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COMPUTER PROGRAMMING

UNIT I - INTRODUCTION

History of computers - Introduction, Evolution of computers. **Block diagram of a computer -** Digital computer, Block diagram of a computer. **Software -** Software, Application software. **Generation of computers -** First generation(1940 - 1956) - Vacuum tubes, Second generation (1956 - 1963) – Transistors, Third generation (1964 –Early 1970s) - Integrated circuits, Fourth generation (1971-at Present) - Microprocessors (VLSI), Fifth generation (Present and beyond) - Artificial intelligence, Generations of computers. **Classification of computers -** Based on operating principles, Based on utility, Based on size and capability, Classification of computers based on size and capability. **Components of a computer system -** Components of a computer system, Input devices, Output devices, Functions of CPU, Functions of memory Unit, Primary memory and secondary memory. **Number system -** Introduction, Number system, Decimal conversion, Binary conversion, Octal conversion, Hexadecimal conversion, Binary arithmetic, 1's and 2's complements, Binary code decimal. **Need for logical analysis and thinking -** Need for logical analysis and thinking, Problem solving techniques, Introduction to algorithm development, Steps involved in developing an algorithm, Algorithm to find sum of three numbers and fahrenheit temperature, Flowchart, Algorithm and flowchart, Algorithm to find factorial N, Pseudo code, Problem solving through algorithm, flowchart and pseudocode.

UNIT II - C PROGRAMMING BASICS

Problem formulation - Problem formulation. **Introduction to ‘ C’ programming and fundamentals -** Introduction to program background, Introduction to 'C' programming, Importance of C. **Structure of a 'C' program -** Structure of C program, Creating and running the program. **Constants, variables -** C character set and tokens, Identifiers and keywords. **Data types -** Data types. **Expressions using operators in 'C' -** Operators, Other types of operators, Expressions, Precedence and associativity, Evaluation of Expressions. **Managing input and output operations -** Introduction to Input/Output statements, Unformatted Input/Output statements, Formatted Input/Output statements. **Decision making and branching -** Introduction to statements, Decision making and branching statements, If statement, If - else statement, Nested if…else statement, Cascaded if else, Switch statement, Conditional operator (Ternary operator). **Looping statements -** Looping statements, while loop, do while statement, for loop statements, Nested for loop, Loop control statements. **Solving simple scientific and statistical problems -** Solving simple scientific and statistical problems. **Programming examples and exercise -** Count the ranges, Getting started, Setting bits at a position n, Symbolic constants, Upper case letters to lower case letters, Armstrong number, Character is vowel or consonant, Even or odd, Factorial of a number, Largest number among three numbers, Leap year, Multiplication table, Number is positive or negative, Palindrome number, Reverse an integer, Roots of quadratic equation, Exercise.

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UNIT III - ARRAYS AND STRINGS

Arrays - Introduction to an array, One – dimensional array, Initialization of one-dimensional array, Passing array elements as argument to functions. **Multi dimensional arrays -** Two-dimensional array, Multi-dimensional array, Array applications. **String -** Introduction to strings, String declaration and initialization. **String operations -** Introduction to string manipulation function, String concatenate [strcat()],String compare [strcmp()],String copy [strcpy()],String length [strlen()],String reverse [strrev()].**Array of string-** Array of string. **String input and output functions -** Strings I/O functions. **Simple programs of sorting and searching -** Program to sort an array of elements, Insertion sort. **Matrix operations and other example programs -** Program for addition of two matrix, Program for subtraction of two matrix, Program for multiplication of two matrix, Program for transpose matrix, Multidimensional array in C, N students using arrays, One-dimensional array, Two-dimensional arrays, Exercise.

UNIT IV - FUNCTIONS AND POINTERS

Functions in C - Designing structured programs, Functions, Library functions(or) standard functions, User-defined function, Function prototypes, Function with arguments and no return types, Function with arguments and with return types, Function with no arguments and with return types. **Argument passing - call by value call by reference -** Introduction, Call by value, Call by reference, Call by value vs call by reference. **Recursion -** Recursion, Recursive function. **Pointers and address -** Introduction to pointers, Pointer assignment and initialization, Address and de-referencing operators, Precedence of address and de-referencing operators. **Address arithmetic -** Address arithmetic. **Pointers and arrays -** Pointers and arrays, Accessing array elements using pointers, Pointer of array. **Example Problems-** Pointers and arrays examples, Pointers and functions examples, Pointers and structures examples. **Dynamic memory allocation methods -** Introduction, Allocating memory, Releasing the allocated memory, Allocating memory for derived data, Altering the allocated memory, Why dynamic memory management and how allocate memory dynamically.

UNIT V - STRUCTURES AND UNIONS

Introduction - Introduction to structures, Declaration of structure variable(s), Initialization of structure, Accessing structure members, Structure data type. **Structure within a structure -** Nested structure. **Structure of functions, arrays and pointers -** Structures and functions, Passing structure elements to function, Passing an entire structure, Passing pointer to structure, Structure of array, Arrays of structures, structures containing arrays. **Union -** Introduction to union, Structure Vs Union. **Program using structures and unions -** Example program for structure, Example program 2 - structure, Example program 3 - structure, Example program for union, Example program for union using typedef keyword. **Storage classes -** Introduction to storage class, Automatic storage class, Register storage class, Static storage class, External storage class. **Pre-processor directives -** Introduction to preprocessor, Preprocessor commands, File inclusion directives, Macro definition, Conditional compilation directives, Miscellaneous directives, Other commands.