

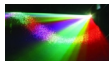
Supplement to
The Design and Implementation of Multimedia Software

The Composite Pattern

Prof. David Bernstein

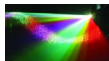
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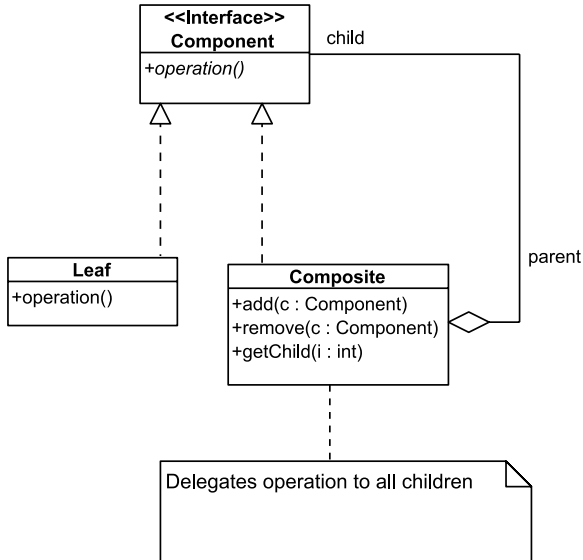


Motivation

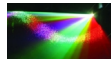
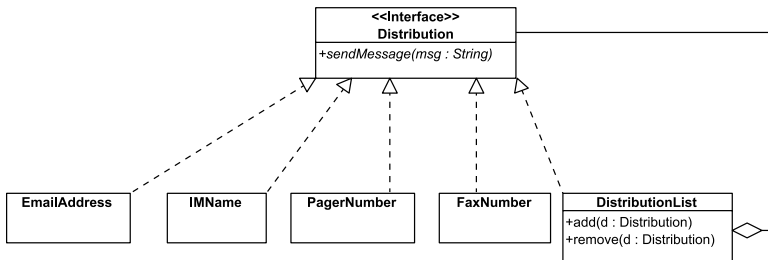
- The Need:
Ignore differences between individual objects and compositions of objects
- Examples:
Group “primitive” shapes in a drawing application
Group “rolling stock” in a locomotive scheduling application



The Composite Pattern

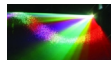


An Example - A Message Distribution System



An Example

```
public interface Distribution
{
    public void sendMessage(String msg);
}
```



An Example (cont.)

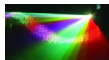
```
import java.util.*;

public class DistributionList implements Distribution
{
    private Hashtable<Distribution,Distribution> aggregate;

    public DistributionList()
    {
        aggregate = new Hashtable<Distribution,Distribution>();
    }

    public void add(Distribution d)
    {
        aggregate.put(d, d);
    }

    public void remove(Distribution d)
    {
        aggregate.remove(d);
    }
}
```



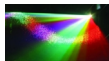
An Example (cont.)

```
public void sendMessage(String msg)
{
    Distribution          d;
    Enumeration<Distribution> iterator;

    // Use the Iterator Pattern to loop through the
    // Distribution objects in the aggregate

    iterator = aggregate.elements();
    while (iterator.hasMoreElements())
    {
        d = iterator.nextElement();

        // Delegate to the Destination
        d.sendMessage(msg);
    }
}
```



An Example (cont.)

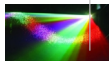
```
DistributionList      cs, math, spam;
EmailAddress          dean;

spam = new DistributionList();
dean = new EmailAddress("Tex Avery",
                        "tex@hollywood.edu");

cs = new DistributionList();
cs.add(new EmailAddress("Gilligan",
                        "littlebuddy@island.edu"));
cs.add(new EmailAddress("The Skipper",
                        "skipper@island.edu"));
cs.add(new EmailAddress("Mr. and Mrs. Howell",
                        "magoo@island.edu"));

math = new DistributionList();
math.add(new EmailAddress("Fred Flintstone",
                           "bedrock.edu"));
math.add(new EmailAddress("Barney Rubble",
                           "bedrock.edu"));
math.add(new EmailAddress("Stony Curtis",
                           "hollyrock.edu"));

spam.add(cs);
spam.add(math);
spam.add(dean);
```



An Example (cont.) (cont.)

```
spam.sendMessage("Buy my book!");
```

