

# DIPLOMA IN JAVA



## C Programming

### INTRODUCTION

- The C Language and its Advantages
- The Structure of a C Program
- Writing C Programs
- Executing a C Program

- Assignment Operators
- Increment and Decrement Operators
- Ternary Operator
- Arithmetic
- Expressions
- Precedence of Operator

### DECISION MAKING & LOOPING

- Decision Making Statements (If, If...Else, If...Else If...Else)
- Nesting of If...Else
- Switch Statements
- GOTO
- Statements
- Looping Statements (While, Do...While, For)
- Jumps in Loops
- Nesting of Loops

### USER DEFINED FUNCTIONS

- Need for User Defined Functions
- Function Declaration
- Defining a Function
- Return Values and Types
- Categories of Functions
- Recursion
- Passing Arrays to Functions
- Passing String to Functions
- Scope, Visibility, and Lifetime of Variables

### OPERATORS & EXPRESSIONS

- Arithmetic Operators

### POINTERS

- What is a Pointer?

- Accessing the address of a Variable
- Declaring Pointers Variables
- Accessing a Variable through its Pointer
- Pointers and Arrays
- Pointers and Character String Array of Pointers
- Pointers as Function Arguments

### **ARRAYS & STRINGS**

- One Dimensional Arrays
- Two Dimensional Arrays
- Initialization of Arrays
- Declaring and Initializing
- String Variables
- Reading and Writing Strings
- String Handling Functions
- Table of Strings

### **CONSTANTS, VARIABLES & DATATYPES**

- Keywords and identifiers
- Constants
- Variable
- Data Types

# C++ Programming

## INTRODUCTION

- Concepts of Object Oriented Programming
- Benefits of OOP
- What is C++
- Structure of C++ Program
- Creating the Source File
- Compiling and Linking

## CLASSES & OBJECTS

- Specifying a Class
- Defining Member Functions
- Making an Outside Function Inline
- Nesting of Member Functions
- Private Member Functions
- Arrays within a Class
- Memory Allocation for Objects
- Static Data Members
- Static Member Functions
- Arrays of Objects
- Objects as Function Arguments
- Friendly Functions
- Returning Objects
- Pointer to Members

## OPERATORS & EXPRESSIONS

- Operators in C++
- Scope Resolution Operator
- Member Dereferencing Operators
- Memory Management Operators
- Manipulators
- Type Cast Operator
- Expressions and Types of Expressions
- Special Assignment Expressions
- Implicit Conversions
- Operator Overloading
- Operator Precedence
- Control Structures

## **OPRETERS OVERLOADING**

- Defining Operator Overloading
- Overloading Unary Operators
- Overloading Binary Operators
- Overloading Binary Operators using Friends
- Manipulation of Strings using Operators
- Rules of Operator Overloading
  
- Type Conversion

## **VIRTUALS FUNCTIONS & POLYMORPHISM**

- Polymorphism Overview
- Virtual Functions
- Pure Virtual Functions

## **EXCEPTION HANDLING**

- Basics of Exception Handling
- Exception Handling Mechanism
- Throwing Mechanism
- Catching Mechanism

## **FUNCTIONS IN C++**

- Function Prototyping
- Call by Reference
- Return by Reference
- Inline Functions
- Default Arguments
- Recursion
- Function Overloading
- Friend and Virtual Functions

## **CONSTRUCTORS & DESTRUCTORS**

- Constructors
- Parameterized Constructors
- Multiple Constructors in a Class
- Constructors with Default Arguments
- Dynamic Initialization of Objects
- Copy Constructor
- Dynamic Constructors
- Destructors

## **INHERITANCE**

- Defining Derived Classes
- Single Inheritance
- Types of Inheritance
- Virtual Base Classes
- Abstract Classes

- Constructors in Derived Classes
- Member Classes

### **MANIPULATING STRINGS**

- Creating String Objects
- Manipulating String Objects
- Relational Operations
- Accessing characters in String
- Comparing and Swapping

### **DATATYPES**

- Keywords and identifiers
- Tokens
- Data Types
- Type Compatibility
- Variable Declaration
- Dynamic Initialization of Variables

## **CORE JAVA**

### **Introduction**

- Programming language Types and Paradigms
- Why Java ?
- Flavors of Java
- Java Designing Goal
- Role of Java Programmer in Industry
- Features of Java Language
- JVM –The heart of Java
- Java’s Magic Bytecode
- Language Fundamentals

### **The Java Environment:**

- Installing Java.
- Java Program Development
- Java Source File Structure
- Compilation

- Executions

### **Basic Language Elements:**

- Lexical Tokens, Identifiers
- Keywords, Literals, Comments
- Primitive Datatypes, Operators
- Assignments

### **Object Oriented Programming**

- Class Fundamentals
- Object & Object reference

- Object Life time & Garbage Collection.
- Creating and Operating Objects
- Constructor & initialization code block
- Access Control, Modifiers, methods
- Nested , Inner Class
- Abstract Class & Interfaces
- Defining Methods, Argument Passing Mechanism
- Method Overloading
- Use of Modifiers with Classes & Methods.
- Extending Classes and Inheritance
- Use and Benefits of Inheritance in OOP
- Types of Inheritance in Java
- Inheriting Data Members and Methods
- Role of Constructors in inheritance
- Overriding Super Class Methods.
- Use of “super”.
- Polymorphism in inheritance.

- Type Compatibility and Conversion
- Implementing interfaces.

### **Package**

- Organizing Classes and Interfaces in Packages
- Package as Access Protection
- Defining Package.
- CLASSPATH Setting for Packages.
- Making JAR Files for Library Packages
- Import and Static Import
- Naming Convention For Packages

### **Exception Handling:**

- The Idea behind Exception
- Exceptions & Errors
- Types of Exception
- Control Flow In Exceptions
- JVM reaction to Exceptions
- Use of try, catch, finally, throw, throws in Exception Handling.
- In-built and User Defined Exceptions
- Checked and Un-Checked Exceptions

### **Array & String :**

- Defining an Array
- Initializing & Accessing Array
- Multi –Dimensional Array
- Operation on String
- Mutable & Immutable String
- Using Collection Bases Loop for String
- Tokenizing a String
- Creating Strings using StringBuffer

### **The Collection Framework**

- Collections of Objects
- Collection Types
- Sets
- Sequence
- Map

## **Advance JAVA**

### **Introduction to J2EE**

- J2EE Overview
- Why J2EE?
- J2EE Architecture
- J2EE APIs
- J2EE Containers

## **Java Server Technologies**

- Servlet
- Web Application Basics.
- Architecture and challenges of Web Application.

## **Introduction to servlet**

- Servlet life cycle
- Developing and Deploying Servlets
- Exploring Deployment Descriptor (web.xml).
- Handling Request and Response
- Initializing a Servlet
- Accessing Database
- Servlet Chaining
- Session Tracking & Management
- Dealing with cookies
- Transferring Request
- User Authentication
- Filtering Request and Response
- Programming Filter
- Filter Mapping
- Servlet Listeners

## **Java Server Pages**

- Basic JSP Architecture
- Life Cycle of JSP (Translation, compilation)
- JSP Tags and Expressions
- Role of JSP in MVC-2
- JSP with Database



- JSP Implicit Objects
- Tag Libraries
- JSP Expression Language (EL)
- Using Custom Tag

### **JSP Capabilities**

- Exception Handling
- Session Management
- Directives

### **DATABASE & SQL FUNDAMENTALS**

- Relational Databases and SQL
- Database, Schema, Tables, Columns and Rows
- DDL & DML
- Sequences , Stored Procedures
- Using SQL Terminals

### **RMI (Remote Method Invocation)**

- RMI overview
- RMI architecture
- Example demonstrating RMI

## **STRUTS2**

### **Overview of MVC**

- Introduction to MVC
- What is M –V- C

## **Pure MVC**

- What is pure MVC components

## **Overview of Framework**

### **Features of Struts**

#### **Model**

- Action Class

#### **View**

- JSP

#### **Action Support Class**

#### **Action Interface**

#### **Struts Interceptor**

- Struts2 Default Interceptor
- Struts2 Custom Interceptor

#### **Struts2 Action Working**

#### **Struts2 ValueStack**

- Struts valueStack methods:
- -findString()
- -findValue()
- -setValue()

#### **Struts2 Integration**

- Struts2-Hibernate

- **Struts2 Database Access**  
JDBC Connection
- **Struts2 JDBC with Pure MVC**
- **Struts2 Exception Handling**

### **Versions of Struts**

#### **Struts 2 Framework**

#### **Configuration File**

- Web.xml
- Struts.xml

#### **Controller**

- FilterDispatcher

## **HIBERNATE 3**

#### **ORM Overview**

- Introduction To Mapping Objects to Relational Databases
- XML
- Mapping
- Primary key, Timestamps

#### **Hibernate Overview**

- Introduction To Hibernate
- History

- Versions

### **Hibernate Architecture**

- Application Classes
- Data Server
- JDBC
- Configuration
- Session Factory
- Query
- Transaction

### **Hibernate Environment**

- Hibernate Prerequisites
- Installing Hibernate
- Hooking Up a Database Server

## **Hibernate Configuration**

### **Hibernate Sessions**

- Session Interface
- Methods:
- -beginTransaction()
- -createCriteria()
- -void delete()
- -Session get()
- -void save()
- Void update()
- -close()

### **Hibernate Persistent Class**

- Mapping Basic Java Class

- Mapping Class with Date
- Persisting objects
- Save Objects
- Delete objects
- Update objects

### **Hibernate Mapping Files**

- <hibernate-mapping> Element
- <class> Element
- <id> Element
- <generator> Element
- <property> Element

### **Hibernate Mapping Types**

- Relationship Elements

### **Hibernate Examples**

- Write a program which saves the Class Student as table in database and saves its attributes as row in table.
- Use Of mapping file through program
- Use of getter Setters of POJO class

### **Hibernate O/R Mappings**

- Mapping of class as table in DB and attributes as row using mapping file.

### **Hibernate Annotations**

- @Entity
- @Id
- @Column
- @Transient
- @Temporal
- @Lob (clob, blob)
  
- @GeneratedValue

### **Hibernate Query Language**

- What is HQL
- From Clause
- Select Clause
- Order By clause
- Having clause
- HQL Joins

### **Hibernate Criteria Queries**

- createCriteria()
- Restrictions with criteria
- Example

### **Hibernate Interceptors**

- Interceptor Interface

- Building an Interceptor

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**Dange Chowk Office:**

**CNC WEB WORLD**

Sr. No. 51/2, Office No. -1,

**Landmark:** Opp. Pandit Petrol Pump,  
On Hinjewadi Road

Dange Chowk, Pune 411033

**Mob:** +91 9175371080/81

**E-mail:** [info.cnc@cncwebworld.com](mailto:info.cnc@cncwebworld.com)

**Helpline no.**9595119900

**Swargate Office:**

**CNC WEB WORLD**

2nd Floor, Office No.202, Modi Plaza,

**Landmark:** Opp.Laxmi Narayan Theatre

**Tel No:** 020-41203324

**Mob :** +91 9156991450/51

**E-mail:** [info@cncwebworld.com](mailto:info@cncwebworld.com)

[www.cncwebworld.com](http://www.cncwebworld.com)

