Java Parallel ImageStreamGang
Example: Structure & Functionality

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Learning Objectives in this Part of the Lesson

• Recognize 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
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
A framework for initiating streams that process input from a list of elements
Customizes the StreamGang framework to download & process images ...
The Structure of the ImageStreamGang App

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

... based on different Java concurrency & parallelism frameworks
The Structure of the ImageStreamGang App

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```plaintext
Uses Java streams to download & filter images sequentially
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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
This class hierarchy applies operations to filter & store images
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Provides the user interface for an Android app
The Structure of the ImageStreamGang App

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There's a Java console version of ImageStreamGang that shares most of the code.
Running the Image StreamGang App
Running the ImageStreamGang App

Starting ImageStreamGangTest
Printing 4 results for input file 1 from fastest to slowest
COMPLETABLE_FUTURES_1 executed in 312 msecs
COMPLETABLE_FUTURES_2 executed in 335 msecs
PARALLEL_STREAM executed in 428 msecs
SEQUENTIAL_STREAM executed in 981 msecs

Printing 4 results for input file 2 from fastest to slowest
COMPLETABLE_FUTURES_2 executed in 82 msecs
COMPLETABLE_FUTURES_1 executed in 83 msecs
PARALLEL_STREAM executed in 102 msecs
SEQUENTIAL_STREAM executed in 251 msecs
Ending ImageStreamGangTest

Tests conducted on a 2.6 GHz six-core Lenovo P52 with 64 Gbytes of RAM