

Satyug Darshan Institute of Engineering & Technology, Faridabad

Department of Applied Science and Humanities

Academic year 2025-26

Programme: B.Tech.	Year & Semester: 1 st & 1 st
Course Name: Programming for problem solving	Course Code: CSU-109-V
Prepared by: Ms.Nisha Arora	

Unit I

Short answer questions

Q.N.	Question	KL
1	List the four main components of a computer system.	1
2	Define an algorithm in your own words.	2
3	Differentiate between source code and executable code.	2
4	What is the role of an operating system in program execution?	2
5	Convert the following steps into a flowchart: "Input two numbers, add them, display the result."	3
6	Identify whether the following is a syntax error or logical error: <code>int x = "hello";</code>	4
7	Compare flowchart and pseudocode as tools for algorithm representation.	2
8	Why are data types important when declaring variables?	4

Long answer questions

Q.N.	Question	KL
1	Explain how a program moves from writing source code to becoming an executable file. Mention the role of the compiler.	4
2	Write pseudocode for finding the largest of three numbers.	3
3	Draw a flowchart for a login system that checks username and password.	3
4	Discuss how variables are mapped to memory locations during program execution. Give an example.	3
5	Differentiate between syntax errors and logical errors with suitable examples of each.	2
6	Critically evaluate the importance of algorithms before writing actual code. Can a program work without a well-designed algorithm?	4
8	Design an algorithm (in pseudocode or flowchart) for a simple calculator that performs addition, subtraction, multiplication, and division based on user choice.	3

Satyug Darshan Institute of Engineering & Technology, Faridabad

Unit II

Short answer questions

Q.N.	Question	KL
1	List the order of precedence for the operators: +, *, %, (), -, /.	1
2	What is the difference between = and == in programming?	2
3	Explain the purpose of a loop in programming.	2
4	What will be the value of x after this expression is evaluated: <code>int x = 5 + 3 * 2 - 4 / 2;</code>	3
5	Write a simple if statement to check if a number is positive.	2
6	Compare while and do-while loops. When would you choose one over the other?	2
7	Why might a logical error occur in a loop even if the syntax is correct?	2

Long answer questions

Q.N.	Question	KL
1	Explain with an example how operator precedence affects the evaluation of arithmetic expressions.	2
2	Write a program snippet in pseudocode to find the factorial of a number using a for loop.	3
3	Draw a flowchart for a program that checks if a number is prime.	4
4	Trace the execution of the following loop and determine the output: <pre>for(int i=1; i<=5; i++) { if(i%2==0) continue; printf("%d ", i); }</pre>	
5	Discuss how nested if-else statements work. Provide an example for grading marks (A, B, C, etc.).	3
6	Evaluate the use of break and continue statements in loops. Are they considered good programming practice? Justify.	3
7	Design a program that uses a loop to print the multiplication table of a given number, but skips multiples of 4 using a continue statement.	3

Satyug Darshan Institute of Engineering & Technology, Faridabad

Unit III

Short answer questions

Q.N.	Question	KL
1	What is the difference between a 1-D array and a 2-D array?	1
2	In C, how do you declare a character array to store a string of up to 50 characters?	1
3	Explain why array indexing starts from 0 in most programming languages.	2
4	Given <code>int arr[5] = {10, 20, 30, 40, 50};</code> , what is the value of <code>arr[3]</code> ?	2
5	What will happen if you try to access <code>arr[10]</code> in an array of size 5?	4

Long answer questions

Q.N.	Question	KL
1	Explain the memory representation of a 2-D array. How is it stored in contiguous memory?	2
2	Write a program to find the largest element in a 1-D integer array.	3
3	Compare character arrays and strings in C. How is the null terminator <code>'\0'</code> significant?	3
4	Is it better to use arrays or linked lists for storing a fixed number of elements? Justify your answer.	2
5	Design an algorithm to multiply two 3x3 matrices and store the result in another 2-D array. Provide pseudocode.	3

Unit IV

Short answer questions

Q.N.	Question	KL
1	Name two basic sorting algorithms	1
2	Explain why Bubble Sort is considered inefficient for large datasets.	2
3	Given the array <code>[7, 2, 5, 1]</code> , show the steps of Selection Sort until the second pass.	3
4	Compare Insertion Sort and Selection Sort in terms of number of swaps.	4
5	Why might a root-finding method like bisection be preferred over trial and error?	4

Satyug Darshan Institute of Engineering & Technology, Faridabad

Long answer questions

Q.N.	Question	KL
1	Write pseudocode for the Insertion Sort algorithm.	3
2	Explain the Bubble Sort algorithm with an example. How many passes are needed for an array of size n?	4
3	Trace the steps of Linear Search for finding 15 in [4, 8, 15, 2, 7]. How many comparisons are made?	4
4	Evaluate the suitability of Bubble Sort vs. Insertion Sort for nearly sorted data. Justify your answer.	5
5	Explain the Merge Sort algorithm with an example. How many passes are needed for an array of size n?	4

Unit V

Short answer questions

Q.N.	Question	KL
1	What is the main purpose of using functions in a program?	2
2	Differentiate between call by value and call by reference.	2
3	Why is it important to declare a function before using it in some programming languages?	4
4	What do you understand by arguments?	1
5	What do you understand by return type in function?	1

Long answer questions

Q.N.	Question	KL
1	Explain with an example how parameter passing works in call by value and call by reference.	3
2	Write a function in pseudocode that accepts an array and its size, and returns the sum of all elements. Mention how the array is passed.	3
3	Design a modular program that uses two functions: • One to sort an array using Bubble Sort • Another to search for an element using Linear Search Explain how you will pass the array between functions.	4
4	Design a modular calculator program that uses separate functions for: • Addition • Subtraction • Multiplication • Division	4

Satyug Darshan Institute of Engineering & Technology, Faridabad

5.	With the help of examples ,explain how the C function works with arguments and return values.	4
----	---	---

Unit VI

Short answer questions

Q.N.	Question	KL
1	Define recursion in programming.	1
2	What is the base case in a recursive function and why is it important?	2
3	What will happen if a recursive function lacks a proper base case?	2
4	Write the recursive formula for the Fibonacci series.	3
5	Compare recursion and iteration. When might recursion be less efficient?	4

Long answer questions

Q.N.	Question	KL
1	Explain how recursive factorial calculation works for <code>factorial(4)</code> .	3
2	Write a recursive function in pseudocode to find the sum of digits of a given integer	3
3	Trace the recursive calls for Ackermann function <code>A(1, 2)</code> and explain why it grows so rapidly.	4
4	Evaluate the use of recursion in Quick Sort vs. Merge Sort. Which is more naturally expressed recursively and why?	4
5	With the help of examples, differentiate between recursion and iteration .	4

Unit VII

Short answer questions

Q.N.	Question	KL
1	What is a structure in C and how is it different from an array?	1
2	How do you define a structure to store a student's rollno, name, and marks?	2
3	Given the structure <code>struct Point { int x; int y; };</code> , write a statement to declare a variable <code>p1</code> and assign <code>x = 5, y = 10</code> .	4
4.	Write a C program to maintain a record of „n“ students details using an array of structures with four fields(roll no,name,marks,and grade).Assume appropriate data type for each field. Print the marks of the student given the student name as input.	4
5.	How is memory allocated for structures?	3

Long answer questions

Q.N.	Question	KL
1	Explain the concept of structures with an example. How are structure members accessed using the dot operator?	2
2	Write a complete C program snippet that defines a structure for a Book (title, author, price), declares an array of 5 books, and reads input for the first book.	4

Satyug Darshan Institute of Engineering & Technology, Faridabad

3	Compare arrays of structures with structures containing arrays. Provide an example scenario where each is more appropriate.	4
4	Design a structure to represent a library record that contains: • Book details (title, ISBN, author) • Borrower details (name, ID) • Due date (day, month, year) Write a program to create an array of these structures and implement a function to list all books overdue by a given date.	4
5.	Explain the difference between array and structures with examples	2

Unit VIII

Short answer questions

Q.N.	Question	KL
1	What is a pointer in C?	1
2	How do you declare a pointer to an integer?	2
3	What is the relationship between a pointer and a memory address?	2
4	Given <code>int a = 10; int *p = &a;</code> , what is the value of <code>*p</code> ?	2
5	What do you understand by dereferencing?	1

Long answer questions

Q.N.	Question	KL
1	Explain the concept of pointers with an analogy. How do they allow indirect access to variables?	3
2	Write a simple C code snippet that uses a pointer to swap the values of two integers.	3
3	Describe how self-referential structures work. Provide an example of a structure that contains a pointer to itself.	4
4	Design a conceptual node structure for a singly linked list. Write the structure definition in C and explain how the pointer links one node to the next.	4
5	What is the <code>sizeof()</code> operator used for with structures?	1

Satyug Darshan Institute of Engineering & Technology, Faridabad

Unit IX

Short answer questions

Q.N.	Question	KL
1	What is the difference between text files and binary files?	1
2	Name two file opening modes in C and explain when you would use each.	2
3	What is a File in C?	1
4	How do realloc() works ?	2
5	Why is there a need for free()?	2

Long answer questions

Q.N.	Question	KL
1	Explain the steps involved in reading from a file in C. Write a simple code snippet to open a file named "data.txt", read the first line, and print it to the screen.	4
2	Compare sequential file access and random file access. In what scenarios would random access be more useful? Also, discuss one risk of improper file handling (e.g., not closing a file) and its consequences.	4
3	Write a detailed program in C using modes of operation in text file	4
4	Discuss the ways how dynamic memory allocation in C occurs .	4
5.	List out the use of following functions with different modes fopen() and fclose()	4