

# Multithreading Interview Questions

1. What is multithreading in Java?
2. How does multithreading improve the performance of an application?
3. What is the difference between a thread and a process?
4. How do you create a thread in Java?
5. What are the different states of a thread in Java?
6. What is the difference between the `start()` and `run()` methods in Java threads?
7. What is a `Runnable` interface, and how is it used?
8. Can you extend `Thread` and implement `Runnable` at the same time?
9. What is thread synchronization?
10. What are synchronized methods and synchronized blocks in Java?
11. How does the `synchronized` keyword prevent thread interference?
12. What is a deadlock, and how can it be avoided in multithreading?
13. Can you explain thread priorities in Java?
14. What is thread pooling, and how does it work?
15. What is the difference between a `wait()` and `sleep()` method?
16. How does the `wait()` and `notify()` mechanism work?
17. What is the difference between `notify()` and `notifyAll()` ?
18. What is the role of the `join()` method in Java?
19. Can you explain the concept of a daemon thread?
20. How do you handle exceptions in multithreaded code?
21. What is thread starvation, and how can it be prevented?
22. What are atomic variables in Java?
23. How do the `volatile` keyword and the `Atomic` package differ?
24. Can you explain the `ReentrantLock` class?
25. What is the difference between a `ReentrantLock` and a `synchronized` block?
26. How does the `ThreadLocal` class work?
27. Can a deadlock happen with just one thread?
28. What is a `Callable` interface, and how is it different from `Runnable` ?
29. What is `Future` , and how does it work in Java?
30. What is the difference between `ExecutorService` and `ForkJoinPool` ?
31. What is the `CountDownLatch` class used for?
32. How does the `CyclicBarrier` class work?
33. What is the role of the `Semaphore` class in multithreading?

34. What is `Exchanger` in Java, and how does it work?
35. Can you explain the concept of a `Phaser` ?
36. What is a race condition in Java multithreading?
37. How can you prevent a race condition from occurring?
38. What is a thread-safe class, and how do you create one?
39. How does the `CopyOnWriteArrayList` work internally?
40. What are the advantages of using `ConcurrentHashMap` over `HashMap` in multithreading?
41. How do you ensure thread safety without synchronization?
42. What are `ForkJoinTask` and `RecursiveTask` in Java?
43. What is the difference between `CyclicBarrier` and `CountDownLatch` ?
44. How does `BlockingQueue` help in multithreaded applications?
45. What is the `ReadWriteLock` interface in Java?
46. Can you explain the `CompletableFuture` class?
47. What is the `ScheduledExecutorService` used for?
48. How do you implement the producer-consumer problem in Java?
49. What is the difference between the `yield()` method and the `sleep()` method in threading?
50. What are the best practices for writing thread-safe code?