

Flyweight DP

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Which is better?

- Point1
- or
- Point2

Code is in Flyweight

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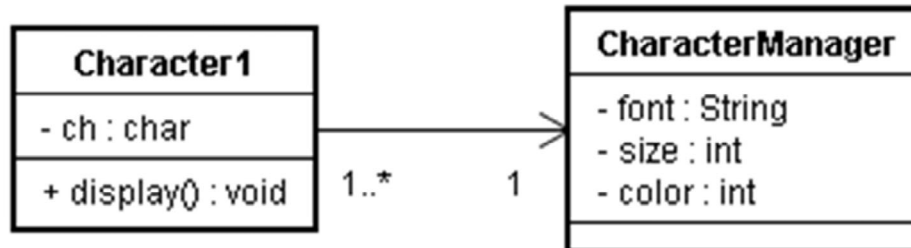
Code available in Java, C# and C++

Problem

- We have a Character class. It stores information about one character.
 - Our document has a large number of characters.
 - Each character can have a different font and size.
 - How to reduce the memory requirements and runtime overheads?



Solution



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Designing objects down to the lowest levels of system "granularity" provides optimal flexibility, but can be unacceptably expensive in terms of performance and memory usage.

Flyweight performs "use sharing" to support large number of fine-grained objects efficiently.

A flyweight is a shared object that can be used in multiple contexts simultaneously.

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The Unicode of the characters can be stored in an array.

Many of the characters have the same attributes e.g. font, font size, color, etc. We can store these common attributes for a set of characters only once.

Usage of Flyweight DP

- String in Java
- Wrapper Classes in Java
- TimerTask
- Should Dimension be Flyweight?

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Java uses the Flyweight pattern to manage the String objects used to represent string literals.

All wrapper classes are Flyweight

TimerTask

Dimension class should have been a Flyweight

When to apply Flyweight?

- Always.
 - Unless you have a very good reason, make your class immutable.
 - Getters should normally return immutable objects.
 - Use `java.util.collections.unmodifiableList`

This rule is applicable only if the language has automatic garbage collection.

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If you cannot make the entire class immutable, make maximum part immutable.
Limit mutability as much as you can.
The less mutable the better.
Final is the new private.

For C++, `shared_ptr` will likely be needed to share immutable values.

Assignment

- We have many user accounts. Permissions for each user are defined at group level.
 - A user can be in multiple groups.
 - Where can we use the flyweight pattern?

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OOAD classes: Different classes (Immutable), Prefer Value Objects, Rules for Concurrency,

Assignment

- We want to cache immutable objects.
- Create a LRU cache for immutable objects

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Java Solution in Patterns project FlyweightCache.