Problem 4

1   The basic problem

A designer needs to be able to add several different responsibilities to an existing object (which we'll call the component).

Consider, for example, a GUI toolkit in which there is already a plain TextWindow class with the responsibility to display a page of text. We may need to have some text windows which are scrollable (can respond to a scroll() message), some which have a visible border, and some which have both.

2   An initial solution...

3   Criteria for a good solution

- It should be possible to add responsibilities to the component, or remove them, at runtime – for example, to make an existing text window scrollable on demand.

- It should still be possible to use the solution even when the component's class can't be subclassed – for example, when it's a final class in Java and its source is not available.

4   A better solution...