PROTEC Computer Consultancy

Course Outline

C language

Introduction:

C is a general purpose language which has been closely associated with the Unix operating system for which it was developed. It is a middle level language with simplicity of high level language and power of low level language.

It is a versatile language for handling very large programs and used in different applications like computer applications, Embedded software, verification software, test codes etc. This program is mainly focused on the concepts of C language.

Detailed Course Contents: (60 hrs)

1. Introduction to 'C' (1 ½ hrs)

Design methods, Programming Languages (low level, high level), Translators (Compiler, Interpreter, Assembler), History of C, Characteristics of C, Structure of C program, Environment for C.

2. Elements of C (1 ½ hrs)

'C' Character-Set: Alphabets, Digits, Special Character; Escape Sequences; Delimiters; Reserved words/keywords; Identifiers; Data

Types; Constants: Numeric, Character, String, Symbolic; Variables; Expressions; Statements; Comments.

3. Input-Output in C (1 ½ hrs)

Conversion Specifications; Reading Input Data; Writing Output Data; Formatted Input and Output: Integer Input, Integer Output, Floating Point Numeric Input, Floating Point Numeric Output, Format for String Input, Format for String Output; Suppression Character in scanf(); Character I/O: getchar(), putchar()

4. Operators and Expressions (6 hrs)

Operators: Arithmetic (Integer, Floating, Mixed Mode) Operators, Assignment Operators, Increment/Decrement Operators, Relational Operators, Logical Operators, Conditional Operators, Comma Operator, sizeof Operator; Type Conversions; Precedence and Associativity of Operators, Order of Evaluation of Operands.

5. Control Statements (7 ½ hrs)

Compound Statements or Block; if…else: Nesting of if…..else, else if Ladder; Loops: while loop, do….while loop, for loop, Nesting of Loops, Infinite Loops; break statement; continue statement; goto; switch; Pyramids.

6. Arrays (9 hrs)

One Dimensional Array: Introduction, Declaration of 1-D Array, Accessing of 1-D Array, Processing of 1-D Array, Initialization of 1-D Array, Insertion in Array, Deletion in Array, Searching in Array,

Sorting in Array; Two Dimensional Array: Declaration and Accessing Individual Elements of a 2-D Array, Processing of 2-D array, Initialization of 2-D array; Multidimensional Array; Introduction to Strings: Input and Output of Strings, String Functions.

7. Functions (6 hrs)

Advantages of Functions; Library Functions; User-Defined Functions; Function Definition; Function Call; Function Declaration; return statement; Function Arguments; Types of Functions; main() Function; Storage Classes: Local, Global, Static Variables; Recursion, Passing Array to Functions.

8. Pointers (6 hrs)

About Memory; Address Operator; Pointer Variables: Declaration, Assigning Address, Dereferencing Pointer Variables; Pointer Arithmetic; Precedence of Dereferencing Operator; Pointer Comparisons; Pointer to Pointer; Pointer with Arrays; Pointer to Array; Pointer and Functions; Function returning Pointer; Passing Array to a Function using Pointer; Array of Pointers; void Pointers; Dynamic Memory Allocation: malloc(), calloc(), realloc(), free(); Dynamic Arrays; Pointers to Functions.

9. Structure and Union (6 hrs)

Defining Structure; Declaration of Structure Variables: with Definition, using Structure Tag; Initialization of Structure Variables;

Accessing of Structure Variables; Storage of Structure Variables; Size of Structure; Array of Structures; Array within Structures; Nested Structures; Pointer to Structures; Pointer within Structures; Structure and Functions; Union; typedef.

10. Linked List(Self- Referential Structures) (6 hrs)

Creation of List; Traversing a Linked List; Searching in a Linked List; Insertion in Linked List; Deletion in Linked List; Reversing of Linked List; Introduction to Doubly Linked List.

11. File Handling (4 ½ hrs)

Introduction to Files; Text and Binary Modes; Concept Of Buffer; Opening of a File; Closing of a File; End of File; Predefined File Pointers; Predefined Functions: Character I/O (fgetc(), fputc(), getc() and putc()), Integer I/O (getw(), putw()), String I/O (fgets(), fputs()), Formatted I/O (fprintf(), fscanf()), Block Read / Write (fread(), fwrite()); Random Access to File: fseek(), ftell(), rewind(); Command Line Arguments

12. The C Preprocessors (3 hrs)

Introduction to C Preprocessor; Types of Preprocessors: Macros (Simple Macro, Nested Macro, Augmented Macro), Macro Vs Functions, Including Files, Conditional Compilation; Predefined Macros.

13. Enumeration (1 ½ hrs)

Introduction to Enumerated data type; creating and defining enumerated variables.