Java Parallel ImageStreamGang Example: Structure & Functionality

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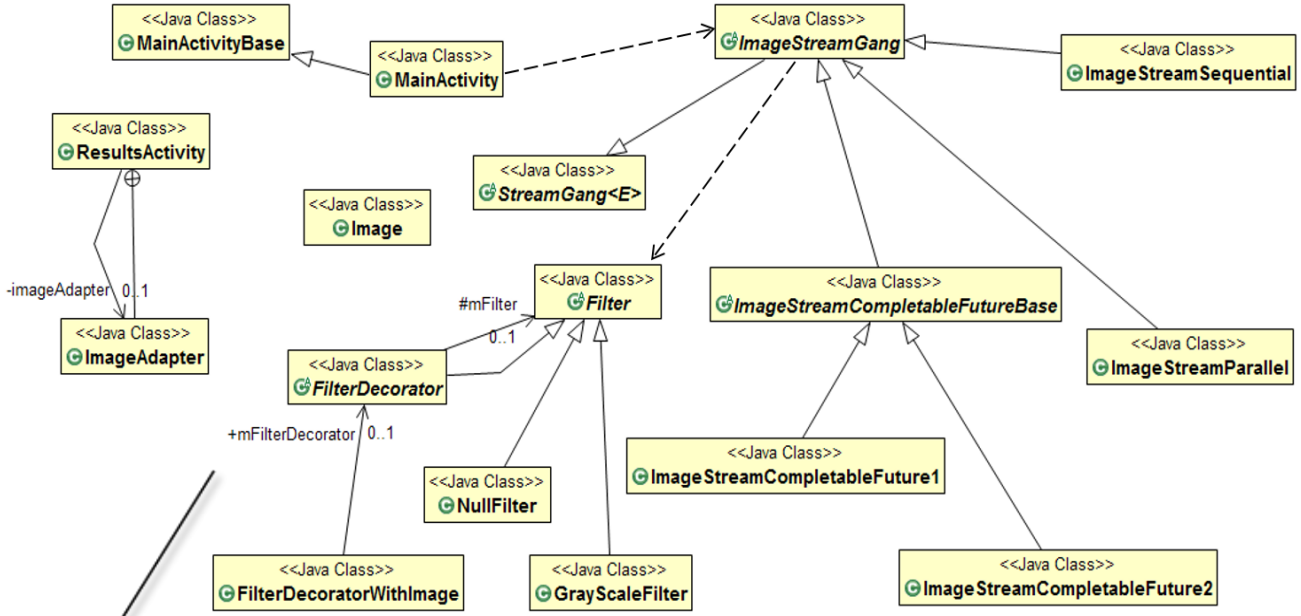
Learning Objectives in this Part of the Lesson

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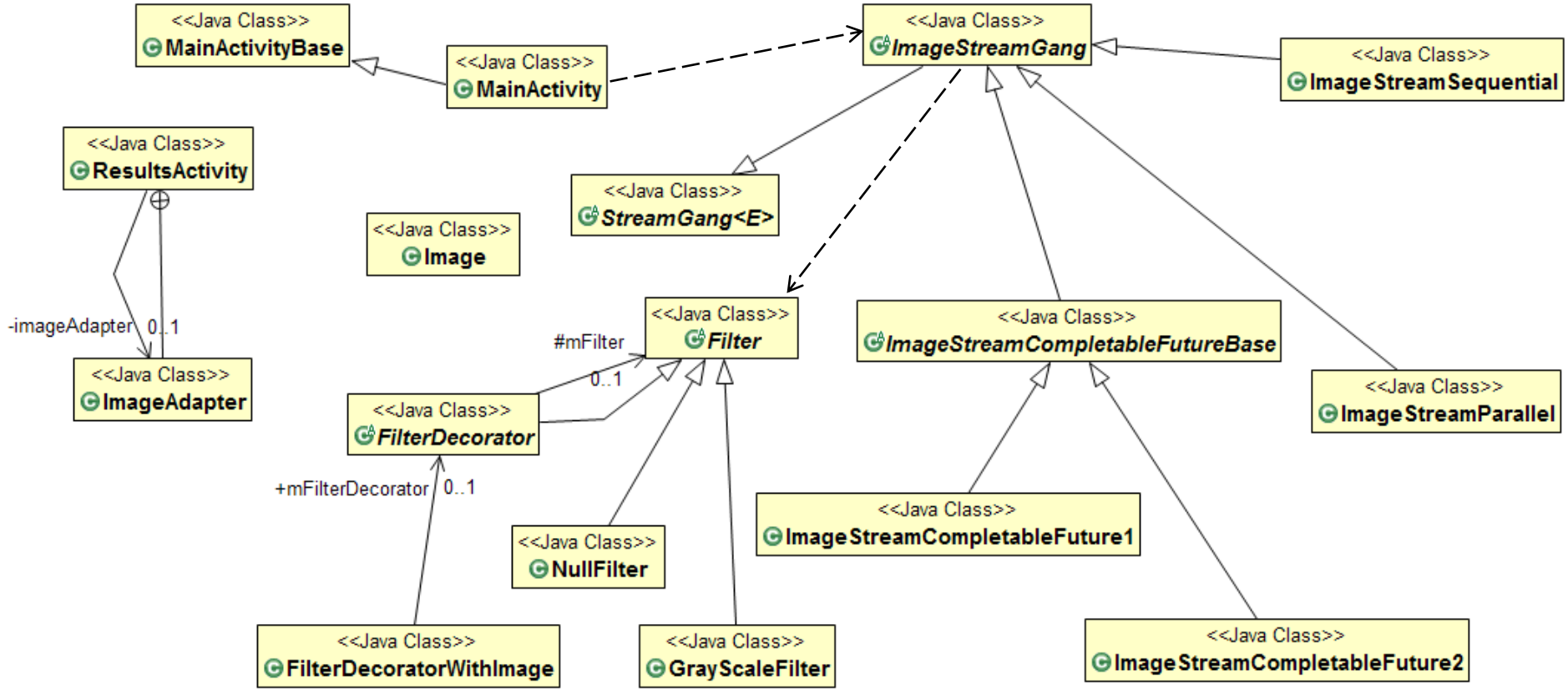
- UML class diagram for the object-oriented ImageStreamGang app design



See en.wikipedia.org/wiki/Unified_Modeling_Language

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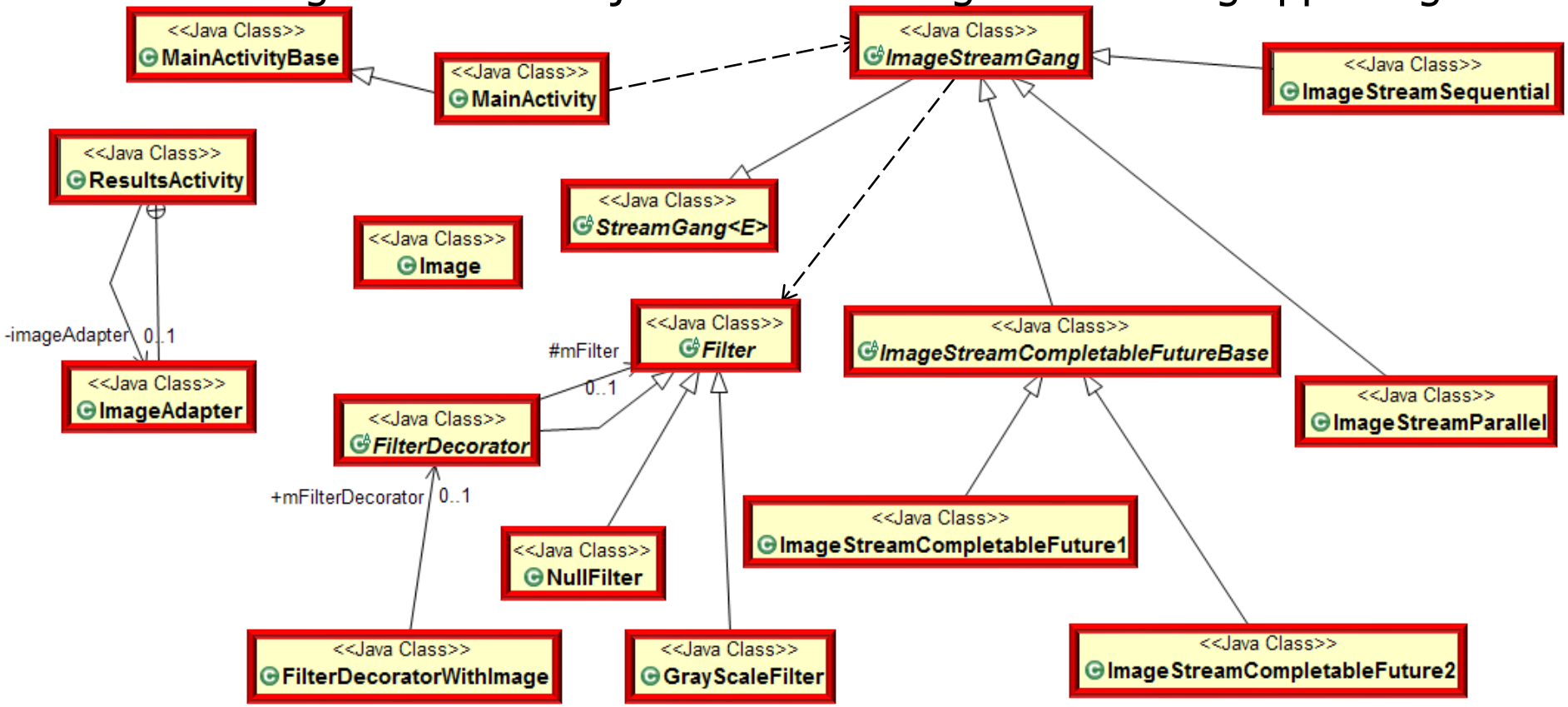

These classes apply Java features to image downloading & processing

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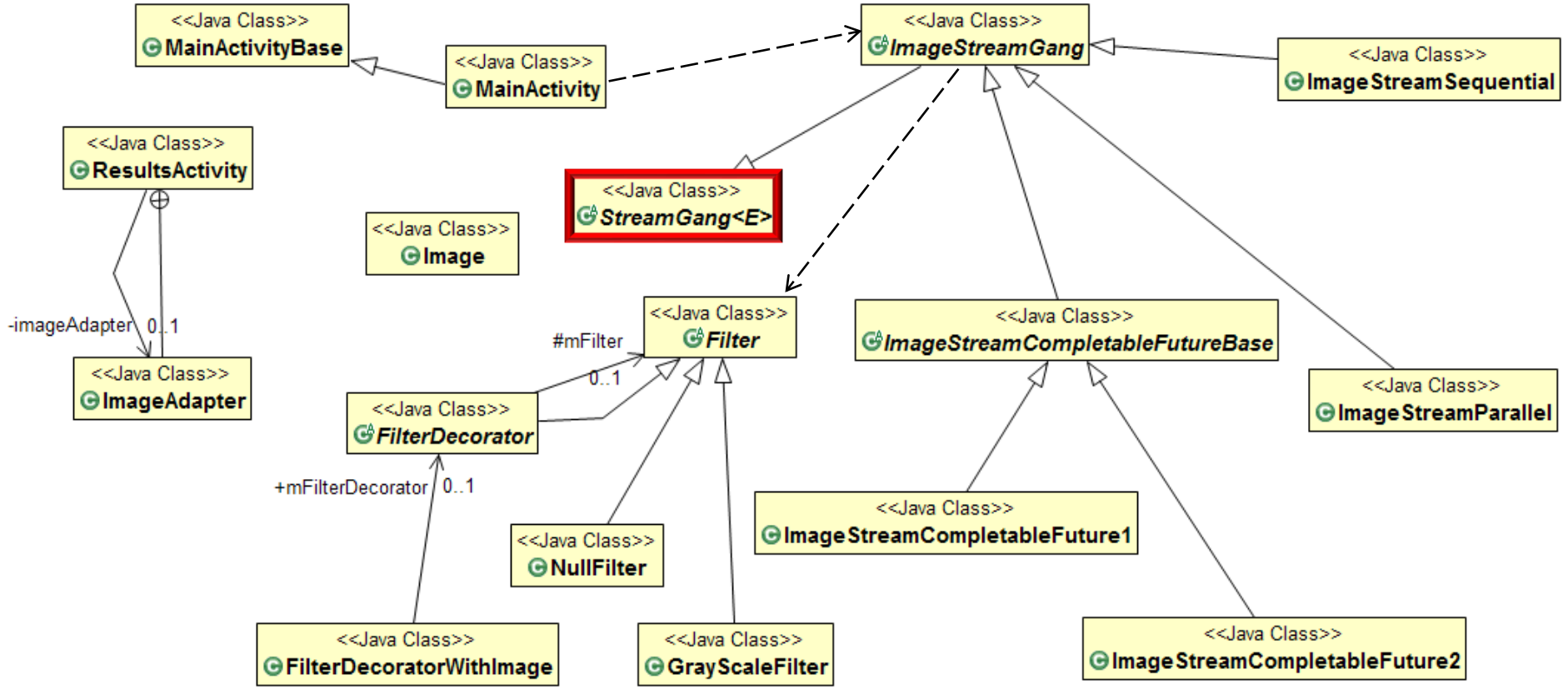

A framework for initiating streams that process input from a list of elements

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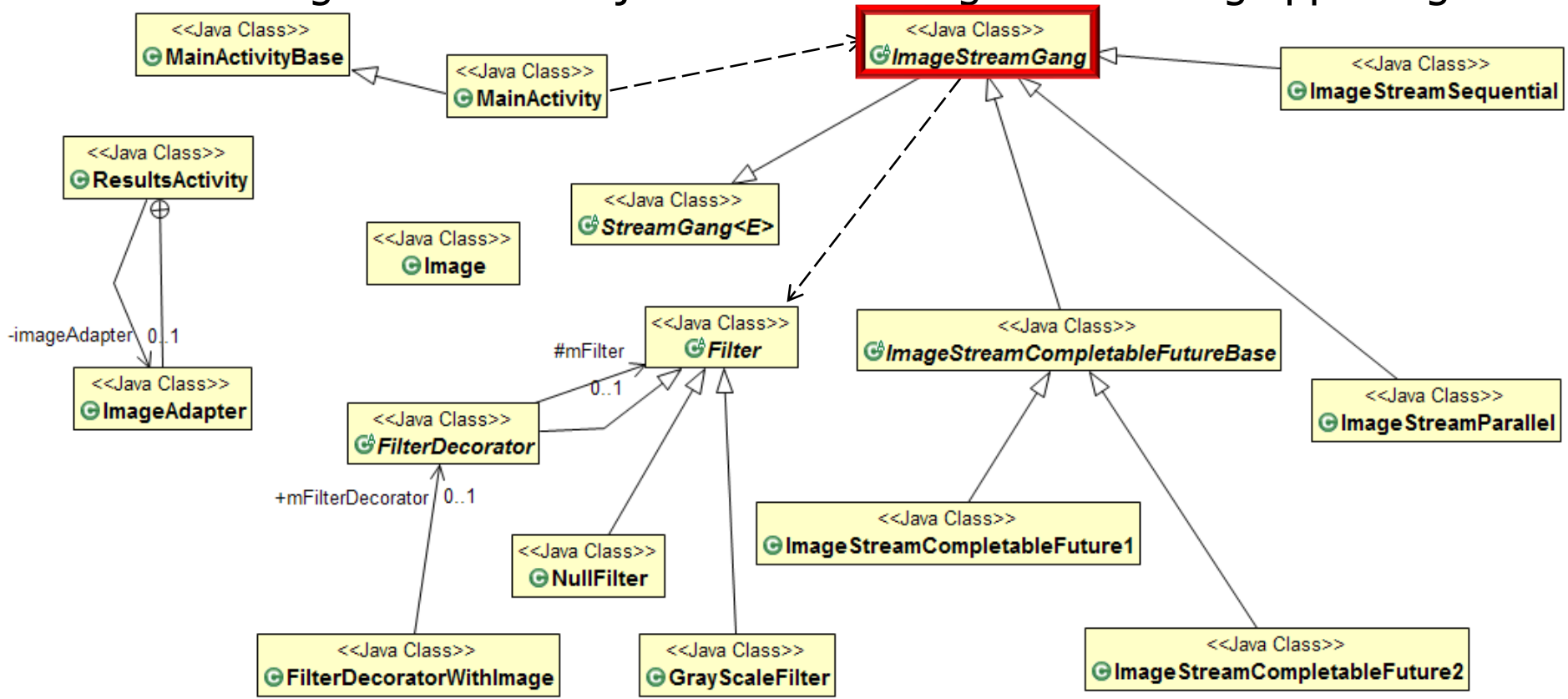

Customizes the StreamGang framework to download & process images ...

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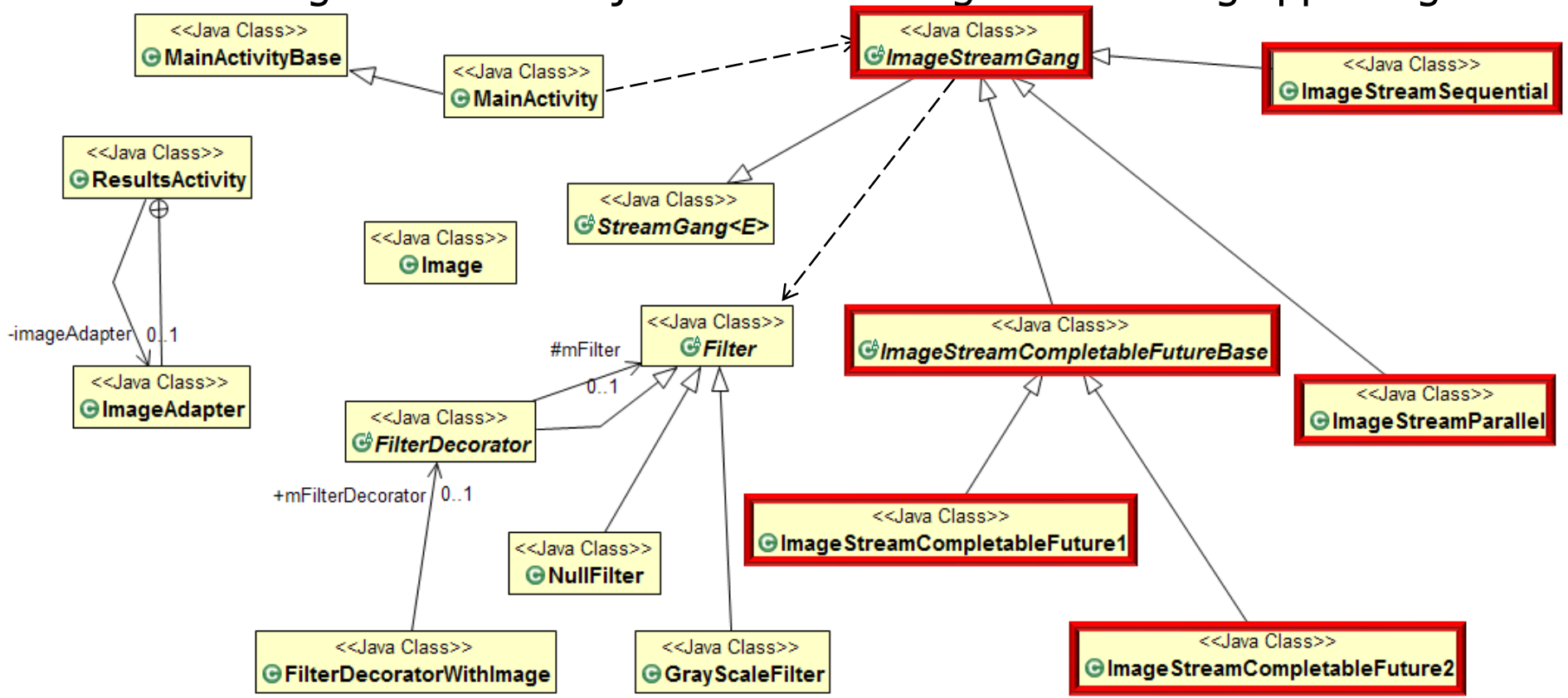

... based on different Java concurrency & parallelism frameworks

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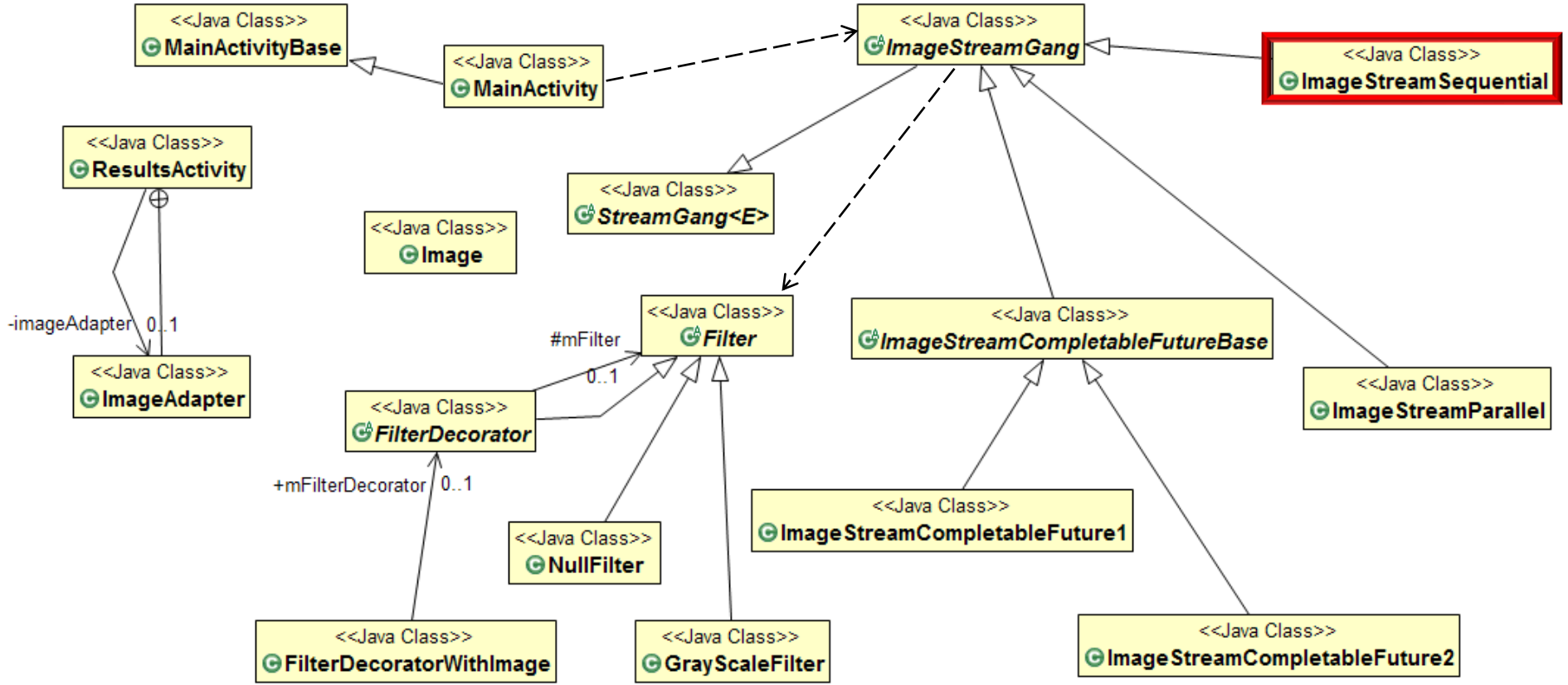

Uses Java streams to download & filter images sequentially

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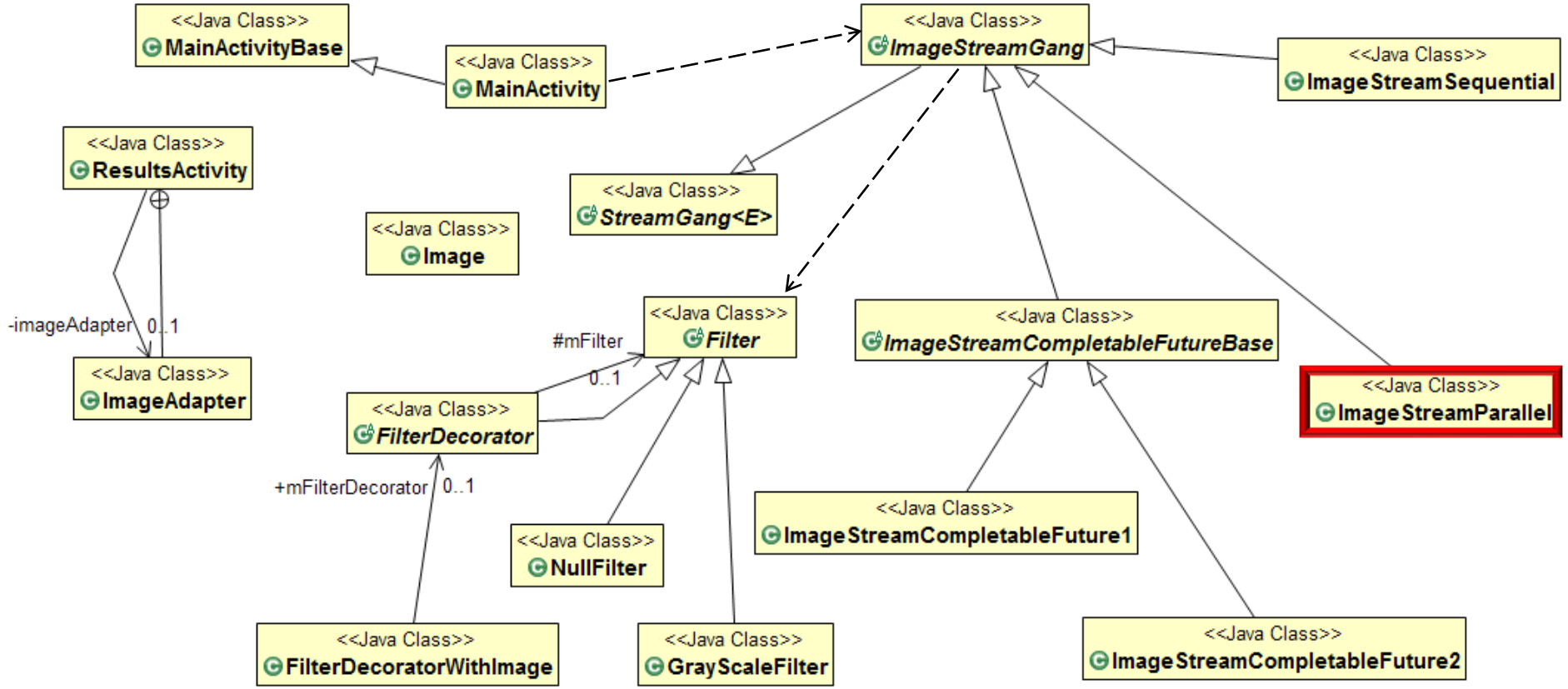

Uses Java parallel streams to download & filter images concurrently

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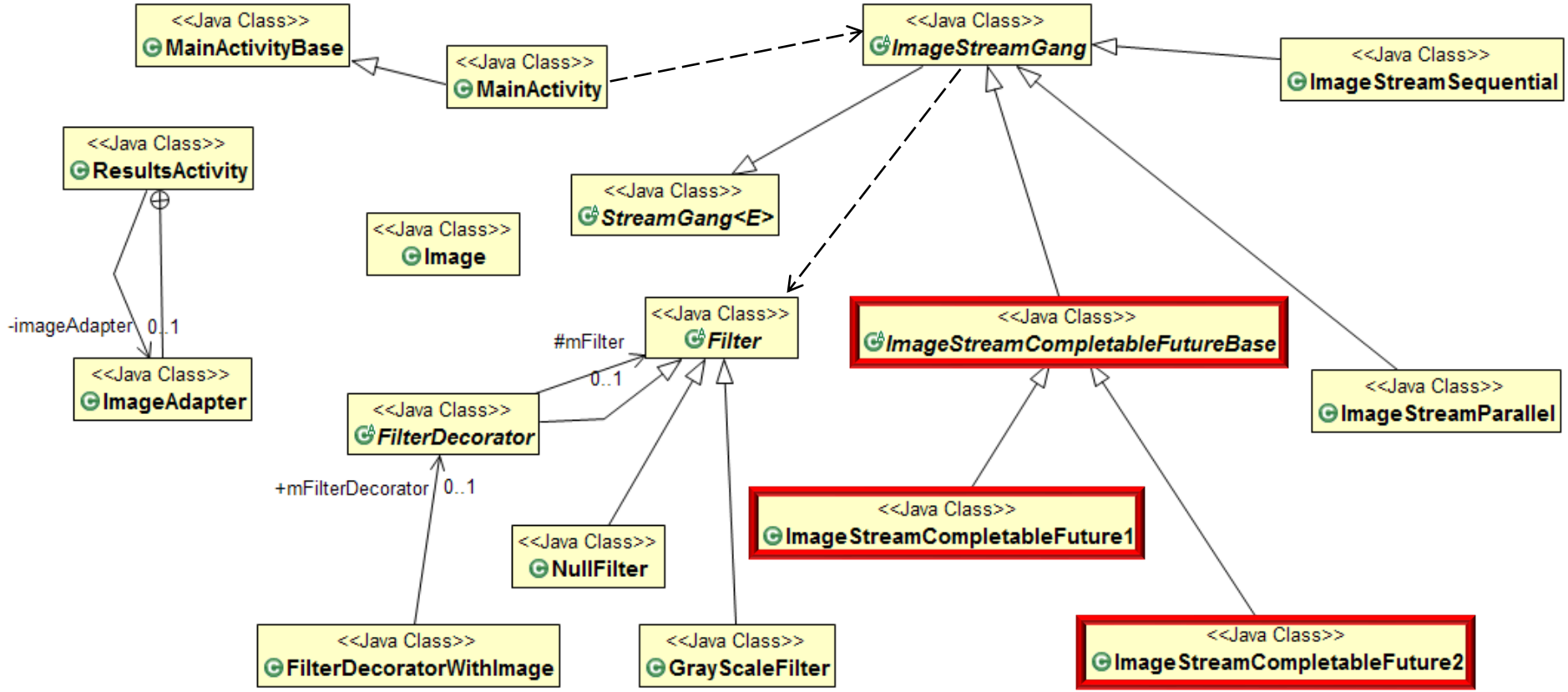

Uses Java CompletableFutures to download & filter images asynchronously

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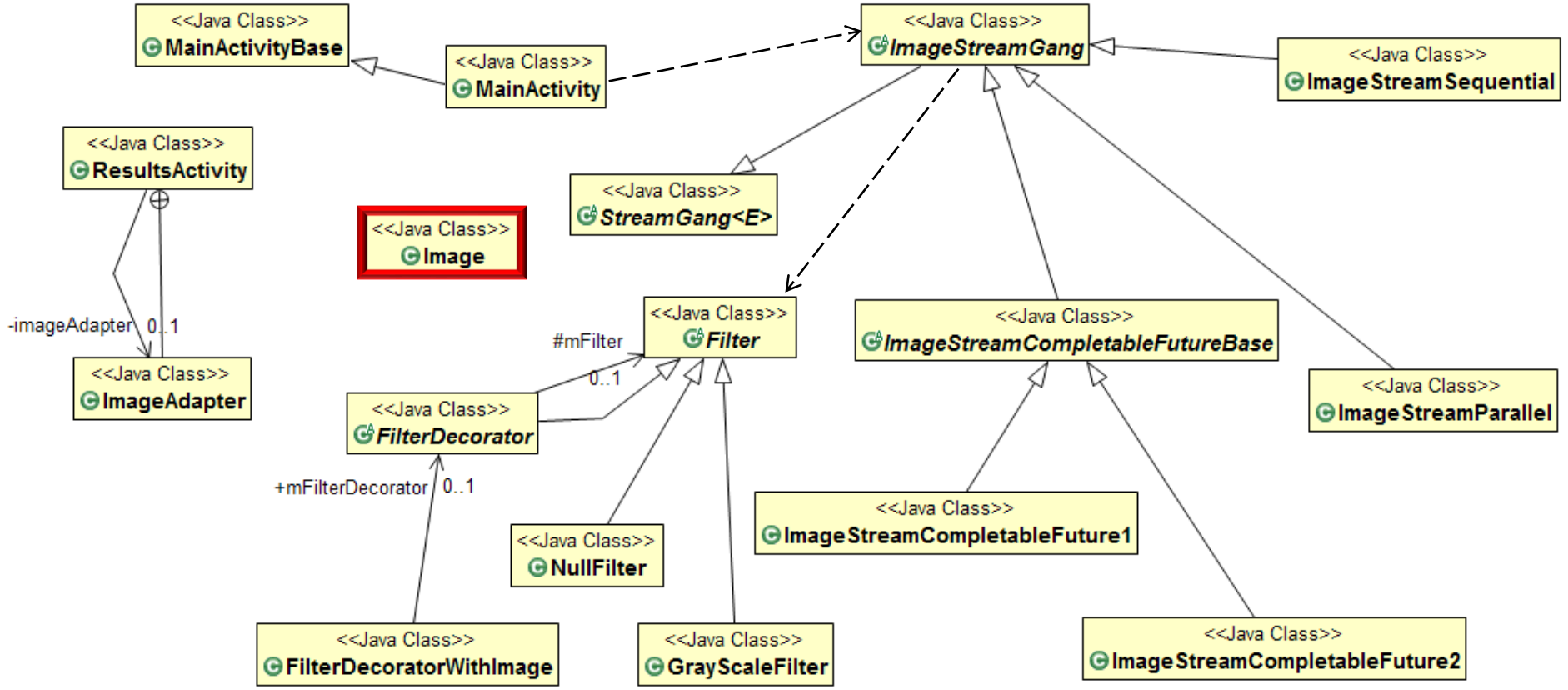

Stores image meta-data & provides methods for common image-/file-related tasks

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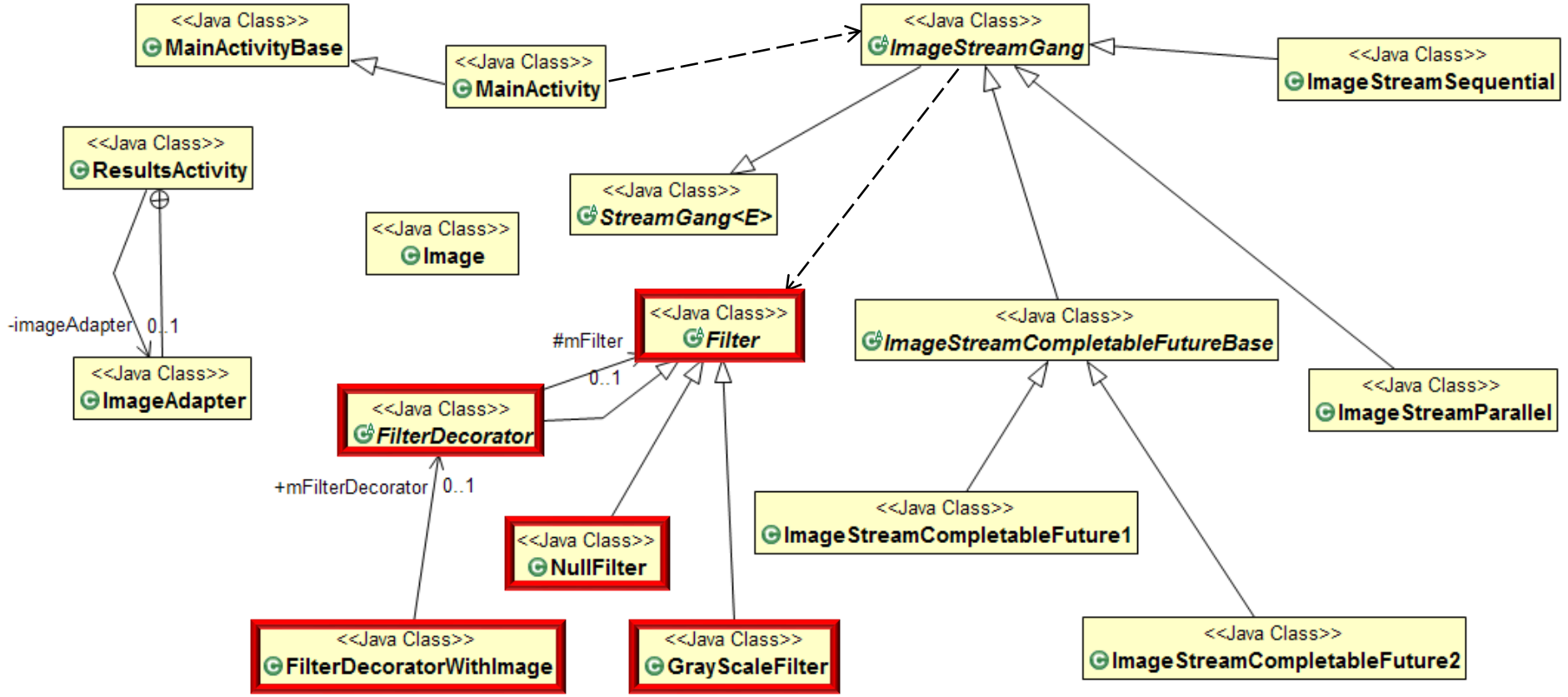

This class hierarchy applies operations to filter & store images

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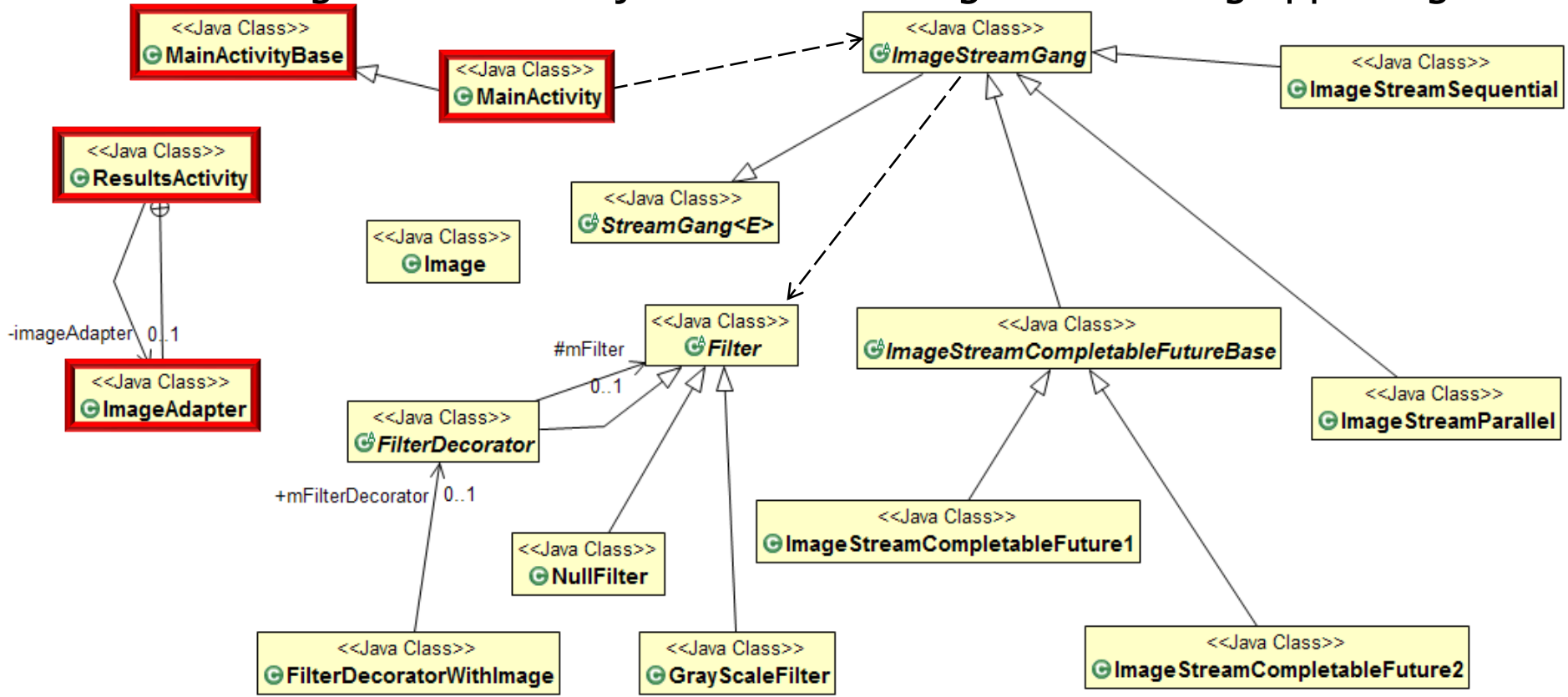

Provides the user interface for an Android app

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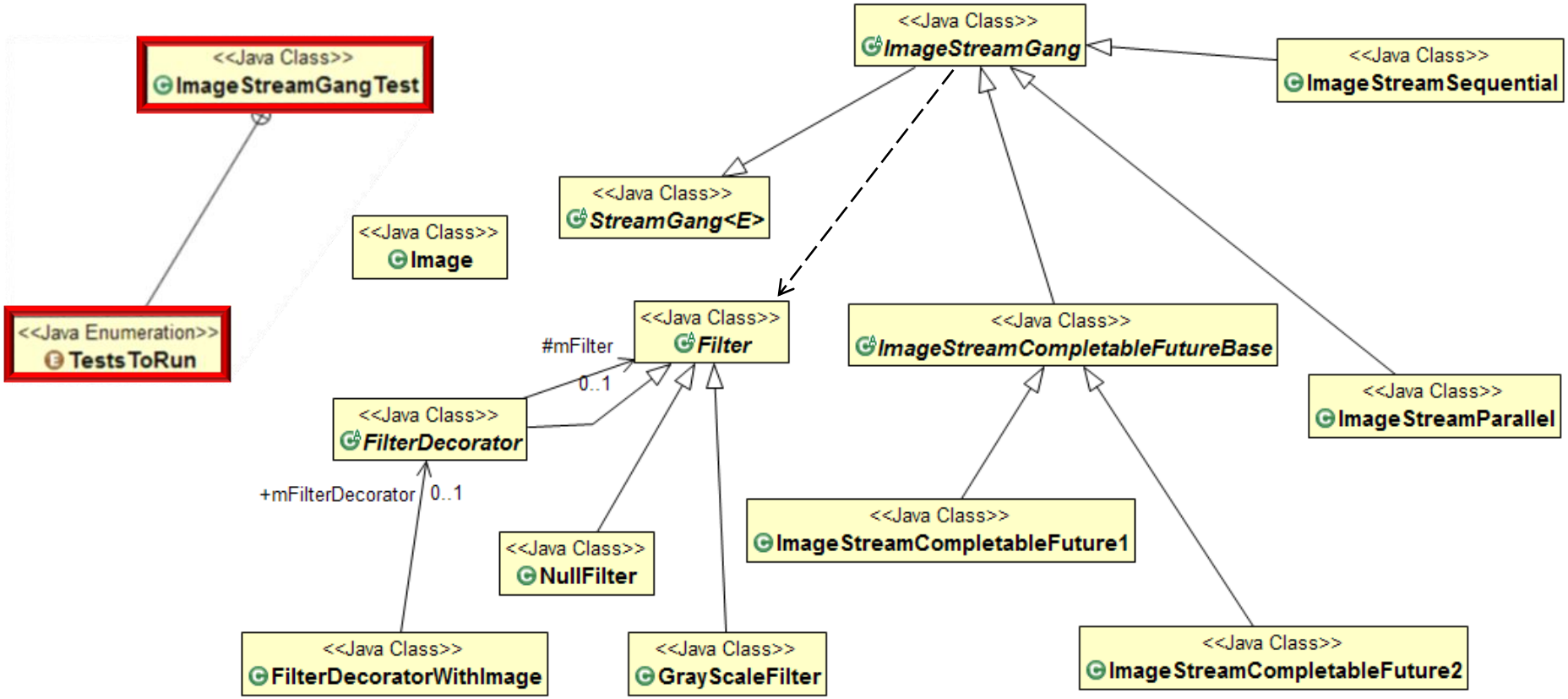


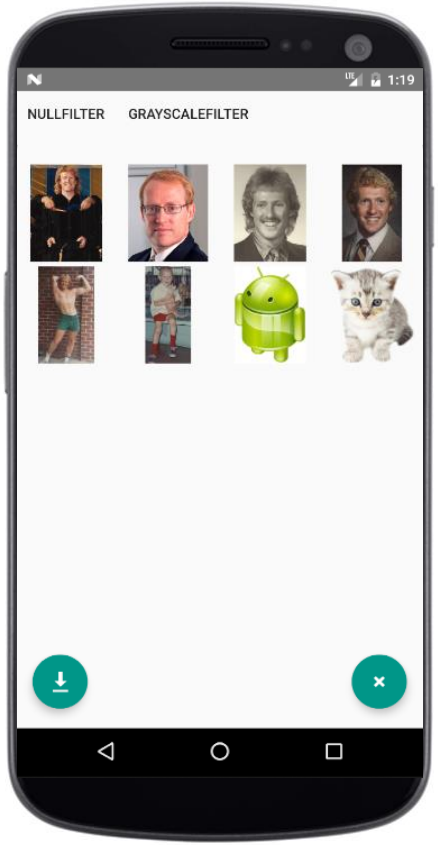
There's a Java console version of ImageStreamGang that shares most of the code

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

End of Java Parallel ImageStreamGang Example: Structure & Functionality