Interview Questions for 5+ Years Experience(Core Java to Microservices)

Core Java

Explain the difference between HashMap, LinkedHashMap and TreeMap?

What is the difference between final, finally and finalize()?

How does the JVM handle memory management(Heap vs Stack)?

Explain the concept of immutability in java with an Example?

What are new features introduced in java 8, 11 and 17?

How does garbage Collection works in java?

What are checked vs unchecked exceptions?

Explain multithreading and synchronization in java?

How do you handle deadlocks in a multithread application?

Write a program to find a non-repeat character in a string?

What is the difference between String, StringBuffer and StringBuilder?

How does volatile keyword works in java?

Explain the difference between hashCode(), == and equals()?

What are the functional interfaces in java?

How does Stream API improves data processing?

What is the difference between parallel stream and normal stream?

Explain class loaders in java?

What are memory leaks in java and how to prevent them?

How is exception handling implemented in java?

Write a program to implement custom exception class?

How does reflection work in java?

Explain Serialization and deserialization java?

What is the difference between Comparable and comparator?

Write a code sort the employee by the salary and by the name?

What is the method overloading and overriding examples?

How does java achieves platform independent?

Explain dynamic binding and polymorphisms with example?

What are the records in java 14+ and how they are useful?

Explain sealed classes introduced in java 17?

What is the role of the JIT compiler in JVM performance?

OOP and Design Patterns

What are the four pillars of oops?

Explain SOLID principles with example?

What is the difference between Factory and AbstractFactory Pattern?

How is singleton implemented in multithreaded enverioument?

Explain dependency injection and its advantages?

Explain observer pattern with real world example?

What is the builder pattern and where do we use it?

What are the structural, creational and behavioral patterns?

Explain prototype pattern with example?

What is the adapter pattern and where do we use it?

Explain MVC architecture and its importance?

What is dependency inversion principle?

Explain open-closed principle with an example?

What is strategy design pattern?

Write code example of decorator pattern?

Spring and Spring Boot

What is the difference between Spring and Spring Boot?

Explain how does dependency injection works in spring?

What are Spring Boot starters?

How does Spring Security handle authentication and authorization?

What is the use of @Transactional annotation?

How do you configure caching in spring boot?

Explain the lifecycle of a spring bean?

What is the difference between @Component, @Service and @Repository?

How do you implement scheduling in Spring Boot?

What are the profiles in spring boot and how do you use them?

How does spring boot auto-configuration work?

What is the role of ApplicationContext in Spring?

Explain the difference between constructor injection and setter injection?

How do you handle exception globally in spring boot?

Explain spring boot actuators and its benefits?

What is the difference between RestTemplate and WebClient?

How do you write integration tests in spring boot?

Explain AOP(Aspect Oriented Programming) in Spring?

What is the role of properties/yml file in Spring Boot?

How do you connect Spring Boot to Kafka and RabbitMQ?

Microservices

What are the main advantages of microservices over monlothic architecture?

How do services communicate in a microservice architecture?

What is the role of API gateway of microservice?

Explain Circuit breaker pattern in microservice?

How do you handle distributed transactions in microservice?

What is the eventualy consistency and how do you implement it?

How do you implement centralized logging in microservice?

Explian sevice discovery and how tools like Eureka or Consul help?

What are sidecar patterns in microservice?

Explain saga pattern with example?

What is the role of conternisation(docker) in microservices?

How does kubernets helps in microservice orchestration?

What is the difference between synchronous and asynchronous communication in microservice?

How do you secure microservice in production?

What is API versioning and why is it important?

How do you monitor microservices in production?

What tools are used for distributed tracing in microservices?

Explian difference between orchestration and choreography in microservice?

What is service mesh and how does Istio help?

How do you design idempontent REST APIs in microservices?

Database & JPA/Hibernate

What is the difference between JPA and Hibernate?

Explain different types of caching in Hibernate?

What is the N+1 problem in hibernate and how to solve it?

What is ACID properties in database?

Explain optimistic and pessimistic locking?

What is connection pooling and why is it needed?

Explain entity lifecycle in JPA?

What is criteria API in Hibernate?

How does lazy loading work in Hibernate?

What are native queries in JPA and when should you use them?

What is dirty checking Hibernate?

How do you handle database migrations in Spring Boot?

What is Flyway and Liquibase?

Explain one-to-one, one-to-many and many-to many relationships in JPA?

What is cascading in JPA and how does it work?

Coding and Problem-solving

Write a program to implement LRU Cache.

Write a program to detect a cycle in a linked list.

Find the longest substring without repeating characters.

Implement a thread-safe singleton class.

Write a program to merge two sorted arrays.

Find kth largest element in an array.

Write a program for producer-consumer problem using wait/notify.

Implement binary search recursively and iteratively.

Write a code to check if a string is a valid palindrome ignoring special characters.

Find the maximum subarray sum using Kadane’s algorithm.

Write a program to reverse a linked list.

Implement quick sorts and merge sorts algorithm.

Write code to solve the two sum problem.

Find the intersection of two sorted arrays.

Implement a thread pool executor from scratch.

System Design and Cloud

How would you design a scalable URL shortener like Bitly?

Explain CAP theorem with examples?

What is the difference between horizontal and vertical scaling?

How do you secure REST APIs in production?

Explain the difference between docker and Kubernets?

How would you design a messaging system in kafka?

What is load balancing and how it is implemented?

Explian CDN and how it improves performance.

How would you handle database sharding in the large systems?

What is eventual consistency in distributed databases?

How would design an e-commerce system like Amazon?

Explain difference between NoSQL and SQL databases.

What is API rate limiting and how to implement it?

How would you ensure high availability in cloud systems?

Explain blue-green deployment vs canary deployment.