**Design principles and patterns:**

**Exercise 1: Implementing the Singleton Pattern**

Program.cs:

using System;

class Program

{

    static void Main(string[] args)

    {

        Logger logger1 = Logger.GetInstance();

        Logger logger2 = Logger.GetInstance();

        logger1.Log("First message");

        logger2.Log("Second message");

        if (ReferenceEquals(logger1, logger2))

        {

            Console.WriteLine("Logger is a Singleton.");

        }

        else

        {

            Console.WriteLine("Logger is NOT a Singleton.");

        }

    }

}

Logger.cs:

using System;

public class Logger

{

    private static readonly Logger \_instance = new Logger();

    private Logger()

    {

        Console.WriteLine("Logger instance created.");

    }

    public static Logger GetInstance()

    {

        return \_instance;

    }

    public void Log(string message)

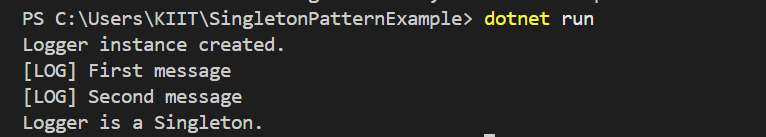
    {

        Console.WriteLine($"[LOG] {message}");

    }

}

OUTPUT:



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

**PROGRAM.CS:**

using System;

class Program

{

static void Main()

{

var factory = new DocumentFactory();

var wordDoc = factory.CreateDocument("word") as WordDocument;

wordDoc?.Open();

var pdfDoc = factory.CreateDocument("pdf") as PdfDocument;

pdfDoc?.Open();

var excelDoc = factory.CreateDocument("excel") as ExcelDocument;

excelDoc?.Open();

}

}

**DocumentFactory.cs:**

using System;

public class DocumentFactory

{

    public object CreateDocument(string type)

    {

        if (type == "word")

            return new WordDocument();

        else if (type == "pdf")

            return new PdfDocument();

        else if (type == "excel")

            return new ExcelDocument();

        else

            return null;

    }

}

**ExcelDocument.cs**

using System;

public class ExcelDocument

{

    public void Open()

    {

        Console.WriteLine("Opening Excel Document...");

    }

}

**PdfDocument.cs**

using System;

public class PdfDocument

{

    public void Open()

    {

        Console.WriteLine("Opening PDF Document...");

  }

}

**WordDocument.cs**

using System;

public class WordDocument

{

    public void Open()

    {

        Console.WriteLine("Opening Word Document...");

    }

}

**OUTPUT:**

