Java Threads

Topics : JAVA
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In Java, a thread is a separate unit of execution that runs independently of other threads. Each thread represents a separate path of execution in a program.

Java provides built-in support for creating and managing threads through the java.lang.Thread class. To create a new thread, you can either extend the Thread class or implement the Runnable interface.

Here's an example of creating a new thread by extending the Thread class:

```
class MyThread extends Thread {
    public void run() {
        // Code to be executed in this thread
    }
}

MyThread thread = new MyThread();
thread.start(); // Start the thread
```

And here's an example of creating a new thread by implementing the Runnable interface:

```
class MyRunnable implements Runnable {
    public void run() {
        // Code to be executed in this thread
    }
}

Thread thread = new Thread(new MyRunnable());
thread.start(); // Start the thread
```

When a thread is started, it begins running in the background and executes the code defined in its run() method. You can also set a thread's priority, sleep duration, and other properties to control its behavior.

Java also provides synchronization mechanisms such as locks and semaphores to help prevent race conditions and ensure thread safety. Synchronization is necessary when multiple threads access the same data concurrently, as it helps to prevent conflicts and ensure consistency.

Advantages of Java Threads

Java threads offer several advantages:

1. Concurrent Execution: Threads allow for concurrent execution of code, enabling multiple tasks to be performed simultaneously, which can result in significant performance improvements and improved user experience.

2. Responsiveness: Using threads can make an application more responsive, as long-running or resource-intensive tasks can be executed in the background without blocking the main thread.

3. Modular Design: Threads enable you to design applications that are more modular and flexible, as you can divide complex tasks into smaller, more manageable units that can be executed independently.

4. Simplified Resource Sharing: Threads allow for simplified resource sharing between different parts of an application, as they can share objects and data without the need for complicated inter-process communication.

5. Improved Scalability: By using threads, you can improve the scalability of an application, as it can handle a larger number of users or tasks without being slowed down by bottlenecks.

6. Improved fault-tolerance: Using threads can improve the fault-tolerance of an application, as errors or exceptions in one thread can be isolated from other threads, preventing the entire application from crashing.