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

**Scenario:**

You are developing a document management system that needs to create different types of documents (e.g., Word, PDF, Excel). Use the Factory Method Pattern to achieve this.

**Steps:**

1. **Create a New Java Project:**
   * Create a new Java project named **FactoryMethodPatternExample**.
2. **Define Document Classes:**
   * Create interfaces or abstract classes for different document types such as **WordDocument**, **PdfDocument**, and **ExcelDocument**.
3. **Create Concrete Document Classes:**
   * Implement concrete classes for each document type that implements or extends the above interfaces or abstract classes.
4. **Implement the Factory Method:**
   * Create an abstract class **DocumentFactory** with a method **createDocument()**.
   * Create concrete factory classes for each document type that extends DocumentFactory and implements the **createDocument()** method.
5. **Test the Factory Method Implementation:**

Create a test class to demonstrate the creation of different document types using the factory method

## Answer

DocumentFactory.java

public class DocumentFactory {

    public DocumentType getDocumentType(String str){

        DocumentType doctype;

        if (str.equalsIgnoreCase("word")){

            doctype = new WordDocument();

        } else if (str.equalsIgnoreCase("pdf")){

            doctype = new PdfDocument();

        } else {

            doctype = new ExcelDocument();

        }

        return doctype;

    }

}

DocumentType.java

public interface DocumentType {

    public void open();

    public void save();

    public void getType();

}

ExcelDocument.java

 public class ExcelDocument implements DocumentType{

    public ExcelDocument(){

        logger.getInstance().logDetails("Excel Document Created.");

    }

    public void open(){

        logger.getInstance().logDetails("Excel Document opened.");

    }

    public void save(){

        logger.getInstance().logDetails("Excel Document saved.");

    }

    public void getType(){

        logger.getInstance().logDetails("Document Type: Excel.");

    }

}

Logger.java

public class logger {

    private static logger log = null;

    private logger(){

    };

    public static logger getInstance(){

        if(log == null){

            log = new logger();

        }

        return log;

    }

    public void logDetails(String str){

        System.out.println(str);

    }

}

Main.java

public class Main {

    public static void main(String[] args) {

        DocumentFactory df = new DocumentFactory();

        logger.getInstance().logDetails("\nFor Word Document");

        DocumentType word = df.getDocumentType("word");

        word.open();

        word.save();

        word.getType();

        logger.getInstance().logDetails("\nFor PDF Document");

        DocumentType pdf = df.getDocumentType("pdf");

        pdf.open();

        pdf.save();

        pdf.getType();

        logger.getInstance().logDetails("\nFor Excel Document");

        DocumentType excel = df.getDocumentType("excel");

        excel.open();

        excel.save();

        excel.getType();

    }

}

PdfDocument.java

public class PdfDocument implements DocumentType {

    public PdfDocument(){

        logger.getInstance().logDetails("Pdf Document Created.");

    }

    public void open(){

        logger.getInstance().logDetails("Pdf Document opened");

    }

    public void save(){

        logger.getInstance().logDetails("Pdf Document saved");

    }

    public void getType(){

        logger.getInstance().logDetails("Document Type: PDF");

    }

}

WordDocument.java

public class WordDocument implements DocumentType {

    public WordDocument(){

        logger.getInstance().logDetails("Word Document Created.");

    }

    public void open(){

        logger.getInstance().logDetails("Word Document opened");

    }

    public void save(){

        logger.getInstance().logDetails("Word Document saved");

    }

    public void getType(){

        logger.getInstance().logDetails("Document Type: Word Document");

    }

}

Output:

