

# The Java Streams collect() Terminal Operation (Part 3)

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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
    - Recognize common Java pre-defined collectors & know how to use them in conjunction with `collect()`
    - Be aware of how to use the Teeing Collector

```
void runCollect* () {  
    Stream  
        .of (getStartPage (pageUri))  
        .collect (teeing  
            (mapping  
                (this::getCountOfImagesInPage,  
                 summingLong (Long::longValue)) ,  
            mapping (page ->  
                crawlLinksInPage (page,  
                                     depth) ,  
                 summingLong (Long::longValue)) ,  
            Long::sum) ) ;  
    ...  
}
```

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    - Know what a collector does
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    - Be aware of how to use the Teeing Collector
      - Added in Java 12

```
void runCollect*() {  
    Stream  
        .of(getStartPage(pageUri))  
        .collect(teeing  
            (mapping  
                (this::getCountOfImagesInPage,  
                 summingLong(Long::longValue)),  
            mapping(page ->  
                crawlLinksInPage(page,  
                                   depth),  
                 summingLong(Long::longValue)),  
            Long::sum));  
    ...  
}
```

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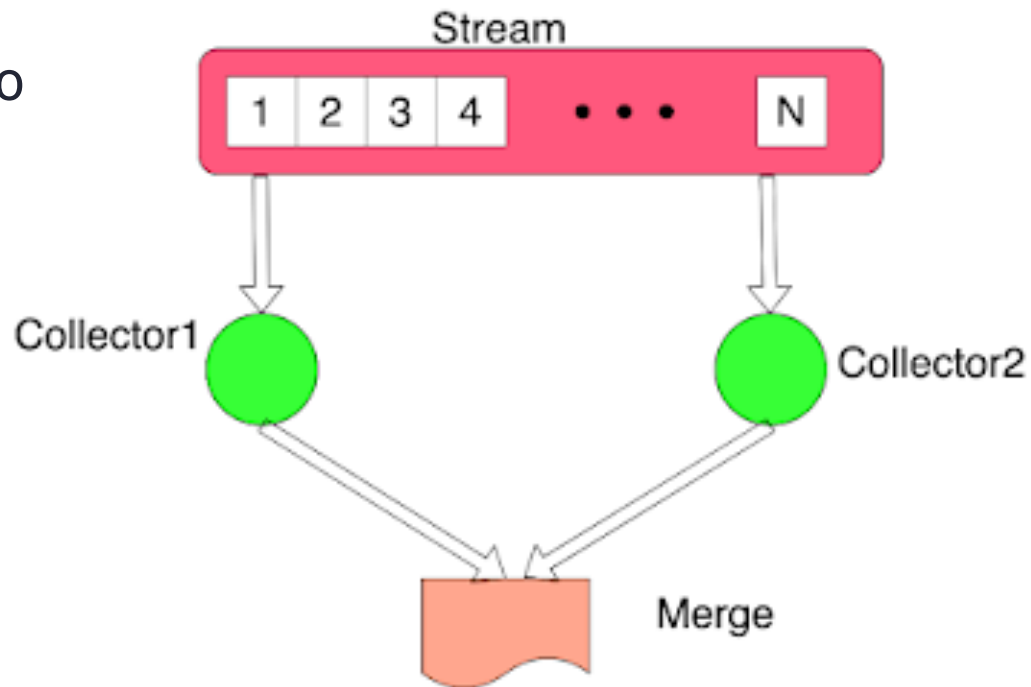
See [dzone.com/articles/java-12-the-teeing-collector](https://dzone.com/articles/java-12-the-teeing-collector)

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# Overview of the Teeing Collector

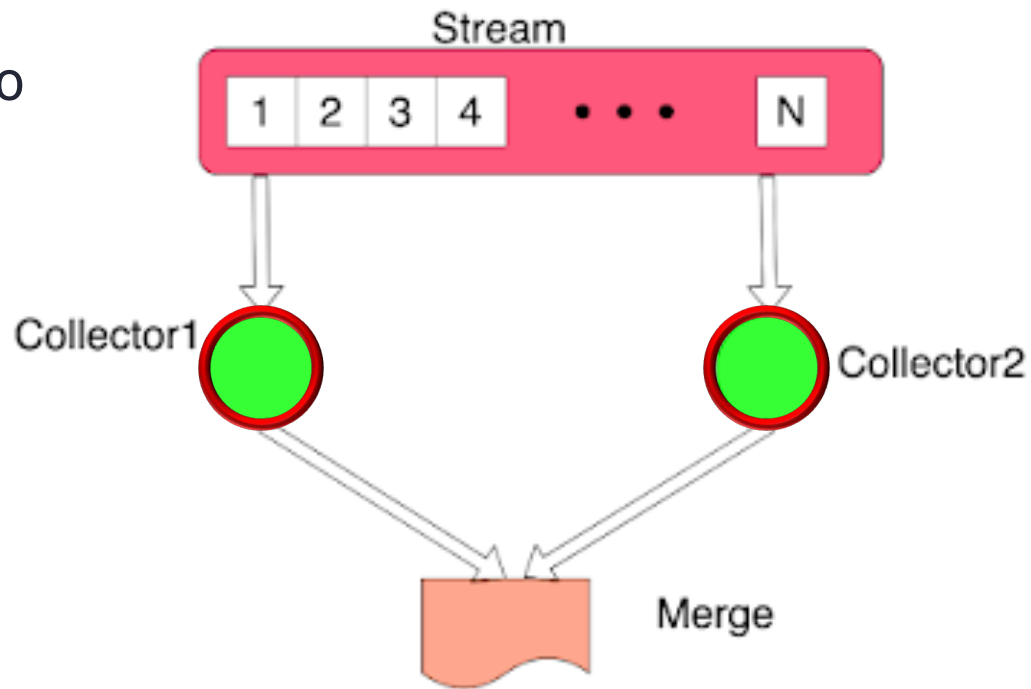
# Overview of the Teeing Collector

- The Teeing Collector returns a Collector that is a composite of two downstream collectors



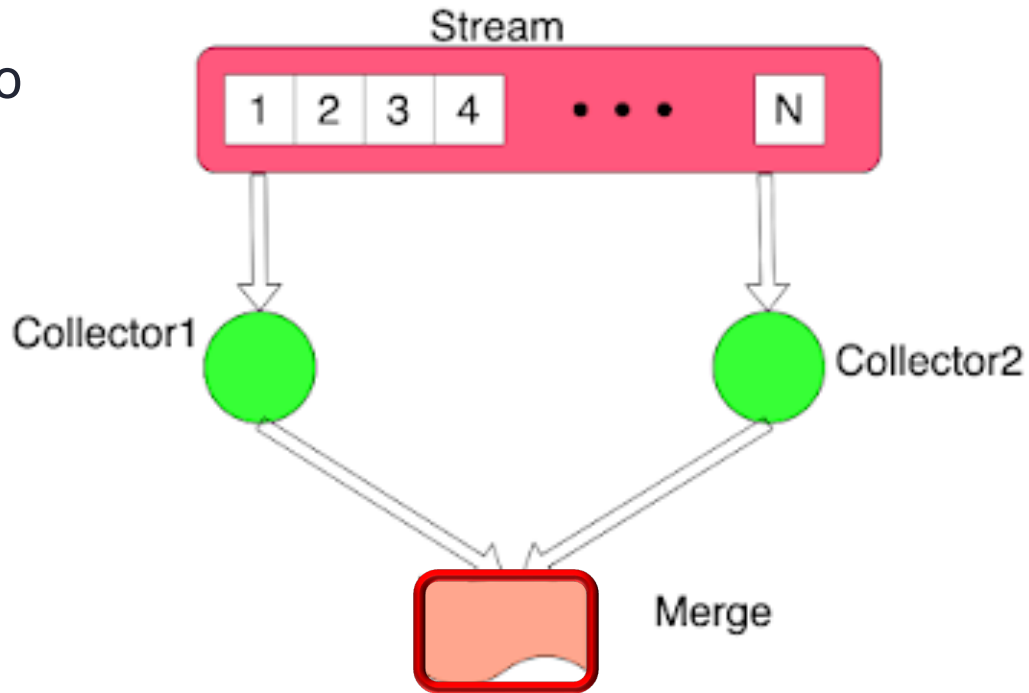
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  - Every element passed to the resulting collector is processed by both downstream collectors



# Overview of the Teeing Collector

- The Teeing Collector returns a Collector that is a composite of two downstream collectors
  - Every element passed to the resulting collector is processed by both downstream collectors
- Their results are then merged using the specified merge function into the final result



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# Applying the Teeing Collector

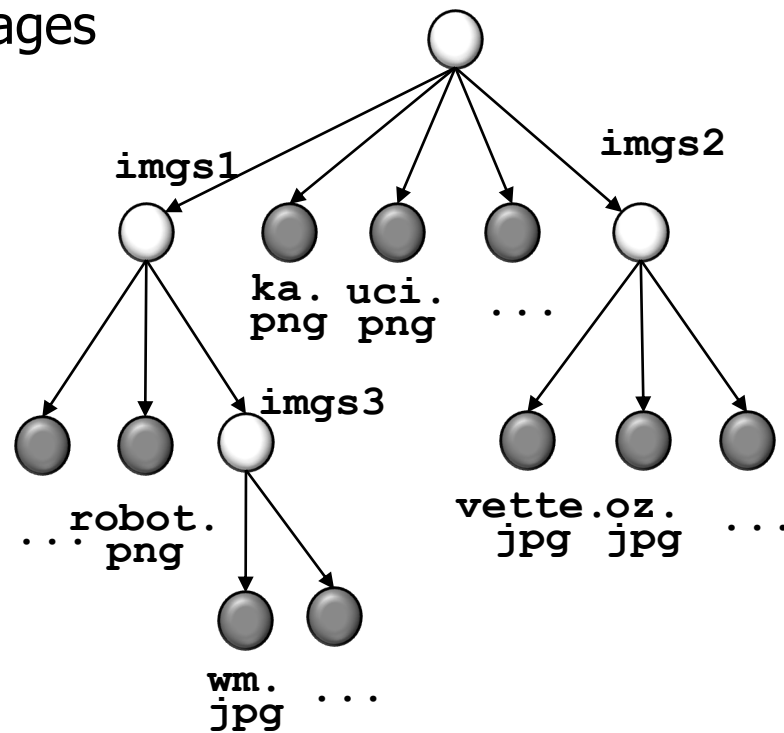


# Overview of the Teeing Collector

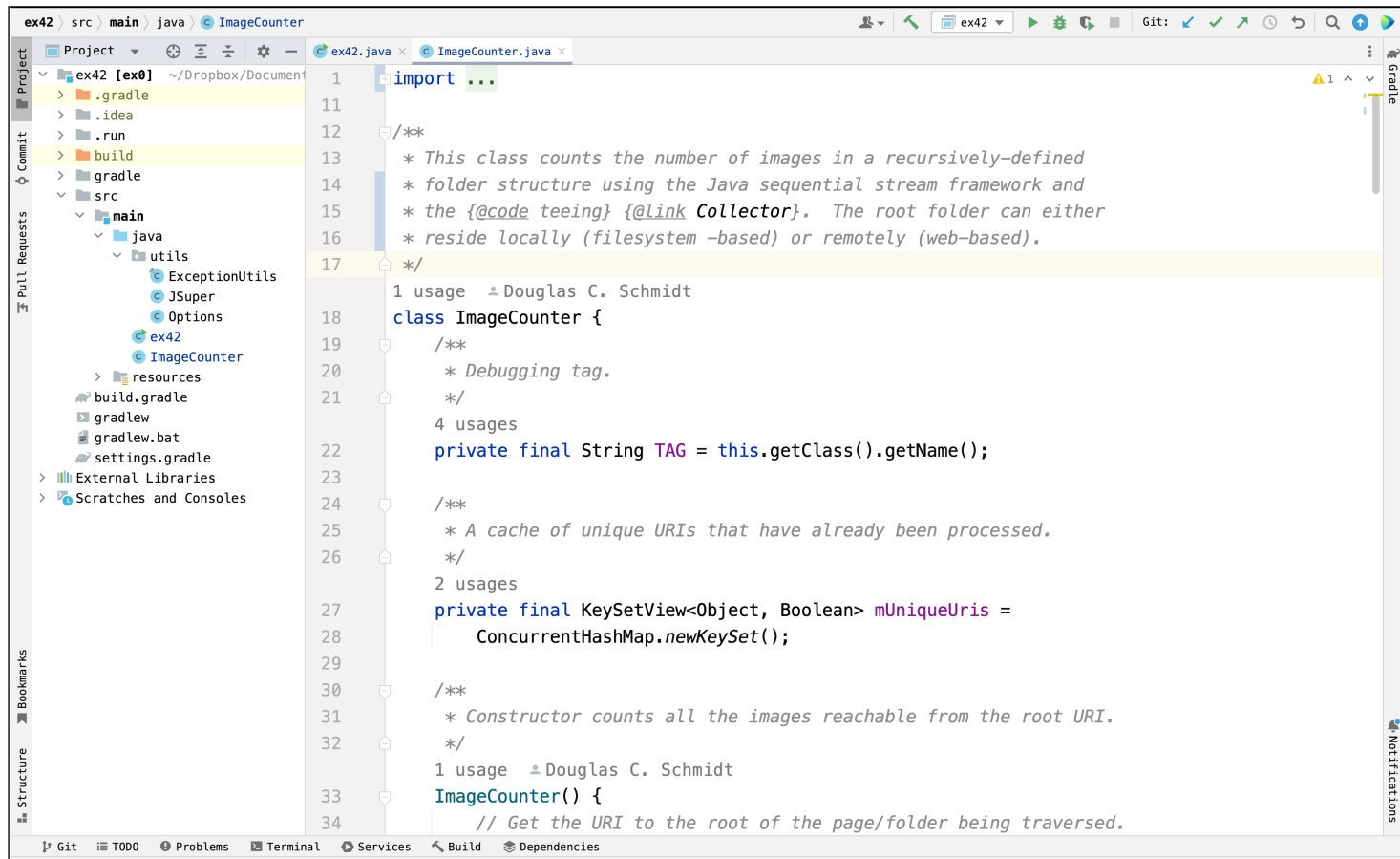
- We'll showcase the Teeing Collector via a program that crawls pages containing images in a recursively defined folder structure



*This program also showcases the Java sequential streams framework*



# Applying the Teeing Collector



```
1  import ...
11
12  /**
13   * This class counts the number of images in a recursively-defined
14   * folder structure using the Java sequential stream framework and
15   * the {@code teeing} {@link Collector}. The root folder can either
16   * reside locally (filesystem -based) or remotely (web-based).
17  */
18  1 usage  ⚙ Douglas C. Schmidt
19  class ImageCounter {
20      /**
21       * Debugging tag.
22       */
23       4 usages
24       private final String TAG = this.getClass().getName();
25
26       /**
27        * A cache of unique URIs that have already been processed.
28        */
29       2 usages
30       private final KeySetView<Object, Boolean> mUniqueUris =
31           ConcurrentHashMap.newKeySet();
32
33       /**
34        * Constructor counts all the images reachable from the root URI.
35        */
36       1 usage  ⚙ Douglas C. Schmidt
37       ImageCounter() {
38           // Get the URI to the root of the page/folder being traversed.
```

See [github.com/douglasraigschmidt/LiveLessons/tree/master/Java8/ex42](https://github.com/douglasraigschmidt/LiveLessons/tree/master/Java8/ex42)

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# End of the Java Streams collect() Terminal Operation (Part 3)