**Excercise1: Implementing the Singleton Pattern**

Code: package EngineeringConcepts.DesingPatternsandPrinciples;

class SingletonExample {

public static void main(String[] args) {

Logger logger1 = Logger.getInstance();

Logger logger2 = Logger.getInstance();

logger1.log("First message");

logger2.log("Second message");

if (logger1 == logger2) {

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

} else {

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

}

}

}

// Logger class (not public)

class Logger {

private static Logger instance;

private Logger() {

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

}

public static Logger getInstance() {

if (instance == null) {

instance = new Logger();

}

return instance;

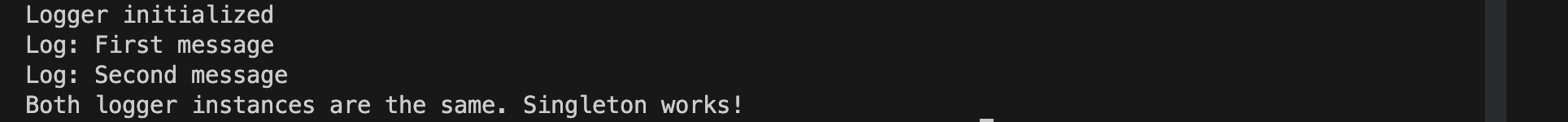
}

public void log(String message) {

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

}

}

Output: 

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

Code:

package EngineeringConcepts.DesingPatternsandPrinciples;

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 FactoryMethodExample {

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:

