

CS 635 Advanced Object-Oriented Design & Programming  
Spring Semester, 2013  
Doc 21 Flyweight  
May 2, 2013

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# Flyweight

Use sharing to support large number of fine-grained objects efficiently

# Text Example

A document has many instances of the character 'a'

Character has

- Font

- width

- Height

- Ascenders

- Descenders

- Where it is in the document

Most of these are the same for all instances of 'a'

Use one object to represent all instances of 'a'

# Java String Example

```
public void testInterned() {  
    String a1 = "catrat";  
    String a2 = "cat";  
    assertFalse(a1 == (a2+ "rat"));  
  
    String a3 = (a2 + "rat").intern();  
    assertTrue(a1 == a3);  
    String a4 = "cat" + "rat";  
    assertTrue(a1 == a4);  
    assertTrue(a3 == a4);  
}
```

`public String intern()`

Returns a canonical representation for the string object.

A pool of strings, initially empty, is maintained privately by the class String.

# Intrinsic State

Information that is independent from the object's context

The information that can be shared among many objects

So can be stored inside of the flyweight

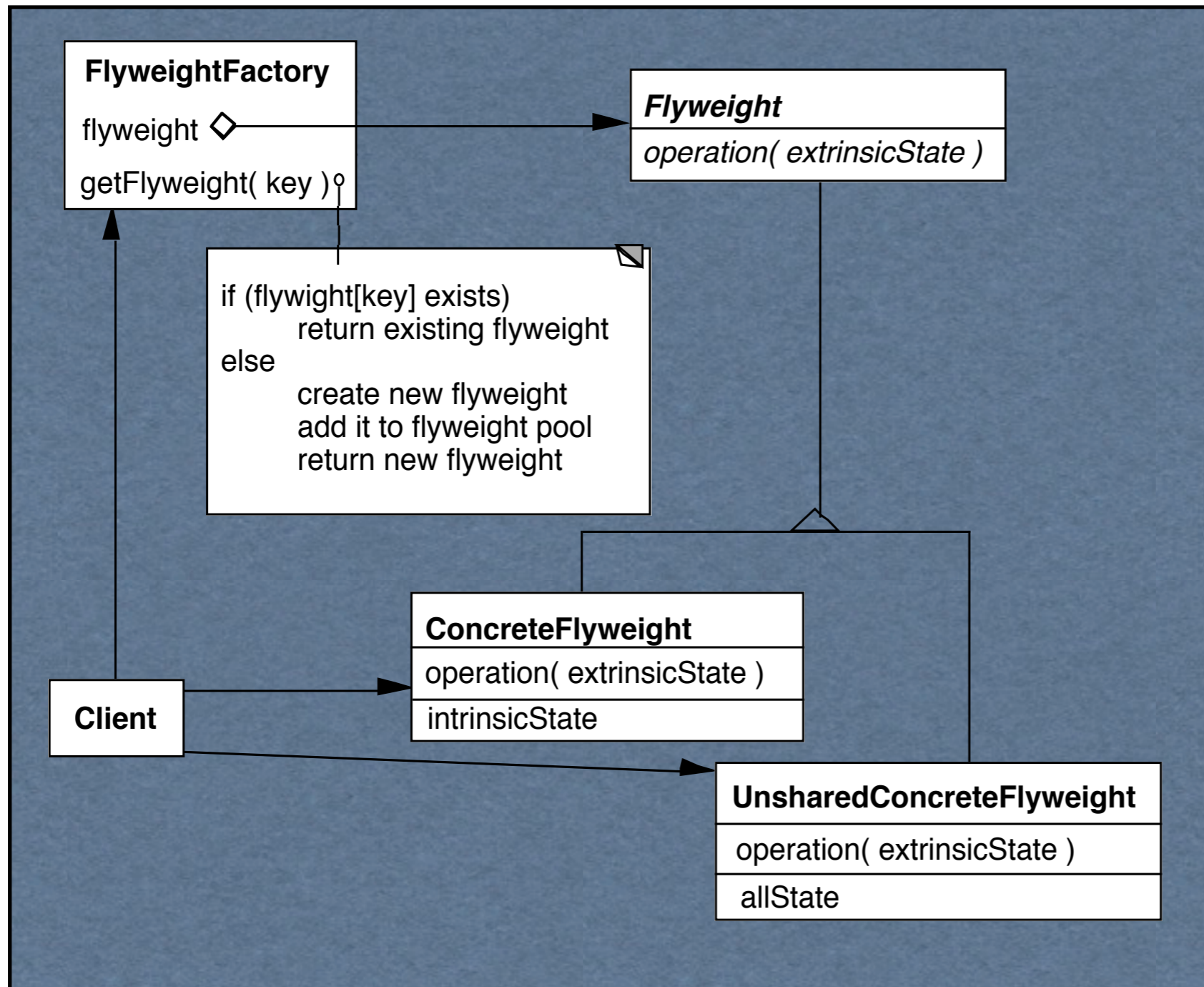
# Extrinsic State

Information that is dependent on the object's context

The information that can not be shared among objects

So has to be stored outside of the flyweight

# Structure



# The Hard Part

Separating state from the flyweight

How easy is it to identify and remove extrinsic state

Will it save space to remove extrinsic state



# Example Text

Run Arrays

aaaaabaaaaaaaaaaaaaaaaaaaaa



a b a  
5 1 20

# Text Example

Lexi Document Editor

Uses character objects with font information  
(To support graphic elements)

"A Cat in the hat came **back** the very next day"

Use run array to store font information (extrinsic state)

Normal	Bold	Normal
22	4	18