### **Recognizing Benefits of Java Streams**

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#### Learning Objectives in this Part of the Lesson

- Understand the structure & functionality of Java streams, e.g.,
  - Fundamentals of streams
  - Benefits of streams
  - Creating a stream
  - Aggregate operations in a stream
  - Applying streams in practice
  - Sequential vs. parallel streams
  - Common programming hazards of parallel streams
  - Benefits of streams



 Java streams provide several key benefits to programs & programmers





• Java streams provide several key benefits to programs & programmers This case study program downloads, stream() transforms, stores, & displays images List of URLs to Download Deque Deque Deque filter(not(this::urlCached)) Sub-Task Sub-Task Sub-Taska Persistent Sub-Task Sub-Taska List of Transforms to Apply Sub-Task1.1 **Data Store** map(this::downloadImage) A pool of worker threads flatMap(this::applyFilters) Socket Socket collect(toList())

See github.com/douglascraigschmidt/LiveLessons/tree/master/ImageStreamGang

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  - Concise & readable
    - Declarative paradigm focuses on *what* functions to perform, not how to perform them





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e.g., no Java controlflow operations are applied in this stream

See docs.oracle.com/javase/tutorial/java/nutsandbolts/flow.html

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  - Concise & readable
  - Flexible & composable
    - Functions are automatically connected together







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  - Simplified scalability
    - Parallelize performance without the need to write any multi-threaded code





See docs.oracle.com/javase/tutorial/collections/streams/parallelism.html

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A pool of worker threads is used to process behaviors in parallel



See <a href="https://dzone.com/articles/common-fork-join-pool-and-streams">dzone.com/articles/common-fork-join-pool-and-streams</a>

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Data mapped automatically to underlying processor cores





See gee.cs.oswego.edu/dl/papers/fj.pdf

# End of Recognizing Benefits of Java Streams