Flyweight

Space Optimization

By Alexander Tilkin

Motivation

- Avoid redundancy when storing data
- E.g., Massive Multiple Online RPG
  - Plenty of users with identical first/last name
  - No sense of storing first/last name over and over again
  - Store a list of names and pointers to them
- E.g., bold or italic text in the console
  - Don't want each character to have a formatting character
  - Operate on ranges (e.g., line number, start/end positions)

Flyweight

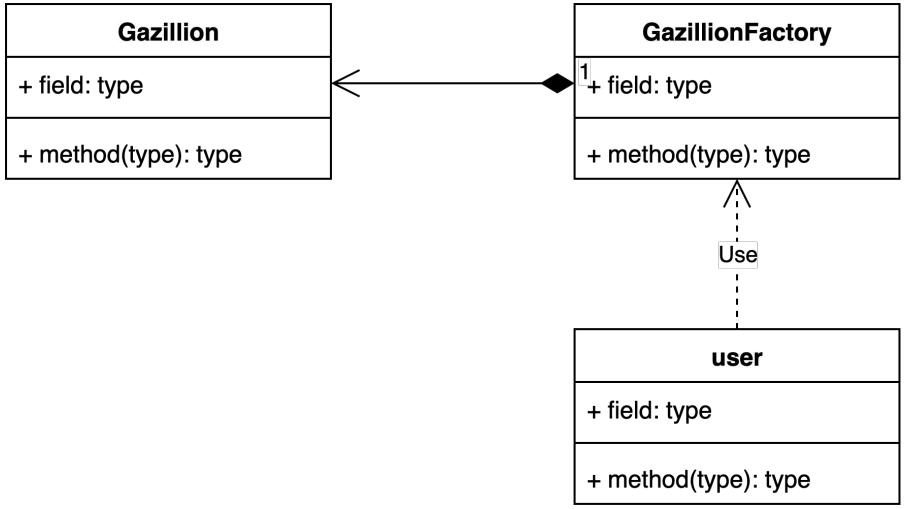
A space optimization technique that lets us use useless memory by storing externally the data associated with similar objects.

units.unit_11_flyweight.FlyweightExample.java

units.unit_11_flyweight.NotOptimizedGazillionExample.java

Flyweight Example

- Trying to use objects at very low levels of granularity is nice, but the overhead may be prohibitive
- Flyweight suggests removing the non-shareable state from the class, and having the client supply it when methods are called
- This places more responsibility on the client, but, considerably fewer instances of the Flyweight class are now created
- Sharing of these instances is facilitated by introducing a Factory class that maintains a "cache" of existing Flyweights



units.unit_11_flyweight.FlyweightTextFormattingExample.java

Flyweight Text Format

- In this example we create a formatting class that capitalize ranges of characters
- We demonstrate a naive solution of a class that stores an array of booleans that indicates which character should be capitalized. This is a waste of memory
- Next we preset a class that has the same functionality but saves space

units.unit_11_flyweight.FlyweightExercise.java

Flyweight Exercise

- You are given a class called Sentence, which takes a string such “hello world”
- You need to provide a method called getWord() that returns a WordToken which can be used to capitalized a particular word in the sentence

Summary

- Store common data externally
- Specify an index or a reference into the external data store
- Define the idea of ‘ranges’ on homogenous collections and store data related to those ranges