Understand the Java Parallel Image
StreamGang Structure & Functionality

Douglas C. Schmidt
d.schmidt@vanderbilt.edu
www.dre.vanderbilt.edu/~schmidt

Professor of Computer Science
Institute for Software Integrated Systems
Vanderbilt University
Nashville, Tennessee, USA
Learning Objectives in this Part of the Lesson

- Understand the structure & functionality of the ImageStreamGang app
- It applies several Java parallelism frameworks
- Focus is on integrating object-oriented & functional programming paradigms

This design shows the synergy between object-oriented & functional programming
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Patterns are used to emphasize key roles & responsibilities in the app's design
The Structure of the ImageStreamGang App
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- UML class diagram for the object-oriented ImageStreamGang app design

See en.wikipedia.org/wiki/Unified_Modeling_Language
The Structure of the ImageStreamGang App

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These classes apply Java features to image downloading & processing
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A framework for initiating streams that process input from a list of elements
Customizes the StreamGang framework to download & process images...

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[Diagram showing class relationships and methods]
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... based on different Java concurrency & parallelism frameworks
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Uses Java streams to download & filter images sequentially
The Structure of the ImageStreamGang App

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Uses Java parallel streams to download & filter images concurrently
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Uses Java CompletableFutures to download & filter images asynchronously
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Stores image meta-data & provides methods for common image-/file-related tasks
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- This class hierarchy applies operations to filter & store images
The Structure of the ImageStreamGang App

• UML class diagram for the object-oriented ImageStreamGang app design

Provides the user interface for an Android app
There’s a Java console version of ImageStreamGang that shares most of the code.
Running the Image StreamGang App
Starting ImageStreamGangTest
Printing 4 results for input file 1 from fastest to slowest
COMPLETABLE_FUTURES_2 executed in 153 msecs
COMPLETABLE_FUTURES_1 executed in 251 msecs
PARALLEL_STREAM executed in 300 msecs
SEQUENTIAL_STREAM executed in 1026 msecs

Printing 4 results for input file 2 from fastest to slowest
PARALLEL_STREAM executed in 62 msecs
COMPLETABLE_FUTURES_1 executed in 68 msecs
COMPLETABLE_FUTURES_2 executed in 70 msecs
SEQUENTIAL_STREAM executed in 261 msecs
Ending ImageStreamGangTest

Tests conducted on a 2.4 GHz eight-core Lenovo P1 with 128 Gbytes of RAM
End of Understand the Java Parallel ImageStreamGang Structure & Functionality