**Exercise 1: Implementing the Singleton Pattern**

**Source code:**

**Logger.java**

package singleton;

public class Logger {

private static Logger instance;

private Logger() {

System.out.println("Logger initialized.");

}

public static synchronized Logger getInstance() {

if (instance == null) {

instance = new Logger();

}

return instance;

}

public void log(String message) {

System.out.println("LOG: " + message);

}

}

**TestSingleton.java**

package singleton;

public class TestSingleton {

public static void main(String[] args) {

Logger logger1 = Logger.getInstance();

Logger logger2 = Logger.getInstance();

logger1.log("This is the first log message.");

logger2.log("This is the second log message.");

if (logger1 == logger2) {

System.out.println("Only one Logger instance exists. Singleton confirmed.");

} else {

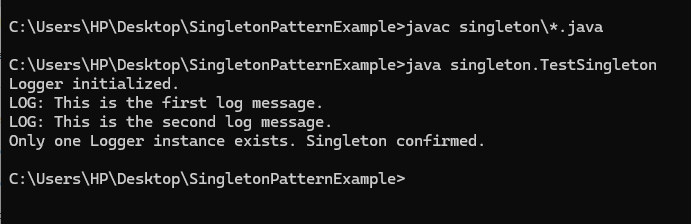
System.out.println("Different Logger instances exist. Singleton violated.");

}

}

}

**Output:**

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