PRANVEER SINGH INSTITUTE OF TECHNOLOGY KANPUR

Even Semester   Session 2021-22   PreUniversity

B. Tech. 2nd Semester

Programming for problem solving (KCS-201T)

CO Number	Course Outcome (Please include all COs of your Course here)
CO1	Able to **define** [L1-Knowledge] basics of computer and C programming concepts, algorithms and **draw** [L1-Knowledge] flow charts.
CO2	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	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	Able to **analyze** [L4- Analysis] various C programming constructs.
CO5	(Not applicable)

Time: 3 Hrs.   M. M. 100

Section A

Q1. Attempt all questions: (2X10 =20 Marks)

a)	Explain functionalities of operating system.	CO2
b)	Explain Memory Hierarchy.	CO2
c)	Define order of complexity for an algorithm.	CO1
d)	Discuss the advantages of using Linked Lists.	CO2
e)	Identify Output of following code:	CO1

```
main(){
        int i,len;
        char *ptr="Strings";
        len=strlen(ptr);
        for(i=0;i<len;i++)
        { puts(ptr);
          ptr++; }
}
```

f)   Identify Output of following code: CO1

```
#include <stdio.h>
#define MESSAGE "You wish123!"
main()
{
#ifdef MESSAGE
printf("Here message: %s\n", MESSAGE);
#endif
printf("Here out-if message: %s\n");
}
```

g)	Explain the difference between malloc() and calloc() functions.	CO2
h)	Compare Structure and Union in C language.	CO4
i)	What do you mean by pointer arithmetic?	CO1
j)	Compare Function and function-like Macro in C with suitable example.	CO4

Section B

Q2. Attempt three questions. Question No 2(a) is compulsory :   (10X3 = 30 Marks)

a)   List all Data-Types in c within various categories. Explain Union and Enumeration data   CO2
types in detail with suitable example. Also explain both Data-Type conversion-methods.

b) Explain the importance of Recursion in C? Also explain the concept of Tail-recursion and Non-tail-recursion, with suitable examples.   CO2

OR

c) List all types of Operators in c within various categories. Explain Bit-wise operators in detail with suitable examples. Also explain the concept of operator Precedence and Associativity with example.   CO2

d) Develop a C program to store the records of n employees of a company {ID, Name, Department, Salary} and then display the records of those employees who are working in a given department and getting salary more than 5000.   CO3

OR

e) Develop a C program to perform following operations on strings entered by user, by selecting appropriate option number (entered by user). (Do not use predefined function to handle string)   CO3.
- [1] Palindrome Test for a string.
- [2] Concatenate two strings.

Section C

Q3. Attempt all questions: **(10X5 = 50 Marks)**

a i) Explain Digital Computer System, along with detailed description of all its components.   CO2

OR

ii) Explain algorithm, flowchart and pseudocode on example of finding roots of a quadratic equation.   CO2

b i) Illustrate detailed description of various storage classes in C with suitable examples.   CO3

OR

ii) Illustrate significance of Macros in C. Develop a C program to test a given year is leap year or not a leap year by using Macro.   CO3

c i) Develop a C program to implement Binary Search method.   CO3

OR

ii) Develop a C program to implement Matrix multiplication method for two rectangular matrices (of size mxn and pxq).   CO3

d i) Develop a C program to swap values of two variables using call by value and call by reference techniques, also illustrate the effect of swapping within main() function.   CO3

OR

ii) Develop a C program to sort 5 strings in lexicographically (alphabetical order) using bubble sort technique.   CO3

e i) Explain the concept of File-Handling in C. Discuss all the file opening modes. Develop a C program to count occurrence (frequency) of a given word in a given text file.   CO3

OR

ii) Explain the concept of Pointer in C. Develop a C program to implement linear search method by using dynamic memory allocation concept (number of elements of array will be asked dynamically at run time).   CO2