Design Pattern Midterm

Question 1

Read the following description of SportsMania and answer all the questions.
"SportsMania is a fantastic sport site for sport lovers. They cover almost all kinds of sports and provide the latest news, information, matches scheduled dates, live commentary or scores of matches as an SMS service, but only for their premium users. Their aim is to SMS the live score,
match situation and important events after short intervals. As a user, you need to subscribe to the package and when there is a live match you will get an SMS to the live commentary. The site also provides an option to unsubscribe from the package whenever you want to.
As a developer, the SportsMania asked you to provide this new feature for them. The reporters of the SportsMania will sit in the commentary box in the match, and they will update live commentary to a commentary object. As a developer your job is to provide the commentary to the registered users by fetching it from the commentary object when it's available. When there is an update, the system should update the subscribed users by sending them the SMS."

1. Identify one design pattern that you can use to provide the new feature required by SportsMania.

    Observer Design Pattern

2. With reference to GoF's categorization of design patterns, the design pattern you stated in Question 1.a. falls into which category of pattern? State also whether the category is object or class scope.
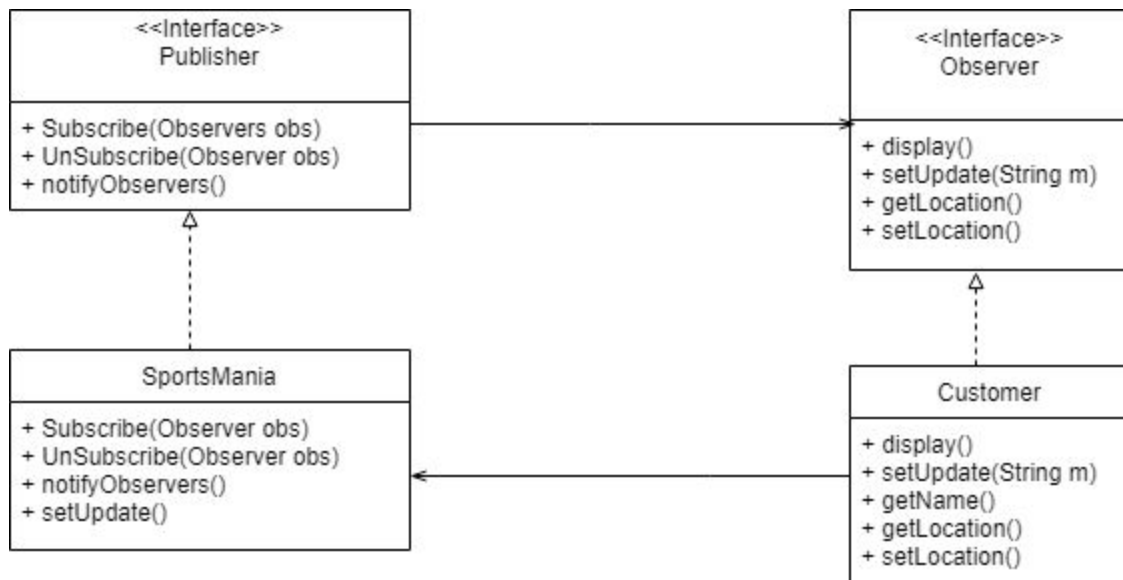
    GoFs Categorization : Behavioral Pattern
    Category : Object Scope

3. Justify why you choose the design pattern in Question 1.a.

    Because it consists of publisher and subscriber . The publisher is the commentary in SportsMania and customer will be the subscriber

4. Draw a UML class diagram to show you apply the design pattern in Question 1.a. in developing the new feature for SportsMania.

```
+-------------------------------+          +-----------------------------+
|        <<Interface>>          |          |        <<Interface>>        |
|          Publisher            |          |          Observer           |
+-------------------------------+          +-----------------------------+
| + Subscribe(Observers obs)    |--------->| + display()                 |
| + UnSubscribe(Observer obs)   |          | + setUpdate(String m)       |
| + notifyObservers()           |          | + getLocation()             |
+-------------------------------+          | + setLocation()             |
              △                            +-----------------------------+
              :                                          △
              :                                          :
              :                                          :
+-------------------------------+          +-----------------------------+
|         SportsMania           |          |          Customer           |
+-------------------------------+          +-----------------------------+
| + Subscribe(Observer obs)     |          | + display()                 |
| + UnSubscribe(Observer obs)   |<---------| + setUpdate(String m)       |
| + notifyObservers()           |          | + getName()                 |
| + setUpdate()                 |          | + getLocation()             |
+-------------------------------+          | + setLocation()             |
                                           +-----------------------------+
```

Question 2

A legacy Rectangle has a display method that expects to receive "x, y, w, h" parameters to draw a rectangle, where x and y represent the upper left x and y coordinates of the rectangle, w represents the width of the rectangle and h represents the height of the rectangle. However, the client wants to pass "upper left x and y coordinates" and "lower right x and y coordinates" of a rectangle to the display method to draw the rectangle.

a. Identify one design pattern that you can use to provide the new feature required by SportsMania.

Adapter Design Pattern

b. Draw a UML class diagram to show how you apply the design pattern in Question 2.a. to solve the problem.
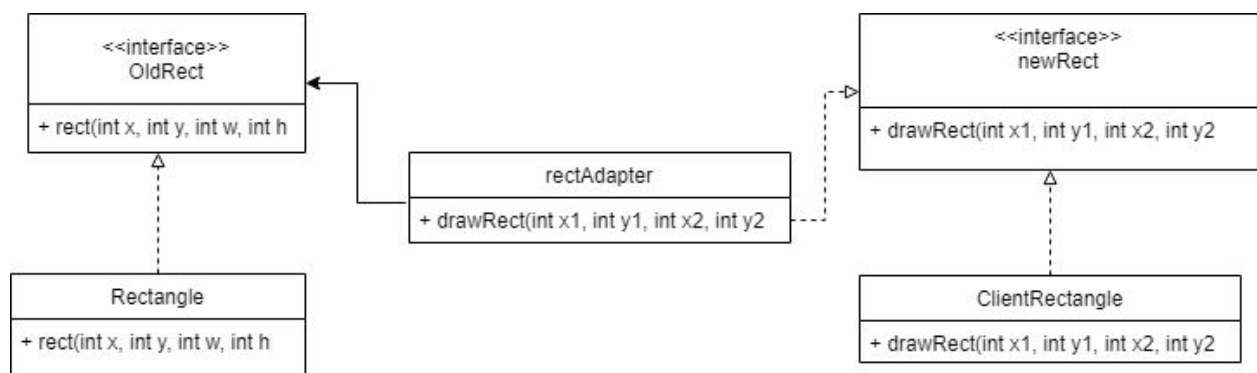
c. With reference to GoF's categorization of design patterns, the design pattern you applied in Question 2.b. falls into which category of pattern? State also whether the category is object or class scope.

GoF's categorization : Structural Pattern
Category : Object Scope

p/s : Adapter pattern can have two category either object or class. The answer for this question is based on how you design your uml in 2b