

# JAVA\_SDE\_1

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## ♦ 1. Core Java (Deep Understanding)

At this stage, you should have a solid grasp of Java fundamentals and its best practices.

### ✓ Java Fundamentals

- ✓ Data Types, Operators, Type Casting
- ✓ Control Flow (if-else, loops, switch)
- ✓ Functions & Methods (Overloading, Overriding)
- ✓ String Manipulation (String, StringBuilder, StringBuffer)
- ✓ Java Memory Model (Heap, Stack, Metaspace)

### ✓ OOP Principles (Object-Oriented Programming)

- ✓ Encapsulation, Abstraction, Inheritance, Polymorphism
- ✓ Static vs. Instance Methods
- ✓ this and super Keywords
- ✓ Access Modifiers (private, protected, public, default)

### ✓ Exception Handling

- ✓ Try-Catch-Finally Blocks
- ✓ Custom Exceptions
- ✓ Checked vs. Unchecked Exceptions

### ✓ Collections Framework

- ✓ List (ArrayList, LinkedList)
- ✓ Set (HashSet, TreeSet)
- ✓ Map (HashMap, TreeMap)
- ✓ Queue (PriorityQueue, Deque)

### ✓ Java 8+ Features

- ✓ Functional Interfaces (Predicate, Function, Supplier)
- ✓ Lambda Expressions
- ✓ Streams API (Filter, Map, Reduce)
- ✓ Optional Class
- ✓ Default & Static Methods in Interfaces

## ♦ 2. Data Structures & Algorithms (DSA)

To succeed as an SDE-1, you must be comfortable solving DSA problems.

### ✓ Key Concepts

- ✓ Arrays & Strings (Sliding Window, Two Pointers)
- ✓ Linked Lists (Singly, Doubly, Fast & Slow Pointer)

- ✓ Stacks & Queues (Monotonic Stack, Deque)
- ✓ HashMaps & HashSets (Frequency Count, Grouping Anagrams)
- ✓ Trees (Binary Trees, BST, DFS, BFS)
- ✓ Graphs (BFS, DFS, Dijkstra's Algorithm)
- ✓ Dynamic Programming (Memoization, Tabulation)
- ✓ Sorting Algorithms (Merge Sort, Quick Sort, Heap Sort)

🔥 Practice: Solve at least 300+ problems on Leetcode (Easy-Medium)

### ♦ 3. Multithreading & Concurrency (Basic Understanding)

As an SDE-1, you should understand the basics of multithreading.

- ✓ Threads (Thread class, Runnable interface)
- ✓ Synchronization & Locks (synchronized, ReentrantLock)
- ✓ ExecutorService & Thread Pooling
- ✓ CompletableFuture (Async Programming)

### ♦ 4. Backend Development with Java

Most SDE-1 roles involve backend development, primarily using Spring Boot.

#### ✓ Spring Boot Basics

- ✓ Creating REST APIs using Spring Boot
- ✓ Controllers (@RestController, @RequestMapping)
- ✓ Dependency Injection (@Autowired)
- ✓ Configuration (application.properties)
- ✓ Exception Handling (@ControllerAdvice)

#### ✓ Database & ORM (SQL & NoSQL)

- ✓ SQL Fundamentals (Joins, Indexing, Aggregations)
- ✓ CRUD Operations in Spring Boot
- ✓ JPA & Hibernate (Entity, Repository, Query Methods)
- ✓ Database Connection Pooling (HikariCP)

#### ✓ REST APIs

- ✓ HTTP Methods (GET, POST, PUT, DELETE)
- ✓ Status Codes & Headers
- ✓ Pagination & Sorting
- ✓ Swagger & OpenAPI Documentation

#### ✓ Authentication & Security

- ✓ JWT (JSON Web Tokens) for Authentication
- ✓ OAuth2 Basics
- ✓ Password Hashing (BCrypt)

🔥 Project: Build a simple CRUD API using Spring Boot & MySQL

#### ♦ 5. Version Control & Build Tools

- ✓ Git & GitHub (Branching, Pull Requests, Merge Conflicts)
- ✓ Maven/Gradle (Dependency Management)

#### ♦ 6. DevOps & Deployment (Basic)

- ✓ Docker (Containerizing Java Apps)
- ✓ CI/CD Pipelines (GitHub Actions, Jenkins)
- ✓ Cloud Basics (AWS EC2, S3, Lambda)

#### ♦ 7. Soft Skills & Code Quality

- ✓ Writing Clean Code (SOLID Principles, DRY, KISS)
- ✓ Code Reviews & Collaboration (PR Reviews, Pair Programming)
- ✓ Writing Unit Tests (JUnit, Mockito)

#### ♦ 8. Projects for Resume

 Basic Projects:

To-Do List API (Spring Boot + MySQL + JWT)

URL Shortener (Spring Boot + Redis)

E-Commerce Backend (Spring Boot + JPA + OAuth2)

Chat App (WebSockets)

🔗 Host projects on GitHub & deploy them to AWS/Vercel

#### ♦ 9. Interview Preparation

- ✓ DSA Practice: Leetcode (Easy-Medium)
- ✓ System Design Basics: High-Level Overview
- ✓ Behavioral Questions (STAR Method)