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Question Paper Code: X10841

B.E./B.Tech. DEGREE EXAMINATIONS NOVEMBER/DECEMBER 2020

Seventh Semester

Biomedical Engineering

OCS752 Introduction to C Programming

Common to Civil Engineering, Electrical and Electronics Engineering, Electronics and communication Engineering, Electronics and Instrumentation Engineering, Instrumentation and control Engineering, Textile Technology

(Regulations 2017)

Time : 3 Hours

Answer ALL Questions

Max. Marks: 100

PART-A (10 x 2 = 20 Marks)

1. Consider the following code:

```
int main()
{
    char text[25]= "C PROGRAMMING";
    printf("%d,%d", strlen(text), sizeof(text));
    return 0;
}
```

What is the difference between strlen() and sizeof()?

2. Write a C program to generate the following sequence until the last value is less than 1000.
1,3,7,15,31,.....
3. Suppose a company keeps a linear array YEAR(1980:2000) such that YEAR[K] contains the number of employees born in year K. Develop the module to print each of the years in which no employee was born.
4. Write a C program to remove the duplicate elements in an array.
5. Write a C program to count the frequency of occurrence of digits 0 to 9 in a string.
6. Write a C program to remove the duplicate elements in an array.
7. Explain the meaning of each of the following function prototypes:
a) int fun1(int a);

- b) double fun2(double a, int b);
 - c) void fun3();
 - d) char fun4(void);
8. Write a program in C to check whether the given integer as a sum of two prime numbers using the function.
 9. When passing an argument to a function, what is the difference between passing by value and passing by reference? Explain with example what type of arguments does each apply?
 10. Given an unsorted array. The array has this property that every element in array is at most k distance from its position in sorted array where k is a positive integer smaller than the size of array. Write a C program to sort the elements in an array.

PART-B (5 x 13 = 65 Marks)

11. a) A bank charges commission on the issue of demand draft (DD) at the following rates:

DD Amount	Commission
Upto INR 500/-	INR 10/-
INR 501/- to INR 1000/-	INR 15/-
INR 1001/- to INR 5000/-	INR 20/-
INR 5001/- to INR 10000/-	INR 25/-
>INR 10,000/-	INR 4/- for every INR 1000/- and a maximum commission of INR 1500/-

(13)

Write a C program which will accept DD amount through terminal and calculate the commission payable and print it along with the DD amount.

OR

- b) The rates of income tax (IT) on gross income are as shown below:

Income (INR)	Tax (INR)
<1 L	No tax
1,00,001/- to 3,00,000/-	10%
3,00,001/- to 5 L	20%+1000/-
>5 L	30%+2000/-

(13)

Write a C program to compute the income tax.

12. a) A and B are two arrays of same size. Assume that the values in array A are already available in the memory. Write a program to create the array B, using the elements of array A in such a way that the elements of the first column of A are the same as

the last of array B and so on. (ie., B is a mirror image of A). The input and output arrays would appear as follows:

Array A				Array B				(13)
8	4	3	1	1	3	4	8	
2	6	4	9	9	4	6	2	
3	4	7	5	5	7	4	3	
8	6	9	1	1	9	6	8	

OR

- b) You are given two matrices **A** and **B**. Write a C program to print the number of pairs **(x, y)** such that **x** is from array **A** and **y** is from array **B** and **y > x**. (13)

13. a) Write a function `int* generateprimes(int limit)` to generate all the prime numbers between 2 and some given limit and return them as an array. Print all elements from array. (13)

OR

- b) Write a C program using structure to store the name, account number and balance of customers.
- (i) Write a function to print the names of all the customers having balance less than INR 5,000/-. (7)
- (ii) Write a function to add INR 2,000/- in the balance of all the customers having more than INR 50,000/- in their balance and then print the incremented value of their balance. (6)

14. a) The university students can view their profile by logging into a portal in their university's website. To display the profile of a particular student, the university accepts the register number, or any valid identifier issued uniquely to identify the student. This would be mostly a unique number. When the server receives a request from the student, it must search for the student's profile among the profile of all the students and retrieve it to be displayed to the student. What a C program for the optimal way of searching a given number in an array? (13)

OR

- b) Write a C program to keep records and perform statistical analysis for a class of 5 students. The information of each student contains ID, Name, Sex, mark 1, mark 2, mark 3, mark 4, mark 5 and total. The program will prompt the user to choose the operation of records from a menu as shown below: (13)
- (i) Add student records

- (ii) Delete student records
- (iii) Update student records
- (iv) View student records
- (v) Calculate an average of a selected student's scores
- (vi) Show student who gets the max total score
- (vii) Show student who gets the min total score

15. a) Create a structure Employee with the relevant members. Write a C program using suitable function for finding out total number of male and female employees and to retrieve the salary of the employee. (13)

OR

b) Create a structure Time with three fields for hours, minutes and seconds. Write a C program to initialize the data members and to perform arithmetic and relational operations using structure. (13)

PART C (1 x 15 = 15 Marks)

16. a) You are given an array of size N denoting N working days in a school. Each element in the array represents a working day and the number in it denotes the number of units of electricity consumed from the first working day till that day. Write a C program to find which working day the number of units of electricity consumed crosses a particular threshold. (15)

OR

b) Your local bookstore just received a new shipment of classic literature, and you are extremely excited to find the rare text you've been looking for. What is the best way to search for your book? But, when you get into the store, the clerk tells you that the books have yet to be sorted. Write a C program for searching your favorite book using array of structures. (15)
