 1 times*
*43 occurs 1 times*

5. Write a program in C to sort elements of array in ascending order.

*Test Data :*
*Input the size of array : 5*
*Input 5 elements in the array :*
*element - 0 : 2*
*element - 1 : 7*
*element - 2 : 4*

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| | *element - 3 : 5*<br>*element - 4 : 9*<br>*Expected Output :*<br>*Elements of array in sorted ascending order:*<br>*2 4 5 7 9*<br><br>6. Write a program in C to find the second largest element in an array.<br><br>*Test Data :*<br>*Input the size of array : 5*<br>*Input 5 elements in the array :*<br>*element - 0 : 2*<br>*element - 1 : 9*<br>*element - 2 : 1*<br>*element - 3 : 4*<br>*element - 4 : 6*<br>*Expected Output :*<br>*The Second largest element in the array is : 6* | | |
| 3 | **Write Programs based on Functions and Pointers**<br><br>1. Write a program in C to add two numbers using pointers.<br>2. Write a program in C to store n elements in an array and print the elements using pointer.<br>3. Write a program in C to swap two numbers using pointers.<br>4. Write a program in C to sort an array using Pointer.<br>5. Write a program in C to compute the sum of all elements in an array using pointers.<br>6. Write a program in C to print the elements of an array in reverse order. | | |
| 4 | **Write Programs based on Recursion**<br><br>1. Write a program in C to Print Fibonacci Series using recursion.<br>*Test Data :*<br>*Input number of terms for the Series (< 20) : 10*<br>*Expected Output:*<br><br>*Input number of terms for the Series (< 20) : 10*<br>*The Series are :*<br>*1 1 2 3 5 8 13 21 34 55*<br>2. Write a program in C to count the digits of a given number using recursion.<br>*Test Data :*<br>*Input a number : 50*<br>*Expected Output :*<br><br>*The number of digits in the number is : 2* | | |

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| | 3. Write a program in C to find GCD of two numbers using recursion.<br>*Test Data :*<br>*Input 1st number: 10*<br>*Input 2nd number: 50*<br>*Expected Output :*<br><br>*The GCD of 10 and 50 is: 10*<br>4. Write a program in C to find the Factorial of a number using recursion.<br>*Test Data :*<br>*Input a number : 5*<br>*Expected Output:*<br><br>*The Factorial of 5 is : 120*<br>5. Write a program in C to calculate the power of any number using recursion.<br>*Test Data :*<br>*Input the base value : 2*<br>*Input the value of power : 6*<br>*Expected Output :*<br><br>*The value of 2 to the power of 6 is : 64* | | |
| 5 | **Write Programs based on String**<br><br>1. Write a program in C to print individual characters of string in reverse order.<br>2. Write a program in C to count the total number of words in a string<br>3. Write a program in C to compare two strings without using string library functions<br>4. Write a program in C to count total number of alphabets, digits and special characters in a string<br>5. Write a program in C to copy one string to another string<br>6. Write a program in C to count total number of vowel or consonant in a string. | | |
| 6 | **Write Programs based on Structures & Union**<br><br>1. Write a C program to create a structure of Book Detail and display the details of the book in appropriate format by passing structure as function argument.<br><br>2. Create a Union called library to hold accession number, title of the book, author name, price of the book and flag indicating whether the book is issued or not. (flag = 1 if the book is issued, flag = 0 otherwise). Write a program to enter data of one book and display the data | | |
| 7 | **Write Programs based on File Handling in C**<br><br>1. Write a program in C to read an existing file.<br>2. Write a program in C to Find the Number of Lines in a Text File.<br>3. Write a program in C to count a number of words and characters in a file. | | |

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| | 4. Write a program in C to copy a file in another file name.<br>5. Write a program in C to merge two files and write it in a new file. | | |
| 8 | **Write Menu Driven Program**<br><br>1. Design, Develop and Implement a menu driven Program in C for the following array operation.<br>• Creating an array of N Integer Elements<br>• Display of array Elements with Suitable Headings<br>• Inserting an Element (ELEM) at a given valid Position (POS)<br>• Deleting an Element at a given valid Position (POS)<br>• Exit.<br>Support the program with functions for each of the above operations.<br><br>2. Write a menu-driven program to perform following Matrix operations (2-D array implementation):<br>• Sum<br>• Difference<br>• Product<br>• Transpose | | |
| 9 | **Write Linked List Programs**<br><br>1. Write a program in C to create and display Singly Linked List.<br>2. Write a program in C to create a singly linked list of n nodes and display it in reverse order.<br>3. Write a program in C to create a singly linked list of n nodes and count the number of nodes.<br>4. Write a menu driven program to implement various operations of Singly Linked List<br>5. Write a program in C to create a doubly linked list and display in reverse order<br>6. Write a program in C to create and display a circular linked list.<br>7. Write a program in C to insert a node at the end of a circular linked list. | | |
| 10 | **Write Stack and Queue Programs**<br><br>1. Write menu driven program to implement various operations of Stack<br>2. write menu driven program to implement various operations of Queue<br>3. write menu driven program to implement various operations of Circular Queue | | |
| 11 | **Write programs on Searching and Sorting Algorithm** | | |

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| | 1. Write program to implement Bubble Sort<br>2. Write program to implement Selection Sort<br>3. Write program to implement Insertion Sort<br>4. Write program to implement Quick Sort<br>5. Write program to implement Merge Sort<br>6. Write program to implement Linear Search<br>7. Write program to implement Binary Search | | |
| 12 | **Write programs on Tree and Graph**<br>1. Write program to implement Binary Search Tree and its Traversals (Preorder, Inorder, Postorder)<br>2. Program to implement Shortest Path Algorithm: Dijkstra's Algorithm<br>3. Program to implement Minimum Spanning Trees: Kruskal's and Prim's Algorithm | | |