Who's afraid of design patterns? Not JDK!

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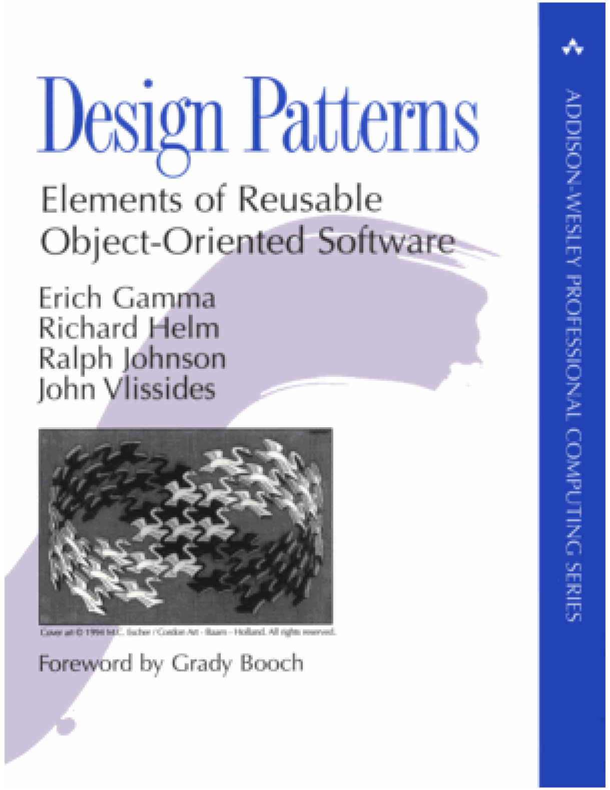
Why am I here? (1)


Design Patterns
Elements of Reusable Object-Oriented Software
Erich Gamma
Richard Helm
Ralph Johnson
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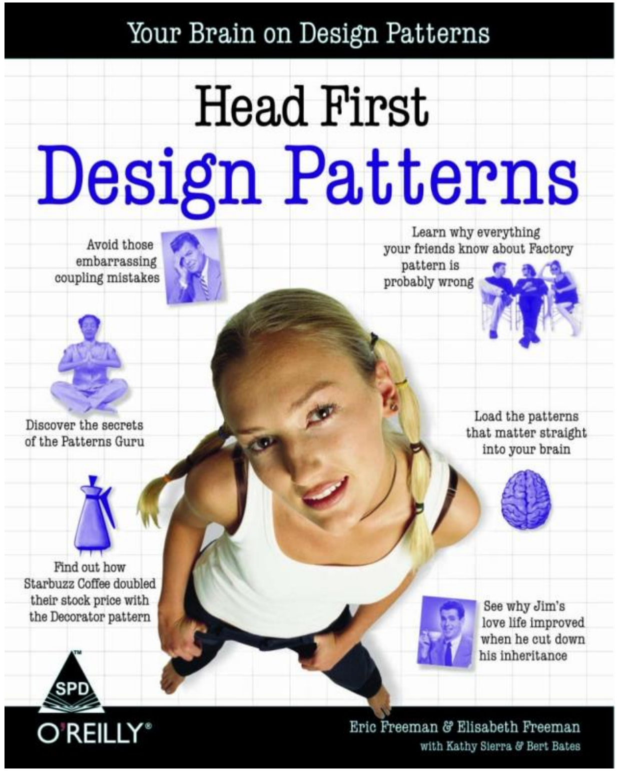
Your Brain on Design Patterns
Head First
Design Patterns
Avoid those embarrassing coupling mistakes
Learn why everything your friends know about Factory pattern is probably wrong
Discover the secrets of the Patterns Guru
Load the patterns that matter straight into your brain
Find out how Starbuzz Coffee doubled their stock price with the Decorator pattern
See why Jim's love life improved when he cut down his inheritance
SPD
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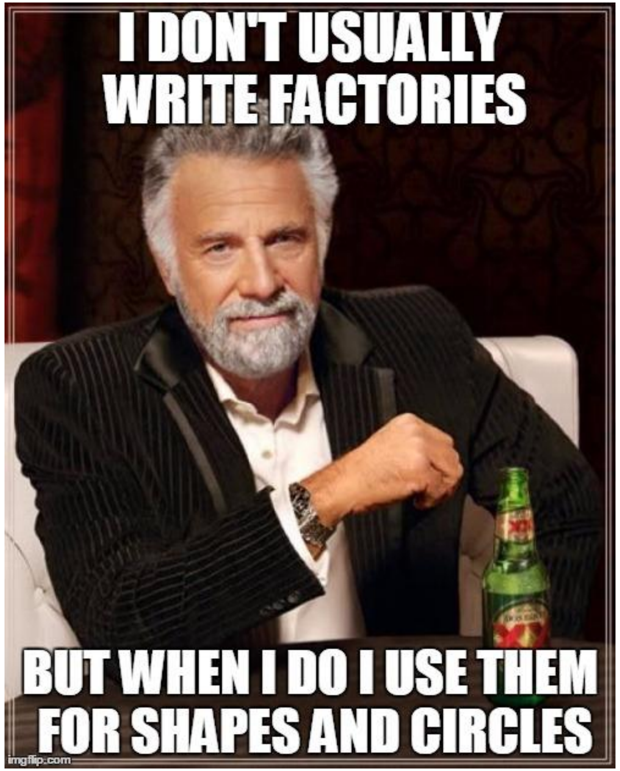
Why am I here? (2)


I DON'T USUALLY WRITE FACTORIES
BUT WHEN I DO I USE THEM FOR SHAPES AND CIRCLES
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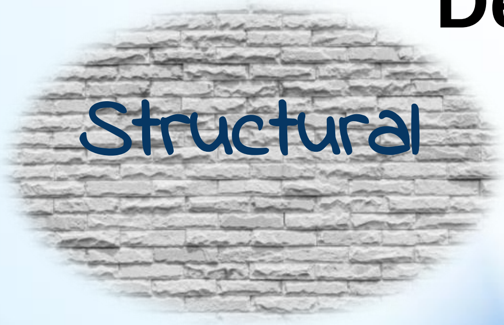
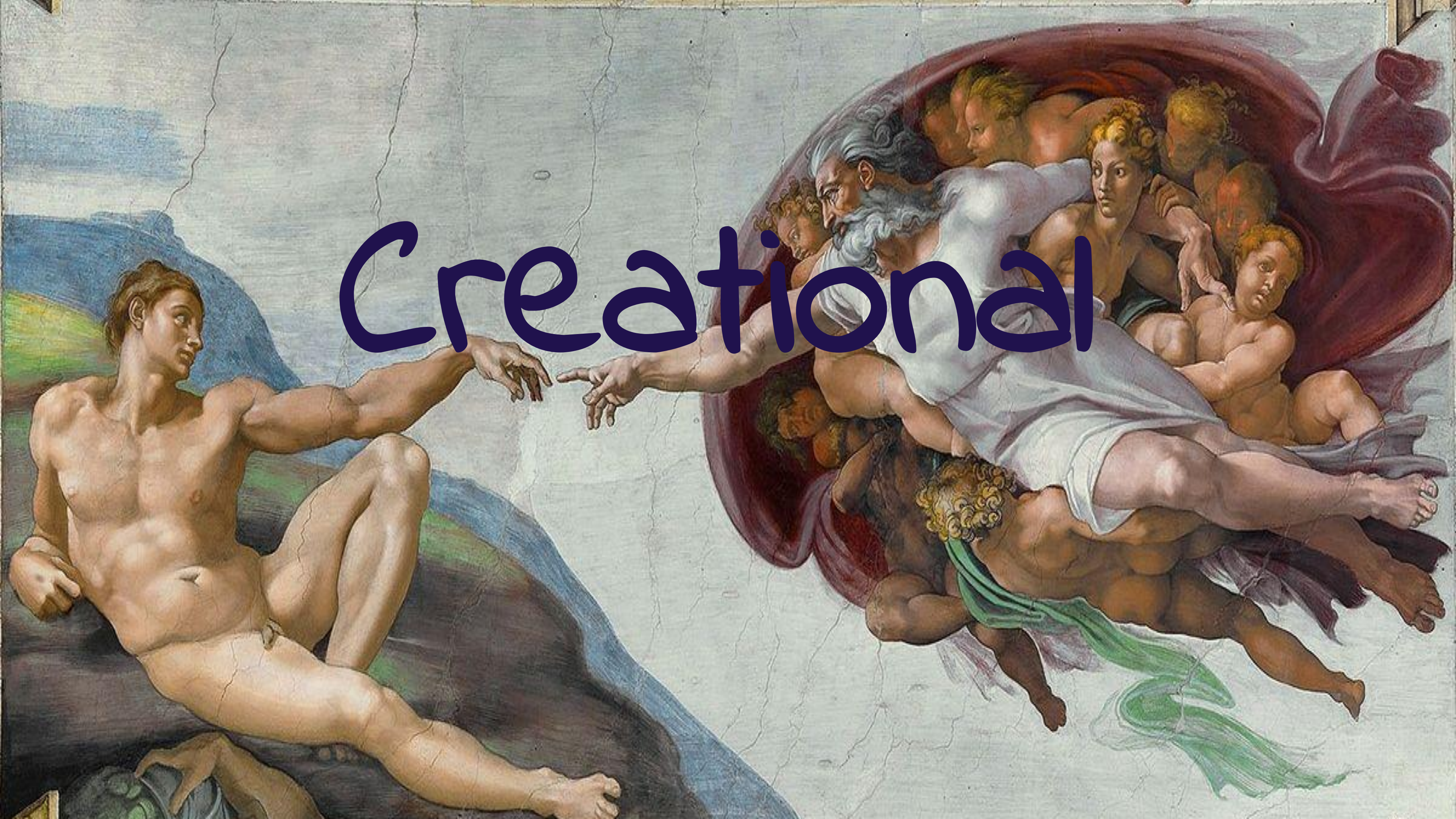
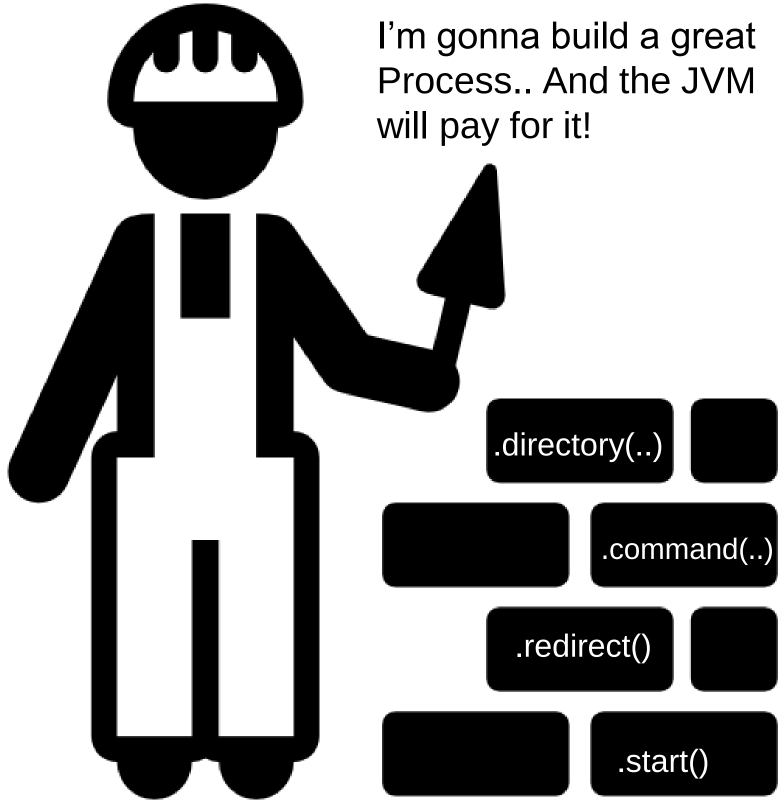
Design patterns





Creational

Builder


I'm gonna build a great Process.. And the JVM will pay for it!
.directory(..)
.command(..)
.redirect()
.start()

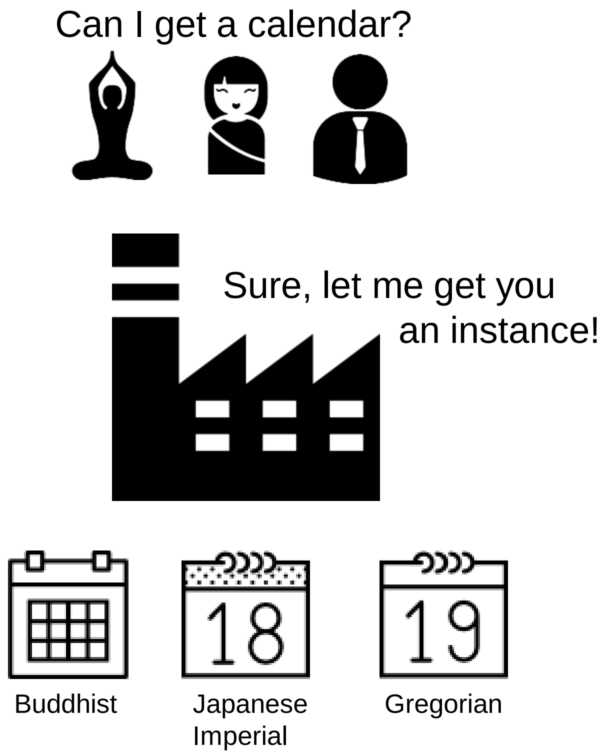
How to spot them?

- Instance methods return the instance itself.
- Tend to be named after the property being set.
- Classes named XXXBuilder.
- A 'build' method that returns the object being built

Examples:

- java.lang.StringBuilder
- java.lang.StringBuffer
- java.lang.ProcessBuilder
- java.text.CalendarBuilder

Factory method



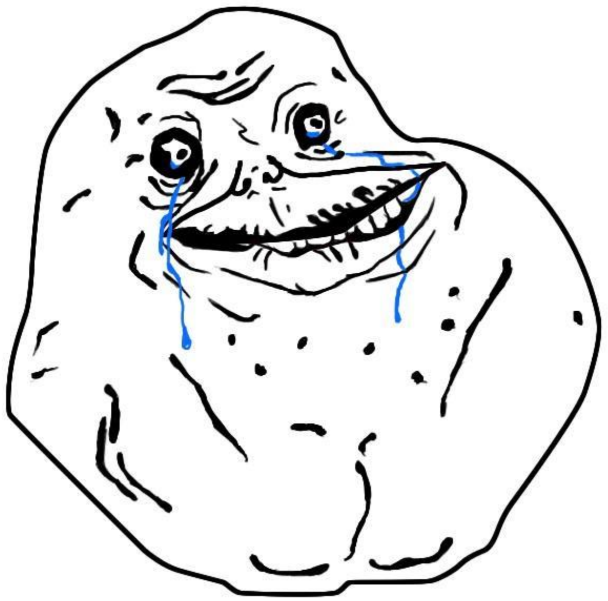
How to spot them?

- Creational methods returning a **new** instance of an interface / abstract class.

Examples:

- java.util.Calendar#getInstance()
- java.util.ResourceBundle#getBundle()
- java.text.NumberFormat#getInstance()
- java.nio.charset.Charset#forName()

Singleton

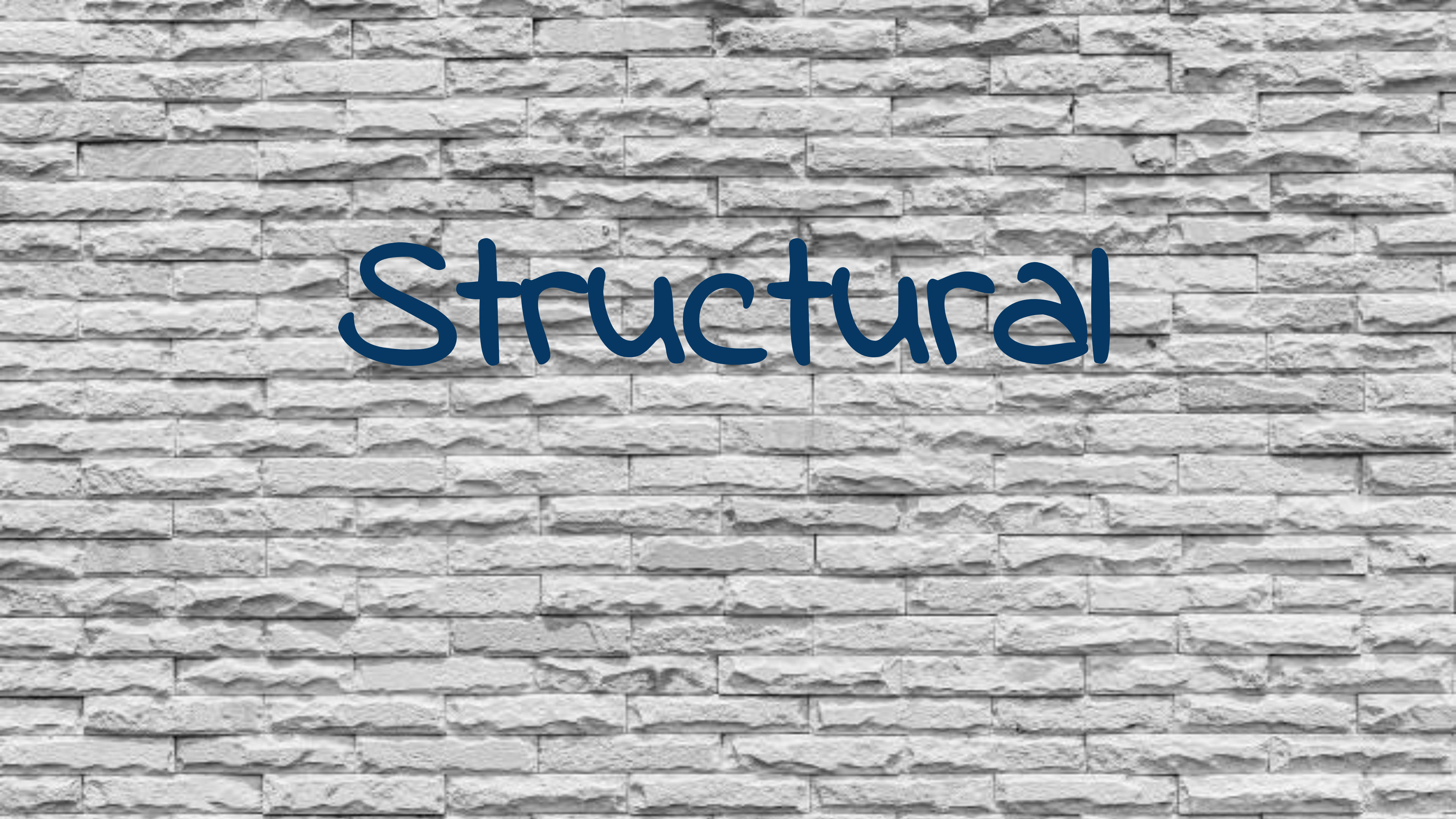


How to spot them?

- Class has one global point (static method) of acquiring the same instance (usually of itself) every time.

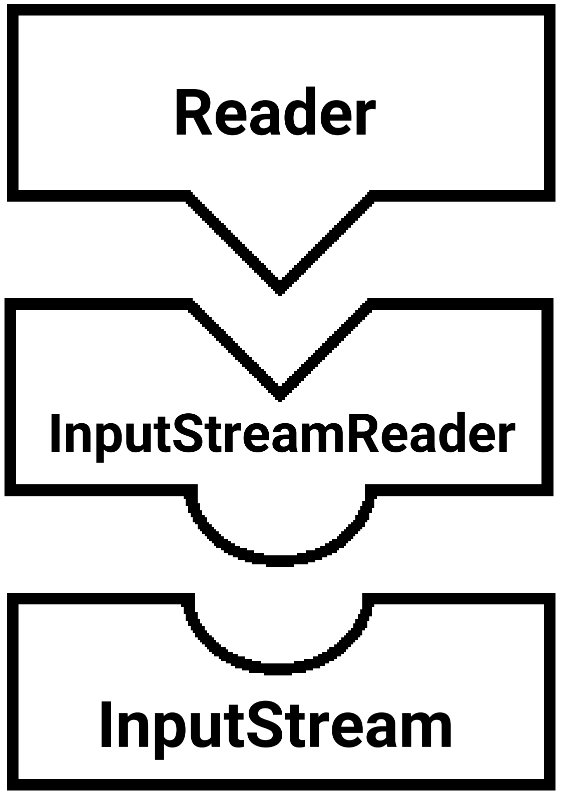
Examples:

- java.lang.Runtime#getRuntime()
- java.awt.Desktop#getDesktop()
- java.util.logging.LogManager#getLogManager()
- java.lang.System#getSecurityManager()



Structural

Adapter



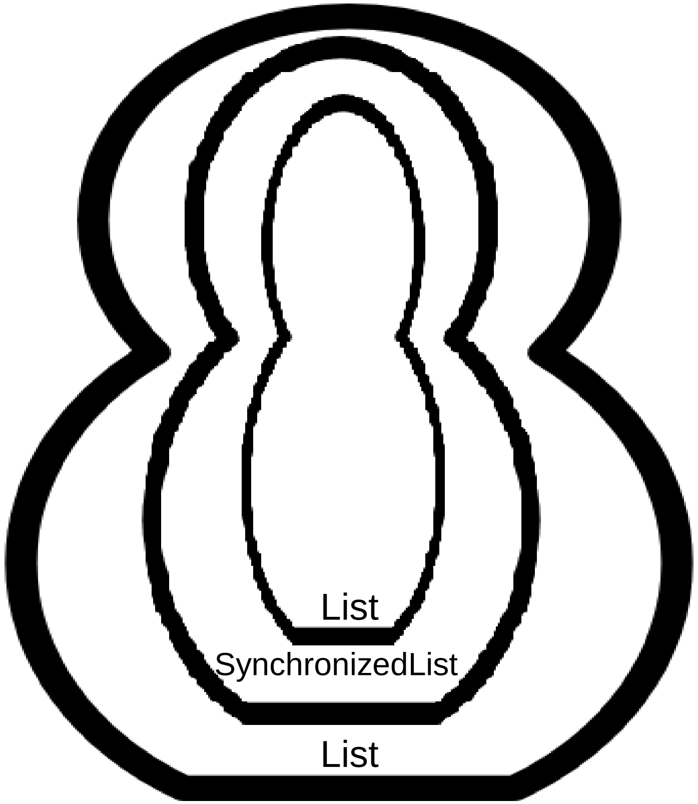
How to spot them?

- Creational methods that take an instance of an interface and returns an instance of a different interface.
  Usually called XXXAdapter or XXXWrapper or XXXTranslator.

Examples:

- java.io.InputStreamReader(InputStream)
- java.io.OutputStreamWriter(OutputStream)
- java.util.Arrays#asList()
- java.util.Collections#list()
- java.util.Collections#enumeration()

Decorator



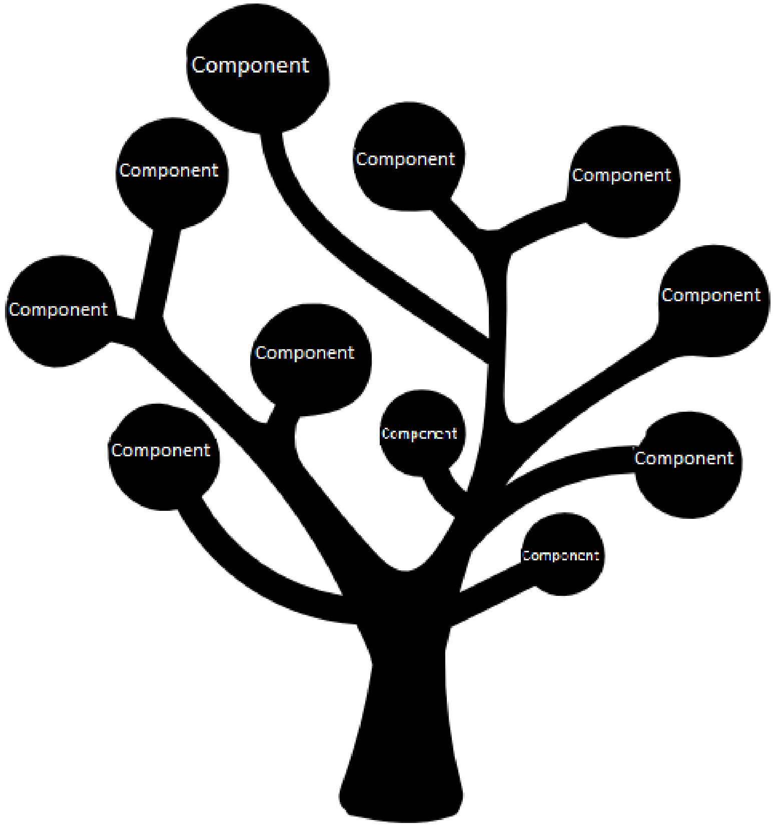
How to spot them?

- Creational methods
  taking an instance of an interface / abstract class returning another instance of the same interface / abstract class with added behavior.
- Can also be called XXXWrapper.

Examples:

- All static classes of type SynchronizedXXX, UnmodifiableXXX, CheckedXXX from the Collections class.
- All subclasses of java.io.InputStream, OutputStream, Reader and Writer have a constructor taking an instance of the same type.

Composite



How to spot them?

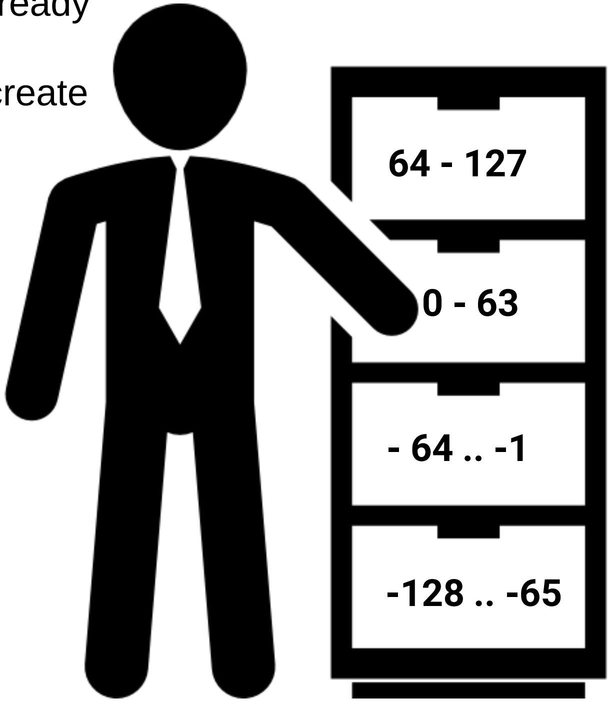
- Behavioral methods taking an instance of same abstract/interface type into a tree structure.

Examples:

- java.awt.Container#add(Component)

Flyweight

Integers! Integers! We have them all here!
They are all ready
for use!
No need to create
your own!



How to spot them?

- Creational methods return a cached instance of the class.

Examples:

- java.lang.Integer#valueOf
- java.lang.Boolean#valueOf
- java.lang.Byte#valueOf
- java.lang.Character#valueOf
- java.lang.Short#valueOf
- java.lang.Long#valueOf
- java.lang.BigDecimal#valueOf

Behavioural

Chain of responsibility

Hey, can you handle this request for me?
Ugh.. I’ll try.. (..to just give it to Bob..)
I think I’ll just give it to our intern over there.
I can do it!

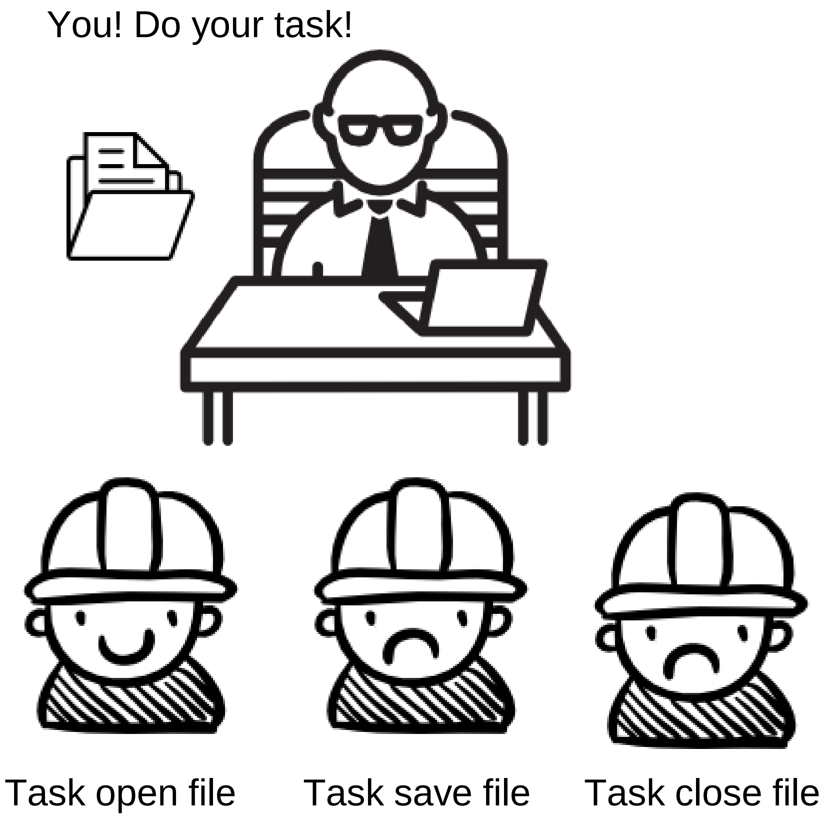
How to spot them?

- Behavioral methods that invoke the same method of another implementation of the same interface or abstract class.

Examples:

- javax.servlet.Filter#doFilter()
- java.util.logging.Logger#log()

Command



How to spot them?

- An instance of an interface / abstract (Command object) is invoked by another object (Invoker object).

Examples:

- Implementations of javax.swing.Action are Command objects that are called by Swing components (Invoker object).
- Implementations of java.lang.Runnable are Command objects that are called by an Invoker object like Thread.

Strategy

Sort them by their age..
and then by their last name.

How to spot them?

- Strategies are usually provided as an argument when calling an algorithm, thus enabling the behavior of the algorithm to be selected at runtime.

Examples:

- java.util.Comparator#compare(), executed by among others Collections#sort().

PLEASE SIR
I WANT SOME MORE PATTERNS
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Further reading

- http://stackoverflow.com/questions/1673841/examples-of-gof-design-patterns-in-javas-core-libraries
- JDK source code.
- Source codes of familiar frameworks.

- Credits for the illustrations go to Freepik.