
Java, Java EE & SOA

1. Introduction to JAVA

- History of Java
- Difference between Java and other programming languages.
- Features of Java
- Working of Java
- Language Fundamentals
  - Tokens
  - Identifiers
  - Literals
  - Keywords
  - Operators
  - Data types
- Java Installations
- Download and install JDK
- JDK tools- javac, java, appletviewer
- Set path and how to run Java Program in Command Prompt
- JVM
- Byte code
- Java Program Structure
- Packages in java
- Java naming rules and conventions
- comments
- Wrapper Classes
- Conditional Statements
- Looping constructs
- Create objects of class
- Functions
- Variable types – local, instance and static variables
- Parameterized functions
- Function overloading
- Variable argument function

2. IDE, Test tool, Code review tool, Code coverage tool

Eclipse:

- Overview

- Installation
- Menus
- Views
- Perspective
- Workspaces
- Create project
- Create package
- Create java class
- Run Configuration
- Running Program
- Build Project

Coding Standards

- Introduction to Java Coding Standards
- Code formatting
- Architecture
- Coding best practices
- Tools for Code reviews (SonarLint)

JUnit

- JUnit overview
- JUnit usage
- JUnit environment setup
- JUnit - Test Framework
- JUnit - Writing Tests
- JUnit – Assertion
- JUnit – Executing Testing
- Code coverage tool – EclEmma

Debugging Java

- What is debugging
- Debugging support in Eclipse
- Controlling the program execution
- Breakpoints view and deactivation break points
- Evaluating variables in the debugger
- Controlling the display of the variables with detail formatter

3. OOPS

- OOPs concepts in JAVA
- Object Oriented Features
- Constructors
- Constructor overloading
- Types of inheritance – single, hierarchical and multilevel
- Base class and child class concepts

- Access specifies and scope of variables – public, private, protected

- Method overriding
- super-3 uses
- final- 3 uses
- Static functions and properties
- Dynamic method dispatch (Runtime Polymorphism)
- Order of constructor calling in inheritance
- Abstract class
- Interface

4. Inner Class and Nested Class

- Regular inner class
- Method local inner class
- Anonymous inner class
- Static nested class

5. Exception handling and assertions

- Exception hierarchy in java
- Exception handling in Java
- Error Vs Exception
- Types of Exception
    - Checked and unchecked exceptions
- Try-catch-finally
- Nested try and multi catch statements
- Throw and throws clause
- Creating user defined exceptions
- Assertions

6. Strings

- String, StringBuffer and StringBuilder
- Built-in methods in String and StringBuffer class and its usage

7. String manipulation using Java Regex

- MatchResult interface
- Matcher class
- Pattern class
- PatternSyntaxException class

8. Arrays

- One-dimensional array
- Enhanced for loop
- Two-dimensional array (dynamic column size)

- Multidimensional array

9. Collection Framework

- Introduction to Collection framework
- List Interface
  - ArrayList
  - Vector
  - LinkedList
- Set Interface
  - HashSet
  - LinkedhashSet
  - TreeSet

- Map Interface
  - HashMap
  - HashTable
  - LinkedHashMap
  - TreeMap
- Queue and Priority Queue

10. Generics

- Introduction to Generics code
- Mixing Generics and Non Generic code
- Polymorphism in Generics
- Generics methods

11. Date

Create and manipulate calendar data using classes from

- java.time.LocalDateTime
- java.time.LocalDate
- java.time.LocalTime
- java.time.format.DateTimeFormatter
- java.time.Period

12. Annotations

- What is Annotation and its usage
- Built in Annotations
- User Defined Annotations

13. File Navigation and IO

- Introduction to java.io package

- Character and Byte Streams
- File Class
- Character Classes – FileReader, FileWriter, BufferedReader, BufferedWriter,PrintWriter
- Byte Streams – FileInputStream, FileOutputStream, BufferInputStream, BufferedOutputStream

- Object Serialization
- ObjectInputStream and ObjectOutputStream
- readObject() and writeObject()
- Serialization in inheritance
- Externalization

14. Multithreading

- What is Multithreading
- Lifecycle of Thread
- Creating Thread
- Thread Scheduler
- Sleeping a thread
- Starting thread
- Calling run()
- Joining thread

15. JDBC

- Introduction to MySql
- Queries:
    - create – database, table
    - alter – add, modify, change, rename, drop column
    - drop – table, database
    - insert, delete, update, select, show, desc
    - where clause, order by, group by,
    - operators – and, or, between and, in, not in, like, distinct
    - sub queries
    - join – inner join, left join, right join

- JDBC Introduction
- JDBC Driver
- DB Connectivity steps
- Connectivity Java with MySQL and Oracle/MongoDB
- Driver Manager
- Connection
- Statement
- ResultSet

16. Web Application Introduction

- Introduction
- Web server and web client
- Web application directory structure
- Web application components
- Web container
- Deployment descriptor
- Apache Maven build tool
- Starting a web application in Eclipse
- Internet, client server architecture, Http, https, ftp, file uploading etc. – introduction

17. HTML 5 & CSS

- HTML introduction
- HTML tags
- Images
- HTML tables
- HTML forms
- CSS syntax
- CSS Id and Class selectors
- How to insert CSS

18. JavaScript

- Introduction
- External and internal JavaScript
- Functions
- Accessing HTML form controls
- JavaScript pop up boxes
- Validation
- Debugging JavaScript

19. jQuery

- Introduction and installation
- Syntax
- Selectors
- Events
- jQuery effects – hide, show, fade, slide, animate
- Callback function
- Chaining effects

20. AJAX using jQuery

- Introduction to AJAX
- Send GET and POST data
- Read response and display it in HTML controls

21. Web services

- Introduction
- Features of Web Services
- Roles – service provider, service requestor, service registry
- Web services protocol stack
- Life cycle
- Standards

SOAP web service (Minimal)

- What is SOAP?
- Messages
- Envelope
- Header
- Body
- Fault
- Encoding
- Transport
- Examples
- Standards

RESTful web service

- Create a RESTful web service
- REST - Representational State Transfer
- JAX-RS with Jersey
- Installation of Jersey
- Web container
- Prerequisites
- Create your first RESTful Webservice
- Create a REST client
- RESTful web services and JAXB
- CRUD RESTful webservice
- JSON

22. Servlet

- Features of Servlet
- Working of Servlet
- Introduction to Servlet API and Servlet class hierarchy
- Servlet life cycle

- Life cycle methods
- The Servlet API and its interfaces
- How to set Servlet initialization parameter
- How to set context initialization parameter
- Servlet Event handling
- Servlet events and interfaces
- Servlet session handling techniques
- Inter Servlet communication
- Servlet filters

23. JSP

- Introduction to JSP
- Advantages
- JSP Life cycle
- Structure of JSP page
- Components of JSP page
- JSP implicit objects
- Create error pages in JSP
- JSP and JavaBean
- JSTL
- Custom tags

24. Hibernate

- Introduction
- Advantages
- Hibernate architecture
- Hibernate configuration
- Hibernate persistent class
- Hibernate mapping files HQL
- Using hibernate in a web application
- Hibernate Query Language (HQL)
- CRUD using HQL

25. Spring

- Benefits of using Spring framework
- Dependency injection
- Aspect Oriented Programming
- Spring framework architecture
- Spring environmental setup
- One example
- Spring IoC containers
    - Spring BeanFactory Container
    - Spring ApplicationContext Container

- Spring Bean definition
    - XML based configuration file.
    - Annotation-based configuration
- Spring Bean scopes
- Spring Dependency Injection
    - Constructor based DI
    - Setter based DI
- Spring Injecting Inner Beans
- Spring injecting Collections
- Spring Beans AutoWiring
    - By name
    - By type

- Spring Annotation Based Configuration
    - @Required
    - @AutoWired

- Spring JDBC framework
- Spring with Hibernate
- Spring MVC framework