Advanced Java Completable Future

Features: Arbitrary-Arity Methods

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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
  - Arbitrary-arity methods that process futures in bulk

See docs.oracle.com/javase/8/docs/api/java/util/concurrent/CompletableFuture.html
Arbitrary-Arity Methods
Process Futures in Bulk
### Arbitrary-Arity Methods Process Futures in Bulk

- Arbitrary-arity methods return futures that are triggered after completion of any/all futures

<table>
<thead>
<tr>
<th>Methods</th>
<th>Params</th>
<th>Returns</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>allOf</td>
<td>Varargs</td>
<td>Completable Future&lt;Void&gt;</td>
<td>Return a future that completes when all futures in params complete</td>
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See [en.wikipedia.org/wiki/Arity](en.wikipedia.org/wiki/Arity)
Arbitrary-arity methods return futures that are triggered after completion of any/all futures.

The returned future can be used to wait for any or all of $N$ completable futures in an array to complete.
Arbitrary-Arity Methods Process Futures in Bulk

- Arbitrary-arity methods return futures that are triggered after completion of any/all futures
- The returned future can be used to wait for any or all of \( N \) completable futures in an array to complete
- This “wait” usually doesn’t block, but instead uses completion stage methods

Help make programs more responsive by not blocking caller code
Arbitrary-Arity Methods Process Futures in Bulk

- Arbitrary-arity methods return futures that are triggered after completion of any/all futures
  - The returned future can be used to wait for any or all of \( N \) completable futures in an array to complete
- We focus on `allOf()`, which is like `thenCombine()` on steroids!

See [docs.oracle.com/javase/8/docs/api/java/util/concurrent/CompletableFuture.html#allOf](https://docs.oracle.com/javase/8/docs/api/java/util/concurrent/CompletableFuture.html#allOf)
Arbitrary-Arity Methods Process Futures in Bulk

- These arbitrary-arity methods are hard to program directly

See [en.wikipedia.org/wiki/Gordian_Knot](en.wikipedia.org/wiki/Gordian_Knot)
These arbitrary-arity methods are hard to program directly.

Instead, program them via wrappers.

See next lesson on "Advanced Java CompletableFuture Features: Arbitrary-Arity Methods"
End of Advanced Java

CompletableFuture Features:
Arbitrary-Arity Methods