**C Programming Lab**

**C Program List (Open Ended Experiments)**

**Academic Year 2019-20**

**Decision Making and Branching constructs**

* Write a C program for the following scenario: A telecom service provider offers recharge discount of Rs. 100 for using GPay wallet, Rs. 50 for using Phone Pe wallet and Rs. 200 for using Axis Bank credit card only if in all cases the recharge amount is more than Rs. 499. Program must accept the Recharge amount and mode of payment. The net amount to be paid must be the output of the program.
* Suppose the postal rates for mailing letters are as follows

Rs. 0.50 per 10 grams for the first 50 grams

Rs. 0.40 per 10 grams for the next 100 grams

Rs. 0.25 per 10 grams for the next 250 grams and

Rs. 0.25 per kilograms for the letters weighing more than 400grams

Write a C program that prompts for weight of a letter and prints the postage to be paid

* Write a C program that checks if a given password is strong, weak or moderate as per the rules given below.

1. If it contains a combination of digits, alphabets and special characters, then the password is strong.
2. If it contains a combination of only digits and alphabets, then the password is moderate.
3. If it contains only alphabets, then the password is weak.

* A commercial bank accepts fixed deposit from the public. The rates of interest vary depending on the number of days for which the deposits are made. Following are the rates.

|  |  |
| --- | --- |
| 30 days to 60 days | 6% |
| 61 days to 90 days | 6.5% |
| 91 days to 180 days | 7% |
| 181 days to 1 year | 8% |
| More than 1 year | 8.5% |

For senior citizen, 1% additional interest is offered for deposits more than 50,000.

Write a program to accept the amount, number of days for which the amount is deposited and the age of the depositor, calculate the amount to be given to the customer after the completion of term of deposit.

* Write a C program to add two complex numbers
* Write a C program to read three sides of triangle. Check whether these sides make triangle. If they make then identify whether it is equilateral or isosceles or scalene.
* A Student has scored marks in three subjects. Write a C program to find out the highest, second highest and third highest marks among the three subjects. Also find the average of first two highest marks.

**Decision Making and Looping Statements**

* Write a C program that accepts 60 mobile numbers iteratively. On accepting one mobile number the program must check whether the same ends with an even number or odd number. If even, then the contact belongs to Batch A else the contact belongs to Batch B. The program must output the Number of mobiles in Batch A and Batch B after all the 60 mobile numbers are read.
* Suppose an amount is deposited in a commercial Bank, which pays compound interest at the rate of r% annually for n years. Write a C program that prints the amount in account after each year.
* Write a program to check whether a given number is prime or not.
* Write a C program to create a simple gaming application as per the scenario. The admin is asked to select a number between 1 to 10. The user is asked to enter any number. If the number matches the number chosen by the admin then the user wins. The user is given maximum of 3 chances.
* Write a program to generate following pattern

1

121

12321

1234321

123454321

1

2 1 2

3 2 1 2 3

4 3 2 1 2 3 4

* Write a C program to find Strong Numbers within a range of numbers.
* Write a C program to print following pattern.

1

1 2 1

1 2 3 2 1

1. 2 3 4 3 2 1

* Write a C program to to calculate the average height and weight of the entire class and categorize into i) Avg\_Height <5feet.

ii) 5< Avg\_Height<6

iii) Avg\_Weight<50kg

iv) 50< Avg\_Weight<75kg

**Single dimension Array**

* Write a C program to read a mobile number. Create a single dimension array in such a way that the index location of the array that matches the digit present in the mobile number must be filled with the frequency of that digit in the mobile number. Example if the mobile number is 9945690021 then the array location with index 9 must be filled with 3 as 9 appears 3 times in the mobile number.
* Write a C program that accepts an array , interchanges first element with last element , second element with second last element & so on , finally prints the new array.
* Write a C program to cyclically display the elements of an array for any number of digits.

Sample input: 1 2 3

Sample output: 123 231 312.

* Write a program to find intersection of two arrays a and b with size m and n respectively.

Example:

int a[10]={1,2,4,6,7,8,11,12,13,5}

intb[5]={8,12,56,13}

Output:

c[10]={8,12,13}

* Write a C program to count the frequencies of elements of a given integer array.
* Write a C program to read n numbers in 1-D array and sum of any consecutive elements present in array. Print the sub-array making sum along with start and end index.
* Write a C program to count the number of vowels in a given words.

**Double dimension Array**

* Write a C program to read Physics, Chemistry and Maths marks of 20 students. The total marks secured must be calculated. The maximum marks per student is 300. The PCM percentage also must be calculated. All this data must be stored in an array. The output is a neat display of data shown as under:

Physics Chemistry Maths Marks Secured Total Marks Percentage

52 72 80 204 300 68.00

40 30 50 120 300 40.00

…….

…….

Given a matrix A of order mxn , write a C program to sort even rows in ascending order and odd rows in descending order.

* Write a C program to find the largest and smallest words based on the number of characters in a two dimensional character array without using library functions.
* Annual examination results of 100 students is stored as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| Roll No. | Subject 1 | Subject 2 | Subject 3 |
| :  :  : | :  :  : | :  :  : | :  :  : |

Write a program to read the data and determine the following:

(a) Total marks obtained by each student

(b) The highest marks in each subject and roll number of the student who secured it.

(c) The student who has secured highest marks(class topper)

* The given are two one dimensional arrays A and B which are sorted in ascending order. Write a C program to merge them into a single sorted array C that contains every element from array A and B, in ascending order.
* Write a C program to store product code and price in 2-D array, calculate the total price for multiple product codes entered from array along with quantity.
* Write a C program to store the students name and USN using 2 dimensional array and display the list.

**String Manipulation**

* Write a C program to sort the characters of a string in ascending order. The string must contain only small case alphabets.
* Write a C program to illustrate input and output of array of strings represented as 2D array of characters. (eg Days in a week or Months in a year)
* Write a C program to remove 3 or more consecutive characters from a string, repeat until there are no more

Ex: MNHHHHNNM => MNNNM => MM

* Write a program to find number of occurrences of a word in a string.
* Write a C program which will read a string and rewrite it in the alphabetical order. For example the word STRING should be written as GINRST.
* Write a program in C to print all permutations of a given string using pointers.
* Write a C program to read paragraphs of lines. Count the occurrences of a given word.
* Using String manipulation functions, write a C program to read the name, USN, address and Branch.

**User Defined Function**

* Write a program that reads 10 mobile numbers and stores them in an array. Each number must be sorted in ascending order using a sort function. Print the resultant array with all numbers.
* 2. Write a function , say int unit\_digit(int n) that returns the unit digit of a number represented in argument n.
* 3. Write a C program which displays the details of a criminal in the police station. The name of the criminal is sent as the parameter to a function which displays the details of the criminal such as his name, his criminal record, place of birth, the term for which he is held in imprisonment and other details. If the name doesn’t match with the existing names then a message should be displayed as “Record not found”.
* 4. Write a program to convert a decimal number to its binary equivalent using function.
* 5. Write a C program to perform matrix addition and subtraction using function in following way  
  i. read\_matrix(int [ ][ ]) to read matrix

ii. operation(int [ ][ ], int) to perform addition / subtraction depending on choic

iii. print\_matrix(int [ ][ ]) to print matrix

* Write a C program to demonstrate the use of Calculator using the user defined functions.

**Recursion**

* Write a C program that prints the Sum of first n natural numbers using recursion
* Write a C program to find sum of elements of an array named ‘a’ with ‘n’ elements using recursion.
* Write a C program to print the sum of first n odd numbers using recursion.
* Write a recursive function to implement binary search.
* Write a program in C to check a number is a prime number or not using recursion.
* Write a C program to generate and print first 10 natural numbers along with its sum using recursion
* Write a C program to find the Fibonacci series and also add all the numbers using recursive function.

**Pointers**

* Write a program to read 10 numbers using pointers. Accept a number and search whether that number is present in the list. Use Pointer concept while searching.
* Write a program that dynamically allocates memory for an array of size n , reads elements of array & sorts them in ascending order.
* Write a C program that helps a kid to remember alphabets where in a character is given as an input and a fruit name or a country name is displayed beginning with that character.
* Write a program using functions and pointers to implement substrptr(char s1[], char s2[]) with two arguments of character array type containing source string (s1)and substring(s2). Function should return an address of a substring in a string if present else a NULL pointer.
* Write a C program to change the value of integer constant using pointer.
* Write a C program to swap two numbers using pointers.

**Structures**

* Write a C program to store 10 student records (Name, USN Number, Mobile Number, Address) and sort them by Name in ascending order. Output the sorted records.
* Consider the following declaration

Struct Emp{

int code;

char name[20];

float salary;

};

Given that there are n (<=50) employees in an organization .Write a program using pointer notation to access the data of an Employee that outputs the details of the employee having highest salary.

* Write a C program for generating bill in a shopping mall. The bill should contain the item description, quantity of items purchased, rate and finally the total amount.
* Define structure by name date with members day, month and year of int type. Perform following:

(a) Validate a date

(b) if d1 and d2 are two dates, find whether d1 is earlier than d2 or d1 is later than d2 or both are equal.

(c) find difference between two dates d1 and d2 in terms of number of days.

* Read information (name, roll no and marks) of 10 students using structures and Write a C program to sort them using roll no in ascending order.

5. Write a C Program to read marks of three subjects for 10 students and print them in the order of highest to lowest.

* Write a C program to demonstrate the use of Structure, to read the details of bank customer. The details are i) Cust\_ID, ii) Name iii) Age, iv) Address v) Type of account.

**Files**

* Write a C program to merge contents of two files into a third file. Print contents of the third file.
* Given a text file containing some text , write a program that prompts the user to input name of a text file , reads this file and outputs the number of vowels & number of words in the text.
* Write a C program to compare two text files. If corresponding characters are not same then print a message “Files are not same”. Else, display the contents of the either of the files in reverse order.
* Write a program to sort the numbers sorted in a file.
* Write a program in C to count a number of words and characters in a file.
* Write a C program to find the number of lines in a text file.
* Write a C program to read Student USN and compare the value with the data from a file. If the USN is found display that students details and if not found display appropriate message.