**Exercise 1: Implementing the Singleton Pattern**

**Code:**

**Logger.java**

package singleton;

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);

    }

}

**Main.java**

package singleton;

public class main {

    public static void main(String[] args) {

        Logger logger1 = Logger.getInstance();

        Logger logger2 = Logger.getInstance();

        logger1.log("First message from logger1");

        logger2.log("Second message from logger2");

        if (logger1 == logger2) {

            System.out.println("Only one instance of Logger is used.");

        } else {

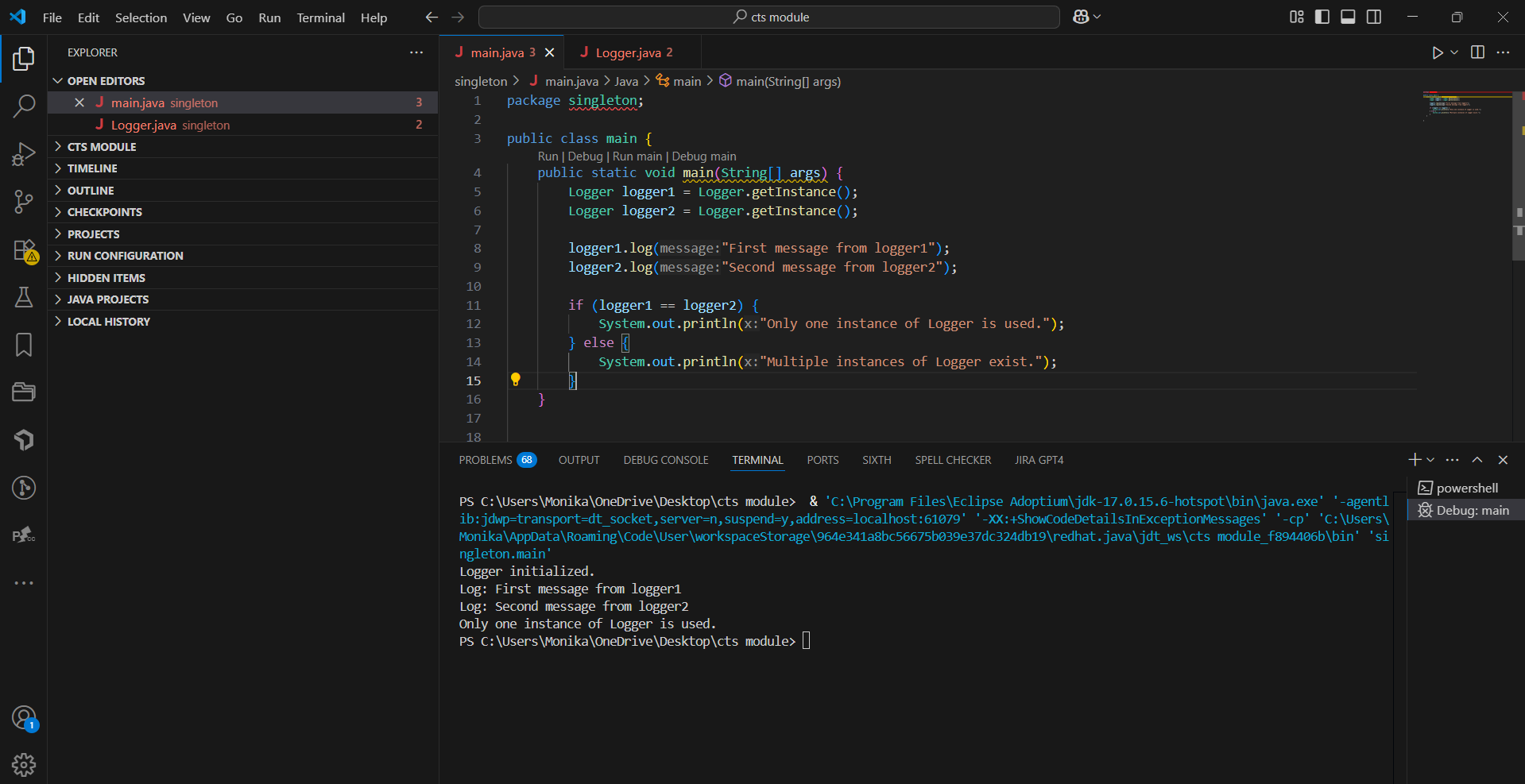
            System.out.println("Multiple instances of Logger exist.");

        }

    }

}

**Output:**



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

**Code:**

**Main.java**

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 Main {

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:**

