Java Parallel Stream Internals: Demo'ing Collector Performance

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Learning Objectives in this Part of the Lesson

- Understand parallel stream internals, e.g.
  - Know what can change & what can't
  - Partition a data source into "chunks"
  - Process chunks in parallel via the common fork-join pool
  - Configure the Java parallel stream common fork-join pool
  - Perform a reduction to combine partial results into a single result
- Recognize key differences between non-concurrent & concurrent collectors
- Learn how to implement non-concurrent & concurrent collectors
- Be aware of performance variance in concurrent & non-concurrent collectors

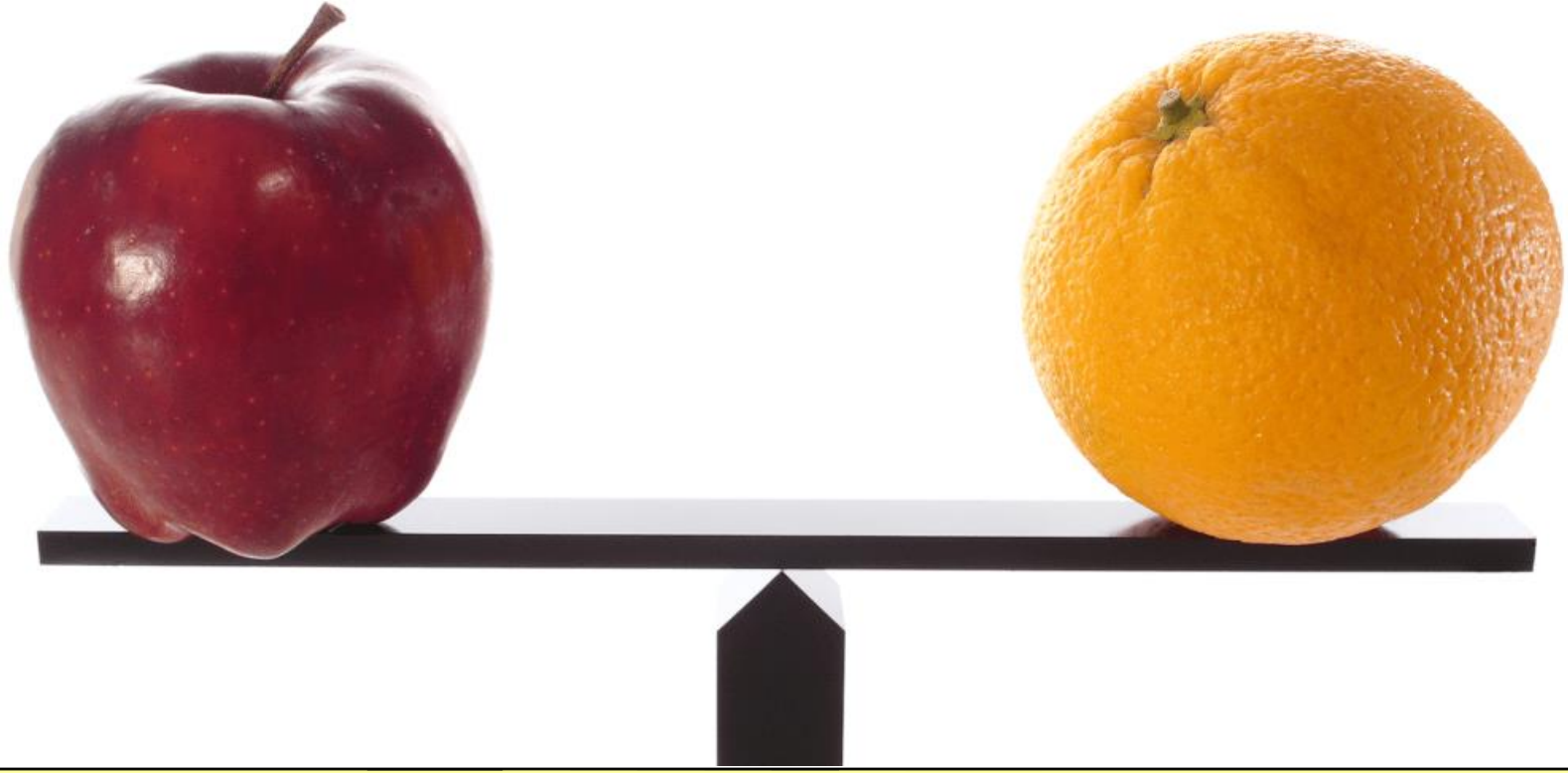
```
Starting collector tests for 1000 words..printing results
    21 msecs: sequential timeStreamCollectToSet()
    30 msecs: parallel timeStreamCollectToSet()
    39 msecs: sequential timeStreamCollectToConcurrentSet()
    59 msecs: parallel timeStreamCollectToConcurrentSet()
Starting collector tests for 10000 words..printing results
    69 msecs: sequential timeStreamCollectToSet()
    70 msecs: parallel timeStreamCollectToSet()
   114 msecs: parallel timeStreamCollectToConcurrentSet()
   120 msecs: sequential timeStreamCollectToConcurrentSet()
Starting collector tests for 100000 words..printing results
   219 msecs: parallel timeStreamCollectToConcurrentSet()
   364 msecs: parallel timeStreamCollectToSet()
   657 msecs: sequential timeStreamCollectToSet()
   804 msecs: sequential timeStreamCollectToConcurrentSet()
Starting collector tests for 883311 words..printing results
  1782 msecs: parallel timeStreamCollectToConcurrentSet()
  3010 msecs: parallel timeStreamCollectToSet()
  6169 msecs: sequential timeStreamCollectToSet()
  7652 msecs: sequential timeStreamCollectToConcurrentSet()
```

See github.com/douglascraigschmidt/LiveLessons/tree/master/Java8/ex14

Demonstrating Collector Performance

Demonstrating Collector Performance

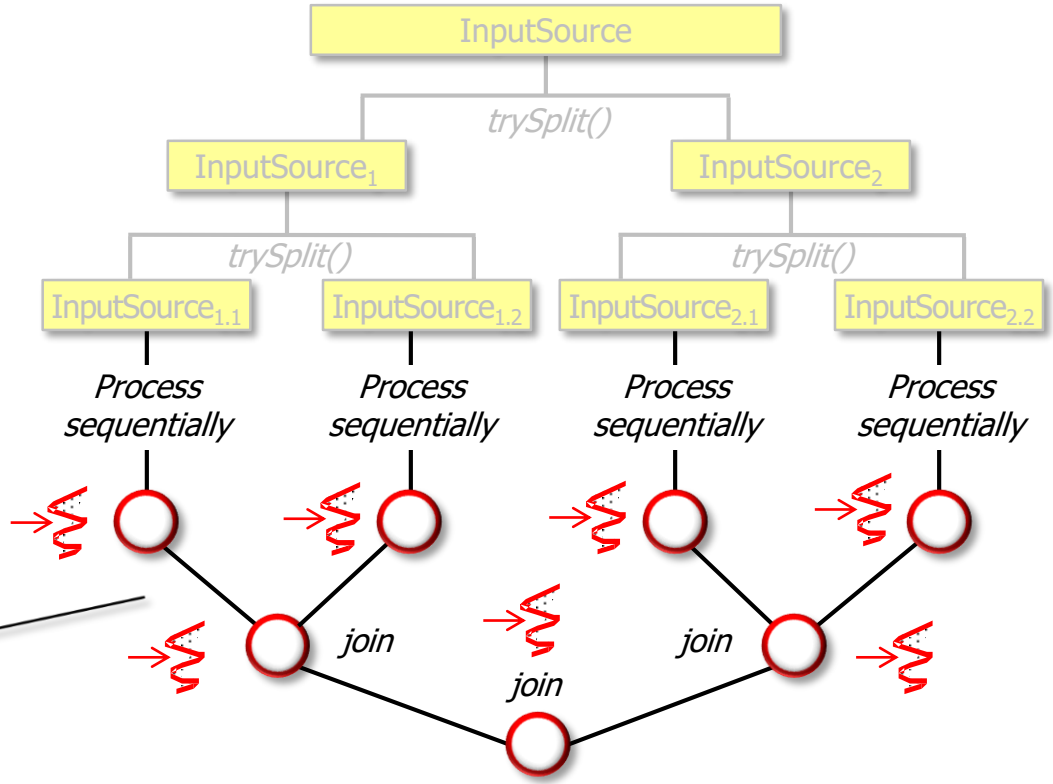
- Concurrent & non-concurrent collectors perform differently when used in parallel & sequential streams on different input sizes



See prior lessons on "*Java Parallel Streams Internals: Non-Concurrent and Concurrent Collectors*"

Demonstrating Collector Performance

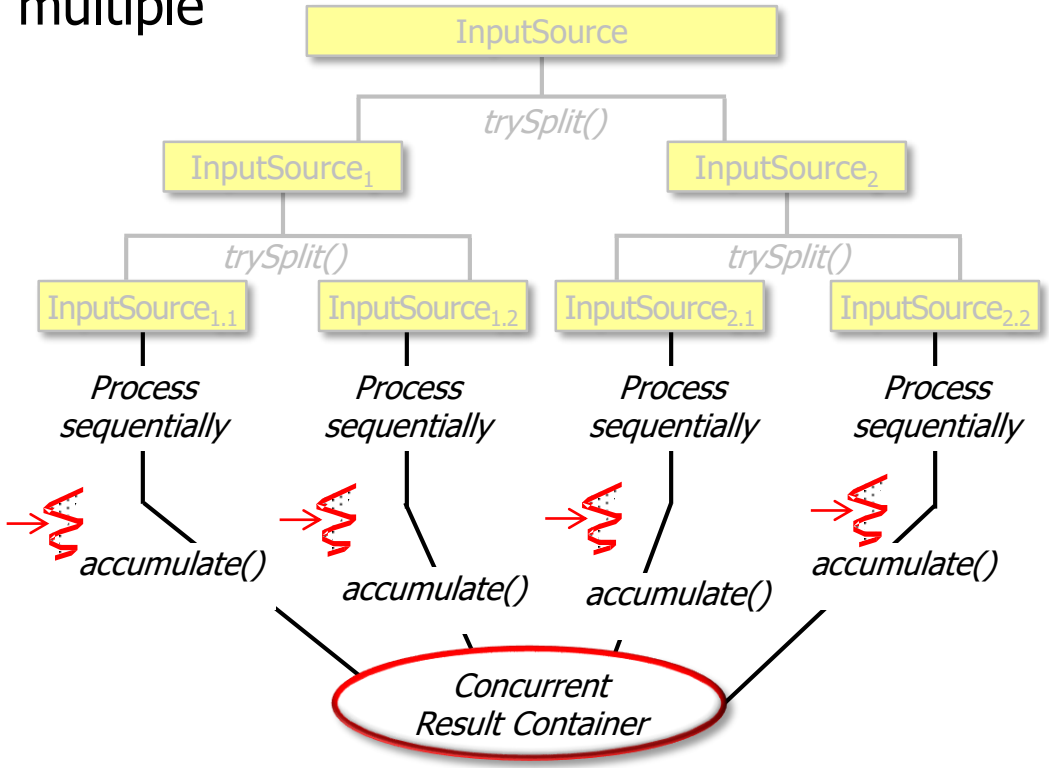
- A non-concurrent collector operates by merging sub-results



Different threads operate on different instances of the intermediate result containers

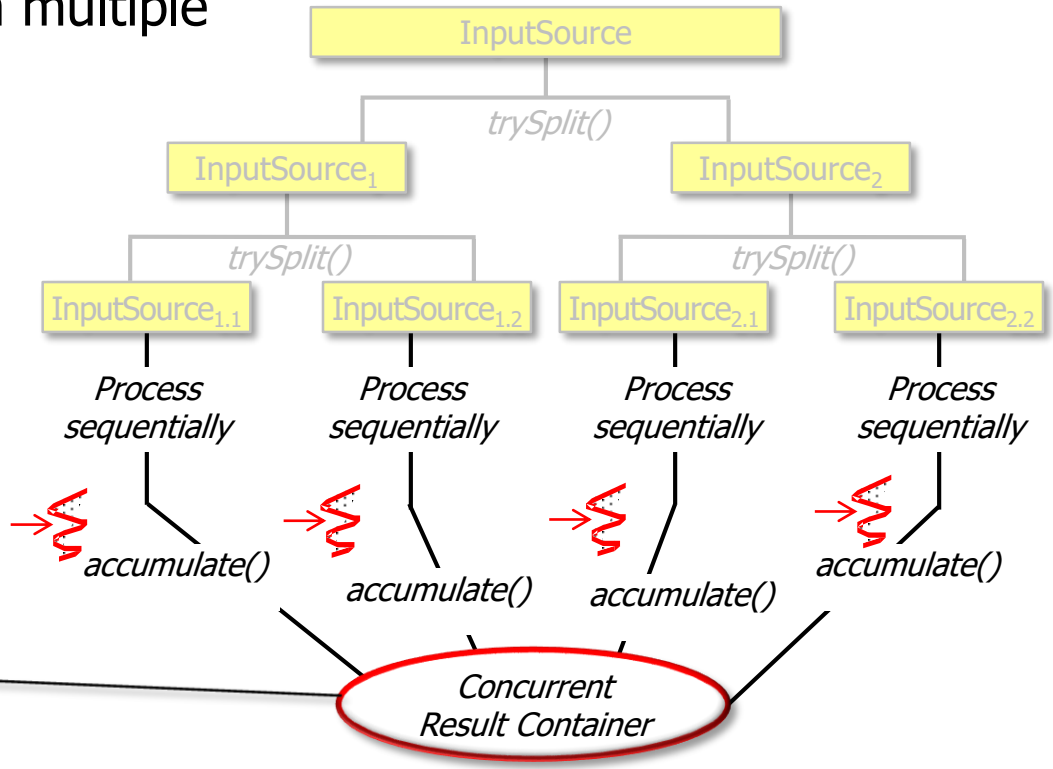
Demonstrating Collector Performance

- A concurrent collector creates one concurrent mutable result container & accumulates elements into it from multiple threads in a parallel stream



Demonstrating Collector Performance

- A concurrent collector creates one concurrent mutable result container & accumulates elements into it from multiple threads in a parallel stream



Thus there's no need to merge any intermediate sub-results!

Demonstrating Collector Performance

- Results show collector differences become more significant as input grows

```
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```
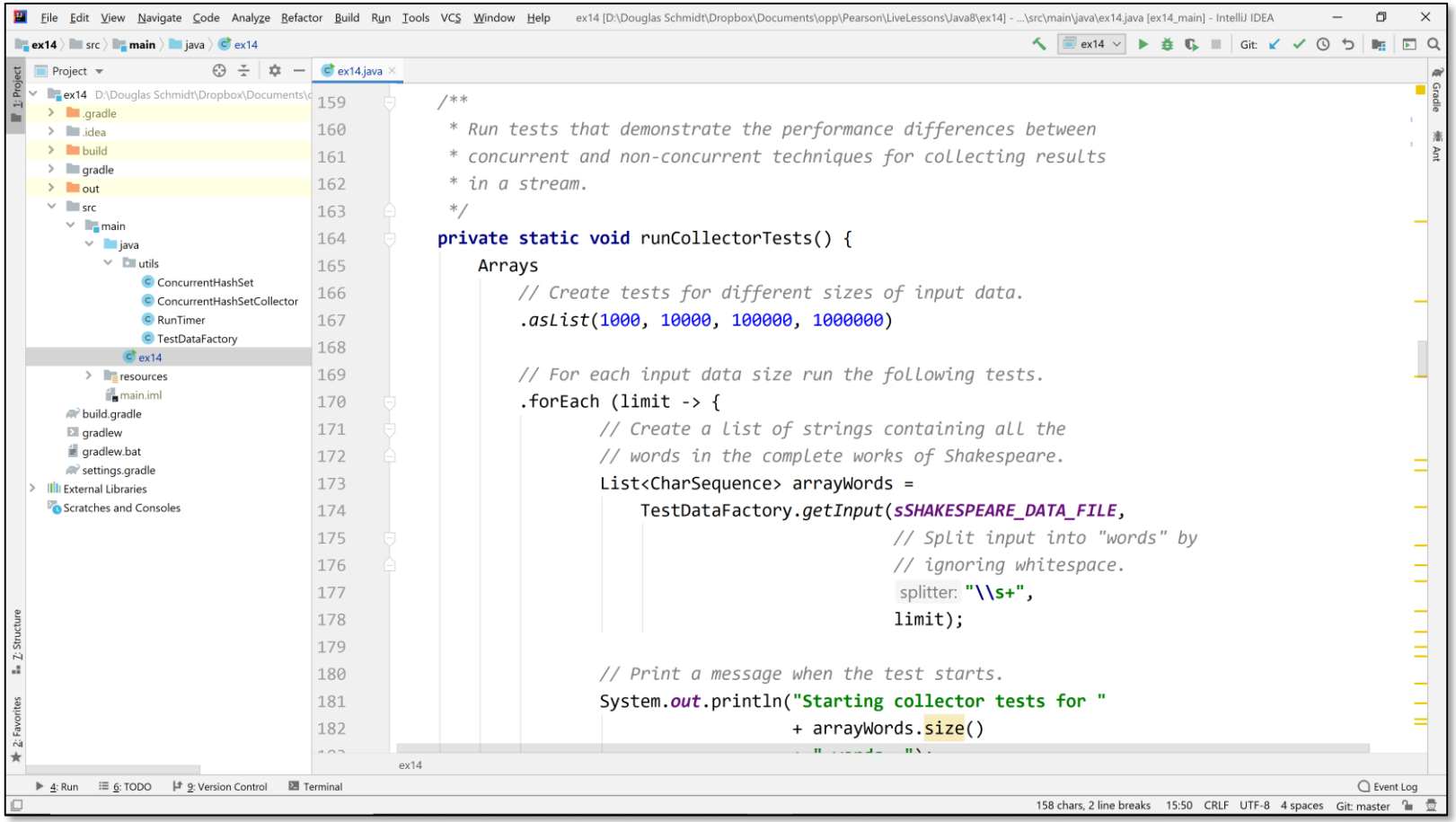

See upcoming lessons on "*When [Not] to Use Parallel Streams*"

Demonstrating Collector Performance



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End of Java Parallel Stream Internals: Demo'ing Collector Performance