CS 485
Advanced Object Oriented Design

Decorator Pattern (Ch 17)

Spring 2017

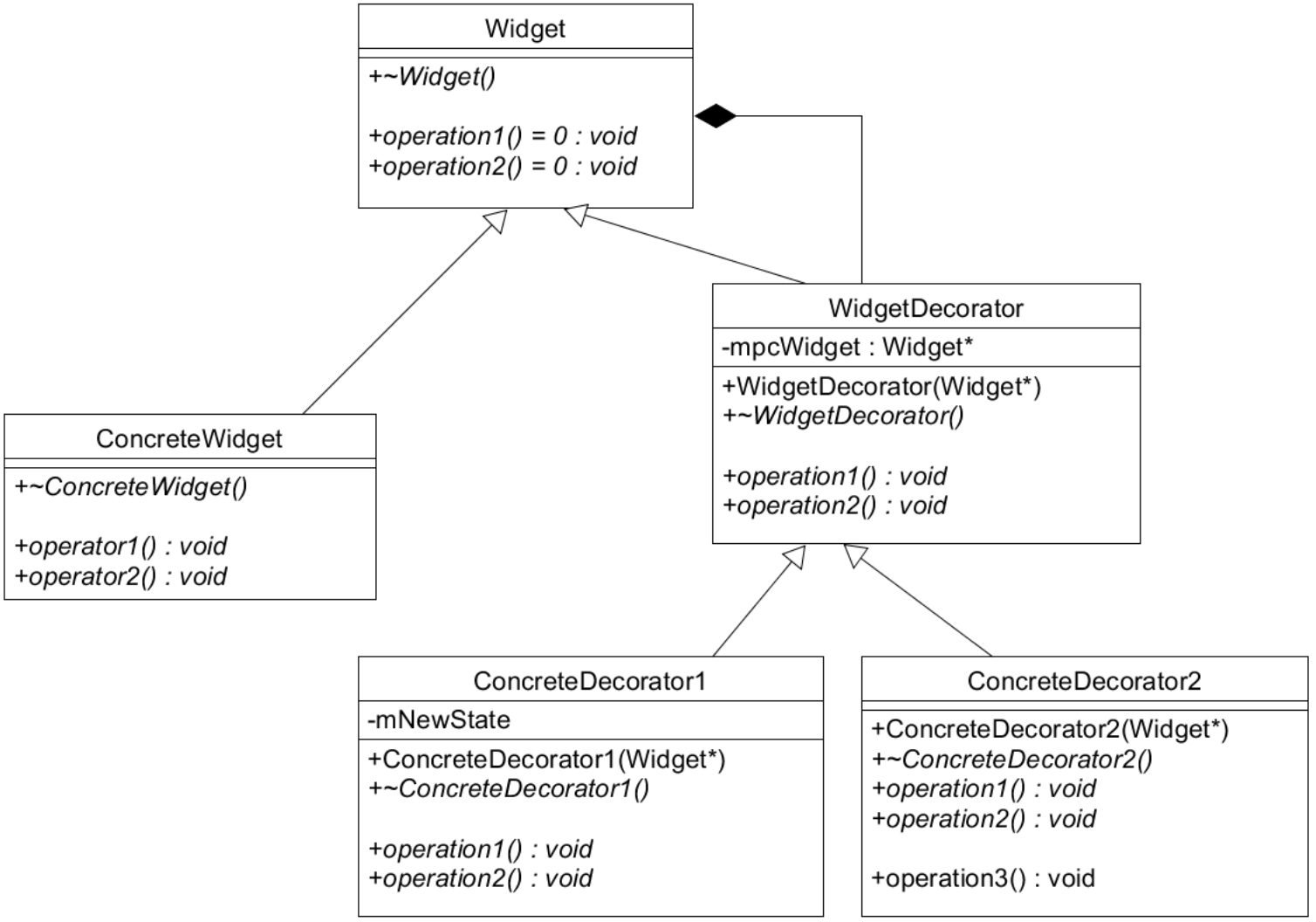
http://www.netobjectives.com/PatternRepository/index.php?title=PatternsByAlphabet

http://www.netobjectives.com/files/books/dpe/design-patterns-matrix.pdf

Decorator

- Structural Pattern
- One (decorator) subclass of an interface contains the parent interface
- The decorator can change functionality
- The decorator can add functionality
- Add/change functionality without subclassing
  - avoid subclass explosion

UML




```
Widget *pcWidget = new ConcreteDecorator2(new ConcreteDecorator1(new ConcreteWidget()));
```

Goals

- Allows objects to be customized dynamically
- Used with a high number of customizations
  - Prevent subclass explostion
- Caveats!

http://www.oodesign.com/decorator-pattern.html

Often used for....

- Customize file access in Java
  - FileReader, BufferedFileReader, ...
- Customize display of a widget on the screen
  - Window/ScrollableWindow/NestedWindow
- Some languages (Python) allow you to dynamically add functions to specific objects
  - similar to the decorator pattern

Example

```
class CountingDecorator : public SDLTextWidgetDecorator
{

public:

  CountingDecorator (SDLTextWidget *pcWidget);


  void setData (std::string cData);

  void draw (SDLApp &rcApp);

private:
  int mChangesCount = 0;
};
```

```
class NumberOfWordsDecorator : public SDLTextWidgetDecorator
{

public:

  NumberOfWordsDecorator (SDLTextWidget *pcWidget);

  int getNumberOfWords () const;

private:

};
```

TicTacToe-MVP Repository

Usage

```
mpcTextWidgetChangeAndWordCounter =
  new NumberOfWordsDecorator (
    new CountingDecorator(
      new SDLTextWidget (
        "Combo", "data", 10, 200, courierFont, { 255,0,0,255 })));
```

Shalloway

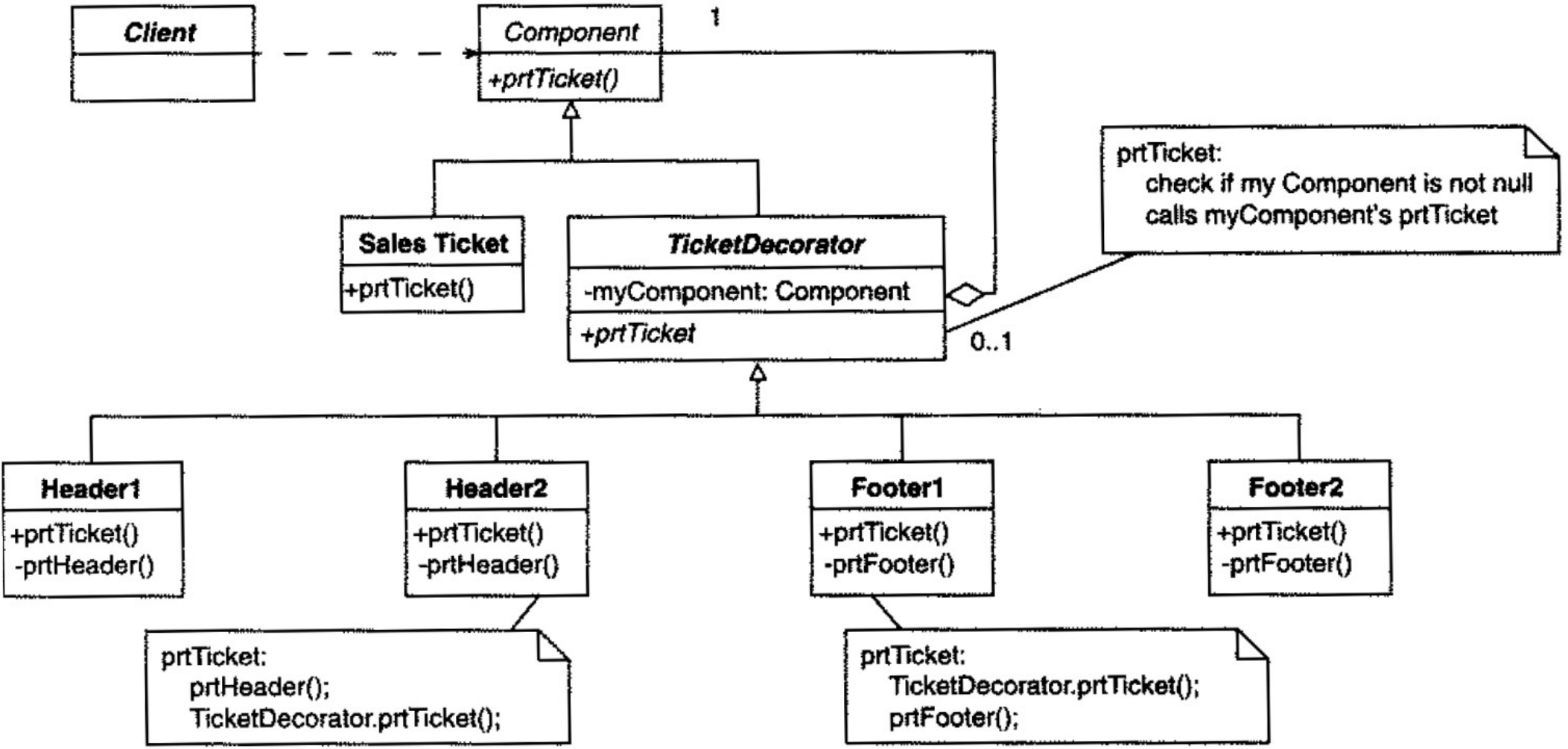


Figure 17-5 Setting up headers and footers to look like a report.