Exercise 1: Implementing the Singleton Pattern

**Step 1: Create the Java Project**

Create a new Java project named:

SingletonPatternExample

**Step 2: Define the Singleton Class**

package SingletonPatternExample;

public class Logger{

private static Logger instance;

private Logger() {

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

}

public static Logger getInstance() {

if (instance == null) {

instance = new Logger();

}

return instance;

}

public void log(String message) {

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

}

**}**

**Step 3: Test the Singleton Implementation**

package SingletonPatternExample;

public class Main {

public static void main(String[] args) {

Logger logger1 = Logger.getInstance();

logger1.log("First message");

Logger logger2 = Logger.getInstance();

logger2.log("Second message");

if (logger1 == logger2) {

System.out.println("Both logger instances are the same (Singleton works).");

} else {

System.out.println("Logger instances are different (Singleton failed).");

}

}

}

**OUTPUT :**

A close-up of a white background

AI-generated content may be incorrect.

Exercise 2: Implementing the Factory Method Pattern

interface Document {

void open();

}

class WordDocument implements Document {

public void open() {

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

}

}

class PdfDocument implements Document {

public void open() {

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

}

}

class ExcelDocument implements Document {

public void open() {

System.out.println("Opening an 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 FactoryMethodExample {

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

