Java Development Syllabus

Module 1: Core Java

1. Features of Java Language

- Simple.
- Object-Oriented.
- Platform Independent.
- Portable.
- Robust.
- Secure.
- Interpreted.
- Multi-Threaded

2. Language Fundamentals

- Identifiers, literals
- Data types -
- Primitives and bucket concept
- Arrays
- Java coding standards
- Downloads and Installations -

  JDK - 1.8

  Eclipse – Photon or Oxygen

3. Operators and Assignments

- Increment & Decrement operators.
- Arithmetic operators.
- String concatenation operators.

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- ❖ Relational operators
- ❖ Equality operators
- ❖ Bitwise operators (&, |)
- ❖ Short circuit operators (&&, ||)
- ❖ instance of operators
- ❖ Assignment operator
- ❖ Conditional operator
- ❖ new operator
- ❖ [] operator

4. Java inside

- ❖ JDK, JRE, JVM
- ❖ Memory Organisation in Java
  5 memory areas viz Method, Stack, Heap, PC, Native
- ❖ Garbage Collection in Java
- ❖ Loading, Linking, Initialisation
- ❖ Class loader
- ❖ Class Loader types and properties

5. Declarations and Access Control

- ❖ Java project, package, class
- ❖ Members of class
- ❖ static vs instance
- ❖ constructor details
- ❖ Modifiers - 12 (4+8)

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6. Flow control

- ❖ Selective
  - if, if-else, if-else ladder, nested if-else, ternary operator, switch
- ❖ Iterative
  - while
  - do-while
  - for
  - for-each
- ❖ Transfer
  - break
  - continue
- ❖ Arrays examples

7. Exception Handling

- ❖ Exception and Error
- ❖ Hierarchy of Throwable
- ❖ checked vs unchecked, partially checked, errors
- ❖ How to handle exceptions
  - Try-catch-finally blocks
  - Throw
  - Throws
- ❖ Code flow in try catch blocks
- ❖ Top 10 exceptions with examples
- ❖ Custom Exceptions
- ❖ Exception improvements in 1.7

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8. OOPS - Object Oriented Programming Concepts

- ❖ Inheritance
  - Definition, types, Diamond problem, solution
- ❖ Abstraction
  - Abstract class and Interface details
- ❖ Encapsulation
  - Meaning, 12 modifiers, their applicability
- ❖ Polymorphism
- ❖ Overloading
  - Rules for signature
- ❖ Overriding
  - Rules for signature, Return Type, Modifiers, Exceptions
- ❖ Code scenarios for OOPS

9. JFC – Java Fundamental Classes

- ❖ String Class
- ❖ StringBuffer, StringBuilder
- ❖ Object Class
- ❖ Wrapper Classes
- ❖ Thread
- ❖ File related classes

10. Java 5 features

- ❖ Static imports
- ❖ for-each loop

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- ❖ Var-agr methods
- ❖ ENUM
- ❖ AutoBoxing-Unboxing

11. File Handling and IO Package

- ❖ File
- ❖ BuffereReader
- ❖ PrintWriter
- ❖ Serialisaion
- ❖ SerialVersionUID
- ❖ Custom Serialisaion
- ❖ Externalisation

12. Inner Classes

- ❖ static inner class
- ❖ member inner class
- ❖ local inner class
- ❖ nested inner class
- ❖ calling variables and methods of inner classes

13. Multithreading

- ❖ Thread class, Runnable Interface
- ❖ Thread schedular
- ❖ methods in Thread Class - start(), run(), join(), yield(), sleep(), and others
- ❖ Thread life Cycle

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- ❖ Synchronisation
- ❖ Class level lock and Object level lock
- ❖ Inter-Thread communication - wait(), notify(), notifyAll()

14. Collection Framework

- ❖ Limitations of legacy classes and Arrays
- ❖ List and its classes
- ❖ Set and its classes
- ❖ Usage, utilities, backend DS, methods of each collection classes
- ❖ Collections class and its utility methods
- ❖ Cursors in java
    - Enumeration
    - Iterator
    - ListIterator
- ❖ Fail fast and Fail Safe (ConcurrentMoficationException)
- ❖ Map Interface
- ❖ HashSet vs HashMap
- ❖ HashSet add method and HashMap put method
- ❖ Internal working of put() and get() methods
- ❖ Map, Entry interface methods

15. Java 8 features and Usage

- ❖ Lambda expression
- ❖ Stream API
- ❖ forEach method
- ❖ Functional Interface
- ❖ default and static methods in Interfaces.

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- ❖ Other improvements
- ❖ Methods of Stream Class
- ❖ Collection API improvements.
- ❖ Java Time API
- ❖ Concurrency API improvements
- ❖ Java IO improvements
- ❖ Various Examples of stream

16. Design Pattern

- ❖ Creational
  - Factory Method Pattern
  - Abstract Factory Pattern
  - Singleton Pattern
  - Prototype Pattern
  - Builder Pattern
  - Object Pool Pattern
- ❖ Structural
  - Adapter Pattern
  - Bridge Pattern
  - Composite Pattern
  - Decorator Pattern
  - Facade Pattern
  - Flyweight Pattern
  - proxy Pattern
- ❖ Behavioural
  - Chain of Responsibility Pattern
  - Command Pattern

- Interpreter Pattern
- Iterator Pattern
- Mediator Pattern
- Memento Pattern
- Observer Pattern
- State Pattern
- Strategy Pattern
- Template Pattern
- Visitor Pattern
- Null Object

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Module 2: DBMS – Database Management System

1. SQL

- ❖ DDL
- ❖ DML
- ❖ MySql database
- ❖ MySql database default functions - max, min, avg, distinct, limit, offset, count, rank
- ❖ SQL joins
  - inner join
  - left join
  - right join
  - outer join
- ❖ Feqently asked queries in interviews
- ❖ SQL injection

- ❖ Prepared statements and Stored Procedures
- ❖ Complex queries

2. JDBC – Java Database Connectivity

- ❖ Connection steps
- ❖ MySql connector jar importance
- ❖ JDBC classes and interfaces
- ❖ JDBC fetch and insert query
- ❖ Driver types

3. Hibernate

- ❖ Limitations of JDBC
- ❖ hibernate.cfg.xml file
- ❖ mapping types - xml, annotations
- ❖ Hibernate Inheritance
  - Table per hierarchy
  - Table per class
  - Join
- ❖ Hibernate Mappings-
- ❖ Collection mapping (List, Set, Map)
- ❖ One to One Mappings
- ❖ One to Many Mappings
- ❖ Many to Many Mappings
- ❖ Hibernate Cache

- Primary
- Secondary
- Query Cache

❖ Session interface methods save(), persist(),get(), load(), save() saveOrUdate(), merge(), evict(), clear(), close()
- JPA methods
- Hibernate methods

❖ Cascading strategies --> All, Detach, Remove, Merge ------> Delete, delete_orphan,

❖ HQL language

❖ Exceptions in Hibernate

❖ Query, Criteria and Criterion Interface

❖ Hibernate Pagination

❖ Named Query

❖ Hibernate Projections

❖ Lazy Loading

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Module3: Advance Java and Web Technologies

1. Initial Web Tech

❖ Servlet

❖ web.xml details

❖ Servlet life cycle

❖ HTML

❖ JSP

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- ❖ JSP life cycle

2. Spring

- ❖ Spring framework introduction
- ❖ DI and IoC
- ❖ IoC containers
- ❖ Spring block diagram
- ❖ Spring Hello World examples
- ❖ Ways to configure Spring
- ❖ Bean properties
  - id
  - scope
  - custom methods –
    - init,
    - destroy
    - default-init
    - default-init
  - autowire
    - by type
    - by name
  - lazy-init
  - properties

- ❖ Dependency Injection
  - Constructor injection

- Setter injection

❖ Exceptions in spring

❖ Spring MVC

- Model
- View --JSPs
- Controller

❖ Spring Controller imp annotations

@Component ,@Controller, @Service, @Repository @RestController

❖ Spring AOP

❖ Exception Handling in Spring MVC

❖ Spring Batch Processing

3. Spring Boot

❖ Need of Boot

❖ starter on Boot

❖ Autoconfigurations

❖ Dev tool

❖ DB connection with Boot

❖ Profiling in Spring Boot

❖ Unit testing with Mokito

❖ Actuaters

4. Microservices -

❖ Monolythic app

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- ❖ Need of Microservices
- ❖ writing a Microservice
- ❖ CRUD operation
- ❖ Microservice with Spring Boot

Module4: Developers Tools and imp Technologies

- ☞ Maven
- ☞ Git
- ☞ Jira
- ☞ Tomcat
- ☞ Junit/TestNG
- ☞ Mokito
- ☞ Jenkins
- ☞ SONAR Cube introduction
- ☞ Agile
- ☞ Linux and Shell Script
- ☞ Deployment knowledge (release, sprint, Envs)
- ☞ Docket and Kubernities

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