Understanding Method Groupings in the Java Completable Futures API

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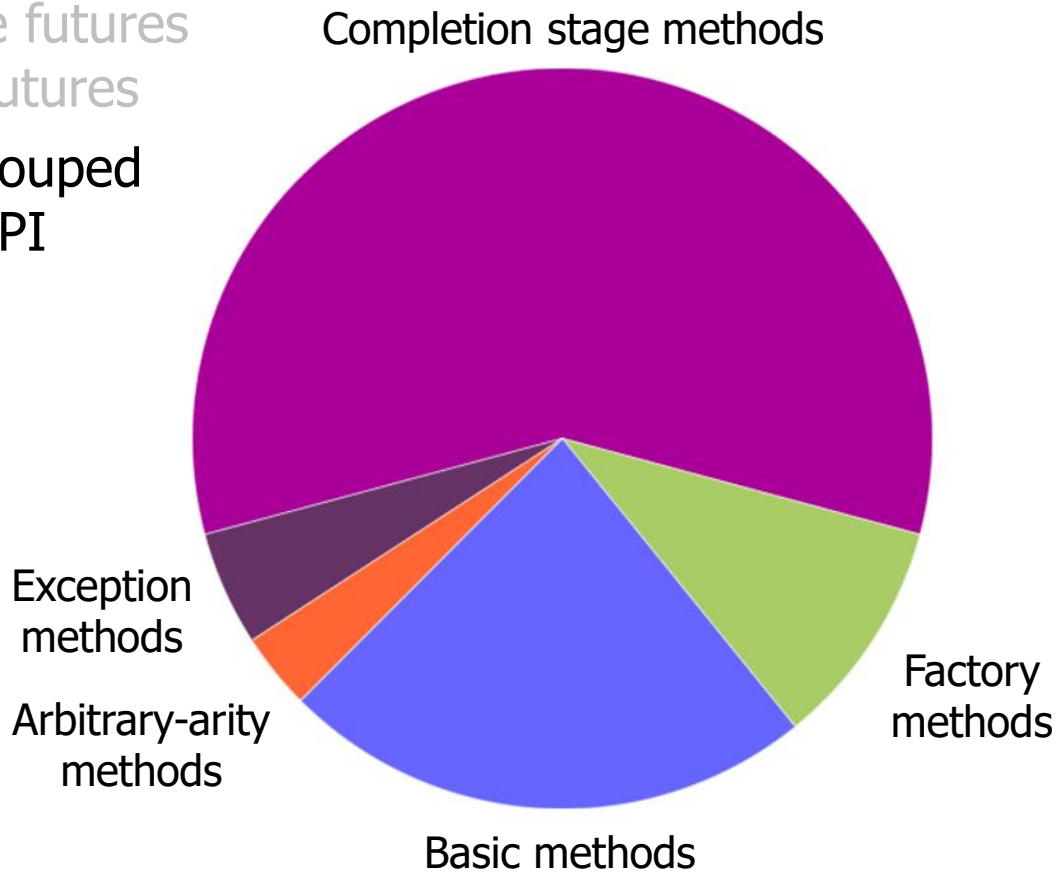
Learning Objectives in this Part of the Lesson

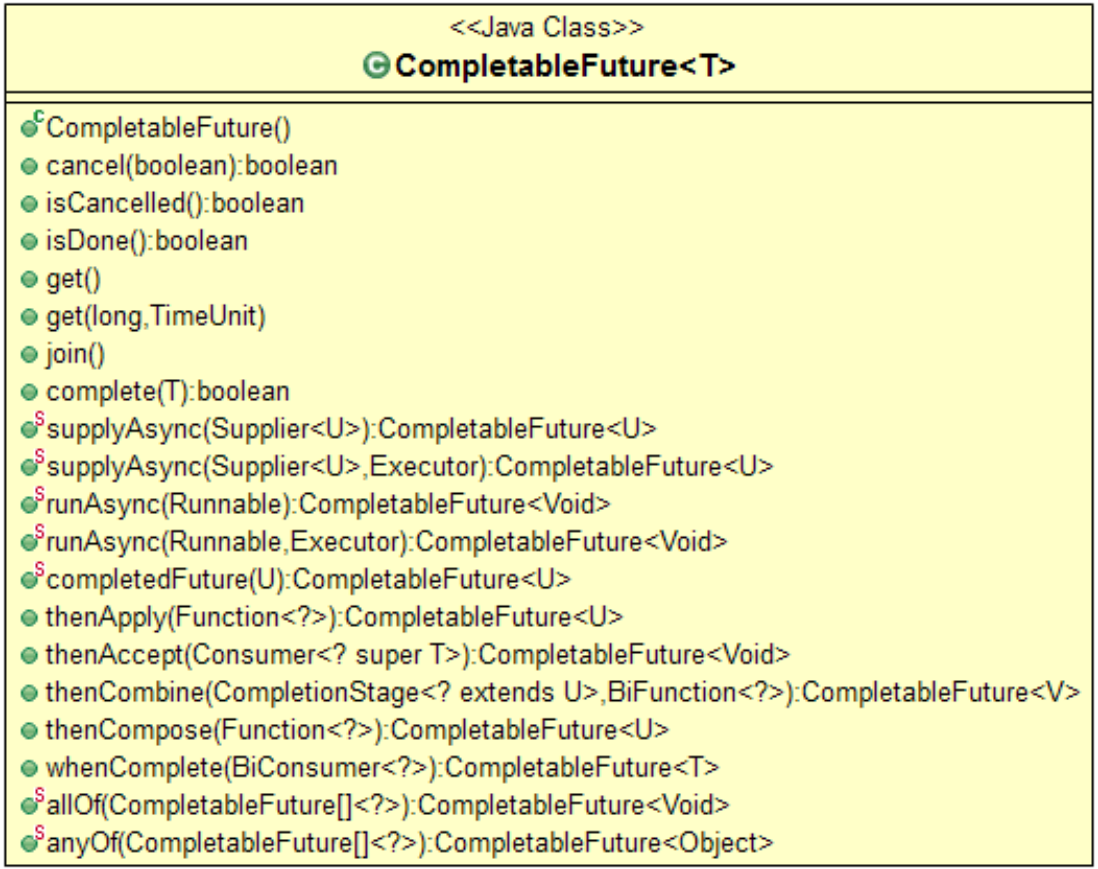
- Recognize how Java completable futures overcome limitations with Java futures
- Understand how methods are grouped in the Java completable future API



Grouping the Java Completable Future API

Grouping the Java Completable Future API

- The entire completable future framework resides in 1 public class with 60+ methods!!!

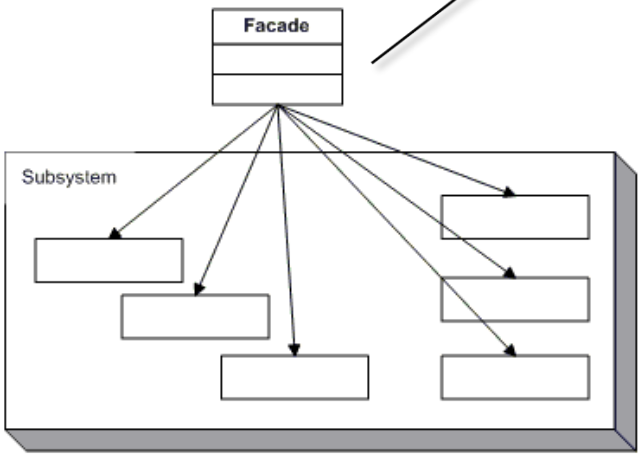


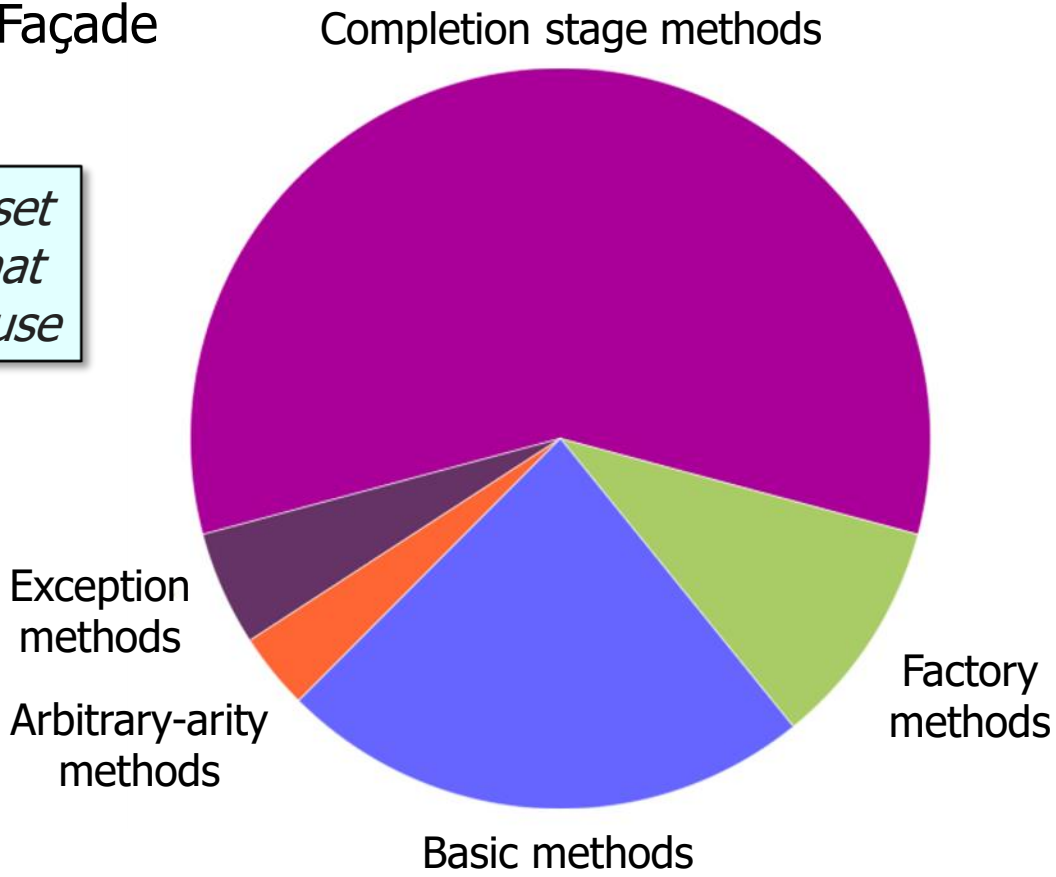
See docs.oracle.com/javase/8/docs/api/java/util/concurrent/CompletableFuture.html

Grouping the Java Completable Future API

- This framework implements the Façade pattern

Provide a unified interface to a set of interfaces in a sub-system that makes the subsystem easier to use

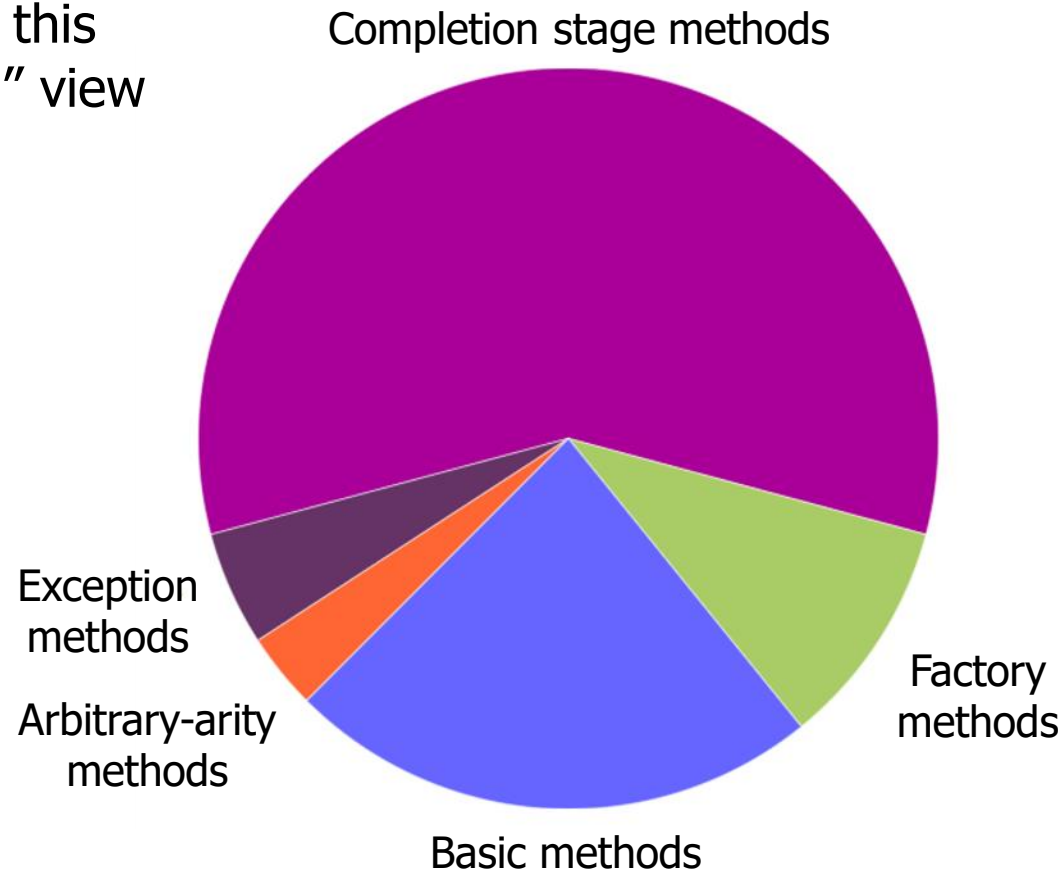




See en.wikipedia.org/wiki/Facade_pattern

Grouping the Java Completable Future API

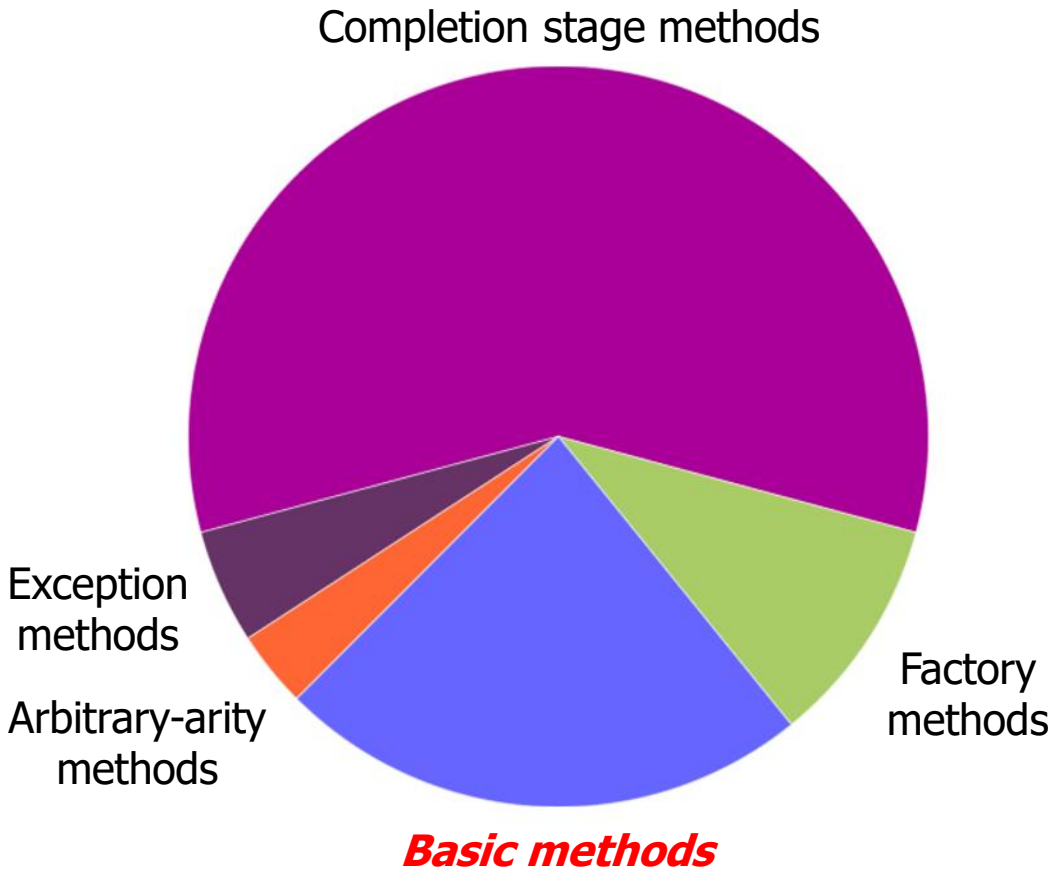
- Given the large # of methods in this API it helps to have a "birds-eye" view



See en.wikipedia.org/wiki/Earthrise

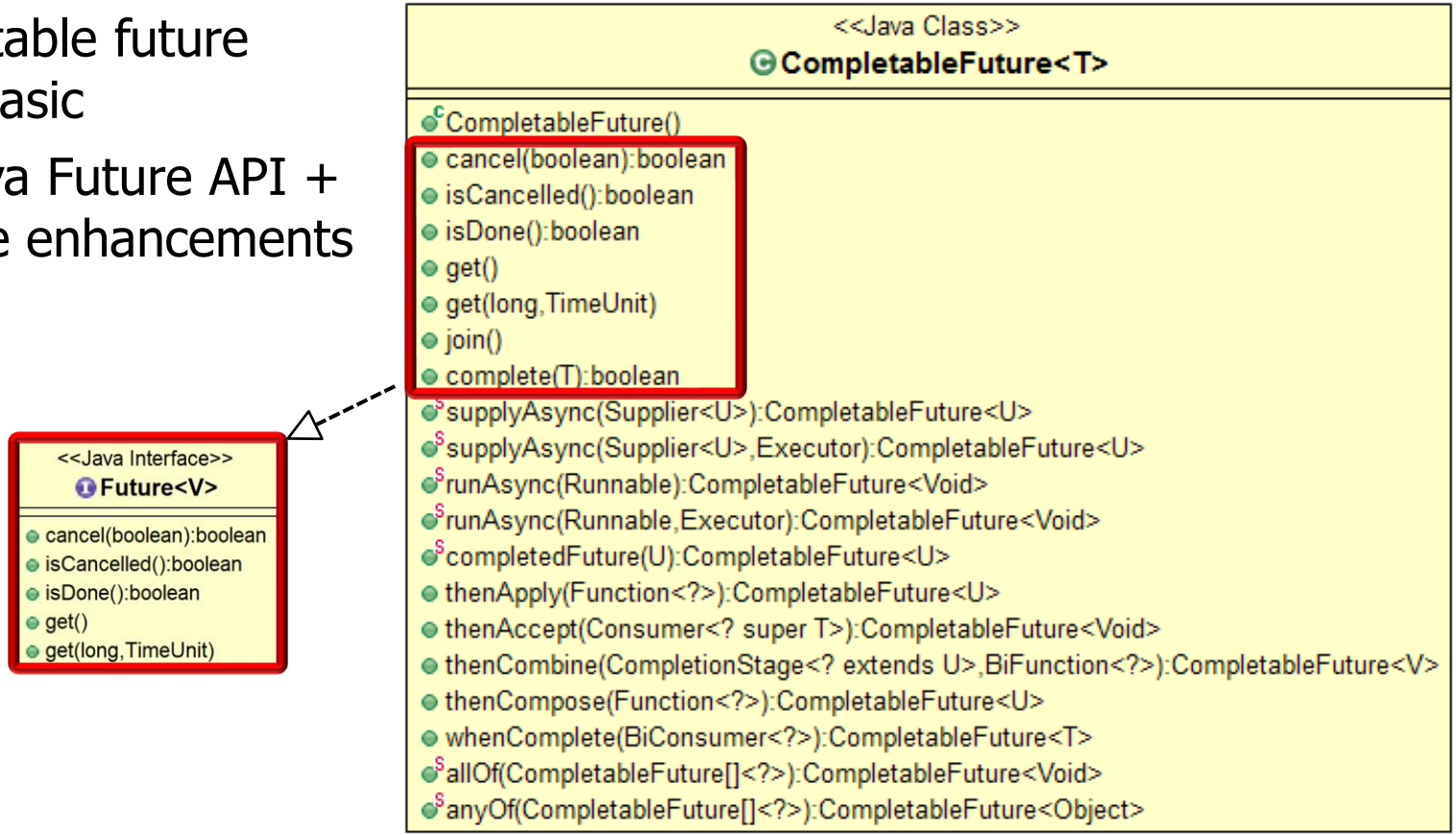
Grouping the Java Completable Future API

- Some completable future features are basic



Grouping the Java Completable Future API

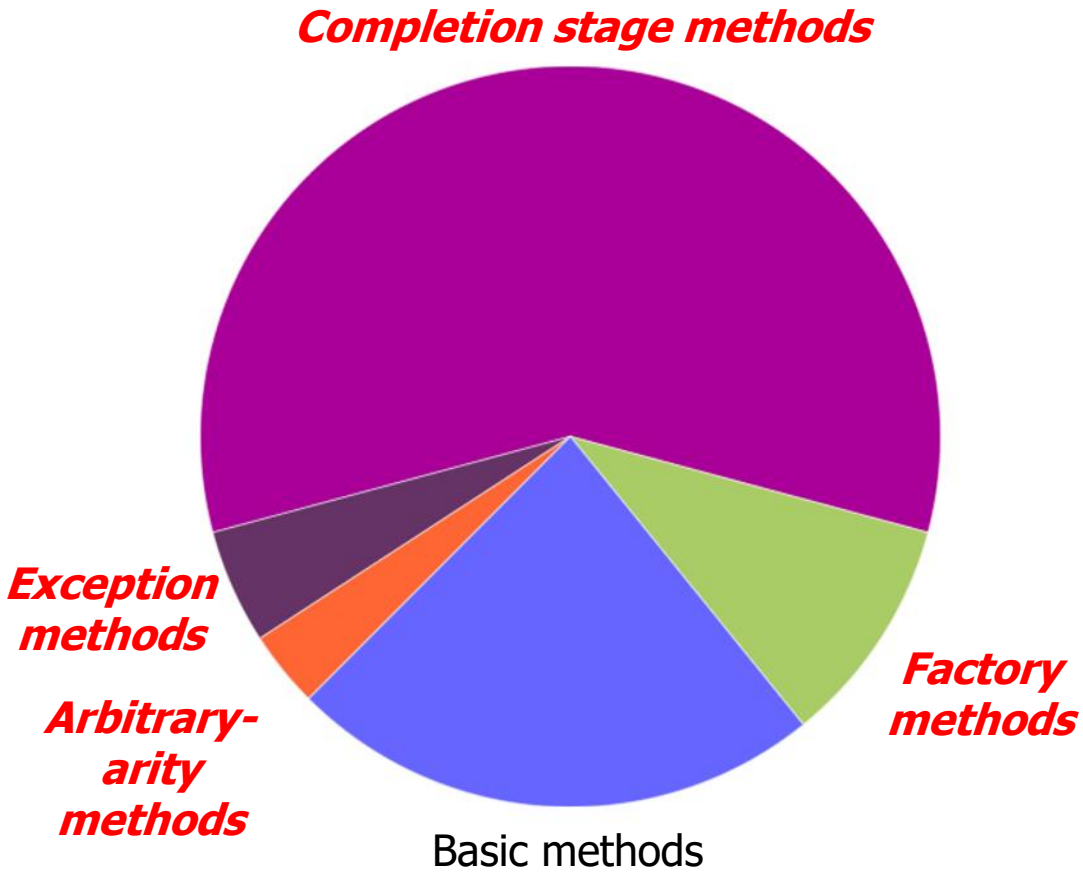
- Some completable future features are basic
  - e.g., the Java Future API + some simple enhancements



Only slightly better than the conventional Future interface

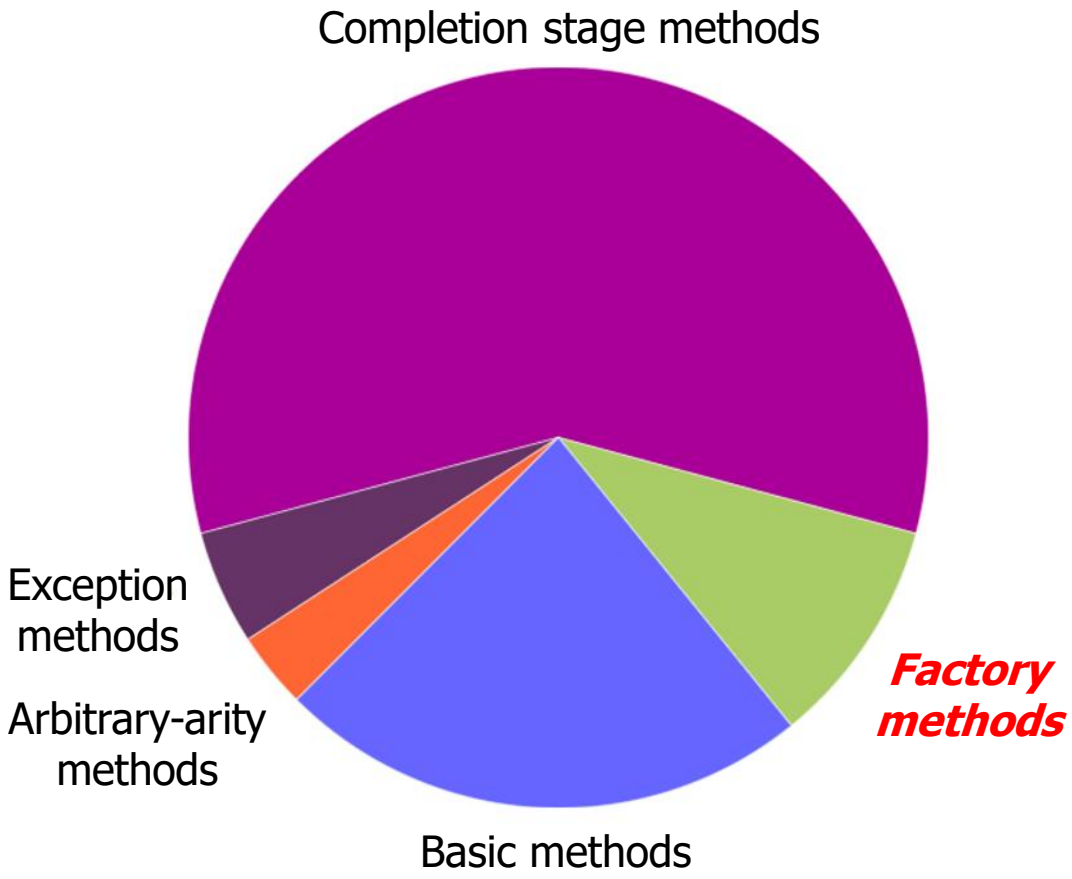
Grouping the Java Completable Future API

- Other completable future features are more advanced



Grouping the Java Completable Future API

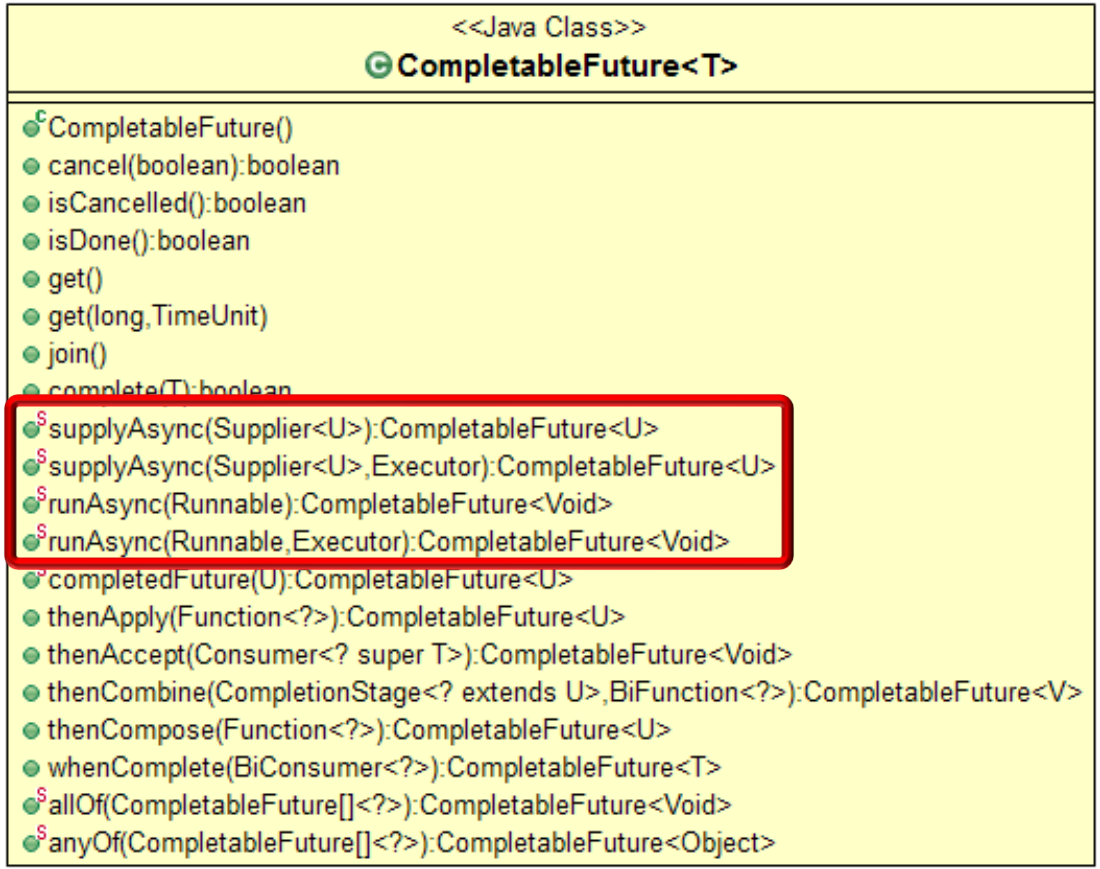
- Other completable future features are more advanced
  - Factory methods



See en.wikipedia.org/wiki/Factory_method_pattern

Grouping the Java Completable Future API

- Other completable future features are more advanced
  - Factory methods
    - Initiate async two-way or one-way computations without using threads explicitly



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<<Java Class>>

CompletableFuture<T>

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Help make programs more *elastic* by leveraging a pool of worker threads

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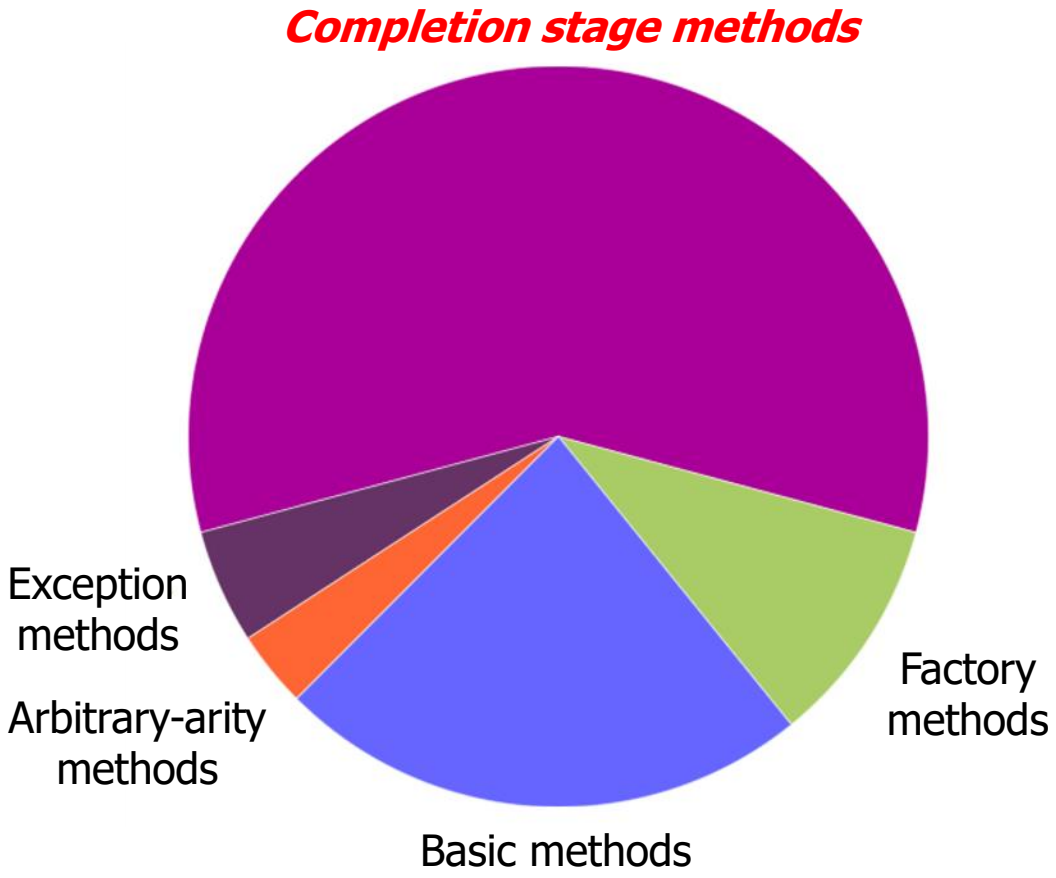
- Other completable future features are more advanced
  - Factory methods
  - Completion stage methods



Grouping the Java Completable Future API

- Other completable future features are more advanced
  - Factory methods
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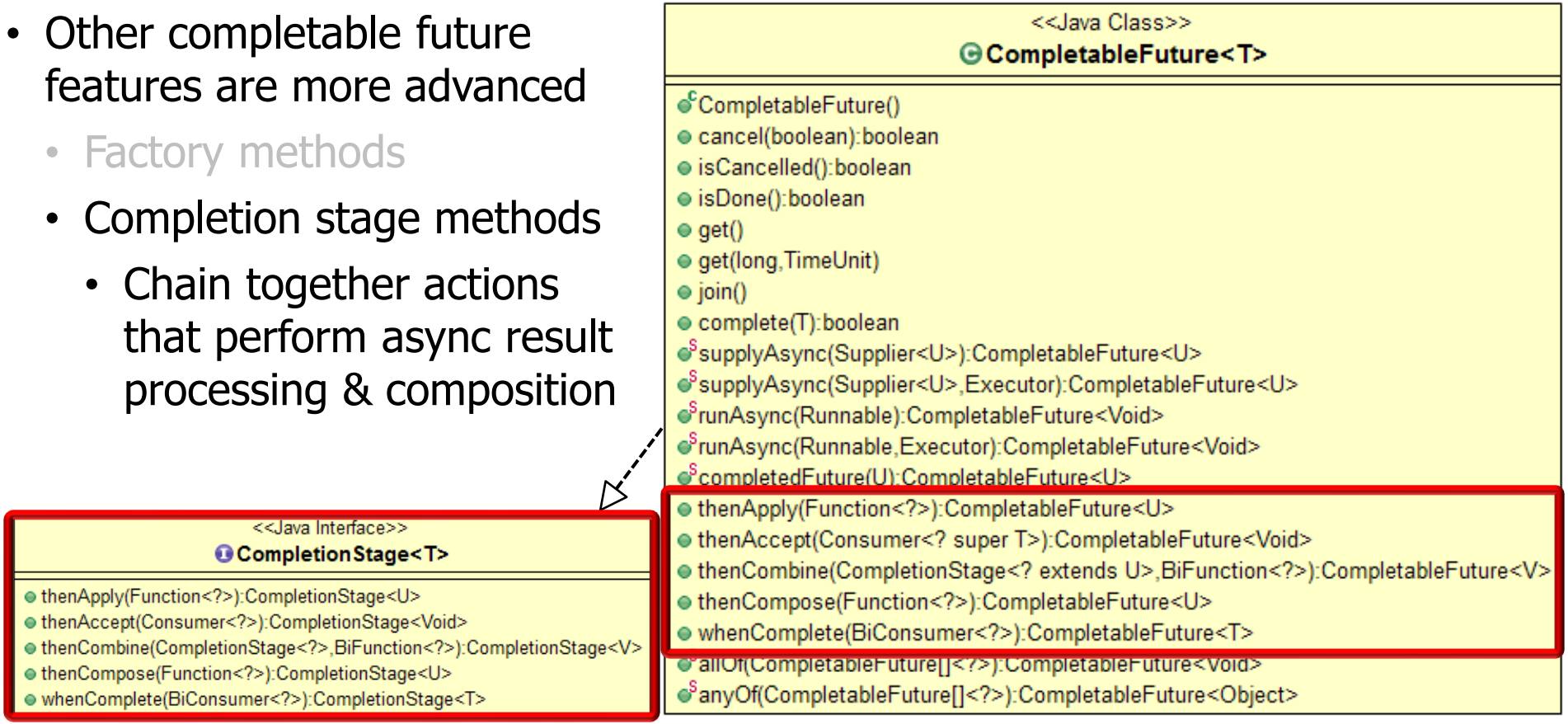
    - Chain together actions that perform async result processing & composition



See docs.oracle.com/javase/8/docs/api/java/util/concurrent/CompletionStage.html

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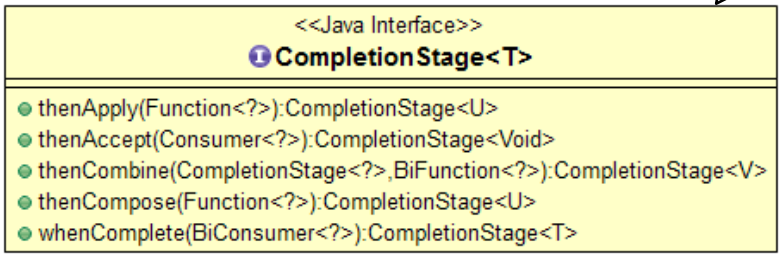
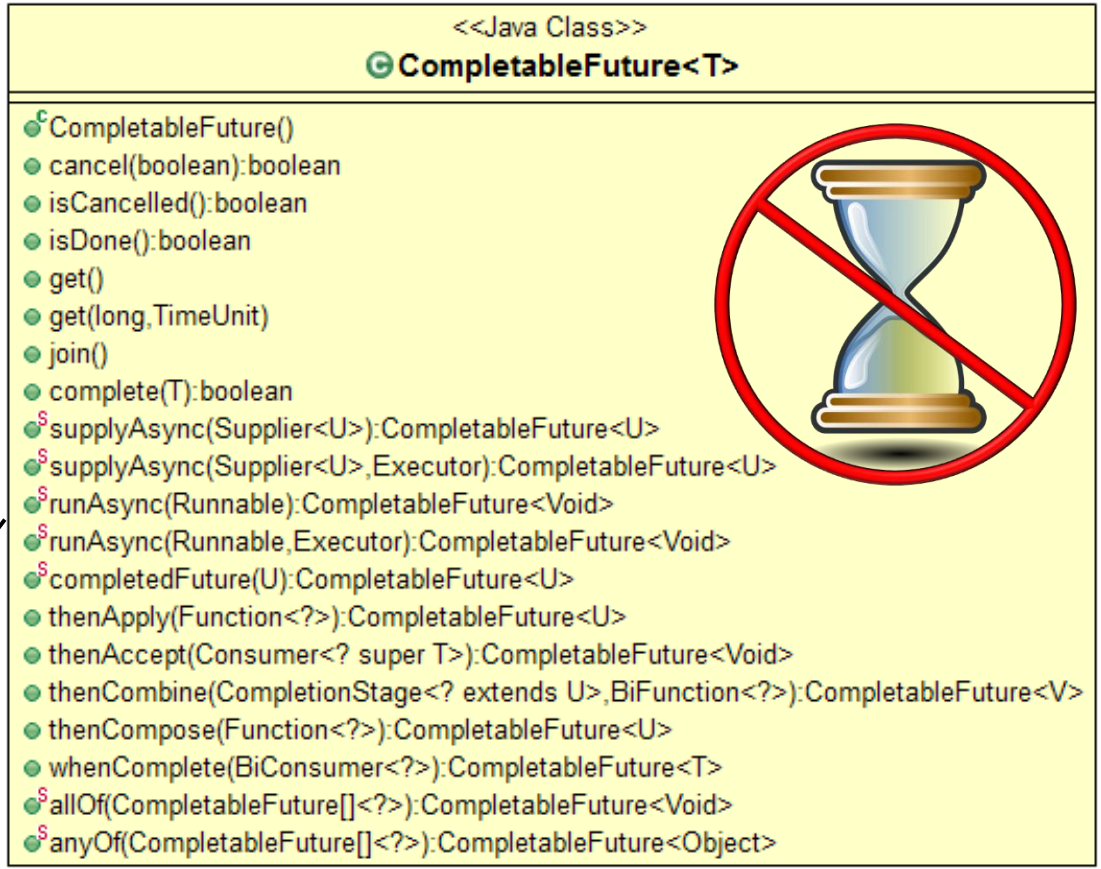
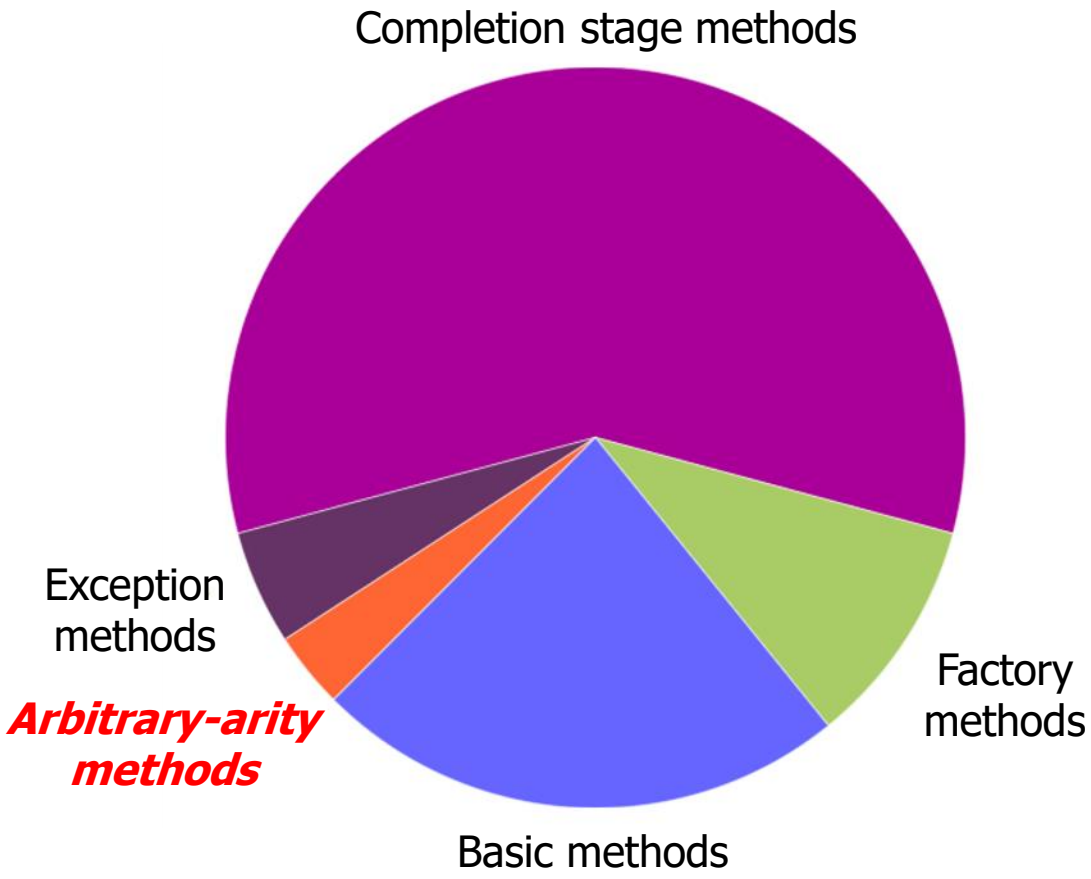




Help make programs more *responsive* by not blocking caller code

Grouping the Java Completable Future API

- Other completable future features are more advanced
  - Factory methods
  - Completion stage methods
  - "Arbitrary-arity" methods



See en.wikipedia.org/wiki/Arity

Grouping the Java Completable Future API

- Other completable future features are more advanced
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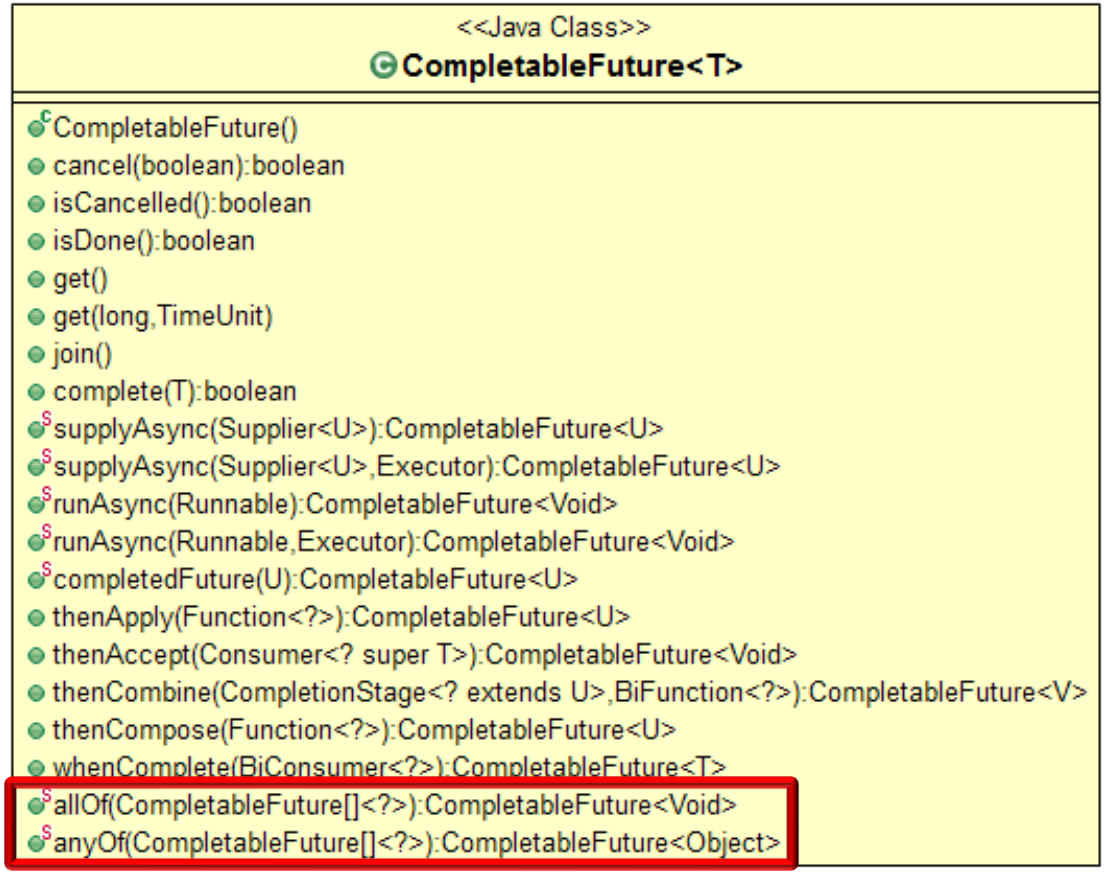
    - Process futures in bulk by combine multiple futures into a single future



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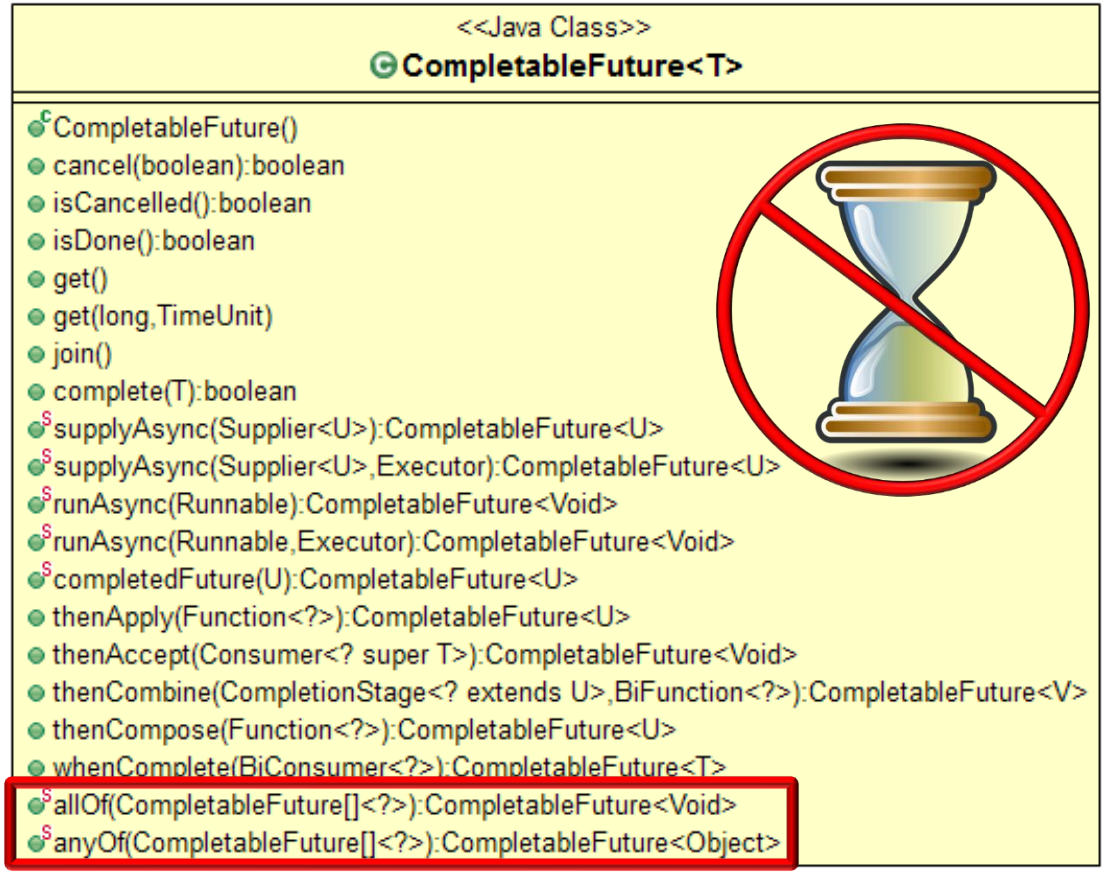

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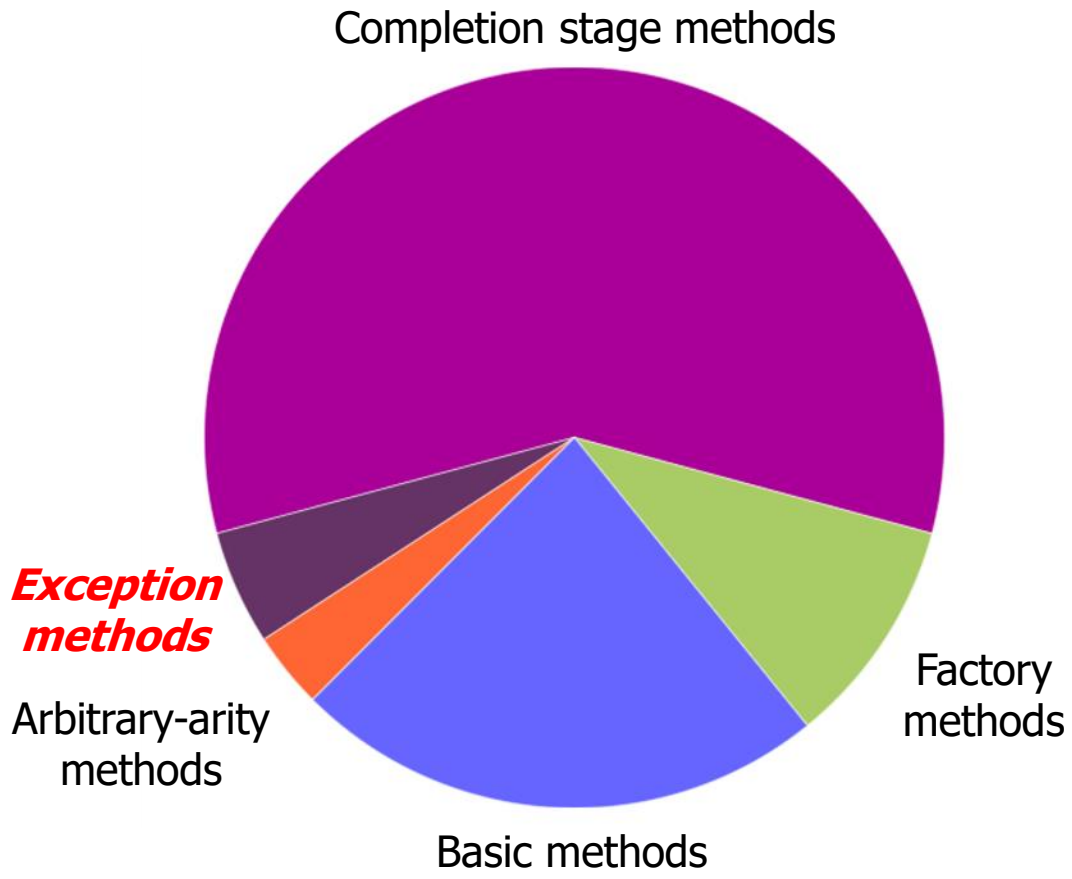

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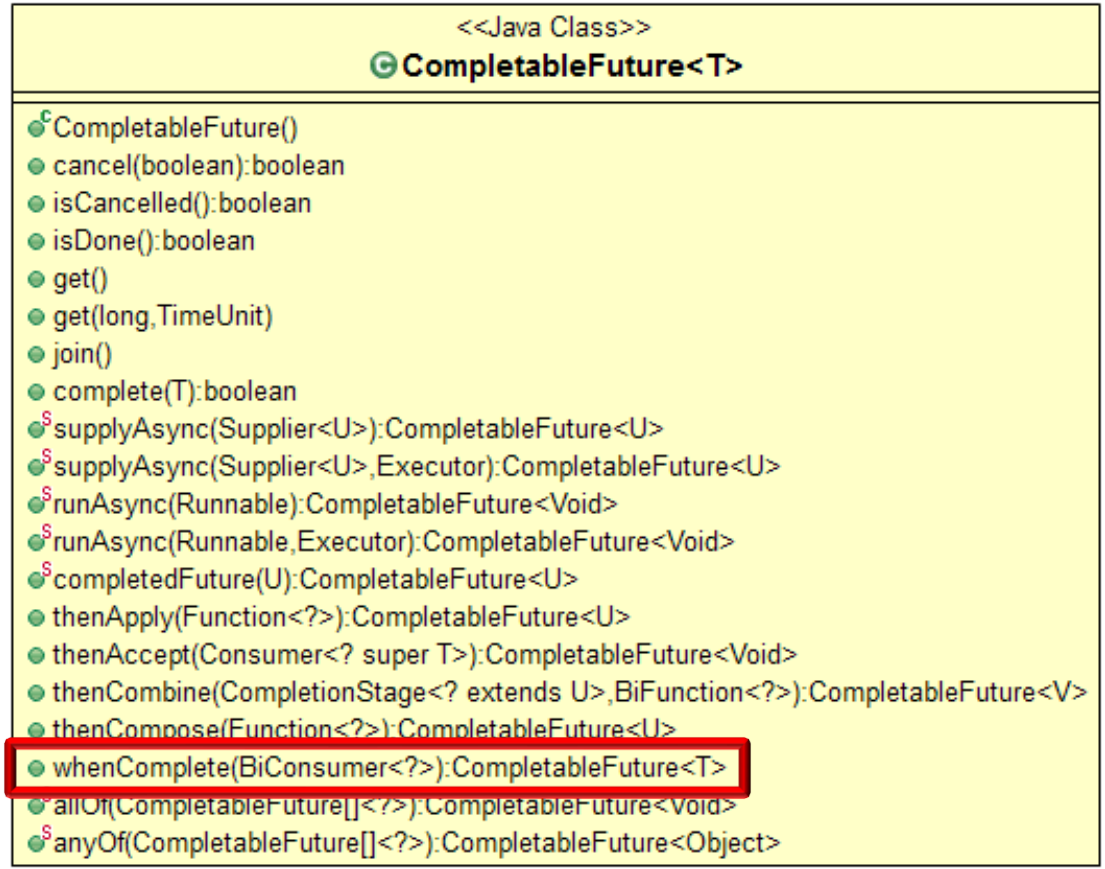
    - Handle exceptional conditions at runtime



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

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- All methods are implemented internally via message-passing that's ultimately connected to Java-based thread pools

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Ensures loose coupling, isolation, & location transparency between components

End of Understanding Method Groupings in the Java Completable Futures API