



KAKATIYA UNIVERSITY WARANGAL

Under Graduate Courses (Under CBCS with effect from Academic Year 2022-2023 onwards)

B.Sc. DATA SCIENCE

I Year: Semester-I

Paper – I: Programming with C

[4 HPW:: 4 Credits :: 100 Marks (External: 80, Internal: 20)]

Objectives:

- The course aims to provide exposure to problem-solving through programming.
- It aims to train the student to the basic concepts of the C-programming language.
- The course is designed to provide complete knowledge of C language.
- Students will be able to develop logics which will help them to create programs, applications in C.
- The students will be able to enhance their analyzing and problem solving skills and use the same for writing programs in C.
- Also by learning the basic programming constructs they can easily switch over to any other language in future.

Outcomes:

Students should be able to

- Write the program on a computer, edit, compile, debug, correct, recompile and run it.
- To handle possible errors during program execution
- Choose the right data representation formats based on the requirements of the problem.
- Ability to define and manage data structures based on problem subject domain.
- Ability to work with textual information, characters and strings.
- Ability to work with arrays of complex objects.

Unit - I

Computing Concepts: Types of Software, Programming Languages, Translator Programs, Problem Solving Techniques Using Computer.

Overview of C: History of C, Importance of C, Sample Programs, Basic Structure of C Programs, Programming Style, Executing a ' C ' Program.

Constants, Variables, and Data Types: Introduction, Character set, C tokens, Keywords and Identifiers, Constants, Variables, Data Types, Declaration of Variables, Declaration of Storage Class, Assigning Values to Variables, Defining Symbolic Constant, Declaring Variable as Constant and Volatile, Overflow and Underflow of Data.

Managing Input and Output Operations: Introduction, Reading a Character, Writing a Character, Formatted Input and Output.

Operators and Expressions: Introduction, Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operator, Conditional Operators, Bitwise Operators, Special Operators, Arithmetic Expressions, Evaluation of expressions, Precedence of Arithmetic Operators, Some Computational Problems, Type Conversions in Expressions, Operator Precedence and Associativity, Mathematical Functions.

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Unit – II

Decision Making and Branching: Introduction, Decision Making with IF Statement, Simple If Statement, The If...Else Statement, Nested if, The else if Ladder, The Switch Statement, The ?: Operator, The Goto Statement.

Decision Making and Looping: Introduction, The While statement, the do Statement, the For Statement, Jumps in Loops.

Arrays: Introduction, One-dimensional Arrays, Declaration and Initialization of One-dimensional Arrays, Two-dimensional Arrays, Initializing two-dimensional Arrays, Multi-dimensional Arrays, Dynamic Arrays.

Unit III

Character Arrays and Strings: Introduction, Declaring and Initializing String Variables, Reading Strings from Terminal, Writing Strings to Screen, Arithmetic Operations on Characters, Putting Strings together, Comparison of Two Strings, String-handling Functions, Table of Strings, Other Features of Strings.

User-Defined Functions : Introduction, Need for User-Defined Functions, A Multi-function Program, Elements of user-defined Functions, Definition of Functions, Return Values and their Types, Function Calls, Function Declaration, Category of Functions, No Arguments and No Return Values, Arguments but No Return Values, Arguments with Return Values, No Arguments but Returns a Value, Functions that Return Multiple Values, Nesting of Functions, Recursion, Passing Arrays to Functions, Passing Strings to Functions, The Scope, Visibility and Lifetime of Variables.

Unit- IV

Pointers : Introduction, Understanding Pointers, Accessing the Address of a Variable, Declaring Pointer Variables, Initialization of pointer Variables, Accessing a Variable through its pointer, Chain of Pointers, Pointer Expressions, Pointer Increments and Scale Factor, Pointers and Arrays, Pointer and Arrays, Pointers and Character Strings, Arrays of Pointers, Pointers as Function Arguments, Functions Returning Pointers, Pointers to Functions, Pointers and Structures.

Structures and Unions : Introduction, Defining a Structure, Declaring Structure Variables, Accessing Structure Members, Structure Initialization, Copying and Comparing Structure Variables, Operations on Individuals Members, Arrays of Structures, Arrays within Structures, Structures within Structures, Structures and Functions, Unions, Size of Structures, Bit Fields.

File Management in C : Introduction, Defining and Opening a File, Closing a File, Input/Output Operations on Files, Error Handling During I/O Operations, Random Access to Files, Command Line Arguments.

Text Book:

1. Computing Fundamentals & C Programming – by E Balagurusamy, 1st Edition McGrawHill Education.

References:

1. Spoken Tutorial on “C”, as E-resource for Learning. <http://spoken-tutorial.org>



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Practical-1: Programming with C Lab
[3 HPW :: 1 Credit :: 25 Marks]

Objective

The main objectives of this laboratory are:

- To learn the fundamental programming concepts and methodologies which are essential to building good C programs.
- To practice the fundamental programming methodologies in the C programming language via laboratory experiences
- To code, document, test, and implement a well-structured, robust computer program using the C programming language.
- To give the student hands-on experience with the concepts.

Exercises

1. Write a c program for electricity bill tacking different categories of users, different slabs in each category.(using nested if else statement)
2. Write a c program to evaluate the following using loops
 - a. $1+x^2/2!+x^4/4!+...$ up to 5 terms
 - b. $x+x^3/3!+x^5/5!+...$ up to 5 terms
3. Write a c program to check whether the given number is
 1. Prime or not
 2. Perfect or not
4. Write a c program to find the mean, mode, median, and variance of list of values by using one dimensional array
5. Write a menu driven program to read a list of numbers and perform the following operations
 1. Print the list
 2. Delete duplicates from the list
 3. Reverse the list
6. Write a program to read a list of numbers and search for given number using binary search algorithm and if found display its index otherwise display the message "element not found in the list" using functions
7. Write a menu driven program to read two matrices and compute their sum and product using functions
8. Write a menu driven program to read list of student names and perform the following operations using functions.
 1. To print list of names
 2. To sort them in ascending order
 3. To print list after sorting
9. Write a c program that consists of recursive functions to find
 1. Factorial of a given number
 2. Print the Pascal triangle using binomial theorem
10. Write a menu driven program to read list of student names and perform the following operations using array of character pointers.
11. a) To insert a student name b) To delete a name c) To print the names
12. Write a program to create an array of structures and display their content.
13. Write a program to demonstrate nested structures.
14. Write a program to create 10 student records and display those using pointers.
15. Write a program to display the contents of a file.
16. Write a program to copy the contents of one file into another file.
17. Write a program to append the contents of one file to another file.
18. Write a program to demonstrate the command line arguments.