The Java Streams collect() Terminal Operation (Part 1)

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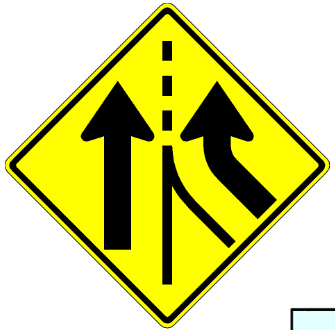
Learning Objectives in this Part of the Lesson

- Understand common terminal operations, e.g.
  - forEach()
  - collect()
    - Know what a collector does in the context of collect()

```
void runCollect*() {
  List<String> characters =
    List.of("horatio",
            "laertes",
            "Hamlet", ...);
  ...<String> results =
    characters
      .stream()
      .filter(s ->
        toLowerCase(…) =='h')
      .map(this::capitalize)
      .sorted()
      .collect(...); ...
```



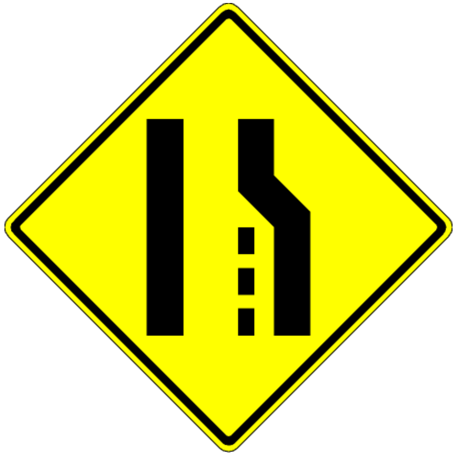
We showcase collect() using the Hamlet program

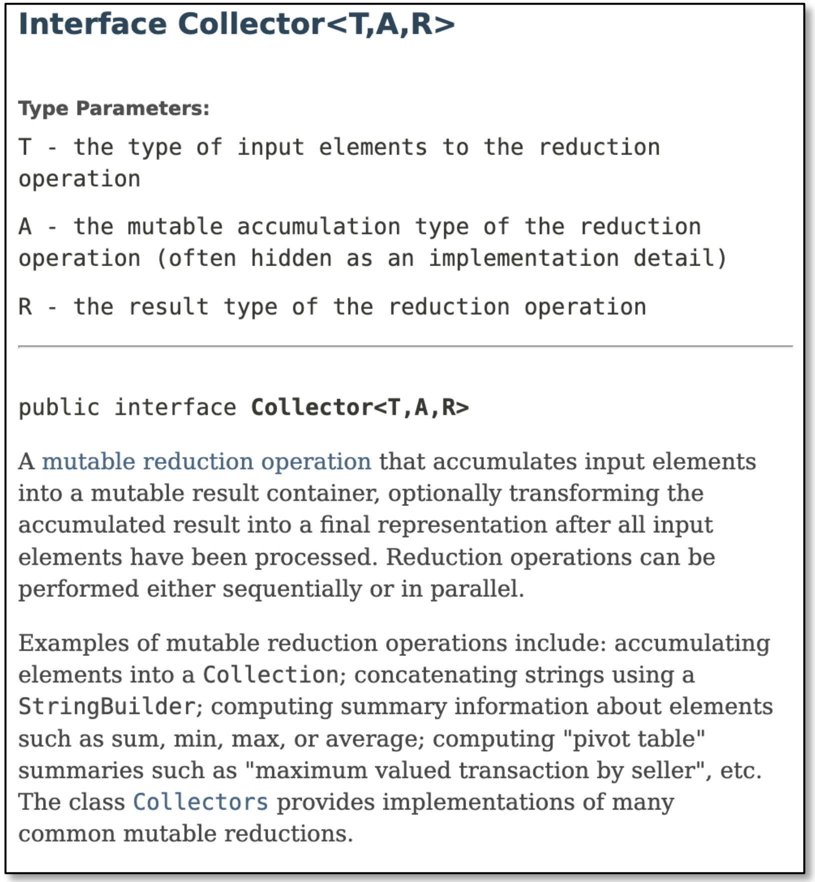
See github.com/douglascraigschmidt/LiveLessons/tree/master/Java8/ex12

A Stream Terminal Operation That Returns Collections

A Stream Terminal Operation That Returns Collections

- A collector performs reduction operations





Interface Collector<T,A,R>

Type Parameters:

`T` - the type of input elements to the reduction operation

`A` - the mutable accumulation type of the reduction operation (often hidden as an implementation detail)

`R` - the result type of the reduction operation

```
public interface Collector<T,A,R>
```

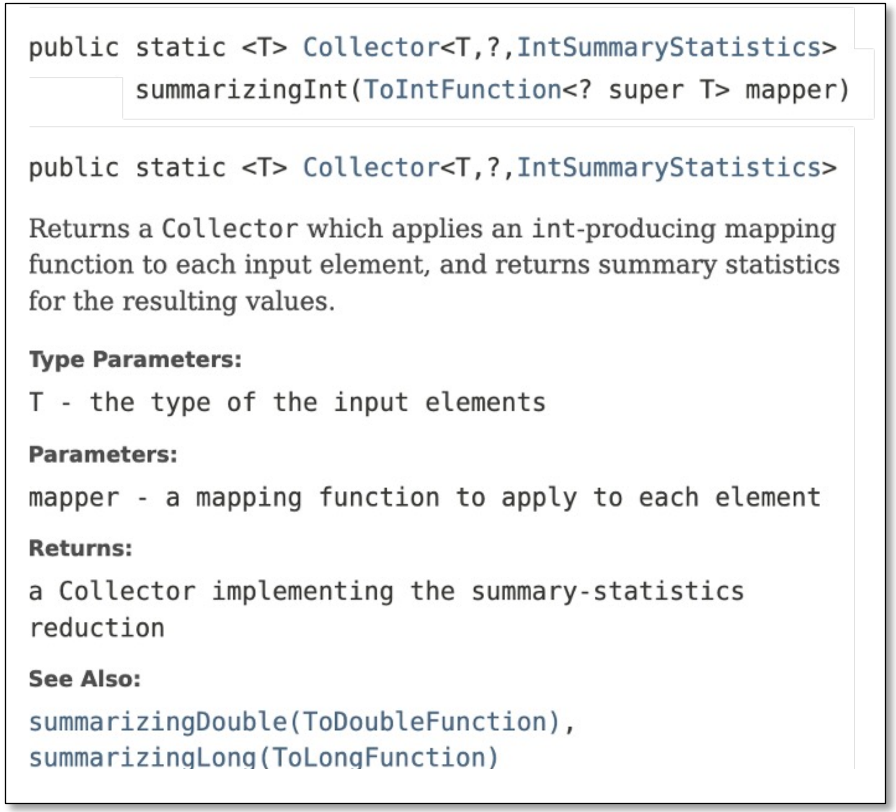
A mutable reduction operation that accumulates input elements into a mutable result container, optionally transforming the accumulated result into a final representation after all input elements have been processed. Reduction operations can be performed either sequentially or in parallel.

Examples of mutable reduction operations include: accumulating elements into a `Collection`; concatenating strings using a `StringBuilder`; computing summary information about elements such as sum, min, max, or average; computing "pivot table" summaries such as "maximum valued transaction by seller", etc. The class `Collectors` provides implementations of many common mutable reductions.

See docs.oracle.com/javase/8/docs/api/java/util/stream/Collector.html

A Stream Terminal Operation That Returns Collections

- A collector performs reduction operations, e.g.
  - Summarizing elements according to various criteria
    - e.g., average, max, min, & sum



```
public static <T> Collector<T,?,IntSummaryStatistics>
        summarizingInt(ToIntFunction<? super T> mapper)
```

```
public static <T> Collector<T,?,IntSummaryStatistics>
```

Returns a `Collector` which applies an `int`-producing mapping function to each input element, and returns summary statistics for the resulting values.

Type Parameters:

`T` - the type of the input elements

Parameters:

`mapper` - a mapping function to apply to each element

Returns:

a `Collector` implementing the summary-statistics reduction

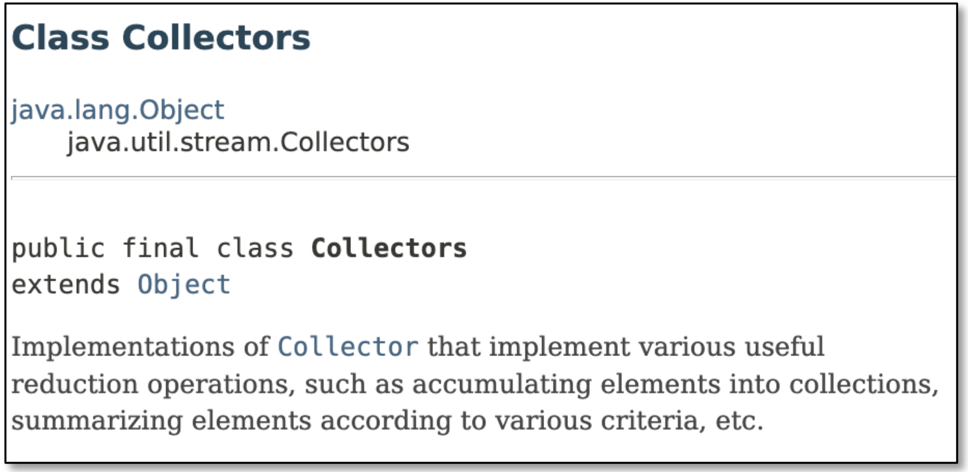
See Also:

`summarizingDouble(ToDoubleFunction)`, `summarizingLong(ToLongFunction)`

See docs.oracle.com/javase/8/docs/api/java/util/stream/Collectors.html#summarizingInt

A Stream Terminal Operation That Returns Collections

- A collector performs reduction operations, e.g.
  - Summarizing elements according to various criteria
  - Accumulating elements into various collections or single objects, etc.

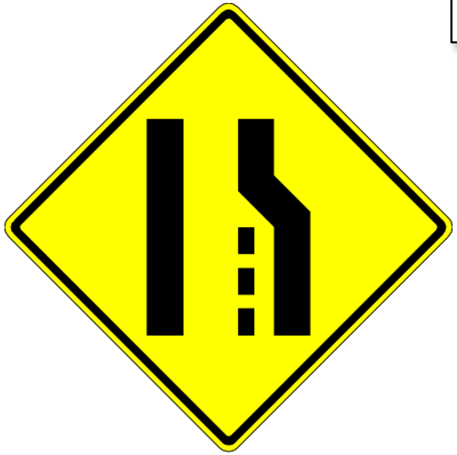


Class Collectors

java.lang.Object
    java.util.stream.Collectors

```
public final class Collectors
extends Object
```

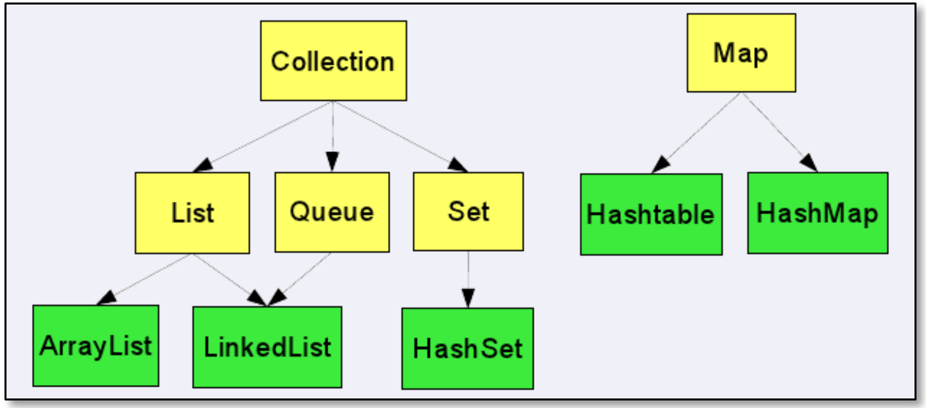
Implementations of Collector that implement various useful reduction operations, such as accumulating elements into collections, summarizing elements according to various criteria, etc.



See docs.oracle.com/javase/8/docs/api/java/util/stream/Collectors.html

A Stream Terminal Operation That Returns Collections

- The collect() terminal operation typically returns a collection



See www.concretepage.com/java/jdk-8/java-8-stream-collect-example

A Stream Terminal Operation That Returns Collections

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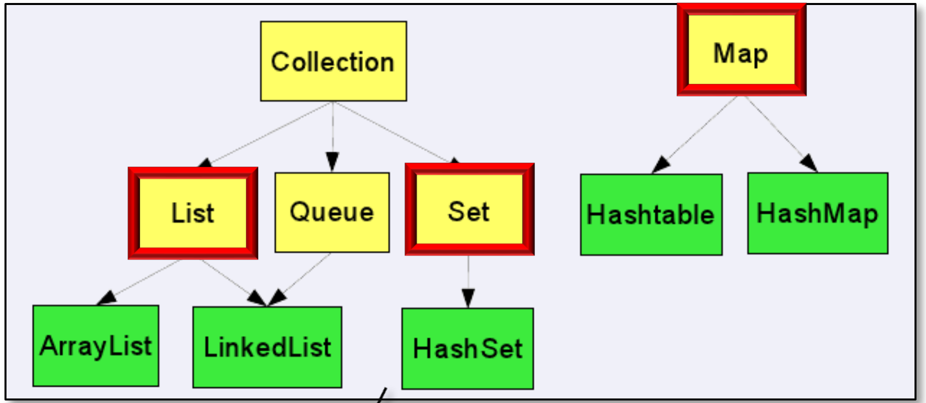

We focus on the most common pre-defined collectors in this lesson

See docs.oracle.com/javase/8/docs/api/java/util/stream/Collectors.html

A Stream Terminal Operation That Returns Collections

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void runCollect*() {
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      .sorted()
      .collect(...); ...
```

This example demonstrates many variants of Collectors.

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```

Create & process a stream consisting of characters from the play "Hamlet".

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```

collect() performs a mutable reduction on all stream elements using some collector & returns a single collection.

See docs.oracle.com/javase/8/docs/api/java/util/stream/Stream.html#collect

End of the Java Streams collect() Terminal Operation (Part 1)