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PRANVEER SINGH INSTITUTE OF TECHNOLOGY KANPUR

Odd Semester Session 2023-24 Pre-University

B. Tech.- I Semester

Programming for Problem Solving (BCS-101)

CO Number	Course Outcome
CO1	To be able to **Define [L1: Knowledge]** basics of computer and C programming concepts, algorithms and draw [L1-Knowledge] flow charts.
CO2	To be able to **Explain [L2: Comprehension]** the C programming constructs such as data types (primitive and non-primitive), operators, conditions and looping, modular programming, pointer, preprocessor directives and file management.
CO3	To be able to **Apply [L3: Application]** the C programming constructs such as data types (primitive and non-primitive), operators, conditions and looping, modular programming, pointer, preprocessor directives and file management.
CO4	To be able to **Analyze [L4: Analysis]** various C programming constructs.

Time: 3 Hrs. M. M. 70

Section A

Q1. Attempt all questions: **(2X7 = 14 Marks)**

a) Explain the characteristics of an algorithm. Draw a flow chart to find largest number among three distinct numbers. CO2

b) Explain memory hierarchy in computer system. CO2

c) Define operating system and list various functions of operation system. CO1

d) Explain the working of switch-case statement in C. CO2

e) Differentiate between implicit and explicit type casing with example. CO4

f) Differentiate between structure and union. CO4

g) Differentiate between entry controlled and exit controlled loop. CO4

Section B

Q2. Attempt all questions: **(7X3 = 21 Marks)**

a) Draw the block diagram of digital computer and define various components and their functions. CO1

b i) Explain all the basic data types with its format specifier, size and range. CO2

OR

ii) Explain various storage classes in C with proper examples. CO2

c i) Develop a program in C to input two 4x4 matrices from user and print multiplication of matrices in matrix form. CO3

OR

ii) Discuss various string handling functions in C. Develop a C program to check that a given string is palindrome or not. CO3

Section C

Q3. Attempt any one part of the following questions: **(7X1 = 7 Marks)**

a) Develop a C program to print Pascal triangle up to n lines. CO3

OR

b) Develop a C function which returns the factorial of a given number. CO3
(1) Without using recursion
(2) Using recursion

Q4. Attempt any one part of the following questions: **(7X1 = 7 Marks)**

a) Develop C programs for the following using function: CO3
(1) To find the GCD of two given numbers.
(2) To print all Prime numbers in a given range.

OR

b) Develop C programs for the following: CO3
(1) To check that a given number is palindrome or not.
(2) Given an array of integers find the difference of largest and smallest element in array.

Q5. Attempt any one part of the following questions: **(7X1 = 7 Marks)**

a) Explain call by value and call by reference. Illustrate malloc() and calloc() functions with proper examples. CO3

OR

b) Illustrate the role of Preprocessor. Explain various types of macros with the help of suitable examples. CO3

Q6. Attempt any one part of the following questions: **(7X1 = 7 Marks)**

a) Analyze the run time of Bubble sort. Given an array arr[]={16,25,14,13,12,11}, show all the steps to sort the array using Bubble sort. CO4

OR

b) Justify, that the complexity of binary search is $O(\log_2 N)$. Also develop a C program to search an element using binary search. CO4

Q7. Attempt any one part of the following questions: **(7X1 = 7 Marks)**

a) Construct a structure *'student'* to specify data of students given below: Roll number, Name, Percentage, city_of_residence. Develop a C program to store the record of 100 students and print the name and roll number of students who reside in *"Kanpur"* and percentage<40. CO3

OR

b) Define various file operations in C. Develop a program in C to copy the content of a text file into another file, also print the count of characters copied on monitor. CO3