School of Computer Engineering
KIIT deemed to be University
Laboratory Lesson Plan – Autumn'2024 (2nd Semester)

Discipline: Computer Science and Engineering

Course name and Code: PROGRAMMING LABORATORY (CS13001)

(L-T-P-Cr: 0-2-4-4)

Instructor Name: **Prof.**

Instructor Chamber:

Technical Assistants Names:

Course Contents: Week-wise lesson plan

Sr #	Details	Week#
1	Fundamentals of computer, Number systems and basic Linux commands.	1
2	Practice and write programs on simple input and output operations.	2
3	Practice and write programs on Operators and Expressions.	2
4	Practice and write programs on branching statements (if-else).	3
5	Practice and write programs on looping (control) statements.	4, 5
6	Practice and write programs on Arrays.	6,7
7	*Mid Sem Exam (26th Feb - 2nd March)*	8
8	Practice and write programs on Functions	9, 10
9	Practice and write programs on Character Array	11
10	Practice and write programs on Pointers	12, 13
11	Practice and write programs on Structures and Unions	13, 14
12	Practice simple programs on file handling	15
13	*Sessional Exam (19th to 26th April)*	

List of Experiments (Day wise):

Introduction To Programming, Linux Commands

Week1- Day 1, Day2

	Introduction to computer fundamentals, memory
	Flow chart, algorithm
	Number system representation (Binary-decimal) and numerical
	Linux commands ● man ● ls ● pwd ● cd ● mkdir ● cp ● mv ● rm ● rmdir ● whereis
	Hello World program

Operators & Expressions, Simple Input & Output Statements

Week2 - Day 3, Day4

Day 03: Lab Assignments

Day 03 : Home

Q#	Experiment Details	Input	Output
1.	WAP to perform the addition of two integers and display the result. Input must be given by user.	Enter 1st number:12 Enter 2nd number:13	Sum is 25.
2.	WAP to find Fahrenheit for a given centigrade temperature.	Enter the temperature in Centigrade: 30	The Fahrenheit temperature is: 86
3.	WAP to calculate area of a circle while taking radius as user input.	Enter the radius of the circle: 11	The area is: 380.12
4	WAP to calculate area of a triangle who's base and height are user input.	Enter the height of the triangle: 12 Enter the base of the triangle: 10	The area of th triangle is: 60.
5	Write a C program to perform swapping of two integers using a third variable.	Enter num1: 10 Enter num2: 20	Before Swapping num1=10, num2=20 After Swapping num1=20, num2=10

Assignments

Q#	Experiment Details	Input	Output
1.	Write a C program to perform swapping of two integers without using a third variable.	Enter num1: 10 Enter num2: 20	Before Swapping num1=10 num2=20 After Swapping num1=20 num2=10
2.	WAP to find the average mark of 5 subjects of a student and find the percentage. Assume full mark of each subject is 200. All the input must be given by user.	Enter the number of 1st subject: 160 Enter the number of 2nd subject: 170 Enter the number of 3rd subject: 165 Enter the number of 4th subject: 180 Enter the number of 5th subject: 185	The average is: 172. The percentage is: 86%
3	WAP to convert given	Enter the amount:550	550 paisa = 5 Rupee ar

	paisa into its equivalent rupee and paisa as per the following format.	paisa.	50 paisa

Day 04:

Lab Assignments

Q#	Experiment Details	Input	Output
1.	WAP to convert given second into its equivalent hour, minute and second as per the following format.	Enter the time:7560 second.	7560 second = 2 Hour, 27 Minute and 40 Second
2.	WAP to convert a distance in meter entered through keyboard into its equivalent kilometer and meter as per the following format.	Enter the distance: 2430 meter.	2430 meter = 2 Km and 430 meters.
3.	WAP to find the sum of 1st and last of a six-digit number. Number must be a user input.	Enter the number: 234459	Sum of digits is: 11.
4.	WAP to find the sum of all digits of a three-digit number. Number must be a user input.	Enter the number: 354	Sum of digits is: 12.
5.	The buying price, the marker price and discount are entered through keyboard. Sometimes seller gets profit or sometimes loss depending upon the discount. WAP to determine whether the seller has made profit or incurred loss. Also determine how much profit he made or loss he incurred.	**Set 1:** Enter the buying price: 80 Enter the marker price: 100. Enter the discount: 25% **Set 2:** Enter the buying price: 80 Enter the marker price: 100. Enter the discount: 10%	**Set 1:** Seller made a loss of 6.25%. **Set 2:** Seller made a profit of 12.50%.

Day 04: Home Assignments (Practice Problems)

Q#	Experiment Details	Input	Output
1.	WAP to reverse a three-digit number. Number must be a user input.	Enter the number: 376.	Sum of digits is: 673.
2.	WAP to swap the contents of two variables by using a single statement for swap.	Enter num1: 10 Enter num2: 20	Before Swapping num1=10, num2=20 After Swapping num1=20,

			num2=10
3.	WAP to add two times in hour, minute & second format entered through the keyboard in the format hh:mm:ss	Enter two times: 11:45:34 and 09:28:41 [Input must be taken in such a way so that sum should not exceed 24 hours]	Output time is 21:14:15

Branching Statements: if...else, switch...case

Week 3 - Day 5,6

Lab Assignments

Q#	Experiment Details	Input	Output
1	WAP to find the largest between two numbers.	Enter two numbers: 80 990	The largest number is 990
2	WAP to read an alphabet from the user and convert it into uppercase if the entered alphabet is in lowercase, otherwise display an appropriate message.	Set 1 Enter an alphabet: k Set 2 Enter an alphabet: M	Set 1 The upper case of the entered letter is 'K' Set 2 You have entered 'M' which is already in upper case
3	WAP to read a character from the user and test whether it is a vowel or consonant or not an alphabet.	Set 1: Enter an alphabet: B Set 2: Enter an alphabet: %	Set 1: The entered character B is a consonant Set 2: The entered character % is not an alphabet
4	WAP to determine whether a year entered through the keyboard is a leap year or not.	Set 1: Enter the year:2005 Set 2: Enter the year:1996	Set 1: 2005 is not a leap year. Set 2: 1996 is a leap year.
5	WAP to find the roots of a quadratic equation ax2+bx+c=0 using if-else statement.	**Set 1** Input values for a, b and c=>1 2 1 **Set 2** Input values for a, b and c=>1 8 3 **Set 3** Input values for a, b and c=>3 5 7	**Set1** The roots are real and equal Roots are -1 both. **Set2** The Roots are real & unequal. Roots are -0.39 and -7.61 **Set 3** The Roots are imaginary Root1=-0.17+i1.28 Root2=-0.17-i1.28

6	WAP to display the grade system of KIIT University based on total marks secured by a student in a semester. Assume marks are integer values. Use multiple if-else statement. The grade is calculated is as follows: Marks Grade 90 to 100 O 80 to 89 E 70 to 79 A 60 to 69 B 50 to 59 C 40 to 49 D < 40 F	**Set-1** Enter total mark secured by a student: 55 Secured grade is C **Set-2** Enter total mark secured by a student: 95 Secured grade is O	**Set-1** Secured grade is C **Set-2** Secured grade is O
7	WAP to input any two integers, and provide a menu to the user to select any of the options as add, subtract, multiply, divide and display the result accordingly	Enter 2 numbers: 9 100 Select the operation from the menu (A for Add, S for Subtract, M for Multiplication, D for Division) : A	The Sum is 109
8	Print weekday name program according to given weekday number using switch-case weekday number (0-6) and print weekday name (Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, and Saturday)	Enter the week day: 3	This is Wednesday
9	WAP to display the grade system of KIIT University based on total marks secured by a student in a semester. Use else..if ladder statement.	Set-1 Enter total mark secured by a student: 77 Secured grade is C Set-2 Enter total mark secured by a student: 92	Set-1 Secured grade is A Set-2 Secured grade is O

		Secured grade is O	
10	WAP to find the roots of a quadratic equation ax2+bx+c=0 using switch-case statement.	Input values for a, b and c=> 1 2 1 Set2 Input values for a, b and c=>1 8 3 Set 2 Input values for a, b and c=>3 5 7	Input values for a, b and c=>1 2 1 Set2 The Roots are real & unequal. Roots are -0.39 and -7.61 Set 3 The Roots are imaginary Root1=-0.17 + i1.28 Root2=-0.17 - i1.28

Home Assignments (Practice Problems)

Q#	Experiment Details	Input	Output
1	WAP to test whether a number entered through keyboard is ODD or EVEN.	**Set 1** Enter a number: 19 **Set 2** Enter a number: 100	**Set 1** 19 is an ODD number **Set 2** 100 is an EVEN number
2	WAP to determine the eligibility for admission based on the following criteria: Eligibility Criteria: Marks in Maths >=65 and Marks in Phy >=55 and Marks in Chem>=50 and Total in all three subjects >=190 or Total in Maths and Physics >=140	Input the marks obtained in Physics :65 Input the marks obtained in Chemistry :51 Input the marks obtained in Mathematics :72	The candidate is not eligible for admission.
3	WAP to check whether the triangle is equilateral, isosceles or scalene (Triangle consists of three sides of provided lengths n1, n2 and n3 units).	**Set 1** n1=3, n2=3, n3=4 **Set 2** n1=4, n2=4, n3=4 **Set 3** n1=4, n2 =5, n3=7	**Set 1** Isosceles **Set 1** Equilateral **Set 3** Scalene

Looping: while, do...while and for

Week 4 & 5 - Day 7,8,9,10

Day 7

Lab Assignments

Q#	Experiment Details	Input	Output
1	WAP to print even series within 50.		2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
2	WAP to print the natural numbers from 1 to n (value of n is user input).	**Set 1** n=5 **Set 2** n=7	**Set 1** 1 2 3 4 5 **Set 2** 1 2 3 4 5 6 7
3	WAP to print the natural numbers from n to 1(value of n is user input).	**Set 1** n=5 **Set 2** n=7	**Set 1** 5 4 3 2 1 **Set 2** 7 6 5 4 3 2 1
4	WAP to take 10 different numbers as input. Print their sum and average.	Enter 10 numbers: 54 32 56 76 87 90 23 12 44 55	The sum is 529 The average is 52.900002
5	WAP to find out sum of digits of a number.	**Set 1** n=234 **Set 2** n=1235	**Set 1** The sum of digits of 234 is 9 **Set 2** The sum of digits of 1235 is 11
6	WAP to find out reverse of a number.	**Set 1** n=234 **Set 2** n=1235	**Set 1** The reverse of 234 is 432 **Set 2** The reverse of 1235 is 5321

Home Assignments

Q#	Experiment Details	Input	Output

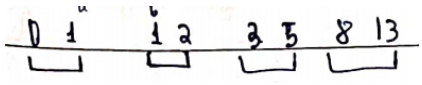
1	WAP to find out factors of a number.	**Set 1** n=6 **Set 2** n=21	**Set 1** The factors are 1 2 3 6 **Set 2** The factors are 1 3 7 21
2	WAP to test whether a number is Armstrong Number or not. (A number is said to be Armstrong when the sum of cubes of its digit is equal with the original number. Ex-153)	**Set 1** n=153 **Set 2** n=121	**Set 1** The given number is Armstrong **Set 2** The given number is not Armstrong
3	WAP to test whether a number is Palindrome Number or not. (A number is said to be Palindrome when its reverse is equal with the original number. Ex-121)	**Set 1** n=234 **Set 2** n=121	**Set 1** The given number is not Palindrome **Set 2** The given number is Palindrome

Day 8

Lab Assignments

Q#	Experiment Details	Input	Output
1.	WAP to print Fibonacci series up to n terms.	**Set 1** n=5 **Set 2** n=10	**Set 1** 0 1 1 2 3 **Set 2** 0 1 1 2 3 5 8 13 21 34
2	WAP to test whether a number is Perfect Number or not. (A number is said to be Perfect when the sum of factors excluding the number itself is equal to the original number. Ex-6)	**Set 1** n=7 **Set 2** n=28	**Set 1** The given number is not Perfect **Set 2** The given number is Perfect
3	WAP to check whether a number n is prime number or not.	**Set 1**: Enter a number:17 **Set 2**: Enter a number:25	**Set 1**: You have entered 17. 17 is a prime number **Set 2**: You have entered 25. 25 is NOT a prime number
4	The first few numbers of the Lucas sequence which is a variation on the Fibonacci sequence are: 1 3 4 7 11 18 29 ... WAP to generate the Lucas sequence.	Enter number of Lucas numbers to be generated: 7	1 3 4 7 11 18 29
5	WAP to print GCD and LCM of two numbers.	Enter two numbers: 12 18	GCD of 12 and 18 is 6 LCM of 12 and 18 is 36

Home

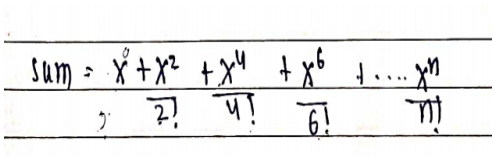
6	WAP to find out factorial of a number.	**Set 1** n=5 **Set 2** n=4	**Set 1** Factorial is 120 **Set 2** Factorial is 24
7	WAP to test whether an inputted number is a strong number or not. (A number is said to be Strong if sum of factorial of digits is equal to the original number)	**Set 1** n=145 **Set 2** n=121	**Set 1** The given number is Strong **Set 2** The given number is not Strong
8	WAP to display this series (3 in a single loop). 	Enter the value of n: 9	0 1 1 2 4 7 13 24 44

Assignments

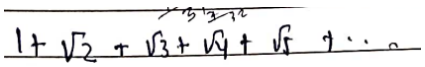
Q#	Experiment Details	Input	Output
1.	WAP to sum the following series S=1+(1+2)+(1+2+3)+...+(1+2+3+...+n)	Enter the value of n: 4	20
2.	WAP to find out 1/n!	Enter the value of n: 6	The value of 1/6! i 0.001389
3.	WAP to find out $x^n/n!$	Enter the value of x and n: 2 2	The value is 2.0
4.	WAP to find out sum of series up to n terms. (1+1/2+1/3.....)	Enter the range: 13	The sum of series i 3.180134

Day 9 & Day 10

Lab

5.	WAP to find out sum of series up to n terms. 	**Set 1**: Enter the value of x and n: 2 2 **Set 2**: Enter the value of x and n: 2 3	**Set 1**: The value is 3.0 **Set 2**: The value is 3.666667

Assignments

1.	WAP to find out sum of series up to n terms $1+2^2+3^3+\ldots\ldots\ldots+n^n$	Enter the value of n: 7	The sum of series is 873612.0
2.	WAP to find out sum of series up to n terms 	Enter the value of n: 7	The sum of series is 13.477573
3.	WAP to print the following pattern for rows = 4 1 1 1 1 2 2 2 2 3 3 3 3 4 4 4 4	Enter Row Number: 4	1 1 1 1 2 2 2 2 3 3 3 3 4 4 4 4
4.	WAP to print the following pattern 1 1 2 1 2 3 1 2 3 4 1 2 3 4 5	Enter Row Number: 5	1 1 2 1 2 3 1 2 3 4 1 2 3 4 5
5.	WAP to print the following pattern 1 2 2 3 3 3 4 4 4 4 5 5 5 5 5	Enter Row Number: 5	1 2 2 3 3 3 4 4 4 4 5 5 5 5 5
6.	WAP to print the following pattern 1 3 7 15 31…….	Enter the value of n: 5	1 3 7 15 31
7.	WAP to print the following pattern * * *	Enter the value of n: 5	* * * * * *

	* * * * * * * * * * * *		* * * * * * * * *

Home Assignments

1.	WAP to print the following pattern
	  *
	  ***
	  *****
	  *******
	*********
		Enter the value of n:
		5
			*
			***
			*****
			*******
			*********

2.	WAP to print the following pattern A B A C B A D C B A E D C B A	Enter the value of n: 5	A B A C B A D C B A E D C B A
3.	Write a C program to print a hollow square pattern using a while loop. For row=4 * * * * * * * * * * * * * *	Enter the value of n: 4	* * * * * * * * * * * * * *

4.	WAP to print the following pattern
	*********
	  *******
	  *****
	  ***
	  *
		Enter the value of n:
		5
			*********
			  *******
			  *****
			  ***
			  *

5	WAP to print the following pattern 1 2 1 1 2 3 4 3 2 1 1 2 3 4 5	Enter the value of n: 5	1 2 1 1 2 3 4 3 2 1 1 2 3 4 5

Array

Week 6 & 7

DAY 11

TOPIC: 1-D Arrays

Lab Assignments

Q#	Experiment Details	Input	Output
1.	WAP to create an array that can store N integers and display the contents of the array	Enter array size (N): 5 Enter number1: 45 Enter number2: 35 Enter number3: 38 Enter number4: 31 Enter number5: 49	Array Contents are: 45 35 38 31 49
2.	WAP to find out the sum of the N numbers stored in an array of integers.	Enter array size (N): 5 Enter number1: 45 Enter number2: 35 Enter number3: 38 Enter number4: 31 Enter number5: 49	Sum of the numbers stored in array: 198
3.	WAP to find the average of N numbers using arrays.	Enter array size (N): 5 Enter number1: 45 Enter number2: 35 Enter number3: 38 Enter number4: 31 Enter number5: 49	Average of the numbers stored in array = 39.6
4.	WAP to find largest element stored in an array.	Enter array size (N): 5 Enter number1: 45 Enter number2: 35 Enter number3: 38 Enter number4: 31 Enter number5: 49	Largest element stored in an array: 45
5.	WAP to insert an element in an 1-D array.	Enter no of elements: 5 1 2 3 4 5 Enter the element to be inserted: 6 Enter the location: 2	The resultant array: 1 6 2 3 4 5
	PRACTICE ASSIGNMENT		
1.	WAP to search an element in an 1-D array.	**Set 1:** Enter no of elements: 5 11 22 33 44 55 Enter the elements to be searched: 44 **Set 2:**	**Set 1:** Number found at the location = 4 **Set 2:**

		Enter no of elements: 5 11 22 33 44 55 Enter the elements to be searched: 77	Number not found
2.	WAP to Count the total number of duplicate elements in an array.	Input the number of elements to be stored in the array: 5 Input 5 elements in the array: element - 0: 1 element - 1: 1 element - 2: 2 element - 3: 3 element - 4: 3	Total number of duplicate elements found in the array: 2
3.	WAP to find out the multiplication of the numbers stored in an array of integers.	Enter array size: 5 Enter array elements: 1 2 3 5 6	Product of the array elements = 180
4.	WAP to find the second largest element in an array.	Input the size of array: 5 Input 5 elements in the array: element - 0: 2 element - 1: 9 element - 2: 1 element - 3: 4 element - 4: 6	The Second largest element in the array is: 6
5.	WAP to delete an element at desired position from an array.	Input the size of array: 5 Input 5 elements in the array in ascending order: element - 0: 1 element - 1: 2 element - 2: 3 element - 3: 4 element - 4: 5 Input the position where to delete: 3	The new list is: 1 2 4 5
	DAY-12		
	TOPIC: 1-D Arrays (Contd...)		
1.	WAP to display the array elements in ascending order.	**Set-1** Enter how many numbers: 7 Enter the 7 Numbers: 7 6 4 5 2 4 8	**Set-1** The Numbers in ascending order are 2 4 4 5 6 7 8

		Set-2 Enter how many numbers :10 Enter the 10 Numbers: 12 34 56 78 90 34 56 799 122 56	**Set-2** The Numbers in ascending order: 12 34 34 56 56 56 78 90 122 799
2.	WAP to Print all unique elements of an array.	Input the number of elements to be stored in the array: 4 Input 4 elements in the array: element - 0: 3 element - 1: 2 element - 2: 2 element - 3: 5	The unique elements found in the array are: 3 5
3.	WAP to print all the even and odd numbers in an 1-D array.	Enter number of elements in the array: 6 Enter 6 elements in the array: 12 19 45 69 98 23	Even numbers in the array are: 12 98 Odd numbers in the array are: 19 45 69 23
4.	WAP to reverse the array elements.	**Set 1:** Enter number of elements in the array: 5 Enter these Array Elements: 1 2 3 4 5	**Set 1:** Elements in reverse order in the array: 5 4 3 2 1
5.	Given an array arr[] of non-negative integers and an integer sum, find a subarray that adds to a given sum.	Input: Enter array size: 6 Enter array elements: 1 4 20 3 10 5 Enter sum = 33	Sum found between and including indices 2 and 4
	PRACTICE ASSIGNMENT		
1.	Given an integer array, find the peak element in it. A peak element is an element that is greater than its neighbours. There might be multiple peak elements in an array, and the solution should report any peak element.	Enter array size: 5 Enter array elements: 8 9 10 12 15	The peak element is 15
2.	Given an array A of N	Enter array size: 5	3

	elements. Find the majority element in the array. A majority element in an array A of size N is an element that appears more than N/2 times in the array.	Enter array elements: 3 1 3 3 2	(**Explanation**: Since, 3 is present more than N/2 times, so it is the majority element.)
3.	Given an array of integers arr[] of size N and an integer d, the task is to rotate the array elements to the left by d positions.	arr[] = {1, 2, 3, 4, 5, 6, 7}, d = 2	Output: 3 4 5 6 7 1 2

DAY-13, DAY-14

TOPIC: 2D Arrays

Q#	Experiment Details	Input	Output
1.	WAP for a two dimensional to store and display the elements. (Store temperature of two cities for a week and display it)	Enter no of Cities: 2 1 2 Enter no of days: 7 Enter the Temp: (Chosen values)	Displaying values: City 1, Day 1 = 33 City 1, Day 2 = 34 City 1, Day 3 = 35 City 1, Day 4 = 33 City 1, Day 5 = 32 City 1, Day 6 = 31 City 1, Day 7 = 30 City 2, Day 1 = 23 City 2, Day 2 = 22 City 2, Day 3 = 21 City 2, Day 4 = 24 City 2, Day 5 = 22 City 2, Day 6 = 25 City 2, Day 7 = 26
2.	WAP to find the sum of two matrices of order 2x2 using multidimensional arrays.	Enter elements of 1st matrix Enter a11: 2; Enter a12: 0.5; Enter a21: -1.1; Enter a22: 2; Enter elements of 2nd matrix Enter b11: 0.2; Enter b12: 0;	Sum of Matrices: 2.2 0.5 -0.9 25.0

		Enter b21: 0.23; Enter b22: 23;	
3.	WAP to multiply two matrices and display it.	**Set-1**: Enter value of matrix A 1 1 1 1 1 1 1 1 1 Enter value of matrix B 2 2 2 2 2 2 2 2 2 **Set-2**: Enter value of matrix a 2 2 2 2 2 2 2 2 2 Enter value of matrix b 3 3 3 3 3 3 3 3 3	**Set-1** Value of matrix a 1 1 1 1 1 1 1 1 1 Value of matrix b 2 2 2 2 2 2 2 2 2 After Multiplication resultant matrix is 6 6 6 6 6 6 6 6 6 **Set-2** Value of matrix a 2 2 2 2 2 2 2 2 2 Value of matrix b 3 3 3 3 3 3 3 3 3 After Multiplication resultant matrix is 18 18 18 18 18 18 18 18 18

4.	WAP to find the sum of elements of a matrix in its upper triangle.	**Set 1:** Enter no. of rows: 3 Enter no. of cols: 3 Enter values to the matrix : Enter a [0][0] value: 9 Enter a [0][1] value: 8 Enter a [0][2] value: 7 Enter a [1][0] value: 6 Enter a [1][1] value: 5 Enter a [1][2] value: 4 Enter a [2][0] value: 3 Enter a [2][1] value: 2 Enter a [2][2] value: 1	**Set 1:** The given matrix is: 9 8 7 6 5 4 3 2 1 Sum of upper triangular matrix = 19
5.	WAP to check whether two matrices are equal or not.	**Set 1:** Enter no. of rows: 3 Enter no. of cols: 3 Enter values to the matrix A: Enter a [0][0] value: 1 Enter a [0][1] value: 2 Enter a [0][2] value: 3 Enter a [1][0] value: 4 Enter a [1][1] value: 5 Enter a [1][2] value: 6 Enter a [2][0] value: 7 Enter a [2][1] value: 8 Enter a [2][2] value: 9 Enter values to the matrix B: Enter b [0][0] value: 1 Enter b [0][1] value: 2 Enter b [0][2] value: 3 Enter b [1][0] value: 4 Enter b [1][1] value: 5 Enter b [1][2] value: 6 Enter b [2][0] value: 7 Enter b [2][1] value: 8	**Set 1:** The given matrix A is : 1 2 3 4 5 6 7 8 9 The given matrix B is: 1 2 3 4 5 6 7 8 9 Matrix A is equal to Matrix B

		Enter a [2][2] value: 9	
	PRACTICE ASSIGNMENT		
1.	WAP to check whether a matrix is identity matrix or not.	**Set 1:** Enter no. of rows: 3 Enter no. of cols: 3 Enter values to the matrix: Enter a [0][0] value: 1 Enter a [0][1] value: 0 Enter a [0][2] value: 0 Enter a [1][0] value: 0 Enter a [1][1] value: 1 Enter a [1][2] value: 0 Enter a [2][0] value: 0 Enter a [2][1] value: 0 Enter a [2][2] value: 1 **Set 2:** Enter no. of rows: 3 Enter no. of cols: 3 Enter values to the matrix: Enter a [0][0] value: 1 Enter a [0][1] value: 2 Enter a [0][2] value: 3 Enter a [1][0] value: 0 Enter a [1][1] value: 1 Enter a [1][2] value: 0 Enter a [2][0] value: 0 Enter a [2][1] value: 2 Enter a [2][2] value: 1	**Set 1:** The given matrix is an Identity Matrix. 1 0 0 0 1 0 0 0 1 **Set 2:** The given matrix is not an Identity Matrix. 1 2 3 0 1 0 0 2 1
2.	WAP to find out the frequency of even and odd numbers in a matrix.	**Set 1:** Enter no. of rows: 3 Enter no. of cols: 3 Enter values to the matrix:	**Set 1:** The given matrix is 1 2 3 4 5 6 7 8 9

		Enter a [0][0] value: 1 Enter a [0][1] value: 2 Enter a [0][2] value: 3 Enter a [1][0] value: 4 Enter a[1][1] value: 5 Enter a[1][2] value: 6 Enter a[2][0] value: 7 Enter a[2][1] value: 8 Enter a[2][2] value: 9	The frequency of occurrence of odd number = 5 The frequency of occurrence of even number = 4
3.	WAP to find the transpose of a matrix.	**Set 1:** Enter no. of rows: 3 Enter no. of cols: 3 Enter values to the matrix: Enter a [0][0] value: 1 Enter a [0][1] value: 3 Enter a [0][2] value: 5 Enter a [1][0] value: 7 Enter a [1][1] value: 9 Enter a [1][2] value: 2 Enter a [2][0] value: 4 Enter a [2][1] value: 6 Enter a [2][2] value: 8	**Set 1:** The given matrix A is: 1 3 5 7 9 2 4 6 8 Transpose of matrix A: 1 7 4 3 9 6 5 2 8
4.	WAP to find the Trace (sum of the diagonal elements) of a given m xn matrix	Enter the order of the square matrix A: 3 Enter the values of matrix A 3 4 5 6 8 9 1 3 4	sum of diagonal values=15

Functions

Week 9 & 10 - Day 15,16,17,18

Day 15

Lab Assignments

Q#	Experiment Details	Input	Output
1.	WAP to add two numbers entered through the keyboard by using a suitable user defined function.	**Set 1:** Enter two number: 17 10 **Set 2:** Enter two number: 5 -12	**Set 1:** Sum of 17 and 10 = 27 **Set 2:** Sum of 5 and -12 = -7
2.	WAP to find the factorial of a number *n* by using a suitable user defined function.	**Set 1:** Enter a number: 5 **Set 2:** Enter a number: 0	**Set 1:** Factorial of 5 = 120 **Set 2:** Factorial of 0 = 1
3.	A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence (Fi = Fi-1 + Fi-2). WAP to find out the value of n^{th} term of the Fibonacci sequence by writing a suitable user defined function.	**Set 1:** Enter Fibonacci term serial number: 2 **Set 2:** Enter Fibonacci term serial number: 8	**Set 1:** Fibonacci term serial number: 2 Fibonacci number: 1 **Set 2:** Fibonacci term serial number: 8 Fibonacci number: 13
4	Write a C program to determine whether a number is prime or not using a function named as “PRIME”.	**Set 1:** Enter an integer: 7 **Set 2:** Enter an integer: 6	**Set 1:** 7 is prime. **Set 2:** 6 is not prime.
5	Write a C program to perform swapping of two integers using a function SWAP.	**Set 1:** Enter num1: 10 Enter num2: 20	**Set 1:** Before Swapping num1=10 num2=20 After Swapping num1=20

Home			**Set 2:** Enter num1: 15 Enter num2: 30	num2=10 **Set 2:** Before Swapping num1=15 num2=30 After Swapping num1=30 num2=15

Assignments (Practice Problems)

Q#	Experiment Details	Input	Output
1.	WAP to test whether a number entered through the keyboard is a number in the Fibonacci sequence or not. (Using function)	**Set 1:** Enter the number to test whether it is in Fibonacci sequence or not: 10 **Set 2:** Enter the number to test whether it is in Fibonacci sequence or not: 8	**Set 1:** Entered number: 10 Number is in Fibonacci sequence: No **Set 2:** Entered number: 8 Number is in Fibonacci sequence: Yes
2.	WAP by designing a recursive function to calculate the sum of the digits of any given integer until it becomes a single digit number using function.	**Set 1:** Enter a number: 589 **Set 2:** Enter a number: 25	**Set 1:** Sum of the digits (up to single digit) of 589 = 4 **Set 2:** Sum of the digits (up to single digit) of 25 = 7
3	WAP to print all prime numbers between 1 to 100 using function.		**Prime numbers between 1 to 100:** 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97
4.	Write a function that will return the counting of Zeros in a Positive Integer	**Set 1:** Input: 110560 **Set 2:** Input: 178655	**Set 1:** No of zeros: 2 **Set 2:** No of zeros: 0
5.	WAP to test whether a number n is palindrome number or not.	**Set 1:** Enter a number to test for palindrome: 123 **Set 2:**	**Set 1:** Entered number: 123 Number is not palindrome. **Set 2:**

		Enter a number to test for palindrome: 1551	Entered number: 1551 Number is palindrome.

Day: 16
TOPIC: Functions with 1D Arrays

Lab Assignments

Q#	Experiment Details	Input	Output
1.	WAP to design a user defined function to calculate the sum of the elements of an integer 1-D array.	**Set 1:** Enter the size of the array: 5 Enter the elements of the array: 3 5 7 2 6 **Set 2:** Enter the size of the array: 3 Enter the elements of the array: 5 0 -2	**Set 1:** Sum of the elements of the given array: 23 **Set 2:** Sum of the elements of the given array: 3
2.	WAP to sort the elements of an 1-D array in ascending order by using a suitable user defined function for sort operation.	**Set 1:** Enter the size of the array: 5 Enter the elements of the array: 3 5 7 2 6 **Set 2:** Enter the size of the array: 3 Enter the elements of the array: 5 0 -2	**Set 1:** Before sorting elements of the given array: 3 5 7 2 6 After sorting elements of the given array: 2 3 5 6 7 **Set 2:** Before sorting elements of the given array: 5 0 -2 After sorting elements of the given array: -2 0 5
3.	Write a C program to determine the largest and smallest element of a 1-D array. Use functions LARGEST and SMALLEST for the given purpose.	**Set 1:** Enter the size of the array: 5 Enter the elements of the array: 3 5 7 2 6 **Set 2:** Enter the size of the array: 3 Enter the elements of the array: 5 0 -2	**Set 1:** Largest element of array is 7 Smallest element of array is 2 **Set 2:** Largest element of array is 5 Smallest element of array is -2

4.	Write a C program to determine the second largest element of a 1-D array of using a function SECLARGEST.	**Set 1:** Enter the size of the array: 5 Enter the elements of the array: 3 5 7 2 6 **Set 2:** Enter the size of the array: 3 Enter the elements of the array: 5 0 -2	**Set 1:** Second largest element of array is 6 **Set 2:** Second largest element of array is 0
5.	Write a C program to swap the first and last element of a 1-D array of using a function SWAP.	**Set 1:** Enter the size of the array: 5 Enter the elements of the array: 3 5 7 2 6 **Set 2:** Enter the size of the array: 3 Enter the elements of the array: 5 0 -2	**Set 1:** Entered array: 3 5 7 2 6 Array after swapping: 6 5 7 2 3 **Set 2:** Entered array: 5 0 -2 Array after swapping: -2 0 5

Home Assignments (Practice Problems)

Q#	Experiment Details	Input	Output
1.	Write a C program to swap the largest and smallest element of a 1-D array of using a function SWAP.	**Set 1:** Enter the size of the array: 5 Enter the elements of the array: 3 5 7 2 6 **Set 2:** Enter the size of the array: 3 Enter the elements of the array: 5 0 -2	**Set 1:** Entered array: 3 5 7 2 6 Array after swapping: 3 5 2 7 6 **Set 2:** Entered array: 5 0 -2 Array after swapping: -2 0 5
2.	Write a C program to find the sum of only odd values in a 1-D array using a function ODDSUM.	**Set 1:** Enter the size of the array: 5 Enter the elements of the array: 3 5 7 2 6 **Set 2:**	**Set 1:** Sum of odd values = 15 **Set 2:** Sum of odd values = 5

		Enter the size of the array: 3 Enter the elements of the array: 5 0 -2	
3.	Write a C program to find the sum of only PRIME values in a 1-D array using a function PRIMESUM.	**Set 1:** Enter the size of the array: 5 Enter the elements of the array: 3 5 7 2 6 **Set 2:** Enter the size of the array: 3 Enter the elements of the array: 5 0 -2	**Set 1:** Sum of prime values = 15 **Set 2:** Sum of prime values = 5

Day: 17
TOPIC: Functions with 2D Arrays

Lab Assignments

Q#	Experiment Details	Input	Output
1.	Write a C program to determine the sum of elements of a 2-D array using a function ELESUM.	**Set 1:** Enter the row and column size of the matrix: 3 4 Enter the matrix: 4 5 6 2 1 9 3 0 7 -2 1 8 **Set 2:** Enter the row and column size of the matrix: 5 3 Enter the matrix: 5 6 2 4 3 0 -7 1 8 4 4 5 0 3 0	**Set 1:** Sum of the elements of the given array: 44 **Set 2:** Sum of the elements of the given array: 38
2.	Write a C program to determine the sum of main diagonal elements	**Set 1:** Enter a 3x3 size matrix: 1 2 3	**Set 1:** Sum of the main diagonal elements of

	of a 2-D array of size 3x3 using a function SUMDIAGONAL.	4 5 6 7 8 9 **Set 2:** Enter a 3x3 size matrix: 1 1 1 2 2 2 3 3 3	the given array: 15 **Set 2:** Sum of the elements of the given array: 6
3.	Write a C program to determine the largest and smallest element of a 2-D array. Use functions LARGEST and SMALLEST for the given purpose.	**Set 1:** Enter the row and column size of the matrix: 3 4 Enter the matrix: 4 5 6 2 1 9 3 0 7 -2 1 8 **Set 2:** Enter the row and column size of the matrix: 5 3 Enter the matrix: 5 6 2 4 3 0 -7 1 8 4 4 5 0 3 0	**Set 1:** Largest element of array is 9 Smallest element of array is -2 **Set 2:** Largest element of array is 8 Smallest element of array is -7
4.	Write a C program to find the sum of only PRIME values in a 2-D array using a function PRIMESUM.	**Set 1:** Enter the row and column size of the matrix: 3 4 Enter the matrix: 4 5 6 2 1 9 3 0 7 -2 1 8 **Set 2:** Enter the row and column size of the matrix: 5 3 Enter the matrix: 5 6 2 4 3 0 -7 1 8 4 4 5 0 3 0	**Set 1:** Sum of prime elements = 17 **Set 2:** Sum of prime elements = 18
5.	Write a C program to perform addition of two matrices and display the result using 3rd matrix.	**Set 1:** Enter matrix1: 1 2 3 4 5 6	**Set 1:** Result matrix 2 3 4

	Use a function ADDMATRIX	7 8 9 Enter matrix2: 1 1 1 2 2 2 3 3 3 **Set 2:** Enter matrix1: 1 2 3 -4 5 -6 7 -8 9 Enter matrix2: 1 1 1 1 1 1 1 1 1	6 7 8 10 11 12 **Set 2:** Result matrix 2 3 4 -3 6 -5 8 -7 10

Home Assignments (Practice Problems)

Q#	Experiment Details	Input	Output
1.	Write a C program to determine the sum of largest and smallest element of a 2-D array. Use a function SUMLS	**Set 1:** Enter the row and column size of the matrix: 3 4 Enter the matrix: 4 5 6 2 1 9 3 0 7 -2 1 8 **Set 2:** Enter the row and column size of the matrix: 5 3 Enter the matrix: 5 6 2 4 3 0 -7 1 8 4 4 5 0 3 0	**Set 1:** Sum of largest and smallest elements: 7 **Set 2:** Sum of largest and smallest elements: 1
2.	Write a C program to swap the largest and smallest element of a 2-D array of using a function SWAP.	**Set 1:** Enter the row and column size of the matrix: 3 4 Enter the matrix: 4 5 6 2 1 9 3 0	**Set 1:** Entered matrix 4 5 6 2 1 9 3 0 7 -2 1 8 Matrix after swapping 4 5 6 2 1 -2 3 0 7 9 1 8

		7 -2 1 8 **Set 2:** Enter the row and column size of the matrix: 5 3 Enter the matrix: 5 6 2 4 3 0 -7 1 8 4 4 5 0 3 0	**Set 2:** Entered matrix 5 6 2 4 3 0 -7 1 8 4 4 5 0 3 0 Matrix after swapping 5 6 2 4 3 0 8 1 -7 4 4 5 0 3 0
3.	Write a C program to sort the elements of a values in a 2-D array using a function SORTELE.	**Set 1:** Enter the row and column size of the matrix: 3 4 Enter the matrix: 4 5 6 2 1 9 3 0 7 -2 1 8 **Set 2:** Enter the row and column size of the matrix: 5 3 Enter the matrix: 5 6 2 4 3 0 -7 1 8 4 4 5 0 3 0	**Set 1:** Entered matrix 4 5 6 2 1 9 3 0 7 -2 1 8 Matrix after sorting -2 0 1 1 2 3 4 5 6 7 8 9 **Set 2:** Entered matrix 5 6 2 4 3 0 -7 1 8 4 4 5 0 3 0 Matrix after sorting -7 0 0 0 1 2 3 3 4 4 4 5 5 6 8
4	Write a C program to perform multiplication of	**Set 1:** Enter matrix1:	**Set 1:** Entered matrix1:

	two matrices of size 3x3 and display the result using 3rd matrix.	2 3 4 3 5 6 4 5 3 Enter matrix2: 1 2 1 -1 2 1 3 2 1 **Set 2:** Enter matrix1: 2 3 1 7 4 1 9 -2 1 Enter matrix2: 9 -2 -1 5 7 3 8 1 0	2 3 4 3 5 6 4 5 3 Entered matrix2: 1 2 1 -1 2 1 3 2 1 Result matrix 11 18 9 16 28 14 8 24 12 **Set 2:** Enter matrix1: 2 3 1 7 4 1 9 -2 1 Enter matrix2: 9 -2 -1 5 7 3 8 1 0 Result matrix 41 18 7 91 15 5 79 -31 -15

Day 18
Recursion

Lab Assignments

Q#	Experiment Details	Input	Output
1.	WAP to find the factorial of a number n by writing a recursive function for it.	**Set 1:** Enter a number: 4 **Set 2:** Enter a number: 1	**Set 1:** Factorial of 4 = 24 **Set 2:** Factorial of 1 = 1
2.	WAP to calculate GCD/HCF of two numbers by using a recursive function.	**Set 1:** Enter two numbers: 105 60 **Set 2:** Enter two numbers: 5 70	**Set 1:** GCD of 105 and 60 = 15 **Set 2:** GCD of 5 and 70 = 5
3.	WAP by designing a	**Set 1:**	**Set 1:**

	recursive function to calculate the sum of the digits of any given integer until it becomes a single digit number.	Enter a number: 589 **Set 2:** Enter a number: 25	Sum of the digits (up to single digit) of 589 = 4 **Set 2:** Sum of the digits (up to single digit) of 25 = 7
4	Write a recursive function to add the digits of a positive integer.	**Set 1:** Input: 13478635 **Set 2:** Input: 5875014	**Set 1:** Sum of digits: 37 **Set 2:** Sum of digits: 30
5	WAP to find out the maximum element of an integer array by using recursion.	**Set 1:** Enter the size of the array: 5 Enter the elements of the array: 3 5 7 2 6 **Set 2:** Enter the size of the array: 3 Enter the elements of the array: 5 0 -2	**Set 1:** Entered Array: 3 5 7 2 6 Maximum elements of the given array: 7 **Set 2:** Entered Array: 5 0 -2 Maximum elements of the given array: 5

Home Assignments (Practice Problems)

Q#	Experiment Details	Input	Output
1.	WAP to count number of digits of a positive integer n by using a recursive function.	**Set 1:** Enter a number: 10 **Set 2:** Enter a number: 2105	**Set 1:** Number of digits of 10 = 2 **Set 2:** Number of digits of 2105 = 4
2.	WAP to find the n^{th} Fibonacci number using recursion.	**Set 1:** Enter the value of n: 10 **Set 2:** Enter the value of n: 4	**Set 1:** n = 10 nth Fibonacci number = 34 **Set 2:** n = 4 nth Fibonacci number = 2
3	Write a recursive function to reverse a null terminated string	**Set 1:** Input: Hello **Set 2:** Input: I am going to school.	**Set 1:** Output: olleH **Set 2:** Output: .loohcs ot gniog ma I

4.	Write a recursive function to copy one array to another.	**Input:** Please Enter the Array Size: 5 Please Enter the Array Elements: 3 5 7 8 9	**Output:** Elements of Second Array are: Value Inside Array b[0] = 3 Value Inside Array b[1] = 5 Value Inside Array b[2] = 7 Value Inside Array b[3] = 8 Value Inside Array b[4] = 9
5.	Write a recursive function to convert a decimal number to binary	**Set 1:** Input: 765 **Set 2:** Input: 123	**Set 1:** Output: 1011111101 **Set 2:** Output: 1111011

Character Arrays/Strings

Week 11 - Day 19, 20

Lab Assignments

Q#	Experiment Details	Input	Output
1.	WAP to find the length of a string with/without using library function for getting length of the string	Enter a string: Programming	Length of the entered String is 11
2.	Write a program to extract last character of every word present in a sentence.	Enter a sentence: How are You	weu
3.	Write a program to concatenate two strings without using any library function.	Enter String 1: KIIT Enter String 2: University	KIIT University
4.	Write a program to check whether an entered string is palindrome or not.	**Set1:** Kalinga **Set2:** Madam	**Set1:** Not Palindrome **Set2:** Palindrome
5.	Write a C program to extract a substring from a given string. Prompt the user to enter the starting position and length of the substring.	Industrial 2 4	dust
6.	Write a C program to find the first largest word in a given sentence. Assume that words are separated by spaces.	You are very good boy.	very
7.	Write a program to count the number of vowels, consonants, new lines and the total number of characters and words present in a string.	This is the best university.	Vowels=3, consonants=9, new lines=1, total number o characters=23, Tota words=5.
8.	Write a program to count the frequency of each character present in a string.	Hello World	H=1, e=1, l=3, o=2, w=1 r=1, d=1
9.	Write a program to replace all the occurrence of a particular character in a string by its	Hello World, character= l	HeHeo Worod

Home

	previous 3rd character, If any.		
10.	Write a C program to remove all leading and trailing spaces from a given string, if any.	Hello world	Hello world
11.	Write a C program to replace multiple occurrences of a specific word present in a given sentence with a single occurrence.	You are a very very good boy	You are a very good boy

Assignments (Practice Problems)

Q#	Experiment Details	Input	Output
1	Write a C program to capitalize the first letter of each word in a given sentence. Assume that words are separated by spaces.	Kalinga institute of industrial technology	Kalinga Institute Of Industrial Technology
2	Write a C program to check if a given string is a valid email address. Use appropriate validation criteria, such as the presence of '@' and '.' symbols.	**Case 1:** student@kiit.ac.in **Case 2:** studentkiit.ac.in	**Case 1:** This email Id is valid **Case 2:** This email Id is not valid
3	Write a C program to check if two strings are anagrams. (An anagram is a word or phrase formed by rearranging the letters of another word or phrase.)	String 1: worth String 2: throw	Two strings are anagrams.
4	Write a C program to remove all duplicate characters from a given string. The resulting string should contain each character only once.	College	Coleg
5	Write a C program to reverse the order of words in a given sentence.	Hello World	World Hello
6.	Write a C program to remove all consecutive duplicate characters	aaabbbcccdddeee	abcde

	from a given string.		
7.	Write a C program to find the common characters between two strings. Display the common characters in alphabetical order.	Institute Industrial	I n s t u
8.	Write a C program to compare two strings without using the built-in strcmp() function.	**Case 1:** kiit kiit **Case 2:** kite bite	**Case 1**: 0 **Case 2:** 9
9.	Write a C program to convert a string of digits into an integer value.	"12345"	12345
10.	Write a C program to remove all vowels from a given string. Consider both uppercase and lowercase vowels.	Hello World	Hll Wrld

Pointer, Dynamic Memory Allocation

Week 12, 13 - Day 21, 22, 23

Lab Assignments

Q#	Experiment Details	Input	Output
1	WAP to multiply two numbers using pointers.	5 6	30
2	WAP to swap two numbers using call by reference.	Enter value of a: 8 Enter value of b: 10	After swap, The value of a: 10 Enter value of b: 8
3	WAP to compute the sum of all elements in an array using pointer.	No. Of elements: 3 1 2 3	Sum=6
4	WAP to print a string in reverse using a pointer.	**Set 1:** Input a string: KIIT **Set 2:** Input a string: MADAM	**Set 1:** Reverse of the string is: TIIK **Set 2:** Reverse of the string is: MADAM
5	WAP to count vowels and consonants in a string using pointer.	**Set 1:** Input a string: HelloWorld **Set 2:** Input a string: string	**Set 1:** Number of vowels in String: 3 Number of Consonants in String: 7 **Set 2:** Number of vowels in String:1 Number of Consonants in String: 5
6	WAP to sort an array using Pointer.	**Set 1:** Enter the number of elements to store in the array: 5 Enter 5 number of elements in the array: element - 1: 25 element - 2: 45 element - 3: 89 element - 4: 15 element - 5: 82 **Set 2:** Enter the number of	**Set-1:** The elements in the array after sorting : element - 1: 15 element - 2: 25 element - 3: 45 element - 4: 82 element - 5: 89 **Set-2:**

		elements to store in the array: 6 Enter 6 number of elements in the array: element - 1: 75 element - 2: 45 element - 3: 39 element - 4: 15 element - 5: 92 element - 6: 12	The elements in the array after sorting: element - 1: 12 element - 2: 15 element - 3: 39 element - 4: 45 element - 5: 75 element - 6: 92
7	WAP to compute the sum of all elements in an array using dynamic memory allocation.	No. Of elements: 3 1 2 3	Sum=6
8	WAP to find the largest element stored in an array of n elements by using dynamic memory allocation.	**Set-1:** Enter the total number of elements: 5 Number1: 3.4 Number2: 2.4 Number3: -5 Number4: 24.20 Number5: 6.7 **Set-2:** Enter the total number of elements: 4 Number1: 8 Number2: 14 Number3: 56 Number4: 34	**Set-1:** Largest number is 24.20 **Set-2:** Largest number is 56
8.	Dynamically allocate the size of an array using calloc, insert elements into the array, then print the elements. Change the size of the array, get the new elements and print the array. Finally free the memory.	Enter number of elements: 5 Enter the elements of the array are: 1 2 3 4 5 Enter the new size of the array: 10 Enter new elements of the array: 6 7 8 9 10	Enter number of elements: 5 Memory successfully allocated using calloc. The elements of the array are: 1, 2, 3, 4, 5, Enter the new size of the array: 10 Memory successfully re-allocated using realloc. The elements of the array are: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10,

Home Assignments (Practice Problems)

Q#	Experiment Details	Input	Output
1	WAP to swap three numbers in cyclic order using Call by Reference. In other words, WAP that takes three variables (a, b, c) as separate parameters and rotates the values stored so that value a goes to b, b to c and c to a.	**Set-1:** Enter a, b and c respectively: 1 2 3 **Set-2:** Enter a, b and c respectively: 5 6 7	**Set-1:** Value before swapping: a = 1 b = 2 c = 3 Value after swapping: a = 3 b = 1 c = 2 **Set-2:** Value before swapping: a = 5 b = 6 c = 7 Value after swapping: a = 7 b = 5 c = 6
2	WAP to change the value of constant integer using pointers.	**Set-1:** Before changing - value of a: 10 **Set-2:** Before changing - value of a: 50	**Set-1:** After changing - value of a: 20 **Set-2:** After changing - value of a: 60
3	WAP to count distinct number of vowels and consonants present in a string using pointer.	Enter the string: Java	Consonants are: J-1 v-1 Vowels are: a-2
4	WAP to swap two consecutive characters starting from left to right of a string.	**Set-1:** Enter a String: help **Set-2:** Enter a String: Hello	**Set-1:** String: ehpl **Set-2:** The length of the string is Odd.
5	Dynamically allocate memory using malloc() and calloc(). Check if the memory has	Enter number of elements: 5	Memory successfully allocated using malloc. Malloc Memory

	been successfully allocated by malloc or not. Check if the memory has been successfully allocated by calloc or not. Finally Free the memory.		successfully freed. Memory successfully allocated using calloc. Calloc Memory successfully freed.

User Defined Data Types –Structures and Unions

Week 13, 14 - Day 24, 25, 26

Day 24: Lab Assignments

Q#	Experiment Details	Input	Output
1.	WAP to store one student's information (i.e. student's roll no, name, gender, marks etc) of an educational institute and display all the data, using structure	Enter the students' data: Roll Number: 1505201 Name: Rajesh Agarwal Gender: M Marks: 95	The student's details are: Roll Number: 1505201 Name: Rajesh Agarwal Gender: M Marks: 95
2.	WAP to store n students' information (i.e. student's roll no, name, gender, marks in 5 subjects etc) of an educational institute and display all the data with total marks of each student, using array of structure. If full mark of each subject is considered as 100 and pass mark as 40, then display the list of students failed in a particular subject.	**Set 1:** Enter the number of students: 1 Enter the students' data: Roll Number: 1505201 Name: Rajesh Agarwal Gender: M Mark in subject 1: 95 Mark in subject 2: 85 Mark in subject 3: 35 Mark in subject 4: 65 Mark in subject 5: 55 Enter subject number whose failed list to be displayed: 3 **Set 2:** Enter the number of students: 2 Enter the students' data: Roll Number: 1505201 Name: Rajesh Agarwal Gender: M Mark in subject 1: 95 Mark in subject 2: 85 Mark in subject 3: 50 Mark in subject 4: 30 Mark in subject 5: 55 Enter the students' data: Roll Number: 1505202 Name: Yashraj Behera	**Set 1:** The students details are Roll Number: 1505201 Name: Rajesh Agarwal Gender:M Mark in subject 1: 95 Mark in subject 2: 85 Mark in subject 3: 75 Mark in subject 4: 65 Mark in subject 5: 55 Total marks: 375 List of fail students: 1 **Set 2:** The students' details are Roll Number: 1505201 Name: Rajesh Agarwal Gender: M Mark in subject 1: 95 Mark in subject 2: 85 Mark in subject 3: 50 Mark in subject 4: 30 Mark in subject 5: 55 Total marks: 315 Roll Number: 1505202 Name: Yashraj Behera Gender: M

		Gender: M Mark in subject 1: 90 Mark in subject 2: 80 Mark in subject 3: 45 Mark in subject 4: 35 Mark in subject 5: 75 Enter subject number whose failed list to be displayed: 4	Mark in subject 1: 90 Mark in subject 2: 80 Mark in subject 3: 45 Mark in subject 4: 35 Mark in subject 5: 75 Total marks: 325 List of fail students: 2
3.	WAP to add two distances (in km-meter) using structures.	**Set-1** Enter data for 1st distance: Enter km: 6 Enter meter: 600 Enter data for 2nd distance Enter km: 7 Enter meter: 500 **Set-2** Enter data for 1st distance: Enter km: 7 Enter meter: 700 Enter data for 2nd distance Enter km: 8 Enter meter: 500	**Set-1** Sum of distances = 14 km 100 m **Set-2** Sum of distances = 16 km 200 m
4.	WAP to add two times (in hr-min-sec) by passing structure to a function.	**Set-1** Enter Time 1 -> 3: 40 : 50 Enter Time 2 -> 2: 45: 50 **Set-2** Enter Time 1 -> 5: 10: 45 Enter Time 2 -> 6: 40: 45	**Set-1** Sum of time is -> 6: 26: 40 **Set-2** Sum of time is -> 11: 51: 30
5.	WAP to store n employees' data such as employee name, gender, designation, department, basic pay etc using structures with dynamically memory allocation. Calculate	**Set-1** Enter the number of employees: 3 Enter Employee details- Enter employee name: John Doe Enter employee gender (M/F): M Enter employee designation: Manager	**Set-1** Details of Employee- Name: John Doe Gender: M Designation: Manager Department: Sales Basic Pay: 50000.00 Gross Pay: 87500.00

Home

	the gross pay of each employee as follows: Gross pay=basic pay + HR + DA HR=25% of basic, DA=75% of basic	Enter employee department: Sales Enter employee basic pay: 50000 Enter Employee details- Enter employee name: Jane Smith Enter employee gender (M/F): F Enter employee designation: Engineer Enter employee department: Engineering Enter employee basic pay: 35000 Enter Employee details- Enter employee name: Alex Johnson Enter employee gender (M/F): M Enter employee designation: Analyst Enter employee department: Finance Enter employee basic pay: 45000	Details of Employee- Name: Jane Smith Gender: F Designation: Engineer Department: Engineering Basic Pay: 35000.00 Gross Pay: 61250.00 Details of Employee- Name: Alex Johnson Gender: M Designation: Analyst Department: Finance Basic Pay: 45000.00 Gross Pay: 78750.00

Assignments (Practice Problems)

Q#	Experiment Details	Input	Output
1	WAP to create a new data type DATE (dd-mm-yyyy) with the help of structure and typedef. Write the following user defined functions for the date manipulations. a) To increment date by 1 day b) To increment date by 1 month c) To increment date by 1year d) to add few days in a date. e) To add few months in a date. f) To add few years in a date. g) To return month name from a date.	**Set-1** Enter a date: 24-03-2023 No. of days to add: 9 No. of months to add: 2 No. of years to add : 3	**Set-1** Next day is : 25-03-2023 Next month : 24-04-2023 Next year is : 24-03-2024 After addition of days : 2-04-2023 After addition of months : 24-05-2023 After addition of years : 24-03-2026 Month name : March Date : 24.03.23

	h) To display date in DD-MM-YY format		

Day: 25
TOPIC : Structure and Union

Lab Assignments

Q#	Experiment Details	Input	Output
1	WAP to declare an union named as ABC having three members a, b and c as character, integer and double respectively. Assign user entered values to these members respectively one by one and display these values immediately. Again, assign these user entered values to a, b, c one by one, all together and display these values at last. Find the difference.	**Set-1** Values entered one by one: Enter a character: A Enter an integer: 42 Enter a double: 3.14 **Set-2** Enter a character, an integer, and a double all together: A 42 3.14	**Set-1** Character: A Integer: 42 Double: 3.140000 **Set-2** Values entered all together: character: @ integer: 10586 double: 3.14
2	Use structures to perform addition, subtraction, multiplication and division operations on two complex numbers.	**Set-1** Enter the real and imaginary units of first complex number: First real = 7 First Imaginary = 8 Enter the real and imaginary units of the second complex number: Second real = 3 Second Imaginary = 6	**Set-1** You have entered 1st no. As = 7.0 + 8.0 i You have entered 2nd no. As = 3.0 + 6.0 i What do you want to do? Press e for exit Press a for addition Press s for subtraction Press m for multiplication Press d for division: a Your ans is: 10.0 + 14.0 i What do you want to do? Press e for exit

			Press a for addition Press s for subtraction Press m for multiplication Press d for division: s Your ans is: 4.0 + 2.0 i What do you want to do? Press e for exit Press a for addition Press s for subtraction Press m for multiplication Press d for division: m Your ans is: -27.0 + 66.0 i What do you want to do? Press e for exit Press a for addition Press s for subtraction Press m for multiplication Press d for division: d Your ans is: 1.5 + 0.4 i What do you want to do? Press e for exit Press a for addition Press s for subtraction Press m for multiplication Press d for division : e
3	Use an array of structures to calculate the gross salary and solve the increment issue in an office. Also, calculate the new salary structure after increment. Given basic: Rs 12500, DA: 50%, and HRA 10%.	**Set-1** What do you want to do? A. Enter new employee details: B. Search employee details: C. Increment the salary: A What do you want to do? A. Enter new employee details: B. Search employee details: C. Increment the salary: B What do you want to do? A. Enter new employee	Set-1 Enter employee details: First Name: Arjun Last Name: Mohanty Enter Category: Clerk Enter Address: Patia Square, Kalarahanga Enter Basic Salary: 12500 Enter First Name: Arjun Name: Arjun Mohanty Address: Patia Square,

		details: B. Search employee details: C. Increment the salary: C What do you want to do? A. Enter new employee details: B. Search employee details: C. Increment the salary: B	Kalarahanga Gross Salary: 20000 Enter First Name: Arjun Percentage Increase: 10 Enter First Name: Arjun Name: Arjun Mohanty Address: Patia Square, Kalarahanga Gross Salary: 22000

Home Assignments (Practice Problems)

Q#	Experiment Details	Input	Output
1	WAP to calculate the difference between two time periods. Times are given in (hr:min:sec) User has to choose whether 12hr or 24 hr format.	**Set-1** Enter Choice : 1. 12 hr format 2. 24 hr format 1 Enter time1- 09:25:30 Enter time 2- 06:10:10 **Set-2** Enter Choice: 1. 12 hr format 2. 24 hr format 2 Enter time1- 14:20:10 Enter time2- 13:10:05	**Set-1** Difference between Time 1 and Time 2 is- 3 hrs 15 mins 20 secs **Set-2** Difference between Time 1 and Time 2 is- 1 hrs 10 mins 5 secs
3	WAP to extract individual bytes from an unsigned int using union.	**Set-1** Enter an unsigned integer: 4294967295 **Set-2** Enter an unsigned integer: 987654321	**Set-1** Individual bytes: FF FF FF FF **Set-2** Individual bytes: 31 2D FB 3A

File Handling

Week 15 : Day 27, 28

Lab Assignments

Q#	Experiment Details	Input	Output
1	WAP to read and print the content of a file test.txt	Content of test.txt From the small beginnings KIIT has developed into a leading university	From the small beginnings KIIT has developed into a leading university
2	WAP to write the text From the small beginnings KIIT has developed into a leading university into a file test.txt		Content of test.txt From the small beginnings KIIT has developed into a leading university
3	WAP to append the phrase "with a strong interdisciplinary culture and a commitment to teaching excellence" into the file test.txt	Content of test.txt From the small beginnings KIIT has developed into a leading university	Content of test.txt From the small beginnings KIIT has developed into a leading university with a strong interdisciplinary culture and a commitment to teaching excellence
4	WAP to count the total number of characters in the file test.txt	Content of test.txt From the small beginnings KIIT has developed into a leading university with a strong interdisciplinary culture and a commitment to teaching excellence	150
5	WAP to count the total number of words in the file test.txt	Content of test.txt From the small beginnings KIIT has developed into a leading university with a strong interdisciplinary culture and a commitment to teaching excellence	22
6	WAP to change all small letters in the file test.txt to capital letters	Content of test.txt From the small beginnings KIIT has	Content of test.txt FROM THE SMALL BEGINNINGS KIIT HAS

		developed into a leading university with a strong interdisciplinary culture and a commitment to teaching excellence	DEVELOPED INTO A LEADING UNIVERSITY WITH A STRONG INTERDISCIPLINARY CULTURE AND A COMMITMENT TO TEACHING EXCELLENCE
7	WAP to copy contents of the file test.txt to another file new.txt	Content of test.txt FROM THE SMALL BEGINNINGS KIIT HAS DEVELOPED INTO A LEADING UNIVERSITY WITH A STRONG INTERDISCIPLINARY CULTURE AND A COMMITMENT TO TEACHING EXCELLENCE	Content of new.txt FROM THE SMALL BEGINNINGS KIIT HAS DEVELOPED INTO A LEADING UNIVERSITY WITH A STRONG INTERDISCIPLINARY CULTURE AND A COMMITMENT TO TEACHING EXCELLENCE
8	Write all the programs 1-7 where all the related filenames will be given at command line	Same as previous	Same as previous

Home Assignments (Practice Problems)

Q#	Experiment Details	Input	Output
1	WAP to generate factorial of number given as input through a file test.txt and append the factorial value in the file.	Content of test.txt 5	Content of test.txt 5 120
2	WAP to count the case-insensitive occurrences of a given word in a file test.txt	Content of test.txt From the small beginnings KIIT has developed into a leading university with a strong interdisciplinary culture and a commitment to teaching excellence **Set 1** Input the word to search: a **Set 2** Input the word to search: THE	 **Set 1** 3 **Set 2** 1
3	WAP to count total number of words in	**Set 1** Content of test.txt	**Set 1** Paragraph -1 words

	each paragraph in a file test.txt	From the small beginnings KIIT has developed into a leading university with a strong interdisciplinary culture and a commitment to teaching excellence	– 22
4	Check if contents of two files are same	**Set 2** Content of test.txt From the small beginnings KIIT has developed into a leading university with a strong interdisciplinary culture and a commitment to teaching excellence. Today, KIIT offers professional education to around 35,000 students from across India.	**Set 2** Paragraph -1 words – 22 Paragraph -2 words - 12
5	WAP to check if there exists any date in dd-mm-yyyy format in a file testdate.txt	**Set 1** Content of testdate.txt Today date is 01-01-2023 **Set 2** Content of testdate.txt Today date is 1st January of 2023	**Set 1** YES **Set 2** NO
6	WAP to check if a filepath, given as the commandline argument, exists in the system	**Set 1** test1.txt **Set 2** test.txt	**Set 1** Filepath doesnot exist **Set 2** Filepath exists
7	WAP to delete a file if that exists in the system, where the filepath is given as the commandline argument	**Set 1** test1.txt **Set 2** test.txt	**Set 1** Filepath doesnot exist **Set 2** Fie deleted successfully

Grading Policies:

S No.	Internal/Sessional	Assessment Component	Weightage / Marks
1	**Internal (Sample)** **(60 Marks)**	Continuous Evaluation Lab Report + Attendance	30
		Viva	10
		Quiz	10
		Programming Test	10
2	**Sessional** **(40 Marks)**	Quiz	20
		Programming Test	20

Reference Materials:-

1. Text books

T1: Programming in ANSI C (8th Edition) by E. Balagurusamy

2. Reference books

R1: The C Programming Language by Brian Kernighan and Dennis Ritchie (Second Edition)

3. Links to e-resources (NPTEL, YouTube, Swayam, Virtual lab etc)

- **https://onlinecourses.nptel.ac.in/noc22_cs40/preview**