

[Closed book/notes/calculator] Show all of your work clearly in the space provided. Be sure to **read each problem carefully**. Note that the exam is double sided.

1. (15 points) Suppose you are interviewing from a summer internship (that you'd like to get). Write your answer to the following interview question: "Why study software patterns?"



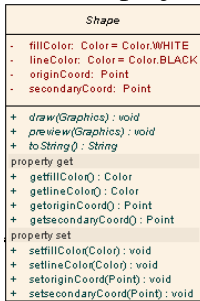
2. (15 points) Consider a spreadsheet application like Microsoft Excel. Clearly and concisely describe how one of the patterns discussed in lecture could be used to help implement functionality found in a spreadsheet application.

3. (15 points) Briefly describe the problem that **Decorator Pattern** addresses.

4. (10 points) Explain what the design tip “Program to Interface” is and give one concrete example where using the tip improves the resulting code.

5. (15 points) Give an example of a situation where it makes sense to use the **Strategy Pattern**. Explain why. You may not use the example developed in lecture.

6. In the lab project this quarter you have a Shape class that looks like this:



(a) (10 points) Draw the UML class diagram for the Rectangle class.

(b) (20 points) Suppose there exists an already implemented class, Rectangle, that is part of the java.awt package. The class has the following methods:

```
Rectangle(int x, int y, int width, int height);
void draw(Graphics);
int getX();
int getY();
int getHeight();
int getWidth();
void setFillColor(Color clr);
void setLineColor(color clr);
void setBounds(int x, int y, int height, int width);
String toString();
void translate(int x, int y);
```

Make use of this class and the **Adapter Pattern** to implement all of the methods in the Rectangle class from part (a) except the preview method.



Answer for **6(b)**



Additional work area for any problem. Clearly identify to which problem the work on this page is related.