Core Java

SYLLABUS

COVERAGE

- Introduction.
- OOPS
- Package
- Exception Handling.
- Multithreading
- Applet, AWT, Event Handling
- Using NetBean, Ecllipse.
- Input Output Streams, Serialization
- Networking

- Collection Framework, classes & interfaces of java.util, generics
- Introduction to Swing (Java Foundation Classes).
- Remote Method Invocation, Implementation of RMI.
- JDBC (Java Data Base Connection), Types of Driver
- Project

SYLLABUS IN DETAILS

History
- Computers... How a Program uses Computers?
- Java... Why? What? How(Green Project)? When?
- Where?
- Different Java Versions.
- How Java is different from other Technologies

Fundamentals of Java Programming
- Naming convention of Java language
- Comments
- Statements
- Blocks (Static, Non-static/instance)
- Identifiers
- Keywords
- Literals
- Primitive Data Types, Range
- Reference(User defined) Data type
- Variables (Primitive, Reference)

- Type Casting, Default Value
- Operators
- Problem Solving

Introduction to Java Programming Environment
- How to Install & set Path.
- A Simple Java Program
- Compiling & executing Java Program
- Phases of Java Program
- Analysis of a Java Program
- Understanding Syntax and Semantic Error,
- Runtime Exception
- Name of a Java Source File
- Platform Independency
- Java Technology(JDK, JRE, JVM, JIT)
- Features of Java
- Text Editors
- Consoles
- Problem Solving.

Control Structures
- Working with Control Structures
- Types of Control Structures
- Decision Control Structure (if, if-else, if else if, switch –case)
- Repetition Control Structure (do –while, while, for)
- Problem Solving

Keyboard Input in Java
- Java program inputs from Keyboard
- Methods of Keyboard inputs
- Scanner, Buffered Reader
- JOption Pane
- Problem Solving
- Java Array
- What is Array
- Array Declaration in java vs C and C++.
- Instantiation of an Array
- String vs character array.Accessing Array Elements, Default Value,
- for-each loop, varargs.
- Length of an Array (What is
- ArrayIndexOutOfBoundsException).
- Increasing, Decreasing the Size
- and Copy of an Array
- Multi-Dimensional Arrays
- Problem Solving

Command-Line Arguments
- What is a Command-Line Argument?
- Java Application with Command-Line Arguments
- Conversion of Command-Line Arguments
- Passing Command-Line Arguments
- Using methods (Static , Non Static)
- Problem Solving

Integrated Development Environment
- Using various Editors
- Program Compilation, Execution in Editor
- Using Eclipse IDE
- Project Set Up
- Source File Generation
- Application Compilation and Run

- Difference between C and C++ with Java,
- Problem Solving
- Application Compilation and Run
- Difference between C and C++ with Java,
- Problem Solving
- Interview related Question and Answer.
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- Object Oriented Programming
- Procedural Vs Object Oriented Program
- Different type of Program Procedural Vs
- Object Oriented.
- Top Down Vs Bottom Up Approach.
- Introduction to Object Oriented
- Programming
- Abstraction, Encapsulation, Inheritance,
- Polymorphism.
- Introduction to Classes and Objects
- Custom Class Definition
- Instance and Static Variables
- Different ways to create Object Instance 5
- Types of Class 3-5
- Instance Variable and it's role in a Class
- Constructors, types of Constructor,
- Constructor Rule, Constructor Overloading.
- Static Variable and it's use.
- Methods and their behavior.
- Constructor vs Methods
- Constructors
- "this" Keyword.
- Java Access Modifiers (and Specifiers)
- Explanation of psvm() , sopl()
- Problem Solving

Inner Class
- First View of Inner Class
- Outer Class Access
- Types of Inner Class
- Problem Solving

Inheritance
- A Little knowledge on Inheritance
- Sub-Classes
- Object Classes
- Constructor Calling Chain
- The use of "super" Keyword
- The use of "private" keyword inheritance.
- Reference Casting
- Problem Solving

Abstract Classes and Inheritance
- Introduction to Abstract Methods,
- Abstract Classes and Interface
- Interface as a Type
- Interface v/s Abstract Class
- Interface Definition
- Interface Implementation
- Multiple Interfaces' Implementation
- Interfaces' Inheritance
- How to create object of Interface
- Problem Solving

Polymorphism
- Introduction to Polymorphism
- Types of Polymorphism
- Overloading Methods
- Overriding Methods
- Hiding Methods
- Final Class and Method
- Polymorphic Behaviour in Java
- Benefits of Polymorphism
- "Is-A" vs "Has-A"
- Association Vs Aggregation
- Problem Solving
- Interview related Question and Answer.

Package

Package and Class path and its use
- First look into Packages
- Benefits of Packages
- Package Creation and Use
- First look into Classpath
- Classpath Setting

- Class Import
- Package Import
- Role of public, protected, default
- and private w.r.t package
- Namespace Management
- Package vs. Header File
- Creating and Using the Sub Package
- Sources and Class Files Management

Using Predefined Lang package & other Classes
- Java.lang Hierarchy
- Object class and using toString(), equals(), hashCode(), clone(), finalize() etc
- Using Runtime Class, Process Class to play music, video from Java Program
- Primitives and Wrapper Class
- Math Class
- String, StringBuffer, StringBuilder Class
- String Constant Pool.
- Various usage and methods of String, StringBuffer, StringBuilder
- Wrapper Classes
- System Class using gc(), exit(), etc.

New Concepts in package
- Atuoboxing and Autounboxing
- Static import.
- Instanceof operator.
- Enum and its use in Java
- Working with jar

Garbage Collection
- Garbage Collection Introduction
- Advantages of Garbage Collection
- Garbage Collection Procedure
- Java API
- Interview related Question and Answer.

Exception Handling
- Introduction to Exceptions
- Effects of Exceptions
- Exception Handling Mechanism
- Try,catch,finally blocks

- Rules of Exception Handling
- Exception class Hierarchy, Checked & Unchecked Exception
- Throw & throws keyword
- Custom Exception Class
- Chained Exception.
- Resource handling & multiple exception class.
- Problem Solving
- Interview related Question and Answer.

Multithreading
- Introduction
- Advanages
- Creating a Thread by inheriting
- from Thread class
- Run() and start() method.
- Constructor of Thread Class
- Various Method of Thread Class
- Runnable Interface Implementation
- Thread Group
- Thread States and Priorities
- Synchronization method, block
- Class & Object Level Lock
- Deadlock & its Prevention
- Interthread Synchronization
- Life Cycle of Thread
- Deprecated methods : stop(), suspend(),
- resume(), etc
- Problem Solving
- Interview related Question and Answer.

GUI :
- Applet, AWT, Event Handling

Applet(java.applet)
- Introduction & Advantage of Applet
- How to create and run an Applet in browser and appletviewer
- Life Cycle of Applet
- Using Graphics, Color, Font and other classes in Applet to draw Shapes, String, Images
- Creating Banner in Applet

- AppletContext interface. Using AudioClip interfaces to play music.
- Problem Solving

Abstract Window Toolkit (java.awt)
- AWT Hierarchy
- Using Component classes like Button, TextArea, TextField, Checkbox, Label, Choice, List, etc
- Using Container classes line Applet, Panel, Frame, Window, Dialog(Open & Save Dialog)
- Using Layout Manager to organize component on a container.
- Using Borderss, Menus, Toolbars, Dialogs
- Using setBounds() to place component on Frame/Applet.Problem Solving

GUI Event Handling(java.awt.event)
- Delegation Event Model
- What is Events and stepsfor Event Handling
- Using different Event Classes to generate event
- Handling different events by respective Event Listeners
- Using Event in Applet & Event
- Handling the event in different ways.
- Adaptor Classes
- Problem Solving

Using Applet and Frame
- Passing Parameter from HTML to Applet
- Inter Applet Communication
- Communication between Frame.
- Customizing TextField, Frame, etc
- Using NetBean IDE
- Problem Solving
- Interview related Question and Answer.

Input Output Streams

Java I/O Stream
- I/O Stream - Introduction
- Types of Streams

- Stream Class Hierarchy
- Using File Class
- Copy and Paste the content of a file.
- Byte Streams vs Character Streams
- TextFile vs Binary File
- Character Reading from Keyboard by InputStreamReader
- Reading a Line/String from Keyboard by BufferedReader
- Standard I/O Streams
- Using Data Streams to read/write primitive data
- PrintStream vs PrintWriter
- Using StreamTokenizer and RandomAccessFile.
- Using nio package.
- Problem Solving

Serialization
- Introduction to Serialization
- Using Object Streams to read/write object
- Transient Keyword
- Serialization Process
- Deserialization Process
- Problem Solving
- Interview related Question and Answer.

Networking
- Networking Basics
- What is IP Address
- What is Protocol
- What is Ports
- What is Client/Server Architecture
- What is Sockets

Java Networking
- INetAddress class
- ServerSocket and Socket Class
- DatagramSocket and DatagramPacket Class
- URL & URLConnection class
- MultiCastSocket class
- Creating chat application
- Problem Solving

- Interview related Question and Answer.

Collection Framework(Java Data Structure)

Generics(Templates)
- What is generic
- Creating User defined Generic classes

The java.util package.
- Collection
- What is Collection Framework
- List, Set & Map interfaces
- Using Vector, ArrayList, Stack,
- LinkedList, etc.
- Using Collections class for sorting
- Using Hashtable, HashMap, TreeMap,
- SortedMap, LinkedHashMap etc.
- Iterator, Enumerator.
- Using Que, Deque, SortedQue, etc.
- Using HashSet, TreeSet, LinkedHashSet etc
.
- Using Random class
- Using Properties in a Java Program
- Using user defined class for DataStructure
- Using Date and Formatting Date class.
- Problem Soving
- Interview related Question and Answer.

Remote Method Invocation (Distributed Application in Java)
Need for RMI
- RMI Introduction
- Efficiency

RMI Architecture
- Remote Interface
- Stub and Skeleton
- Remote Object

RMI Communication Model
- RMI Control Flow
- Marshaling
- Unmarshaling
- Using RRL

Implementing RIM

- Analyzing Remote interface, UnicastRemoteObject class.
- Running Different examples.
- Rmic, rmiregistry, etc.
- Using Examples.
- Problem Solving
- Interview related Question and Answer.

JDBC (Java Data Base Connection)
- Introduction to JDBC
- Databases and Drivers
- Types of Driver
- Loading a driver class file
- Estabalishing the Connection to different Database with different Driver.
- Executing SQL queries by ResultSet, Statements , PreparedStatment interface.
- Using CallableStatement.
- Transaction Management & BatchUpdate.
- Problem Solving
- Interview related Question and Answer.