

Learn How to Implement `WordSearcher.printResults()`

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Learning Objectives in this Part of the Lesson

- Visualize aggregate operations in SimpleSearchStream's WordSearcher.printResults() method
- Understand the implementation of aggregate operations in SimpleSearchStream's WordSearcher.printResults() method

```
public void printResults(List<SearchResults> listOfResults) {  
    listOfResults  
        .stream()  
  
        .collect(groupingBy(SearchResults::getWord,  
                             LinkedHashMap::new,  
                             toDownstreamCollector()))  
  
        .forEach(this::printResult);  
}
```

This lesson shows the collect(groupingBy()) & mapToInt() aggregate operations

Implementing the Word Searcher.printResults() Method

Implementing the WordSearcher.printResults() Method

- This method prints the results of the word search

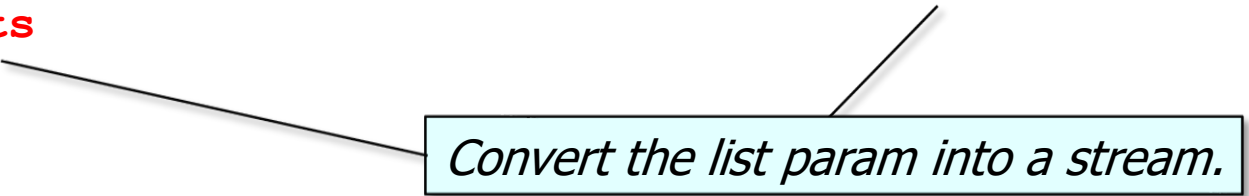
```
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                             LinkedHashMap::new,  
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        .forEach(this::printResult);  
}
```

See [SimpleSearchStream/src/main/java/search/WordSearcher.java](https://github.com/azul/simple-search-stream/blob/main/src/main/java/search/WordSearcher.java)

Implementing the WordSearcher.printResults() Method

- This method prints the results of the word search

```
public void printResults(List<SearchResults> listOfResults) {  
    listOfResults  
        .stream()  
  
        .collect(groupingBy(SearchResults::getWord,  
                             LinkedHashMap::new,  
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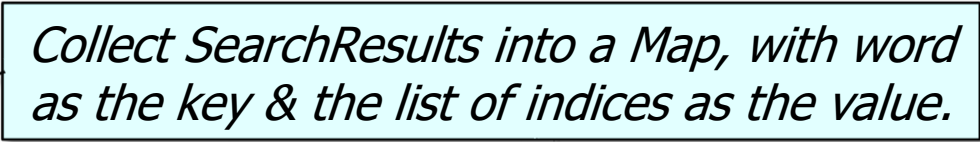


A light blue rectangular box with a black border contains the text *Convert the list param into a stream.* Two lines originate from this box: one points to the `listOfResults` parameter in the method signature, and the other points to the `.stream()` method call in the first line of the method body.

Implementing the WordSearcher.printResults() Method

- This method prints the results of the word search

```
public void printResults(List<SearchResults> listOfResults) {  
    listOfResults  
        .stream()  
  
        .collect(groupingBy(SearchResults::getWord,  
                             LinkedHashMap::new,  
                             toDownstreamCollector()))  
  
        .forEach(this::printResult);  
}
```



Collect SearchResults into a Map, with word as the key & the list of indices as the value.

Implementing the WordSearcher.printResults() Method

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    listOfResults  
        .stream()  
  
        .collect(groupingBy(SearchResults::getWord,  
                             LinkedHashMap::new,  
                             toDownstreamCollector()))  
  
        .forEach(this::printResult);  
}
```

*LinkedHashMap preserves the
insertion order wrt iteration.*

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

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        .forEach(this::printResult);  
}
```

This factory method creates a downstream collector that merges results lists together.

See lesson on "Java Streams: Implementing Custom Non-Concurrent Collectors"

Implementing the WordSearcher.printResults() Method

- This method prints the results of the word search

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        .stream()  
  
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                             LinkedHashMap::new,  
                             toDownstreamCollector()))  
  
    .forEach(this::printResult);  
}
```

*Print out the matching
results in the stream.*

This is the Map forEach() method *not* the Stream forEach() method!

Implementing the WordSearcher.printResults() Method

- Print a word & its list of indices to the output

```
private void printResult(String word,
                        List<SearchResults.Result> results) {
    System.out.print("Word \""
                    + word
                    + "\" appeared at indices ");

    SearchResults.printResults(results);

    System.out.println(" with max index of "
                    + computeMax(results));
}
```

Implementing the WordSearcher.printResults() Method

- Print a word & its list of indices to the output

```
private void printResult(String word,  
                        List<SearchResults.Result> results) {  
    System.out.print("Word \""  
                    + word  
                    + "\" appeared at indices ");
```

Print the word followed by the list of search results.

```
SearchResults.printResults(results);  
  
System.out.println(" with max index of "  
                  + computeMax(results));  
}
```

Implementing the WordSearcher.printResults() Method

- Print a word & its list of indices to the output

```
private void printResult(String word,  
                        List<SearchResults.Result> results) {  
    System.out.print("Word \""  
                    + word  
                    + "\" appeared at indices ");
```

Compute & print the max index.

```
SearchResults.printResults(results);
```

```
System.out.println(" with max index of "  
                  + computeMax(results));
```

```
}
```

Implementing the WordSearcher.printResults() Method

- Compute the max index in the list of search results

```
private int computeMax(List<SearchResults.Result> results) {  
    return results  
        .stream()  
  
        .mapToInt(SearchResults.Result::getIndex)  
  
        .max()  
  
        .orElse(0) ;  
}
```

This implementation works properly even if the results are not sorted!

Implementing the WordSearcher.printResults() Method

- Compute the max index in the list of search results

```
private int computeMax(List<SearchResults.Result> results) {  
    return results  
        .stream()  
        .mapToInt(SearchResults.Result::getIndex)  
        .max()  
        .orElse(0);  
}
```



Convert the list results into a stream of results

Implementing the WordSearcher.printResults() Method

- Compute the max index in the list of search results

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private int computeMax(List<SearchResults.Result> results) {  
    return results  
        .stream()  
  
        .mapToInt(SearchResults.Result::getIndex)  
  
        .max()  
  
        .orElse(0);  
}
```

Map the stream of Result objects into a stream of int primitives.

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

Implementing the WordSearcher.printResults() Method

- Compute the max index in the list of search results

```
private int computeMax(List<SearchResults.Result> results) {  
    return results  
        .stream()
```

```
        .mapToInt(SearchResults.Result::getIndex)
```

```
        .max()
```

Returns an OptionalInt describing the maximum element of this stream or an empty optional if this stream is empty

```
        .orElse(0);
```

```
}
```

OPTIONAL

See docs.oracle.com/javase/8/docs/api/java/util/stream/IntStream.html#max

Implementing the WordSearcher.printResults() Method

- Compute the max index in the list of search results

```
private int computeMax(List<SearchResults.Result> results) {  
    return results  
        .stream()  
  
        .mapToInt(SearchResults.Result::getIndex)  
  
        .max()  
  
        .orElse(0);  
}
```

Return the value (as an int) if present, otherwise return 0.

OPTIONAL

End of Learn How To
Implement Word
Searcher.printResults()