Advanced Java CompletableFuture Features: Two Stage Completion Methods (Part 2)

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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)

![Completion stage methods diagram](chart)
Methods Triggered by Completion of Two Stages
Methods Triggered by Completion of Either of Two Stages

• Methods triggered by completion of either of two previous stages
  • `acceptEither()`

```java
CompletableFuture<Void> acceptEither
    (CompletionStage<? Extends T> other,
     Consumer<? super T> action)
    { ... }
```

See [docs.oracle.com/javase/8/docs/api/java/util/concurrent/CompletableFuture.html#acceptEither](http://docs.oracle.com/javase/8/docs/api/java/util/concurrent/CompletableFuture.html#acceptEither)
Methods Triggered by Completion of Either of Two Stages

- Methods triggered by completion of either of two previous stages
  - `acceptEither()`
    - Applies a consumer action that handles either of the previous stages' results

```java
completableFuture< Void> acceptEither
  (CompletionStage<? Extends T> other,
   Consumer<? super T> action)
{ ... }
```

See en.wikipedia.org/wiki/Logical_disjunction
Methods Triggered by Completion of Either of Two Stages

- Methods triggered by completion of either of two previous stages
  - `acceptEither()`
    - Applies a consumer action that handles either of the previous stages' results
  - Two futures are used here:
    - The future used to invoke `acceptEither()`
    - The `other` future passed to `acceptEither()`

See [en.wikipedia.org/wiki/Logical_disjunction](en.wikipedia.org/wiki/Logical_disjunction)
Methods Triggered by Completion of Either of Two Stages

- Methods triggered by completion of either of two previous stages
  - `acceptEither()`
    - Applies a consumer action that handles either of the previous stages' results
  - Returns a future to Void

```java
CompletableFuture<Void> acceptEither(
    CompletionStage<? Extends T> other,
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{ ... }
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Methods Triggered by Completion of Either of Two Stages

- Methods triggered by completion of either of two previous stages
  - `acceptEither()`
    - Applies a consumer action that handles either of the previous stages' results
    - Returns a future to Void
    - Often used at the end of a chain of completion stages

Create two completable futures that will contain the results of sorting the list using two different algorithms in two different threads.

```java
CompletableFuture<List<BigFraction>> quickSortF = CompletableFuture.supplyAsync(() -> quickSort(list));
CompletableFuture<List<BigFraction>> mergeSortF = CompletableFuture.supplyAsync(() -> mergeSort(list));
```
Methods Triggered by Completion of Either of Two Stages

- Methods triggered by completion of either of two previous stages
- `acceptEither()`
  - Applies a consumer action that handles either of the previous stages' results
  - Returns a future to Void
  - Often used at the end of a chain of completion stages

```java
CompletableFuture<List<BigFraction>> quickSortF = CompletableFuture.supplyAsync(() ->
  quickSort(list));

CompletableFuture<List<BigFraction>> mergeSortF = CompletableFuture.supplyAsync(() ->
  mergeSort(list));

quickSortF.acceptEither(mergeSortF, results -> results.forEach(fraction ->
  System.out.println(fraction.toMixedString())));
```

This method is invoked when either `quickSortF` or `mergeSortF` complete

`acceptEither()` does not cancel the second future after the first one completes
Methods Triggered by Completion of Either of Two Stages

- Methods triggered by completion of either of two previous stages
  - acceptEither()
    - Applies a consumer action that handles either of the previous stages' results
    - Returns a future to Void
    - Often used at the end of a chain of completion stages

```java
CompletableFuture<List<BigFraction>> quickSortF = CompletableFuture.supplyAsync(() ->
    quickSort(list));

CompletableFuture<List<BigFraction>> mergeSortF = CompletableFuture.supplyAsync(() ->
    mergeSort(list));

quickSortF.acceptEither(mergeSortF, results -> results.forEach(fraction ->
    System.out.println(fraction.toMixedString())));
```
End of Advanced Java CompletableFuture Features: Two Stage Completion Methods (Part 2)