

PROGRAMMING IN PROBLEM SOLVING

Unit 1 : Introduction	
Q1)	Explain the basic structure of C program and explain the significance of each section.
Q2)	Describe the four basic datatypes.
Q3)	Describe the purpose of the qualifiers constant, identifiers, keywords and volatile with example.
Q4)	What is type conversion.? Explain different types.
Q5)	Write a flowchart for finding the biggest among n numbers.
Q6)	(a) How does a control string in a printf() function differ from the control string in a scanf() function? (b) Write commonly used scanf() format codes.
Q7)	Write a function that conducts bubble-sorting of a given array elements in descending order.
Q8)	Explain the following with examples (i) Constants and types of constants (ii) Variables and rules for naming variables.
Q9)	Find the final values stored in the variables in following program segments : (i) <pre>int x, y; float a,b; x = 1565/1000 + 2.7; y= 1565/1000.0 +2.7; a= 1565/1000+2.7; b=1565/1000.0+2.7;</pre> (ii) <pre>int x,y; float a,b; x = 12.6; y= x + 0.5; x= x-2; y=y+1; a=x+y -2.5; b=a+x;</pre> (iii) <pre>int x,y; x = 025; y=x+012;</pre> (iv) <pre>int x,y; float a, b; x = 12.6; a = x + 0.5; y= x = 0.5; b= a +y;</pre>
Q10)	Evaluate the following expressions : (i) $5/3*3 - 8\%5 *2 +6*3/9$ (ii) $9/4*2 + 5\%8*3-5*4/2$ (iii) $20*10 <=500 \&\& !20 == 20 !30<50$
Q11)	(a) Define Algorithm. What are the characteristics of good algorithm? (or) Give the distinct definitions of an algorithm. (b) Write a flowchart for finding biggest of three numbers. (c) What are symbolic constants? Explain with examples. (d) Write an algorithm and flowchart for solving quadratic equation. (of the form $ax^2 + bx + c$) (e) What are the advantages of drawing a flowchart?
Q12)	Mention storage class specifiers.
Unit -2 Input and Output Statements	
Q1)	With suitable examples, explain various unformatted console I/O functions.
Q2)	Explain error handling during I/O operations.
Q3)	Write a C function to swap the contents of two variables. Show how it is called.
Q4)	What do you mean by overflow and underflow of data ? Give examples in each case.

Q5)	Write a note on (i) Bitwise operator (ii) Conditional operator (iii) Size of operator (iv) logical operators.
Q6)	What is the purpose of a "FOR" statement? Minimum how many times a for loop will be executed? Compare FOR with WHILE and DO-WHILE statement.
Q7)	Write a program to count number of 1s in a given integer number.
Q8)	Write a program to find the number and sum of 1s in a given binary number.
Q9)	Write a program to find the number and sum of all integers greater than 100 and less than 200 that are divisible by 7.
Q10)	a) Compare the following pairs of statements: (i) Switch and nested-if-else statement (ii) Break and Continue (iii) goto and Continue. b) Write the syntax of if..else statement and illustrate with an example.
Q11)	(a) M1,M2, M3 are the marks scored in 3 tests. Write an algorithm to find the average of best 2 marks. (b) Write a complete program to find the roots of a quadratic equation using if statement.
Q12)	Explain the following with examples: (i) Ternary or conditional operator. (ii) goto statement. (iii) jumps in loops.
Q13)	(a) Explain different forms of if statements with examples. (b) Write a program to read the principal amount, period of deposit and rate of interest. The program should compute the simple interest rounding to nearest rupee without using if statements and built-in functions.
Q14)	(a) Compare while and do-while loops. Give example for each. (b) Write a C program and draw flowchart to count the number of digits and sum of digits in a given integer value.
Q15)	(a) Explain the following with examples and flowchart: (i) Simple if statement (ii) Nested if statement (iii) Else if ladder (iv) switch statement. (b) Write a program to check whether a given integer is prime number or not. (c) Write a program to check a whether a given integer is a perfect square or not. (d) Check whether a number is odd or even, using the ternary operator.
Q16)	(i) Write short note on recursive functions with example. (ii) Write a C program to find the GCD of two numbers using recursion. (iii) Write a recursive function to add two numbers a and b.
Q17)	What are the differences between the WHILE..loop and DO..WHILE loop ?
Q18)	Generate the prime numbers between the given upper and lower bounds(upper bound > lower bound)
Q19)	Write an algorithm and program for finding the biggest of 3 numbers.(using ternary operator)
Q20)	Write a program to evaluate the power series $e^x = 1 + x + x^2/2! + x^3/3! + \dots + x^n/n!$, $0 < x < 1$ using if ...else.
Q21)	Write the different loop control structures available in C. Explain each one of them briefly.
Q22)	What is the output of the following program. main() { int l =-3, j=2, k=0, m; m= ++i && ++j ++k; printf("\n %d %d %d %d", l , j, k, m); }
Q23)	Write a program to find number of primes between integers m and n ($m < n$). Also print the prime numbers.
Unit 3 : Arrays	
Q1)	What is an Array? Discuss how one dimensional array can be declared and their elements are accessed?
Q2)	Write a program to check whether an array is ordered. If ordered, print a suitable message as "ascending" or "descending" otherwise "not ordered".
Q3)	Write a program to get column-sums in a matrix of size m x n.
Q4)	(a) What are subscripted variables? How one and two dimensional subscripted variables (arrays) are declared? (b) Write a program to invert an array A having n integer elements without using another array. (ie) A[0] is interchanged with A[n-2], A[2] with A[n-3] and so on. (c) Explain initialization of one-dimensional and two-dimensional arrays with examples.

	(d) Explain runtime initialization of arrays with an example.
Q5)	(a) Write a program to check whether a string is palindrome or not, without using any built-in string functions. (b) Write a program to reverse the contents of an integer array without using another array. (c) Write a program to reverse a given array of n-elements.
Q6)	Find the output of the following code segment: Int x = 1234; Float a = 12.6876; Printf(“%06d in”, x); Printf(“%0.3f in”, a); Printf(“%8.2,f”, a);
Q7)	Write short note on two-dimensional arrays with example.
Q8)	Write a program to accept the two matrices A(M x N) and B(P x Q) and verify whether they are multipliable. If multipliable, find the resultant matrix C. Verify if the trace exists in C, if so, find the trace. (matrix multiplication)
Q9)	Write a program to sort the given list of numbers using selection sort.
Q10)	Write a program to read data from keyboard, write it to a file called “INPUT” , again read the same data from the “INPUT” file and display item on the screen.
Q11)	Explain any five string handling functions in C with appropriate examples.
Q12)	Write a program to simulate strcat() function, without using any built-in functions related to strings.
Q13)	Write a program to compare two strings without using string handling functions.
Q14)	Explain built-in functions for handling strings.
Q15)	Write a program to check whether a given string is palindrome or not.(without using any built-in string function).
	Unit 4 : Functions & Pointers
Q1)	What are functions? How are they useful? What are the different kinds of user defined functions and what is the need of user defined functions?
Q2)	Write a C function to swap the contents of two variables. Show how it is called.
Q3)	With suitable example illustrate “call by value and call by reference” techniques of passing parameters in (or) What are the two different techniques of passing arguments to function.? Explain with example.
Q4)	Write a C function to swap the contents of two variables. Show how it is called.
Q5)	Write a C program to describe passing arrays to a function.
Q6)	What are the different Categories of functions? Explain with example.
	Pointers
Q1)	(i)What is a Pointer? Mention the advantages of pointers. How do you declare a pointer variable? Explain. (ii) Write a program using pointer to swap two numbers. (iii) What are the advantages of using array name as a pointer.?
Q2)	Write a program to find sum and average of elements stored in an array, using pointers.
Q3)	Explain pointers to functions and array of pointers.
Q4)	Write a C program to find the largest of two numbers using pointers.
Q5)	Explain “Call By Reference” with example.
	Unit 5 : Structure and Unions
Q1)	What are structures in C.? How are they different from unions? Give an example for structure. (or) Define structures and UNION in C.
Q2)	Construct an array of structure called “student”. The data numbers are name, USN, class grade and percentage mark. Read n records and conduct “linear search” to print the details of the student, given a particular USN as the key.
Q3)	What are bit-fields.? Explain their significance.
Q4)	What are the unions? How are they different from structures? Give an example for union.
Q5)	Write a program that reads an array of structures named “STUDENT”. The structure has three fields viz., name of the student, USN(alphanumeric data), branch and grade(character data). Perform a linear search based on a particular USN (key) and print the details of the student if available.
Q6)	Write a program to show how the members of a structure could be accessed, using the pointers.
Q7)	Explain structures within structures.
Q8)	Create a structure of employees having the following information: Employee id

	Employee name Date of joining Salary Write a C program to input information of 20 employees and display the details of the specified employee given the employee id.
Q9)	Write a program to create an array of structures named "STUDENT" with fields name, cell no, address and percentage mark. Read the data pertaining to 'n' students and list the names of the students whose percentage marks is greater than or equal to 85.
Preprocessor	
Q1)	What is pre-processor.? Explain the different preprocessor directives with examples.(or) Write and explain ANSI additions (preprocessor).
Q2)	Explain Macro Substitution with examples.
Q3)	Explain File Inclusion with example.
Q4)	Explain Compiler Control Directives with examples.