UNIVERSITY OF BOLTON

SCHOOL OF CREATIVE TECHNOLOGIES

MSC SOFTWARE ENGINEERING

SEMESTER TWO EXAMINATIONS 2022/2023

ADVANCED SOFTWARE DEVELOPMENT

MODULE NO: SWE7102

Date: Tuesday 09th May 2023   **Time: 14:00 – 16:00**

INSTRUCTIONS TO CANDIDATES: There are **FIVE** questions in this paper.
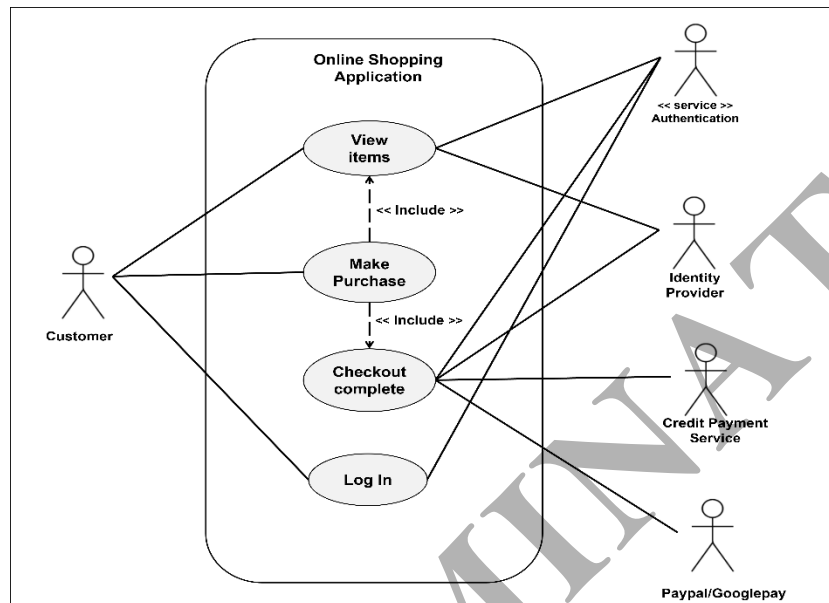
Answer **ANY FOUR** questions.

Total Marks: 40

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Question 1

Investigate the following UML diagram by describing its representation and justifying its various components.

[10 marks]

Question 2

Design and implement a Java program that calculates the area of a rectangle by constructing a class named 'Area'. Incorporate the rectangle's length and breadth as constructor parameters obtained through user input from the keyboard. Create a method named 'getArea' to compute and return the area of the rectangle. Analyse the choice of data structures, algorithms, and design patterns employed in the implementation, as well as the efficiency and scalability of the solution.

[10 marks]

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Question 3

Examine the provided code snippet and determine the design pattern it exemplifies. Identify which category (creational, structural, or behavioral) the pattern belongs to and provide its characteristics.

```java
public class Student {

    private static Student instance = new Student ();
    private Student(){}

    public static Student getInstance(){
        return instance;
    }

    public void showMessage () {
        System.out.println("Hello World!");
    }
}
```
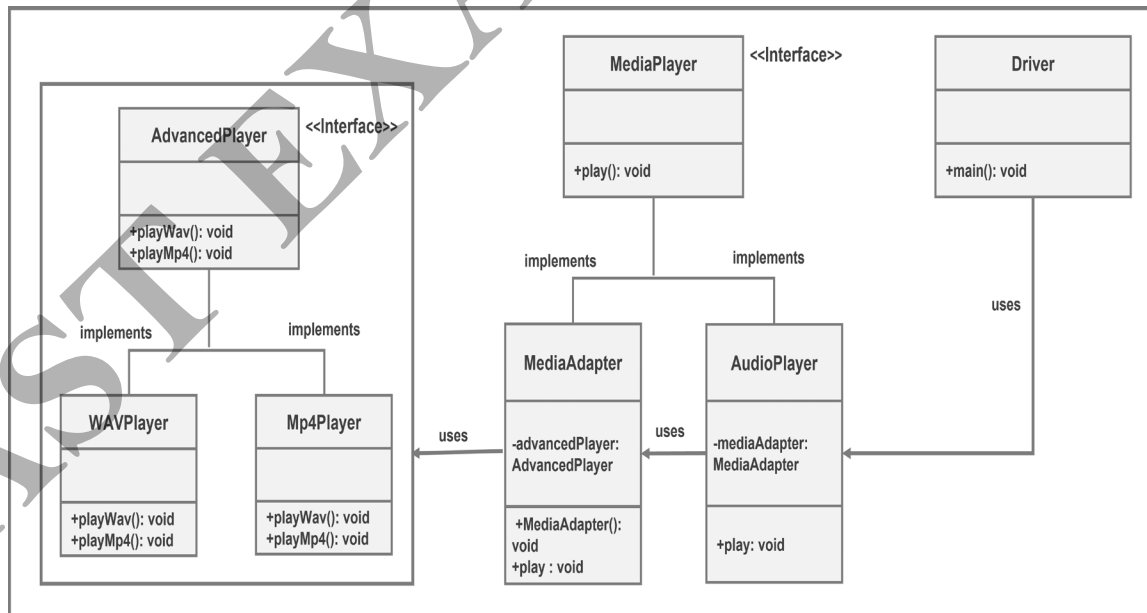
[10 marks]

Question 4

Assess the given UML diagram by pinpointing the design pattern it employs, and provide a detailed explanation of its application in the context of the specified system.
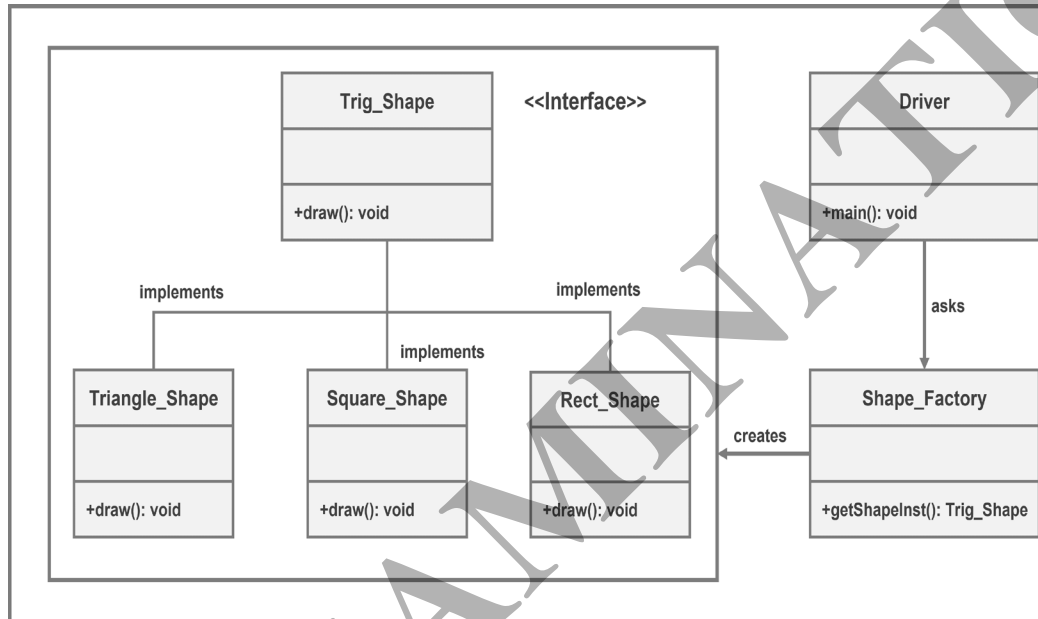

[10 marks]

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Question 5

Analyse the given UML diagram with the following objectives:

a) Determine and explain the design pattern represented by the UML diagram.

b) Develop a comprehensive Java implementation for the components depicted in the UML diagram, ensuring that the code adheres to the principles and structure of the identified design pattern.

[5+5 marks]

END OF QUESTIONS