Java Sequential SearchStreamGang Example: Applying Spliterator (Part 2)

Douglas C. Schmidt
d.schmidt@vanderbilt.edu
www.dre.vanderbilt.edu/~schmidt

Professor of Computer Science

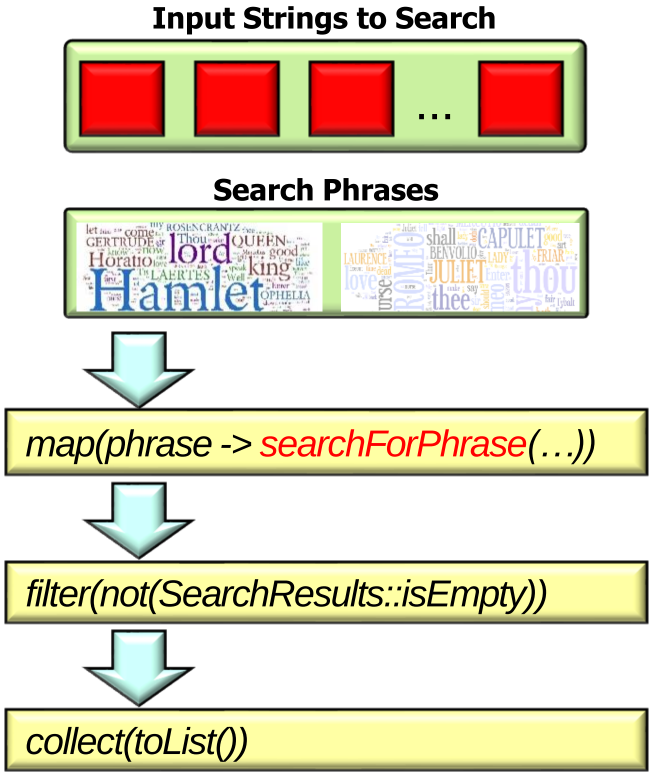
Institute for Software
Integrated Systems

Vanderbilt University
Nashville, Tennessee, USA

Learning Objectives in this Part of the Lesson

- Know how to apply sequential streams to the SearchStreamGang program
- Recognize how a Spliterator is used in SearchWithSequentialStreams

```
SearchResults searchForPhrase
  (String phrase, CharSequence input,
   String title, boolean parallel) {
  return new SearchResults
    (..., phrase, ..., StreamSupport
      .stream(new PhraseMatchSpliterator
                      (input, phrase),
              parallel)
      .collect(toList()));
}
```



Input Strings to Search

...

Search Phrases

map(phrase -> searchForPhrase(…))

filter(not(SearchResults::isEmpty))

collect(toList())

Applying Java Spliterator in SearchStreamGang

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- PhraseMatchSpliterator uses Java regex to create a stream of SearchResults Result objects that match the # of times a phrase appears in an input string

```
class PhraseMatchSpliterator implements Spliterator<Result> {
  ...
  PhraseMatchSpliterator(CharSequence input, String phrase) {
    String regexPhrase = "\\b" + phrase.trim().replaceAll
                                    ("\\s+", "\\\\b\\\\s+\\\\b")
                               + "\\b"; ...

    mPattern = Pattern.compile(regexPhrase,
                 Pattern.CASE_INSENSITIVE | Pattern.DOTALL);
    mPhraseMatcher = mPattern.matcher(input);
    mInput = input; mPhrase = phrase;
    mMinSplitSize = input.length() / 2;
  } ...
```

See SearchStreamGang/src/main/java/livelessons/utils/PhraseMatchSpliterator.java

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Create a regex that matches phrases

See docs.oracle.com/javase/8/docs/api/java/util/regex/Pattern.html

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```

The regex is compiled into a pattern that matches a phrase across lines

See docs.oracle.com/javase/8/docs/api/java/util/regex/Pattern.html

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A matcher is created to search the input for the regex pattern

See docs.oracle.com/javase/8/docs/api/java/util/regex/Matcher.html

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Set key fields with params

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    mInput = input; mPhrase = phrase;
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  } ...
```

Define the min split size

The minimum split size is used by the parallel streams version of this program

Applying Java Spliterator in SearchStreamGang

- PhraseMatchSpliterator uses Java regex to create a stream of SearchResults Result objects that match the # of times a phrase appears in an input string

```
class PhraseMatchSpliterator implements Spliterator<Result> {
  ...
  boolean tryAdvance(Consumer<? super Result> action) {
    if (!mPhraseMatcher.find())
        return false;

    else {
        action.accept(new Result
                          (mOffset + mPhraseMatcher.start()));
        return true;
    }
  }
  ...
```

Called by the Java 8 streams framework to attempt to advance the spliterator by one word match

See docs.oracle.com/javase/8/docs/api/java/util/Spliterator.html#tryAdvance

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    else {
        action.accept(new Result
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        return true;
    }
  }
  ...
```

Passes the result (if any) back "by reference" to the streams framework

See docs.oracle.com/javase/8/docs/api/java/util/function/Consumer.html

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        return false;

    else {
        action.accept(new Result
                            (mOffset + mPhraseMatcher.start()));
        return true;
    }
  }
  ...
```

Check if any remaining phrases in the input match the regex

See docs.oracle.com/javase/8/docs/api/java/util/regex/Matcher.html#find

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  boolean tryAdvance(Consumer<? super Result> action) {
    if (!mPhraseMatcher.find())
        return false;

    else {
        action.accept(new Result
                         (mOffset + mPhraseMatcher.start()));
        return true;
    }
  }
  ...
```

Inform the streams framework to cease calling tryAdvance() if there's no match

See docs.oracle.com/javase/8/docs/api/java/util/regex/Matcher.html#find

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  ...
  boolean tryAdvance(Consumer<? super Result> action) {
    if (!mPhraseMatcher.find())
        return false;

    else {
        action.accept(new Result
                          (mOffset + mPhraseMatcher.start()));
        return true;
    }
  }
  ...
```

accept() stores the index in the input string where the match occurred, which is returned to the streams framework

See docs.oracle.com/javase/8/docs/api/java/util/function/Consumer.html#accept

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  ...
  boolean tryAdvance(Consumer<? super Result> action) {
    if (!mPhraseMatcher.find())
        return false;

    else {
        action.accept(new Result
                            (mOffset + mPhraseMatcher.start()));
        return true;
    }
  }
  ...
```

Inform the streams framework to continue calling tryAdvance()

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```
class PhraseMatchSpliterator implements Spliterator<Result> {
  ...
  public Spliterator<SearchResults.Result> trySplit() {
    ...
  }
  ...
```

We'll analyze the trySplit() method when we discuss SearchWithParallelStreams (it's not used for the sequential version)

See docs.oracle.com/javase/8/docs/api/java/util/Spliterator.html#trySplit

End of Java Sequential SearchStreamGang Example: Applying Spliterator (Part 2)