ThoughtWorks®

DevNexus '14

# Refactoring towards functional Java

John Napier

*1970 -*

*1970 - "...Lambdas are relegated to relative obscurity*

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http://james-iry.blogspot.com/2009/05/brief-incomplete-and-mostly-wrong.html

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- Performance implications

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- Principle of Least Surprise - an object's state won't change out from under you
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- Thread Safety

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## Declarative Syntax

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- Functional semantics can help to de-emphasize non-obviously incidental implementation details
- Refocus on the language of your problem domain
- Help identify conceptual duplication in your codebase

# Ways to Leverage OOP + FP

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[ OOP in the large ]

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- Objects are still a very powerful way to represent your domain model and business interactions
- Functional style tends to shine brightest when used for discrete implementations (method bodies, etc.)

# Functional Patterns in Java

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- Utilize defensive copies where necessary
- Produce new instances of an object for update operations, leaving original instance unchanged

# Functional Patterns in Java

## Higher-level iteration patterns

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(Understanding Folds)

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## Higher-level iteration patterns

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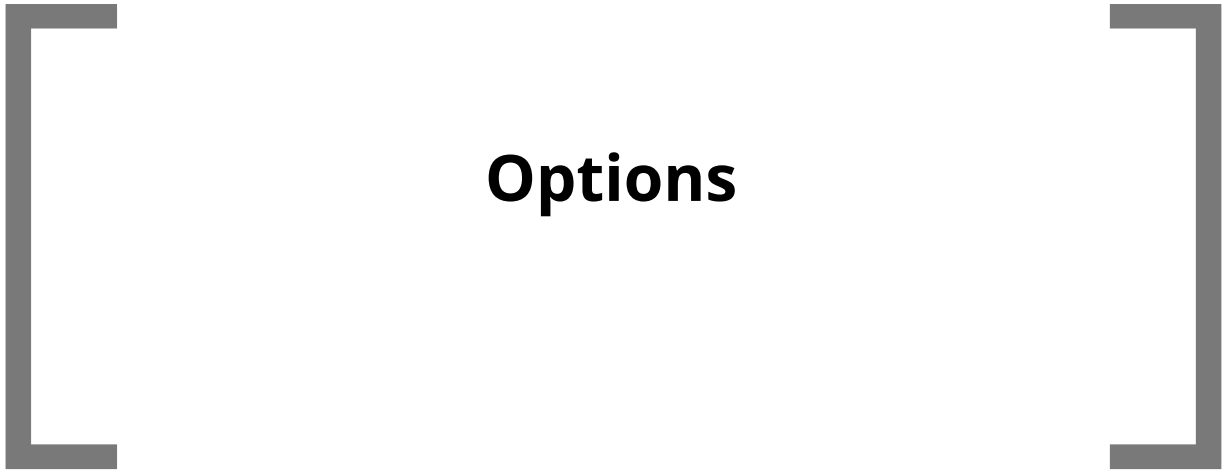
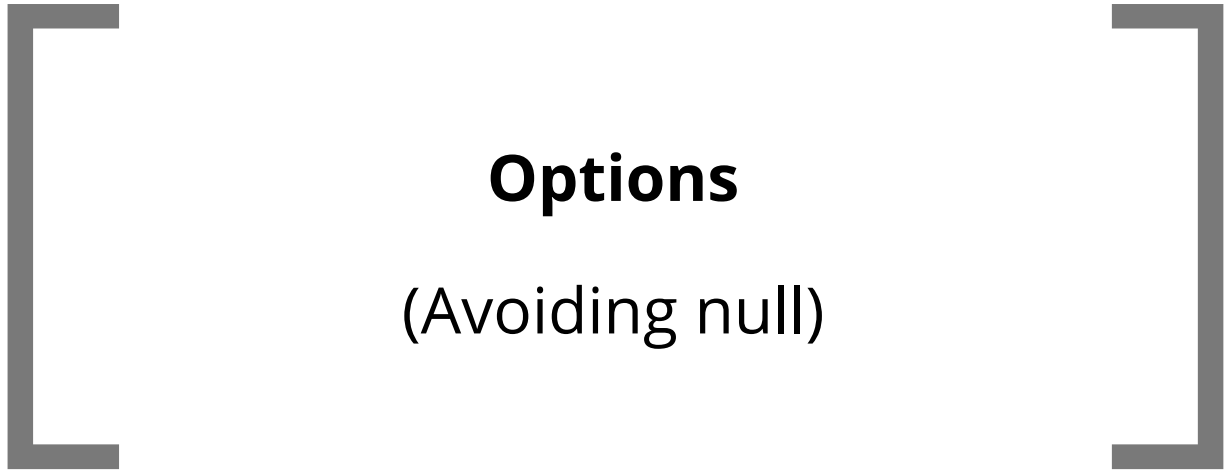
- Left folding / right folding
- Map / Filter
- Any / All / Length / Head / Last / Join / etc.

# Functional Patterns in Java



## Options

# Functional Patterns in Java



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(Avoiding null)

- Use a meaningful representation of the presence or absence of a value
- Use Tell, Don't Ask for value transformations and failure-case recovery
- Powerful companion to Null Objects and Special Case Objects

# Refactoring Techniques

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**DAOs**

(Dealing with persistence)

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(Dealing with persistence)

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- Update operations should return new instances
- Leverage monadic types like Persisted<T>
- Use exceptions when the case is actually exceptional

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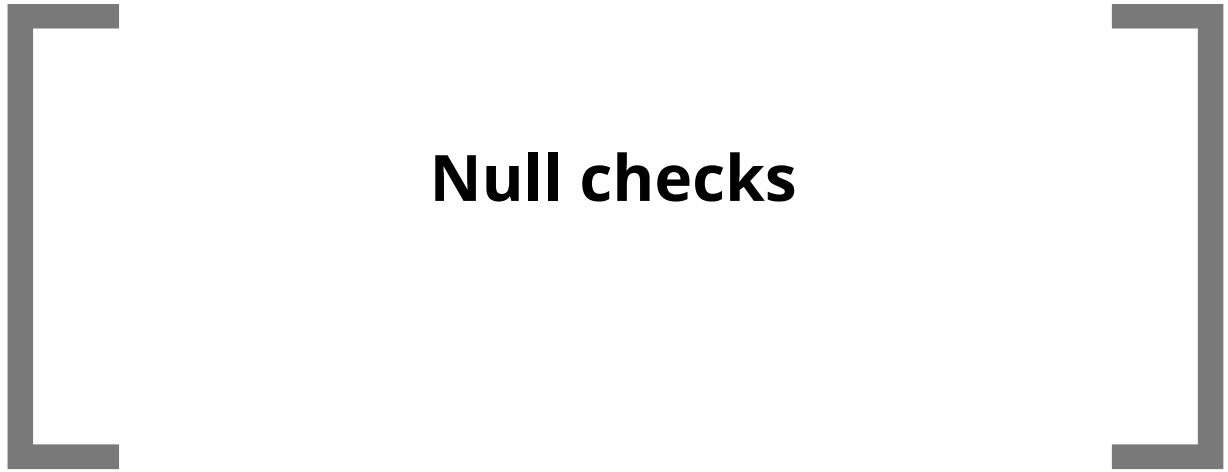

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- Resolve an underlying value as early as possible

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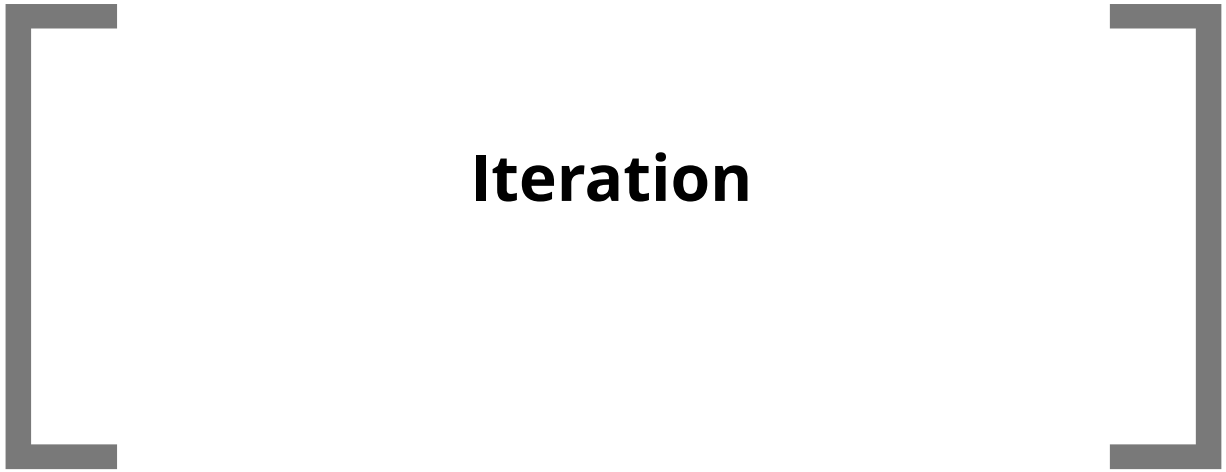

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- Use the newly-created function's signature to inform you about what type of fold is best-suited for your case
- Replace the loop with the fold

# Performance implications

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(Just kidding.)

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- GC that implicitly supports mutation can’t optimize for immutability
- Stack overflows due to recursion
- Stack overflows due to function composition
- YMMV. Take it on a case-by-case basis

# Questions?

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# Thank You.

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