

# JAVA FULL STACK

CRAFTING FULL STACK MAGIC WITH  
THE JAVA ADVANTAGE



JAVA FULL STACK

# CORE JAVA

## Coverage

- Introduction.
- OOPS
- Package
- Exception Handling.
- Multithreading
- Applet, AWT, Event Handling
- Using NetBean, Eclipse.
- 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

## 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.
- 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

### 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

- Autoboxing 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
- Advantages
- 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 Borders, 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 Queue, Deque, SortedQueue, etc.
- Using HashSet, TreeSet, LinkedHashMap etc
- Using Random class

- Using Properties in a Java Program
- Using user defined class for DataStructure
- Using Date and Formatting Date class.
- Problem Solving
- 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 RMI

### Implementing RMI

- 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
- Establishing the Connection to different Database with different Driver.
- Executing SQL queries by ResultSet, Statements, PreparedStatement interface.
- Using CallableStatement.
- Transaction Management & BatchUpdate.
- Problem Solving
- Interview related Question and Answer

# ADVANCED JAVA

## COVERAGE

- Introduction to Advanced Java
- Report Generation
- HTML
- Collection Framework
- CSS
- MVC
- JavaScript
- Basics of Spring
- SQL
- Basics of Hibernate
- JDBC
- Basics of Web Service
- Servlet
- Project
- JSP
- Web Application Security

## SYLLABUS IN DETAILS

### 1. Introduction to Advanced Java

- Java Editions and Overview
- Need of Advanced Java
- Website and Webpage
- Web Terminologies
- Web Application Architecture
- Prerequisite of Core Java

### 2. HTML

- Introduction to HTML
- Tags and Attributes
- Adding Image
- Hyperlink
- Table
- Form
- List
- Scrolling Text and Image
- Playing Audio and Video
- Tooltip, datalist

### 3. CSS

- Introduction to CSS
- Advantages and Disadvantages of CSS
- Types of CSS

- Inline CSS
- Internal CSS
- External CSS
- Different Types of Selector
- Element Selector
- Class Selector
- Id Selector
- Creating Template using CSS

### 4. JavaScript

- Introduction to JavaScript
- Advantages of JavaScript
- Types of JavaScript
- Internal JavaScript

### 5. SQL

- Introduction to SQL
- SQL Sublanguages (DDL, DML, DRL, TCL and DCL)
- Constraints
- Join and Sub Query
- Indexes, Views, Sequences and Synonyms
- Cursors
- Stored Procedures and Functions
- Triggers

### 6. JDBC

- Introduction to JDBC
- Types of Drivers
- Steps required to develop and Execute JDBC Application
- JDBC Statement Object
- Statement
- PreparedStatement
- CallableStatement
- Result Set
- Read Only ResultSet

- Updatable ResultSet
- Forward Only ResultSet
- Scrollable ResultSet
- Database Metadata and ResultSet Metadata
- Batch Updation
- Transaction Management
- Adding and Retrieving BLOB and CLOB Objects

## 7. Servlet

- Introduction to Servlet
- Different ways to develop servlet program
- Develop and Access First Servlet Application in Tomcat Web Server
- Servlet Life Cycle
- Reading HTML Form Data in Servlet
- External JavaScript
- Working with User defined and Builtin Function
- Reading HTML Element in JavaScript
- Form Validation
- Servlet Chaining
- Forward Model
- Include Model
- Cross Context and Cross Server Communication
- Session Tracking Mechanisms
- URL-Rewriting
- Hidden Form Fields
- Cookies
- HttpSession
- Filters
- Listeners
- Annotation

## 8. JSP

- Introduction to JSP
- Advantages of JSP over Servlet
- JSP Life Cycle
- JSP Implicit Objects and Explicit Objects
- JSP Directives
- page
- include

- taglib
- JSP Scripting Elements
- Scriptlets
- Declaration
- Expression
- JSP Chaining
- Java Bean and JSP Communication
- Develop Java Code less JSP using Action tag, EL, JSTL and Custom tag

## 9. Web Application Security

- Cross Site Scripting
- Security Misconfiguration
- SQL Injection
- Salt Hashing
- File Uploading and File Downloading
- ServletConfig and ServletContext

## 10. Report Generation

- PDF File
- Excel File
- CSV File

## 11. MVC

- Introduction to MVC
- Different Types of Logic in Java based Web Application
- Advantages and Disadvantages of MVC Architecture
- MVC pattern Layer: Model, View and Controller
- Create Login and Registration Module in MVC

## 12. Basics of Spring

- Introduction to Spring
- Spring Modules
- Inversion of Control
- Dependency Injection
- Develop and Execute Spring Application in Eclipse IDE

### 13. Basics of Hibernate

- Introduction to Hibernate
- Understanding First Hibernate Application
- Develop and Execute Hibernate Application in Eclipse IDE

### 14. Basics of Web Service

- Introduction to Web Service
- Types of Web Service
- SOAP Web Service
- RESTful Web Service
- Develop and Execute SOAP and RESTful Web Service based Application

## HIBERNATE

1. How To Install Java, Install java in windows
2. What is Hibernate – Hibernate Introduction
3. Mapping And Configuration Files In Hibernate
4. Main Advantage And Disadvantages Of **Hibernates**
5. Simple Hibernate Application Requirements
6. Where To Download, How To Install Hibernate
7. Steps To Use Hibernate In Any Java Application
8. Hibernate Hello World Program (Hibernate Insert Query)
9. Hibernate Hello World Program in Eclipse
  - a) Example On Hibernate Select Query
  - b) Example On Hibernate Delete Query
  - c) Example On Hibernate Update Query
10. Hibernate Versioning Of Objects.
11. Importance Of Wrapper And Primitive Types In Hibernate.
12. Hibernate Converting Object From Detached to Persistent state
13. Inheritance Mapping In

Hibernate – Introduction

14. Hibernate Inheritance: Table Per Class Hierarchy
15. Hibernate Inheritance: Table Per sub Class Hierarchy
16. Hibernate Inheritance: Table Per Concrete Class Hierarchy
17. Example On Composite Primary Keys In Hibernate
18. Composite Primary Key In Hibernate With Select Query.
19. Generators <generator> In Hibernate
- [Part 1: Hibernate Query Language Introduction](#)
- [Part 2: Hibernate Query Language, Executing HQL Commands](#)
- [Part 3: HQL, Different Ways Of Executing HQL Commands](#)
- [Part 4: Hibernate Query Language, Using HQL Select Query](#)
- [Part 5: Hibernate Query Language, Passing Runtime Values](#)
- [Part 6: Hibernate Query Language, HQL Update, Delete Queries](#)
- [Part 7: Hibernate Query Language Insert Query](#)
20. Criteria Query, Hibernate Criteria Query Introduction



- 21. Example On Hibernate Criteria Query
- 22. Hibernate Criteria, Adding Conditions To Criteria
- 23. Hibernate Projections Introduction
  - Hibernate Projections, Example On Hibernate Projections
  - Example On Hibernate Criteria With Multiple Projections
- 24. Difference between HQL and Criteria Query in Hibernate
  - Hibernate Native SQL Query Example
  - Hibernate Named Query Introduction Tutorial
  - Hibernate Named Query Example.
- 25. Hibernate Relationships In Depth**
  - Hibernate One to Many Mapping Insert Query Example
  - Hibernate One to Many Mapping Delete Query Example
  - Hibernate One to Many Select Query Example
  - Hibernate Many to One Mapping Insert Query Example
  - Hibernate Many to One Mapping Select Query Example
  - Hibernate Many to One Mapping Delete Query Example
  - Hibernate One To Many Bidirectional Mapping Example
  - Hibernate Many to Many Mapping Example
  - Hibernate One to One Mapping Example
  - Hibernate Cascade Options – Cascade Attribute In Hibernate
  - Joins In Hibernate
  - Hibernate Left Join, Hibernate Left Join Example
- Hibernate Caching Mechanism, Hibernate Cache
  - Hibernate First Level Cache Example
  - How To Enable Second Level Caching In Hibernate

- Hibernate Second Level Cache Example
- 26. Hibernate Annotations Introduction
  - > Jars Required For Hibernate Annotations
  - > Hibernate Hello World Program With Annotations
  - > Hibernate One To Many Annotation Example
  - > Hibernate Many To One Annotation Example
  - > Hibernate Many To Many Mapping Using Annotations
  - > Hibernate One To One Mapping Using Annotations
  - > Difference Between Merge And Update Methods In Hibernate.
  - > Difference Between Hibernate Save And Persist Methods.
- Struts 2 Hibernate Integration Example [ Struts 2 + Hibernate Integration]
- Difference Between Hibernate get () and load() Methods?

# SPRING AND SPRING BOOT

## 1. Basics of Spring

- What is Spring
- Spring Modules
- Spring Application

## 2. Spring with IDE

- Spring in My eclipse
- Spring in Eclipse
- IOC container

## 3. Dependency Injection

- Constructor Injection
- CI Dependent Object
- CI with collection
- CI with Map
- CI Inheriting Bean
- Setter Injection
- SI Dependent Object
- SI with Collection
- SI with Map
- CI vs SI
- Autowiring
- Factory Method

## 4. Spring AOP

- AOP Terminology
- AOP Implementations
- Pointcut
- Advices

## 5. Spring JDBC

- JdbcTemplate Example
- PreparedStatement
- ResultSetExtractor
- RowMapper
- NamedParameter
- SimpleJdbcTemplate

## 6. Spring with ORM

- Spring with Hibernate
- Spring with JPA7. SPRING WEB MVC
- Spring Web MVC Introduction
- Spring Web MVC Advantages
- Spring MVC Architecture
- Introduction to Front Controller
- Controllers
- Handler Mappers
- View Resolvers

- Web Application development using
- Spring Boot
- Embedded HTTP Servers Introduction
- a) Embedded Tomcat Server
- b) Embedded Jetty Server
- Making Jetty as Default server
- Web Application Deployment in External Server
- Sending Data From UI to Controller
- a) Query Param
- b) Path Param
- Sending Data From Controller to UI
- a) Model
- b) ModelAndView
- @RequestBody annotation
- @ResponseBody annotation
- Form Based application development using Spring Boot
- Thymeleaf Introduction
- Web Application with Thymeleaf
- Sending Email using Spring Boot
- Exception Handling in Spring Boot Web Application
- Spring Boot Actuators
- Health
- Info
- Heapdump
- Theadddump
- Beans
- Httptrace
- Mappings
- Shutdown etc



## 1. SPRING BOOT

- 1) What is Spring Framework
- 2) What is Spring Boot
- 3) Differences between Spring & Spring Boot
- 4) Spring Boot Overview
- 5) Pros & Cons of Spring Boot
- 6) Approaches to create Spring Boot Application
  - a) Spring Initializer (start.spring.io)
  - b) Spring Starter Wizard in STS IDE
- 7) Introduction to Spring Boot Starters
  - a) Spring Boot Parent Starter
  - b) Spring-boot-starter
  - c) Spring-boot-starter-web
  - d) Spring-boot-starter-webflux
  - e) Spring-boot-starter-data-jpa
  - f) Spring-boot-devtools
  - g) Spring-boot-starter-mail
  - h) Spring-boot-actuator
  - i) Spring-boot-starter-test etc.
- 8) What is Start Class in Spring Boot
- 9) @SpringBootApplication annotation internals
- 10) SpringApplication.run(..) method internals
- 11) Spring Boot Application Boot strapping
- 12) Auto Configuration in Spring Boot
- 13) IOC container
  - a) Setter Injection
  - b) Constructor Injection
  - c) Field Injection
- 14) Stereotype Annotations
  - a) @Component
  - b) @Service
  - c) @Repository
  - d) @Controller
- 15) Base Package Naming convention
- 16) Component Scanning
- 17) Auto wiring
  - a) byType
  - b) byname
  - c) constructor
  - d) none

- 19) @Qualifier annotation
- 20) @Primary annotation
- 21) Introduction to @Configuration annotation
- 22) Details of @Bean annotation
- 23) Bean Life Cycle
- 24) Bean Scopes
- 25) Banner in Spring Boot
- 26) Standalone application development in Spring Boot
- 27) Standalone application with layered architecture
- 28) Runner in Spring Boot
  - a) Application Runner
  - b) CommandLine Runner

## 2. SPRING DATA JPA

- 1) What is Persistence Layer
- 2) Best practises to follow in persistence layer
- 3) ORM Basics
- 4) Spring Data JPA Introduction
- 5) Differences between Spring ORM and Spring Data
- 6) CrudRepository introduction
- 7) CrudRepository methods for DB operations
  - a) save( ) method
  - b) saveAll( ) method
  - c) findById( ) method
  - d) findAllById( ) method
  - e) findAll( ) method
  - f) deleteById( ) method
  - g) deleteAllById( ) method
  - h) delete( ) method
  - i) count( )
  - j) existsById( )
- 8) Custom findByXXX method syntax
- 9) Custom Queries Execution in Data JPA

- 10) JpaRepository introduction
- 11) JpaRepository methods for DB operations
- 12) Pagination Using Data JPA methods
- 13) Sorting Using Data JPA Methods
- 14) Query By Example Executor
- 15) Generators
- 16) Custom Generators in Spring Data
- 17) Embedded Database Introduction
- 18) Application Development using Embedded Database (H2)
- 19) Application Development Using MYSQL Database
- 20) Application Development Using MongoDB
- 21) Profiles in Spring Boot

### 3. SPRING REST

- 1) Distributed Applications
- 2) Distributed Technologies
- 3) SOAP vs REST
- 4) RESTful Services Introduction
- 5) REST principles
- 6) One Time operations
- 7) Run Time Operations
  - a) Marshalling
  - b) Un Marshalling
- 8) JAX-B Introduction
- 9) JAX-B Architecture
- 10) Applications development with JAX-B
- 11) JSON Introduction
- 12) XML vs JSON
- 13) JACKSON API
- 14) Converting Java object to JSON and vice versa using Jackson API
- 15) GSON API
- 16) Converting Java Object to JSON and Vice Versa using GSON API
- 17) HTTP Protocol Details
- 18) HTTP Methods
  - a) GET
  - b) POST
  - c) PUT
  - d) DELETE
- 19) HTTP Status Codes
- 20) @RestController
- 21) @RequestBody
- 22) @ResponseBody
- 23) @RequestParam
- 24) @PathVariable

- 5) MediaTypes
- 26) Consumes
- 27) Produces
- 28) Accept Header
- 29) Content-Type header
- 30) REST API Development using Spring Boot
- 31) POSTMAN
- 32) SWAGGER & SWAGGER UI
- 33) Exception Handling in REST API
- 34) REST Security
  - a) HTTP Basic Auth
  - b) JWT
  - c) OAuth2.0
- 35) Mono Objects
- 36) Flux Objects
- 37) REST Client Introduction
- 38) RestTemplate
- 39) WebClient
- 40) RestTemplate vs WebClient
- 41) Reactive Programming
- 42) Synchronous vs Asynchronous Calls
- 43) Apache Kafka with Spring Boot
- 44) Redis Cache Integration with Spring Boot

### 4. MICRO SERVICES

- 1) Monolith Architecture Introduction
- 2) Monolith Architecture case study
- 3) Monolith Application Deployment Process
- 4) Load balancer (Cluster) case study
- 5) Load Balancing Algorithms
  - a) Round Robin
  - b) IP Hashing
  - c) Sticky Session
- 6) Monolith Architecture Drawbacks
- 7) Micro services Introduction
- 8) Micro Services Advantages



- 9) Micro Services Dis-Advantages
- 10) Micro Services case study
- 11) Identifying Micro services boundaries
- 12) Micro services Architecture
- 13) Micro services Development
  - a) API – 1
  - b) API – 2
- 14) Interservice communication case study
- 15) FeignClient
- 16) Cloud Introduction
  - a) AWS
  - b) AZURE
  - c) Eureka
- 17) AWS Account Creation
- 18) AWS Services Overview
- 19) Deploying Micro services to AWS
- 20) Auto Scaling
- 21) Service Registry case study (Netflix Eureka)
- 22) API Gateway
- 23) Hystrix (Circuit Breaker)
- 24) Hystrix Dashboard
- 25) Spring Boot Admin Server
- 26) Spring Boot Admin Client
- 27) Distributed Logging
  - a) Sleuth Logging
  - b) Zipkin Server
- 28) Ribbon case study (Micro services load balancer)
- 29) Implementing Ribbon in Micro services
- 30) ConfigServer Introduction & Implementation
- 31) Micro services Integration with React JS

## TOOLS

- 32) Maven
- 33) Log4J
- 34) Junit & Mocking
- 35) Jenkins
- 36) Docker
- 37) SonarQube
- 38) POST MAN
- 39) Kafka
- 40) git and GitHub
- Spring Boot Annotation
- Define an Entity Class
- @Entity

- @Table
- Basic Column Mappings
- @Column
- @Id
- @GeneratedValue
- @Enumerated
- @Temporal
- @Lob

## Association Mappings

- @ManyToMany
- @ManyToOne and @OneToMany
- @ManyToOne @OneToMany
- @OneToOne
- @Embeddable @Embedded
- @EmbeddedId @ForeignKey
- @IdClass
- @Index
- @Inheritance
- @JoinColumn
- @JoinColumns
- @JoinTable
- @PrimaryKeyJoinColumn
- @PrimaryKeyJoinColumns
- @Table
- @TableGenerator
- @UniqueConstraint
- @Version

## Spring Boot MVC REST Annotations

- @Controller
- @RequestMapping
- @GetMapping,
- @PostMapping
- @PutMapping
- @PatchMapping
- @DeleteMapping
- @GetMapping vs @RequestMapping
- @ModelAttribute
- @ModelAttribute at method argument level
- @ModelAttribute at method level
- @CrossOrigin





@CrossOrigin with method (annotated with @RequestMapping)  
@CrossOrigin with Controller class  
@CrossOrigin with both(Controller class and Handler Method)  
@RequestParam  
@RequestParam with multiple values of a field  
Spring Boot REST Annotations  
@RestController  
@PathVariable  
@RequestParam vs @PathVariable  
@ResponseBody @RequestBody  
@ResponseBody & @RequestBody for XML format data  
@Service @Repository  
@Autowired @Qualifier @Scope  
@Required @Scope @Configuration  
@Bean @Component @Value

- Gradle Maven
- CI-CD (Continuous Integration and Continuous Deployment)
- Git Hub for CI
- Jenkins - Creating & configuring Jenkins job
- Configuring webhook to trigger Jenkins job
- Validation of CI CD pipeline
- Versioning REST APIS
- Through URI Path
- Through Query parameters
- Through custom headers
- Through content negotiation
- Working with the Ecosystems  
Retrofit tool
- Debugging Microservices
- Microservices Scalability
- Designing microservices for SAAS
- Service Mesh
- Ingress

## MICROSERVICES

- Best practices of designing REST ful web services
- Evolution of Microservices
- Monolithic architecture and its Limitations
- Analyzing existing Monolithic application architecture
- Microservices Architecture
- Microservices Landscape
- Configurations
- Ecosystems
- Tools & Technologies
- Build Systems
- Design Patterns involved in Microservices
- Decomposition patterns
- Aggregator pattern
- Chain of Responsibility
- Asynchronous Messaging Design Pattern
- Circuit Breaker pattern
- Service Discovery Pattern
- Command Query Responsibility Segregation (CQRS)
- Saga Pattern
- Using Zuul for API gateway
- Configuration Management System



# UI TECHNOLOGIES

## HTML 4 HTML BASICS

- WHAT IS HTML
- Features of HTML
- Tags: paired tags (vs) Unpaired tags
- List of tags
- Installing Editor and Browse

### HTML Structure

- Syntax of html
- Head (vs) Body
- First example in HTML

### HTML Document Basic

- Heading
- Texting formatting tags
- Preformatted text
- Lines

### Abbreviations, Images and Hyperlinks

- Meta tag
- List Tags
- Ordered List
- Unordered List
- Tables
- Forms
- What is Form
- Importance of Form in Realtime
- Input tag , types and attributes
- Dropdownlist and Option Group
- Fieldset and Label
- Textarea ,Label
- Submitting the form to server
- DIV and Span

## CSS 2

- CSS Basics
- What is CSS
- Need of CSS in real web sites
- Syntax of CSS
- What is Selector
- What is property
- ID Selector
- Class Selector

## Color properties

- Color
- Background Color
- Types of Color: Named colors, Rgb colors, Hexadecimal colors
- Front Properties
- Text Properties
- Background Properties
- Bullets and Numbering
- DIV and its css properties
- Importances of Box Model
- Padding properties
- Border Properties
- Margin properties
- Advanced
- Opacity
- Display
- Visibility
- Overflow

## Position

- Static
- Absolute
- Relative
- Fixed
- Z-index
- Hyperlink Styles
- a:link
- a:hover
- a:visited
- a:active

## Types of Style Sheets

- Internal Style Sheet/Embedded Style Sheet
- Internal Style Sheet
- External Style Sheet

# UI TECHNOLOGIES

## CSS Selectors

### Style Precedences

- Default Style precedence
- Limport
- Menubar in realtime
- Table style in realtime
- Static page template
- Header
- Nav
- Container
- Leftcol
- Pagecontent
- Footer
- Responsive web design
- Need of RWD in realtime
- Extra-small,small,medium,and Large devices
- Media queries in CSS file
- Viewportmeta tag

### Java Script 5

- Introduction to Java script
- Programming fundamentals
- Operators
- Control statements
- Functions
- Arrays
- JavascriptOOP(Advanced JavaScript)
- What is Object
- Properties
- Methods
- Object literals
- Constructor functions
- Demo: creating and calling objects in different ways
- Manipulating objects
- Reading object keys
- Object array
- Prototype
- Inheritances

### JSON

- What is JSON
- Object literal(vs) JSON
- Importance of JSON in realtime
- JSON.stringify()
- • JSON.parse()

### Type conversion

- String functions
- Date functions
- Adadvanced
- Noscript
- Closures
- Hoisting
- **DOM Manipulation**
- What is DOM
- Window object
- Document Object
- Element Object
- Event Handling
- **Validations**
- What is validation
- Need of validation in realtime
- Submit event
- Required field validation
- Using regular expression
- Types of Javascript
- Internal Javascript/Embedded Javascript

## ◆ Javascript 6&7/ Ecma Script 6&7

- Fundamentals
- What is EmcaScript
- EcmaScrpit(vs)JavaScript
- Setting-up the Environment

### **OOP**

- Classes
- Constructors
- Parameter Less Constructor
- Properties
- Methods
- Summary

### **Search suggestions & Calculations**

- Details
- List
- Output

### **Storage**

- Localstorage
- Session storage
- Geo location
- Canvas and SVG
- 7)CSS3
- CSS 3 Basics
- What is CSS 3
- New features of css3
- CSS 3 first example

### **Box model properties**

- Resize
- Word wrap
- Border Radius
- Box shadow
- Text shadow
- Transformations
- Transitions
- Animations by using theKeyframes
- Creating basic page contact
- Tables
- Tables styles
- Tables background colour
- Buttons
- Inheritance
- Method overriding

### **Other Concepts**

- Set and get methods
- DefaultArguments
- Arrow functions
- Let

- Const
- Rest
- Destructuring
- Multiline strings

### **HTML 5**

- Html 5 Basic
- What is html 5
- New features of ntml 5
- Advantages of html 5
- Syntax of html 5
- Deprecated elements andattributes
- New doctype for html 5
- New input types
- NEW INPUTATTERIBUTES
- MULTIMEDIA
- Audio Tag
- Video Tag
- Audio formats and video formates

### **SEMANTIC AND STRUCTURAL TAGS**

- Article
- Header
- Nav
- Section
- Aside
- Footer

### **PROGRESS BAR**

- Meter
- Progress

### **IMAGES**

- Figure
- Figcaption

### **Collapsible**

- Details
- SuButton colours
- Table sizes
- Glyphicons
- Visibility
- Show
- Hidden

### **Images**

- Rounded



- Circle
- Thumbnail
- Jumbotron
- Paging
- Panels
- Panels heading
- Panel body

### Nav Bar

- Navbar
- Navbar inverse
- Navbar fixedtop
- Navbar header
- Navbar nav
- Breadcrumbs
- Dropdown
- Progressbar
- Tabs
- Forms
- Model
- Grid system(responsive web design)
- Extra small
- Small
- Medium
- Large

## ◆ Angular JS

### Introduction

- 1.Introduction
- 2.What is Angular
- 3.Architecture of Angular Apps
- 4.Setting Up the Development environment
- 5.Your First Angular App

### Angular fundamentals

- 1.Introduction
- 2.Building Blocks of Angular Apps
- 3.Controllers
- 4.Templates
- 5.Directives
- 6.Services
- 7.Filters
- 8.Dependency Injection

### Displaying Data and Handling Event

- 1.Introduction
- 2.Expressions
- 3.Event Binding
- 4.Two-way Binding

### Modules

- 1.Creating a module
- 2.Using module in the application
- 3.Creating a module with dependencies
- 4.Creating a contacts for the module

### Directives

- 1.What is a directive
- 2.Built In directives
- 3.Creating the custom directive
- 4.Compile , link and transclusion
- 5.Working with isolated scope

### Controllers

- 1.What is a directive
- 2.Creating the Controller and using in the application
- 3.Creating a model and function inside a controller
- 4.Configuring simple events with function

### Scopes

- 1.What is \$scope
- 2.What is \$rootScope
- 3.\$scope vs \$rootScope
- 4.Change detection and watchers

### Filters

- 1.What is filter
- 2.Built in filters usage in the application
- 3.Creating a custom filter

### Services

- 1.What is service
- 2.built in services in the application
- 3.creating the custom service
- 4.factory vs provider vs services

### Http

- 1.calling the server side apis by using \$http
- 2.getting the data from the server
- 3.ALL CRUD operations by using the \$http
- 4.Working with promises





## Error Handling

1. Identifying the simple errors and trouble shooting
2. Configuring the special error handling functions
3. Displaying generic error messages

## Forms

1. Configuring the Angular Forms with input controls
2. Configuring the validations for the input controls
3. Use of novalidate
4. Configuring project specific error message
5. Routing

1. Configuring single page application
2. Configuring single page application in Real time application
3. Configuring the routes and route parameter

1. Configuring the navigation using the location service
2. Enabling the html5 specific routing

## Integration

1. Angular JS in the JAVA Applications
2. Angular JS in the .net Applications
3. Angular JS in the NODEJS Applications
4. Angular JS in the Python Applications
5. Angular JS in the PHP Applications

## ◆ React JS

### Introduction to React JS

- Importance of React Js in web\_Applications
- Features
- History of ReactJS
- Building single-page applications and mobile applications
- React -> a JavaScript library
- Need of virtual DOM and its Mechanism on performance of applications that rely on frequent updates

### Benefits of React JS

- Declarative
- Reusable components
- Fast rendering
- JSX
- Server-side rendering
- Strong developer community

## Virtual DOM

### Cons of React JS

### Prerequisites for Learning ReactJS

- Basic JavaScript syntax
- Asynchronous JavaScript
- The DOM
- HTML and CSS
- ES6+

### ECMAScript 6

- Arrow functions
- Classes
- Promises
- The spread operator
- Similarities and differences between JavaScript and ReactJs

### ReactJS - Environment Setup

### ReactJS - JSX(JavaScript XML)

- Importance of jsx files and its working
- use className instead of class in JSX
- Concept of modular programming

### ReactJS - Components

- Class level components
- Functional Level components
- Efficiency code of using Functional components

### ReactJS - State

- Purpose of State
- Mutability of State
- Importance of setState(),useState() hook and render() hook

### ReactJS - Props Overview

- Terminology of passing data from a parent component to a child component using props
- Concept of Immutability in props

ReactJS - Props Validation

ReactJS - Component Life Cycle

ReactJS - Events



ReactJS - Refs  
ReactJS - Keys  
ReactJS - Router  
ReactJS - Flux concept  
ReactJS - Higher order Components  
ReactJS - Best Practices

## DATA BASE

### Oracle

#### FUNDAMENTALS OF DATA BASE:

- Introduction to database
- Models
- RDBMS concept
- ORDBMS concept
- E-R model
- Introduction to oracle database
- Oracle database history
- Introduction to oracle 11g features / 12c features
- Oracle 11g server and DB Architecture

#### SQL:

- Introduction to SQL
- Features of SQL
- Introduction to SQL \* plus
- Role of SQL in oracle 11g

#### Classification of SQL Commands

#### Data Definition Language (DDL) commands

- Introduction to DDL commands
- Create table
- Rules for naming a table
- Altering the table structure using ALTER
- Change the table name using RENAME
- Deleting data using TRUNCATE
- Dropping table using DROP

#### Data Manipulation Language (DML) commands

#### INSERT:

- Insert of Data (value and address method)
- Insertion of nulls
- Overriding of data in required formats
- Data loading methods in oracle 11g
- Data loading performance improvement tips

#### Data Updation

- Techniques of Updation
- Complex data updation
- Correlated Query mechanism in update

#### Data Deletion

- Simple data deletion
- Critical data deletion
- Table delete vs table truncate

#### Transaction control language commands

- Introduction of production databases
- Introduction of transaction and ACID properties
- Transaction management in oracle 11g
- What is session and types of terminations
- Commit,rollback and save point

#### Data Retrieve Language (DRL) command SELECT

- Select command and its clauses
- Data retrieving methods
- Data sorting in oracle 11g
- Null value sort and user defined null sorts

#### Operators :

- Types of operators in oracle 11g & filters

#### Functions :

- Types of functions in oracle 11g
- Pseudo columns of oracle 11g
- Table joining in oracle 11g
- Introduction to table join
- ANSI 1992 and ANSI 1999 standard
- Types of joins
- Inner and outer joins
- Equi/Non Equi join/self join /cartesian join
- Oracle specific join and enhancements

#### Integrity Constraints

- Introduction to Constraints
- Importance of integrity constraints
- Levels of constraints
- Type of constraints
- Name of the constraints

## Subqueries

- Simple Sub query
- Complex Sub query on multiple data sources
- Co-related Sub query

Oracle database objects :

## Index:

- Introduction to index
- Type of indexes in oracle 11g
- Index for OLTP and OLAP

## CLUSTER:

- Introduction to cluster
- Types of views and their usage
- Performance evaluation methods in oracle 11g
- Explain plan command usage and oracle scripts

## Views :

- Introduction to views
- Type of views and usage
- Performance issues with views
- Background process of views
- DML restriction on views
- Materialized views and usage

## SYNONYM:

- Introduction to synonym and usage
- Private synonyms
- Public synonyms
- How to see list of synonyms
- Dropping the synonyms

## SEQUENCE:

- Introduction to sequence and usage
- Pseudo columns usage in sequence (Nextval and curval )
- Sequence with positive values Ascending and Descending
- Sequence with negative values Ascending and Descending
- Sequence with cycle option
- Dropping the sequences

## Concurrency control using locks

- Types of locks
- Levels of locks
- Row level
- Page level
- Table level
- Modes of locks
- Share mode
- Share update mode
- Exclusive mode
- Wait and no wait options

## Data control language commands:

- What is privilege
- What is role
- Granting privileges
- Removing privileges
- Cascading privileges

## Plus commands

- Environment setting commands
- Screen formatting commands

## ORDBMS:

- Drawbacks of RDBMS
- Introduction to ORDBMS

## Abstract Datatypes

- Persistent object vs transient object
- Column object vs row object
- Introduction to object table and usage

## New Datatypes

- LOBS, BLOBs, CLOB, NCLOB, BFILE, REG data type
- REF, Deref, VALUE, DANGLING operations
- DBMS\_LOB package and its routines
- Using collection (composite types)
- Nested tables vs varray
- Advantages of collections
- Transaction consistency

### Data partitions and parallel process:

- Types of partitions
- Range partitions
- List partitions
- Hash partitions
- Composite partitions
- Index partitions
- Global partitions
- Local partitions
- Parallel query process

### ◆ PL/SQL

- Introduction to programming languages
- Procedural vs non procedural languages
- Limitations of ANSI SQL and oracle SQL
- Introduction to oracle PL/SQL
- PL/SQL usage in production database
- Key benefits of PL/SQL over SQL
- PL/SQL block structure and designing
- Constructs of PL/SQL
- Assignment operator
- Debugging statement
- Variables in PL/SQL
- Scope of variables in PL/SQL
- Blocks and types of block
- Nested blocks
- Operators in PL/SQL
- Rules of naming a variable
- Comments in PL/SQL

### Flow control statements

- If/nested if/if-else/if-else if/case/searched case/Goto/continue/raise Iterative statement
- Simple loop/while loop/for/for-reverse Embedded SQL :
- Introduction of Embedded SQL
- Role of Embedded sql in PL-SQL
- Constructs of Embedded sql
- Transaction management using Embedded sql

### Dynamic sql:

- Introduction to dynamic sql
- Usage of dynamic sql in pl/sql Exception handling

- Introduction to exceptions
- Importance of exceptions in pl/sql
- Type of exceptions
- Named system exceptions
- User defined exceptions
- Introduction and usage of predefined

### Exceptions and STANDARD package

- Usage of PRAGMA\_EXCEPTION\_INIT()
- Anchor datatypes
- Introduction to anchor datatypes and advantages
- Connection with cods rules

### Cursor management PL/SQL

- Pictorial presentation of cursor mechanism
- Introduction and usage of implicit cursor
- Introduction and usage of explicit cursor
- Cursor attributes (%Found, % Not found, % row count, % Is open)
- Cursor using simple loop
- Cursor using while loop
- Cursor using for loop
- Cursor exceptions
- Data locking
- Data manipulation through cursors
- REF cursor
- Bulk fetch and bulk data retrieval in PL-SQL
- Bulk collection
- Bulk binding mechanism of cursor
- Dynamic Behaviour of cursor management
- Parameterized cursor
- Cursors using joins

## Subprograms

- Introduction to Subprograms
- Advantages of subprograms
- Types of subprograms

## Stored procedures

- Introduction to procedures
- Types of modes (in , out and in/out)
- Sections in the procedures
- Declaration of procedures
- Body of the procedure
- Cursors using procedure
- Use & Declaration of host /bind variable
- How to execute the procedure

## Stored functions

- Introduction to functions
- Sections in the functions
- Declaration of function
- Body of the function
- How to execute the function

## Packages

- Introduction to package
- Stand alone schema Vs packaged objects
- Encapsulation mechanism of package
- Function overloading
- Procedure overloading
- Global variables in package specification
- Usage of pragma serially\_reusable
- Restrict references and compiler hints
- Introduction and usage of pragma
- Db trigger
- Introduction to database trigger
- Types of Trigger
- Triggering events
- Usage of old and new references
- New trigger instead of
- Trigger cascading
- Enabling/disabling triggers
- Schema triggers
- Table mutation error
- Transaction auditing trigger

## ◆ Advanced PL\_SQL topics

- User defined datatypes(records)
- Subtype of PL-SQL
- PL-SQL associated array(PAA)  
(2nd arrays)
- Dynamic behaviour of PAA
- PAA attributes
- Autonomous Transactions
- Advantages of autonomous transactions
- Usage of autonomous transaction
- Scope of autonomous transaction
- Usage of autonomous transaction  
in triggers
- Using of FORALL statement
- About %bulk Row count
- Definer Vs Invoker rights in stored  
procedures
- Optimizing hints to stored procedure.



## ◆ **Mongo DB**

### **Module 1 – Design Goals, Architecture and Installation**

Topics:

- Understanding Base Concepts of Database
- Types of NoSQL Database, and NoSQL vs. SQL Comparison, ACID & Base Property
- Overview of MongoDB, Design Goals for MongoDB Server and Database, MongoDB Tools
- How to modularize code by separating routes
- Installation/Running MongoDB on various platforms Windows, Linux, MAC OS, etc.

### **Module 2 – CRUD Operations**

Topics:

- MongoDB Development Architecture
- MongoDB CRUD Introduction
- Concern Levels, Journalling etc.
- Distributed Read & Write Queries
- MongoDB Datatypes
- MongoDB Production Architecture
- MongoDB CRUD Concerns
- Cursor Query Optimizations, Query Behaviours in MongoDB
- MongoDB CRUD Syntax & Queries (Live Hands on)

### **Module 3 – Schema Design and Data Modelling**

Topics:

- Data Modelling Concepts
- Type of Data Modelling
- Data Model Examples and Patterns
- Model Tree Structures
- Model Relationships between Documents
- Use Case of Data modelling
- Type of Data Modelling
- Analogy between RDBMS & MongoDB Data Model, MongoDB Data Model (Embedding & Linking)
- Challenges for Data Modelling in MongoDB
- Model Specific Application Contexts

### **Module 4 – Administration**

### **Module 5 – Scalability and Availability**

Topics:

- Introduction to Replication
- What is Replica Set and Master Slave Replication?
- Introduction to Sharding
- Concepts around Sharding, What is shards, Key
- How to setup a Sharding
- Concepts around Replication
- Type of Replication in MongoDB
- How to setup a replicated cluster Managing Replica Sets etc.
- Config Server, Query Router etc.?
- Type of Sharding (Hash Based, Range Based etc.), and Managing Shards

### **Module 6 – Indexing and Aggregation Framework**

Topics:

- Index Introduction
- Index Types
- Index Creation
- Aggregation to Introduction
- Type of Aggregation (Pipeline, MapReduce & Single Purpose)
- Index Concepts
- Index Properties
- Index Tutorial
- Indexing Reference
- Approach to Aggregation
- Performance Tuning

### **Module 7 – Application Engineering and MongoDB Tools**

Topics:

- MongoDB Package Components
- MongoDB Limits and Thresholds
- MMS (MongoDB Monitoring Service)
- HTTP and Rest Interface



- Integration of MongoDB with Hadoop and Data Migration MongoDB with Hadoop (MongoDB to Hive).
- Configuration File Options
- Connection String URI Format/ Integration of any compatible tool with MongoDB API and Drivers for MongoDB

### **Module 8 – Project, Additional Concepts and Case Studies**

Topics:

- Security Introduction
- Security Tutorial
- Integration of MongoDB with Pentaho
- Integration of MongoDB with Java
- Integration of MongoDB with GUI Tool Robomongo
- Security Concepts
- Integration of MongoDB with Jasperof
- Integration of MongoDB with Hadoop/Hive
- Project on MongoDB and Java

JAVA  
FULL STACK



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