**Exercise 1: Implementing the Singleton Pattern**

**Program:**

Logger.java

package DesignPatterns.SingletonPatternExample;

public class Logger{

    private static Logger logInst = null;

    private static Logger logSyncInst = null;

    private static Logger logDoubInst = null;

    private Logger(){

        //private logger constructor

    }

    public static Logger getInstance(){

        if(logInst == null){

            logInst = new Logger();

        }

        return logInst;

    }

    public static synchronized Logger getSyncInstance(int n){

        if(logSyncInst == null){

            logSyncInst = new Logger();

        }

        System.out.println("Instance is used by thread "+ n);

        return logSyncInst;

    }

    public static Logger getDoubInstance(){

        if (logDoubInst == null) {

            synchronized (Logger.class) {

                if (logDoubInst == null)

                    logDoubInst = new Logger();

            }

        }

        return logDoubInst;

    }

}

SingletonPatternExample.java

package DesignPatterns.SingletonPatternExample;

public class SingletonPatternExample{

    public static void main(String []args){

        Logger log1 = Logger.getInstance();

        Logger log2 = Logger.getInstance();

        if(log1==log2){

            System.out.println("Same instance is being used");

        }

        else{

            System.out.println("It doesn't work");

        }

        Thread t1 = new Thread(new Runnable() {

           public void run(){

            Logger synclog1 = Logger.getSyncInstance(1);

           }

        });

        Thread t2 = new Thread(new Runnable() {

           public void run(){

            Logger synclog2 = Logger.getSyncInstance(2);

           }

        });

        t1.start();

        t2.start();

        Logger logDoubInst1 = Logger.getDoubInstance();

        Logger logDoubInst2 = Logger.getDoubInstance();

        if(logDoubInst1 == logDoubInst2){

            System.out.println("Same instances for double checking");

        }

    }

}

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AI-generated content may be incorrect.