Understand Advanced Java CompletableFuture Features: Handling Runtime Exceptions (Part 1)

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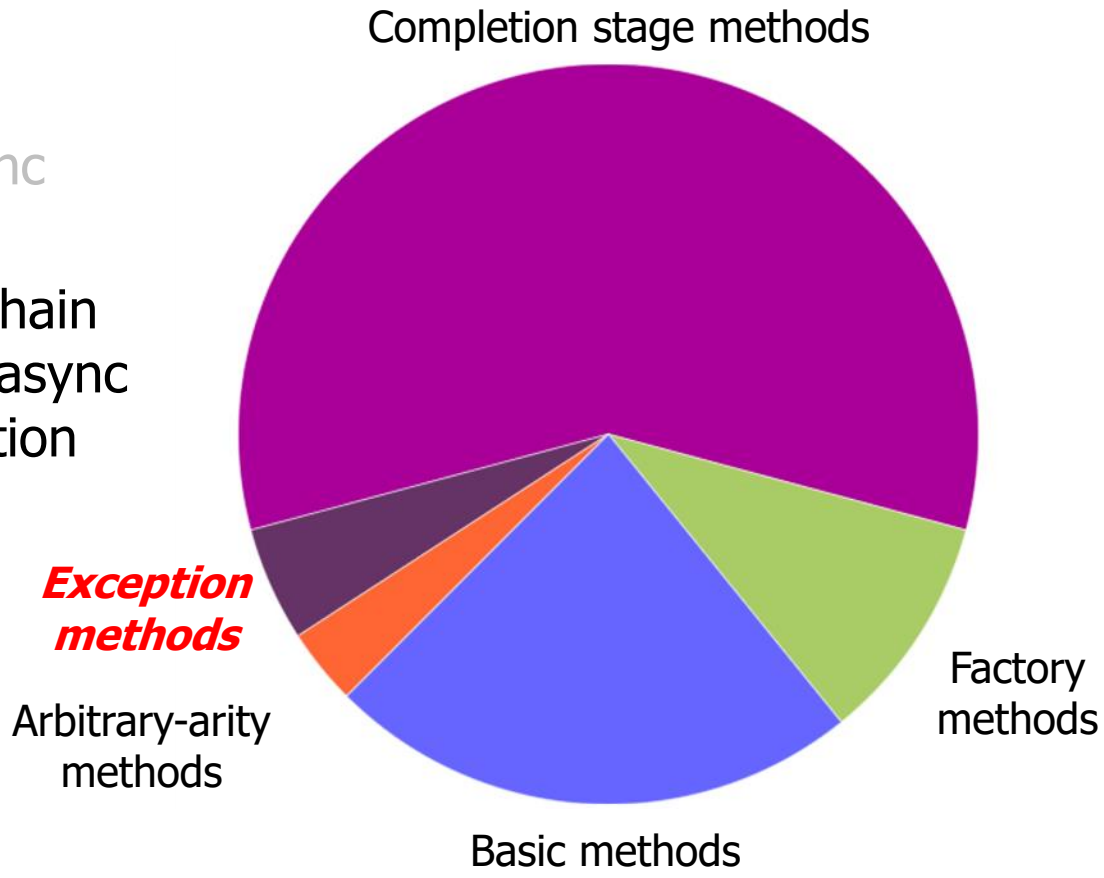
Learning Objectives in this Part of the Lesson

- Understand advanced features of completable futures, e.g.
  - Factory methods initiate async computations
  - Completion stage methods chain together actions to perform async result processing & composition
    - Method grouping
    - Single stage methods
    - Two stage methods (and)
    - Two stage methods (or)
    - Apply these methods
  - Handle runtime exceptions (Overview)



Overview of Handling Exceptions in Completion Stages

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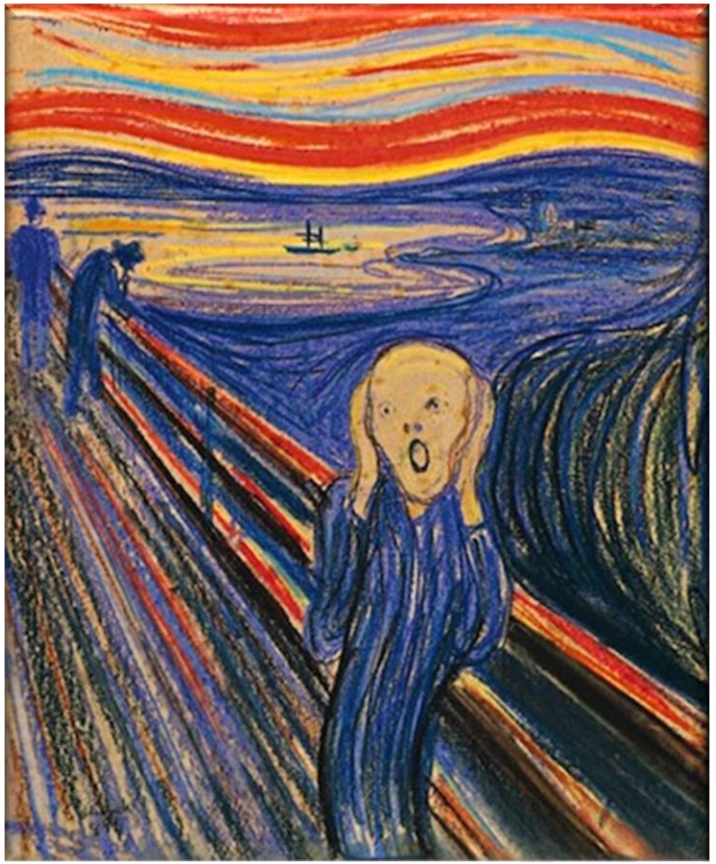

See blog.lightstreamer.com/2014/07/exception-handling-in-asynchronous-java.html

Overview of Handling Exceptions in Completion Stages

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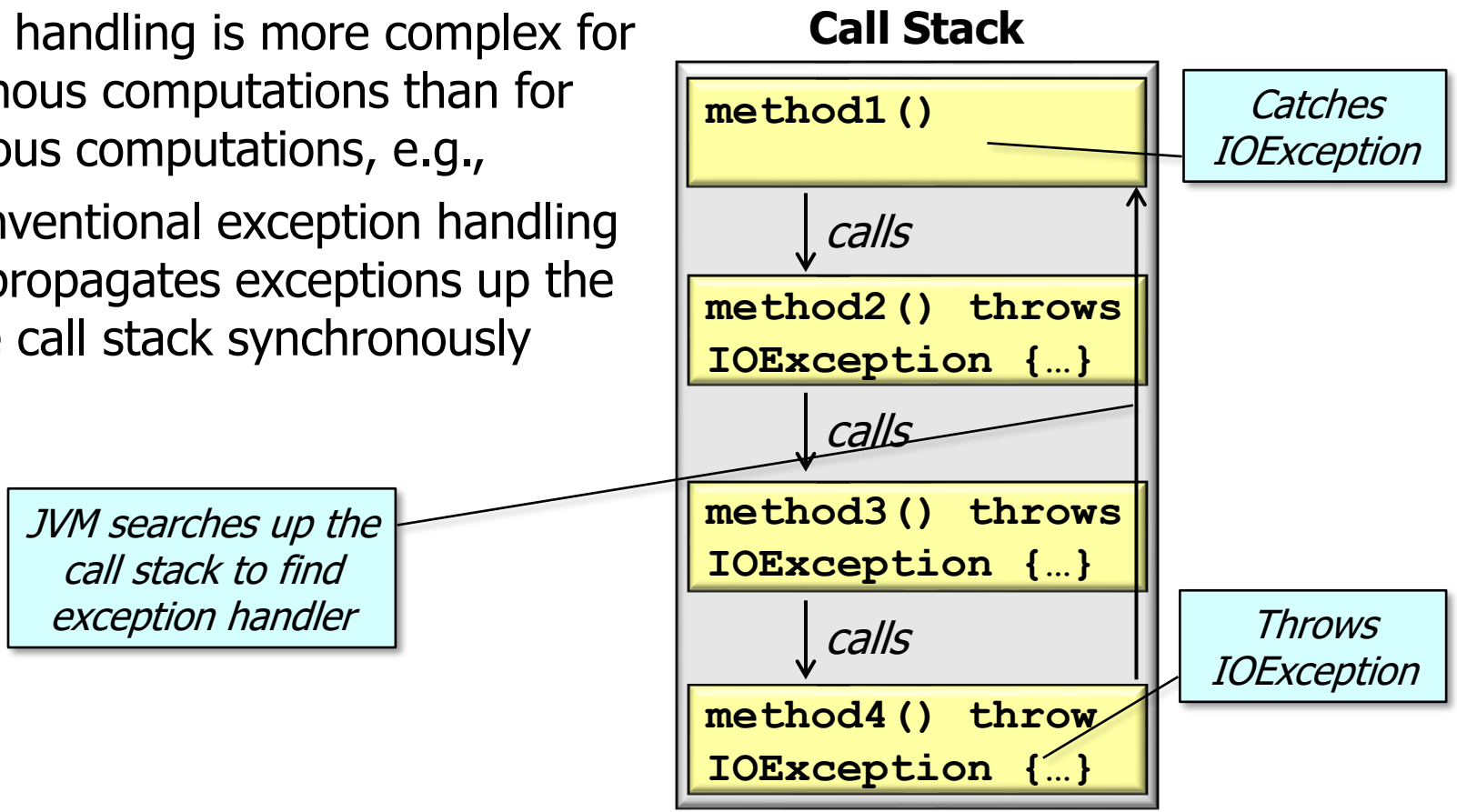
  - The conventional exception handling model propagates exceptions up the runtime call stack synchronously



See en.wikipedia.org/wiki/Exception_handling

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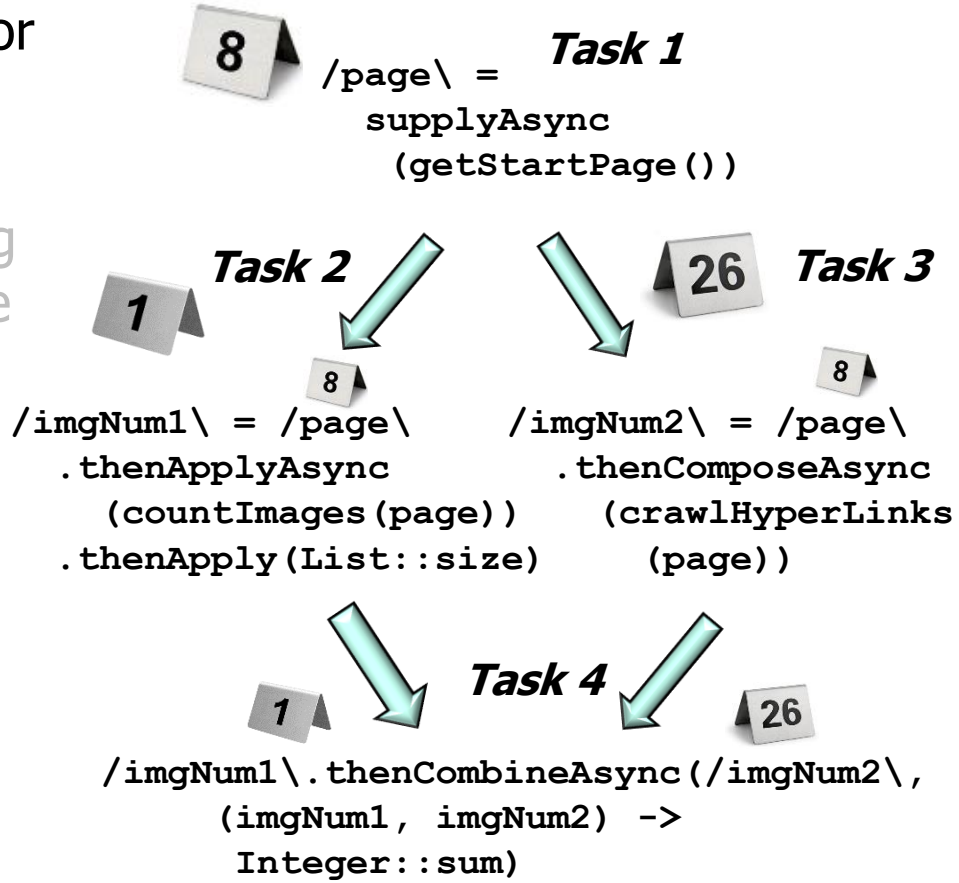
  - However, completable futures that run asynchronously don't conform to a conventional call stack model



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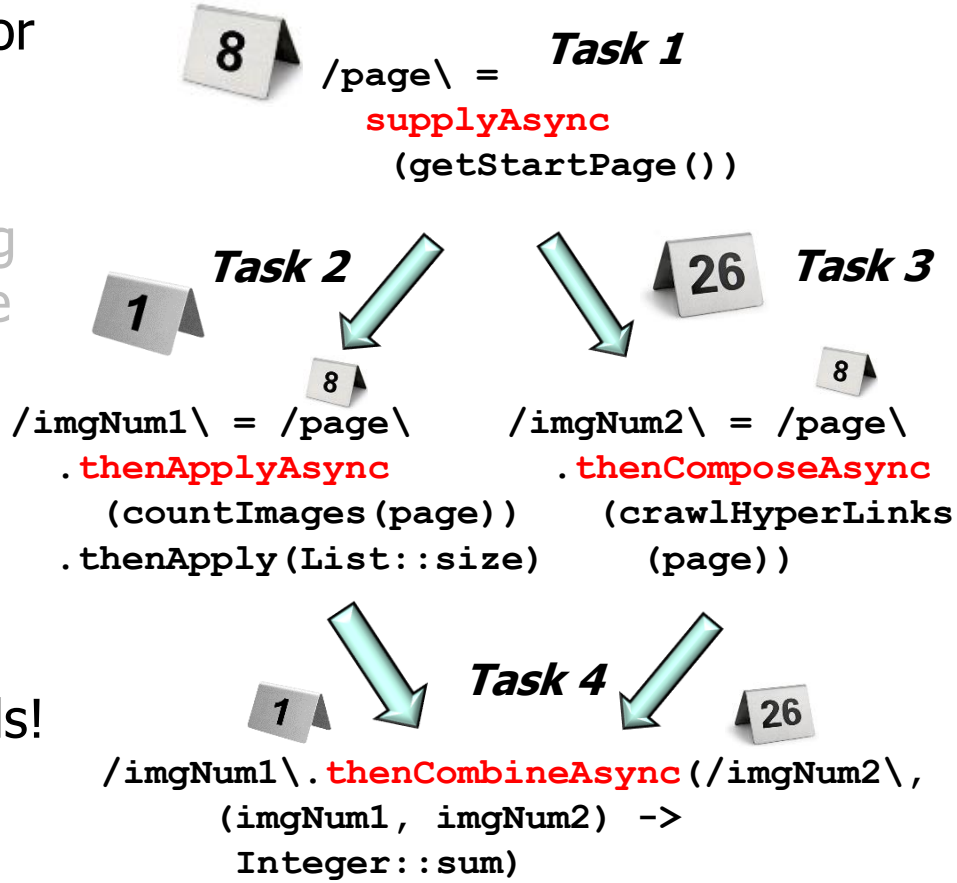
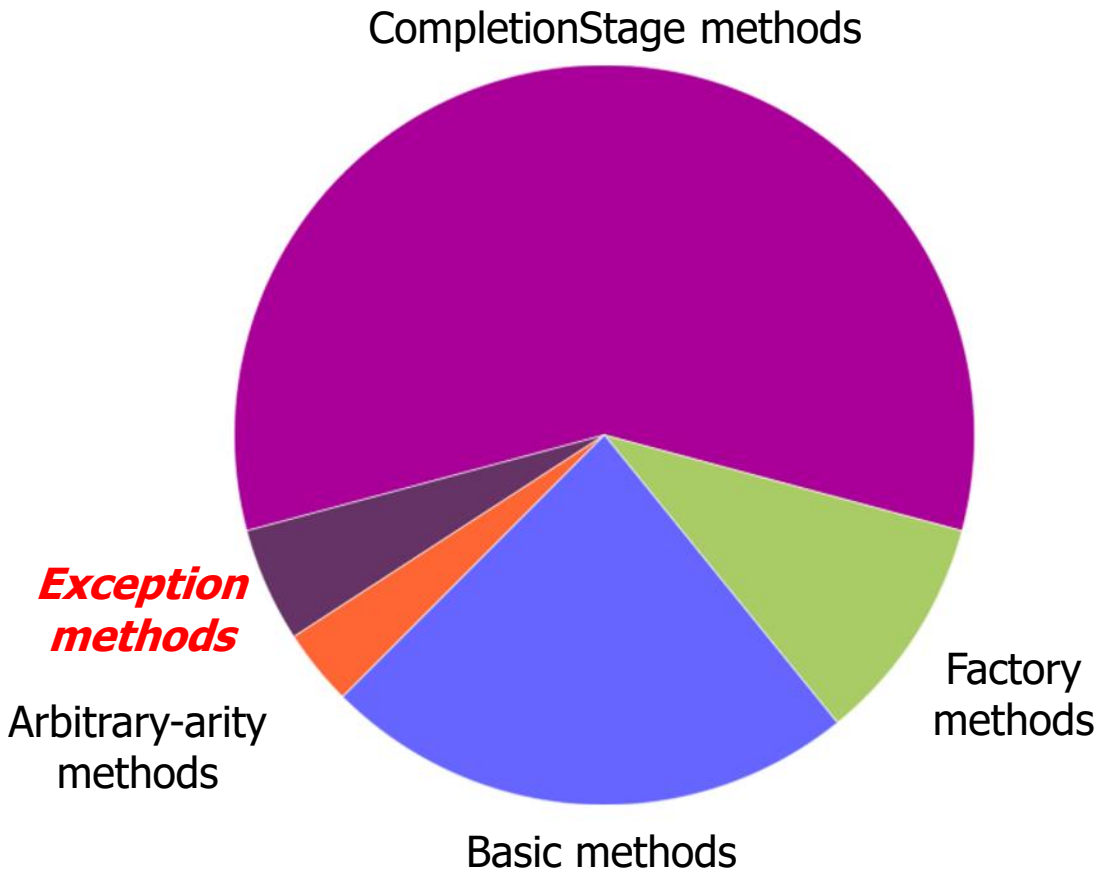
    - e.g., completion stage methods can run in different worker threads!



See suryanarayanjena.wordpress.com/async-methods-in-completablefuture

Overview of Handling Exceptions in Completion Stages

- Completion stage methods handle runtime exceptions that occur asynchronously



See www.jesperdj.com/2015/09/26/the-future-is-completable-in-java-8

Overview of Handling Exceptions in Completion Stages

- Completion stage methods handle runtime exceptions that occur asynchronously

Methods	Params	Returns	Behavior
when Complete (Async)	Bi Consumer	Completable Future with result of earlier stage or throws exception	Handle outcome of a stage, whether a result value or an exception
handle (Async)	Bi Function	Completable Future with result of BiFunction	Handle outcome of a stage & return new value
exceptionally	Function	Completable Future<T>	When exception occurs, replace exception with result value

Help make programs more *resilient* by handling erroneous computations gracefully

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Added in Java 12

See www.logicbig.com/tutorials/core-java-tutorial/java-12-changes/completion-stage-new-methods.html

End of Understand Advanced Java CompletableFuture Features: Handling Runtime Exceptions (Part 1)