**WEEK-1: Engineering Concepts**

**Designs and Patterns**

**Ex 1: Implementing the Singleton Pattern**

**1.Logger.java:**

public class AppLogger {

private static AppLogger singleInstance;

private AppLogger() {

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

}

public static AppLogger getInstance() {

if (singleInstance == null) {

singleInstance = new AppLogger(); // Only one instance created here

}

return singleInstance;

}

public void writeLog(String msg) {

System.out.println("[LOG]: " + msg);

}

}

**2.TestLogger.java:**

public class LoggerTestApp {

public static void main(String[] args) {

AppLogger logRef1 = AppLogger.getInstance();

logRef1.writeLog("First message");

AppLogger logRef2 = AppLogger.getInstance();

logRef2.writeLog("Second message");

if (logRef1 == logRef2) {

System.out.println("Both instances are same, Singleton verified");

} else {

System.out.println("Instances are different");

}

}

}

Output:

A screenshot of a computer program

AI-generated content may be incorrect.

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

1.Document.java:

public interface Document {

void open();

}

2.WordDocument.java:

public class WordDocument implements Document {

public void open() {

System.out.println("Opening Word Document");

}

}

3.PdfDocument.java:

public class PdfDocument implements Document {

public void open() {

System.out.println("Opening PDF Document");

}

}

4. ExcelDocument.java:

public class ExcelDocument implements Document {

public void open() {

System.out.println("Opening Excel Document");

}

}

5. DocumentFactory.java:

public abstract class DocumentFactory {

public abstract Document createDocument();

}

6. WordDocumentFactory.java:

public class WordDocumentFactory extends DocumentFactory {

public Document createDocument() {

return new WordDocument();

}

}

7.PdfDocumentFactory.java:

public class PdfDocumentFactory extends DocumentFactory {

public Document createDocument() {

return new PdfDocument();

}

}

8.ExcelDocumentt.java:

public class ExcelDocumentFactory extends DocumentFactory {

public Document createDocument() {

return new ExcelDocument();

}

}

9. FactoryTest.java:

public class FactoryTest {

public static void main(String[] args) {

DocumentFactory wordFactory = new WordDocumentFactory();

Document wordDoc = wordFactory.createDocument();

wordDoc.open();

DocumentFactory pdfFactory = new PdfDocumentFactory();

Document pdfDoc = pdfFactory.createDocument();

pdfDoc.open();

DocumentFactory excelFactory = new ExcelDocumentFactory();

Document excelDoc = excelFactory.createDocument();

excelDoc.open();

}

}

Output:

A screenshot of a computer program

AI-generated content may be incorrect.