**Question:**

**Implementing the Singleton Pattern**

**Scenario:**

You need to ensure that a logging utility class in your application has only one instance throughout the application lifecycle to ensure consistent logging.

**Steps:**

1. **Create a New Java Project:**
   * Create a new Java project named **SingletonPatternExample**.
2. **Define a Singleton Class:**
   * Create a class named Logger that has a private static instance of itself.
   * Ensure the constructor of Logger is private.
   * Provide a public static method to get the instance of the Logger class.
3. **Implement the Singleton Pattern:**
   * Write code to ensure that the Logger class follows the Singleton design pattern.
4. **Test the Singleton Implementation:**
   * Create a test class to verify that only one instance of Logger is created and used across the application.

**Solution:**  
  
using System;

public class Logger

{

private static Logger? \_instance;

private static readonly object \_lock = new object();

private Logger()

{

Console.WriteLine("Logger instance created.");

}

public static Logger GetInstance()

{

if (\_instance == null)

{

lock (\_lock)

{

if (\_instance == null)

{

\_instance = new Logger();

}

}

}

return \_instance;

}

public void Log(string message)

{

Console.WriteLine($"Log: {message}");

}

}

class Program

{

static void Main()

{

Logger logger1 = Logger.GetInstance();

Logger logger2 = Logger.GetInstance();

logger1.Log("First log message");

logger2.Log("Second log message");

if (ReferenceEquals(logger1, logger2))

{

Console.WriteLine("Both logger instances are the same. Singleton works!");

}

else

{

Console.WriteLine("Logger instances are different. Singleton failed.");

}

}

}

