**Module 1 - Design Patterns and Principles**

**Exercise 1: Implementing the Singleton Pattern**

**CODE:**

Logger.java

package Cts;

public class Logger {

private static Logger instance = new Logger();

private Logger() {

System.out.println("Logger instance created.");

}

public static Logger getInstance() {

return instance;

}

public void log(String message) {

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

}

}

SingletonPatternExample.java

package Cts;

public class SingletonPatternExample {

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

} else {

System.out.println("Different instances found (Singleton failed)");

}

}

}

**OUTPUT SCREENSHOT:**

**A screenshot of a computer

AI-generated content may be incorrect.**

**Exercise 2: Implementing the Factory Method Pattern**

**CODE:**

**FactoryMethodPattern.java**

**package Cts;**

**interface Document {**

**void open();**

**}**

**class WordDocument implements Document {**

**public void open() {**

**System.out.println("Opening Word document...");**

**}**

**}**

**class PdfDocument implements Document {**

**public void open() {**

**System.out.println("Opening PDF document...");**

**}**

**}**

**class ExcelDocument implements Document {**

**public void open() {**

**System.out.println("Opening Excel document...");**

**}**

**}**

**abstract class DocumentFactory {**

**public abstract Document createDocument();**

**}**

**class WordDocumentFactory extends DocumentFactory {**

**public Document createDocument() {**

**return new WordDocument();**

**}**

**}**

**class PdfDocumentFactory extends DocumentFactory {**

**public Document createDocument() {**

**return new PdfDocument();**

**}**

**}**

**class ExcelDocumentFactory extends DocumentFactory {**

**public Document createDocument() {**

**return new ExcelDocument();**

**}**

**}**

**public class FactoryMethodPatternExample {**

**public static void main(String[] args) {**

**DocumentFactory wordFactory = new WordDocumentFactory();**

**Document word = wordFactory.createDocument();**

**word.open();**

**DocumentFactory pdfFactory = new PdfDocumentFactory();**

**Document pdf = pdfFactory.createDocument();**

**pdf.open();**

**DocumentFactory excelFactory = new ExcelDocumentFactory();**

**Document excel = excelFactory.createDocument();**

**excel.open();**

**}**

**}**

**OUTPUT SCREENSHOT:**

**A screenshot of a computer

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