

Java Sequential SearchStreamGang

Example: Visualizing Hook Methods

Douglas C. Schmidt

d.schmidt@vanderbilt.edu

www.dre.vanderbilt.edu/~schmidt



Professor of Computer Science

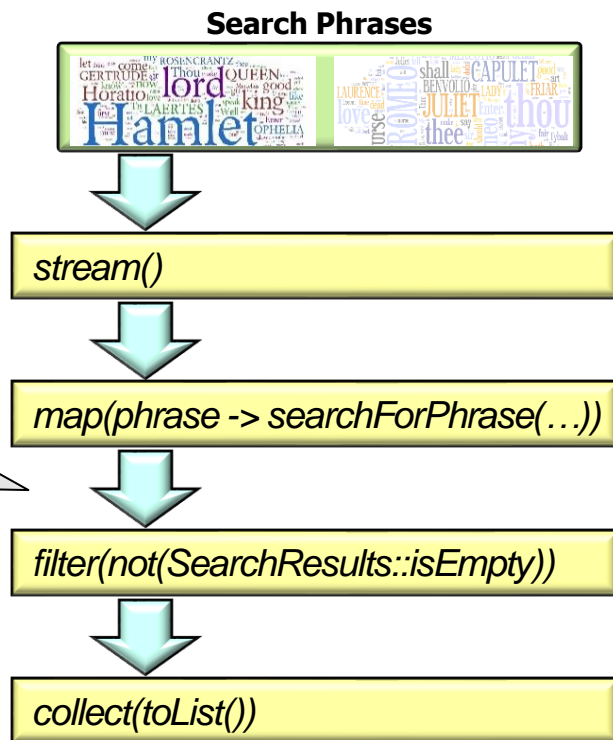
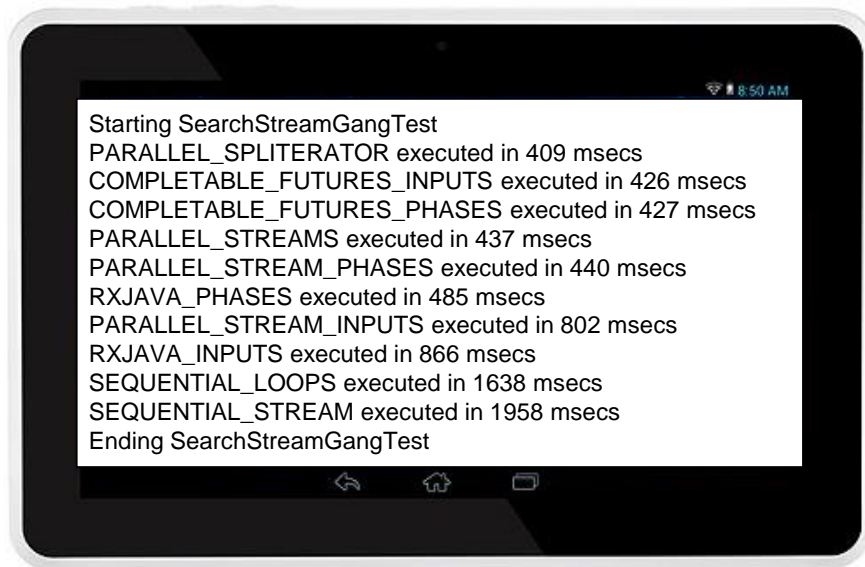
**Institute for Software
Integrated Systems**

**Vanderbilt University
Nashville, Tennessee, USA**



Learning Objectives in this Part of the Lesson

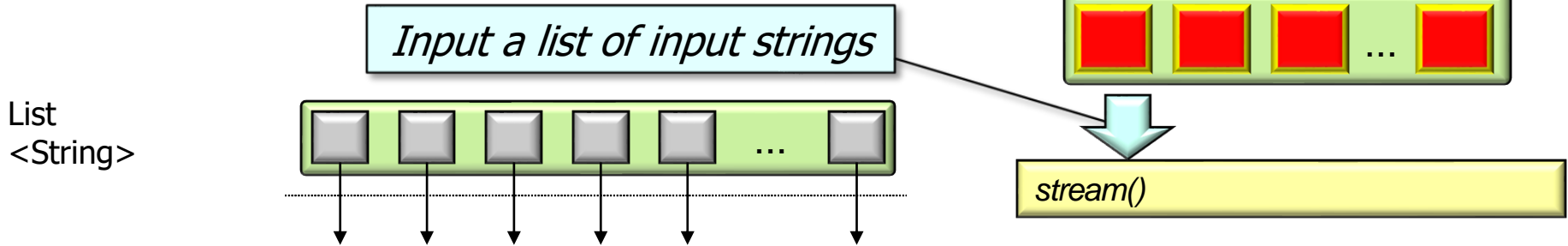
- Know how to apply sequential streams to the SearchStreamGang program
- Understand the SearchStreamGang process
Stream() & processInput() hook methods



Visualizing the processStream() Hook Method

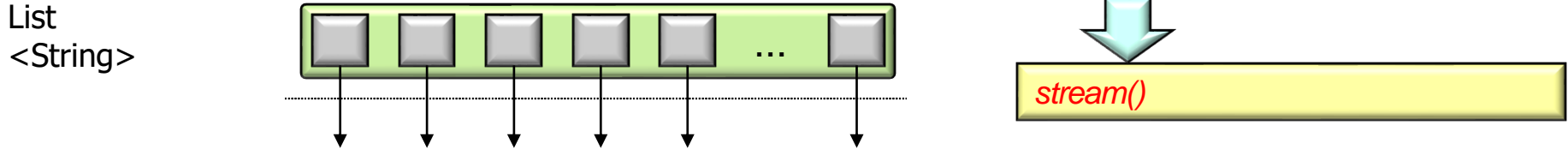
Visualizing the processStream() Hook Method

- processStream() searches a list of input strings



Visualizing the processStream() Hook Method

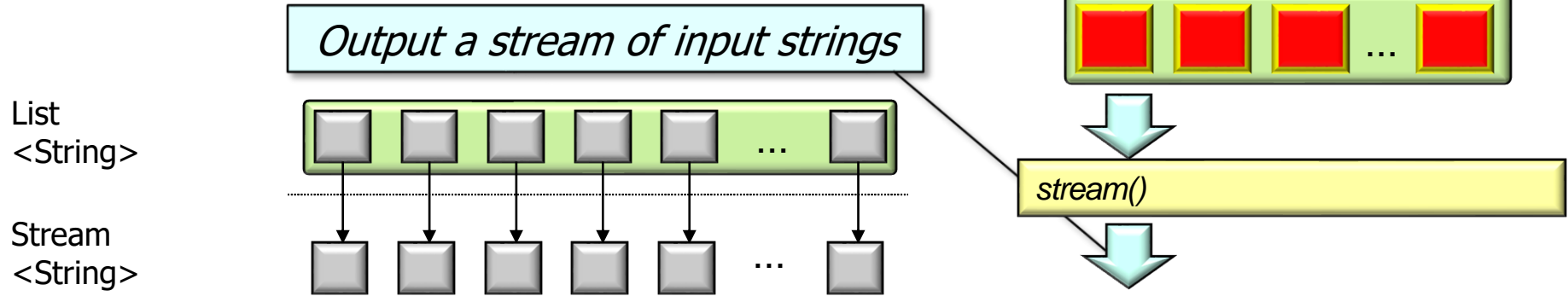
- processStream() searches a list of input strings



Convert collection to a (sequential) stream

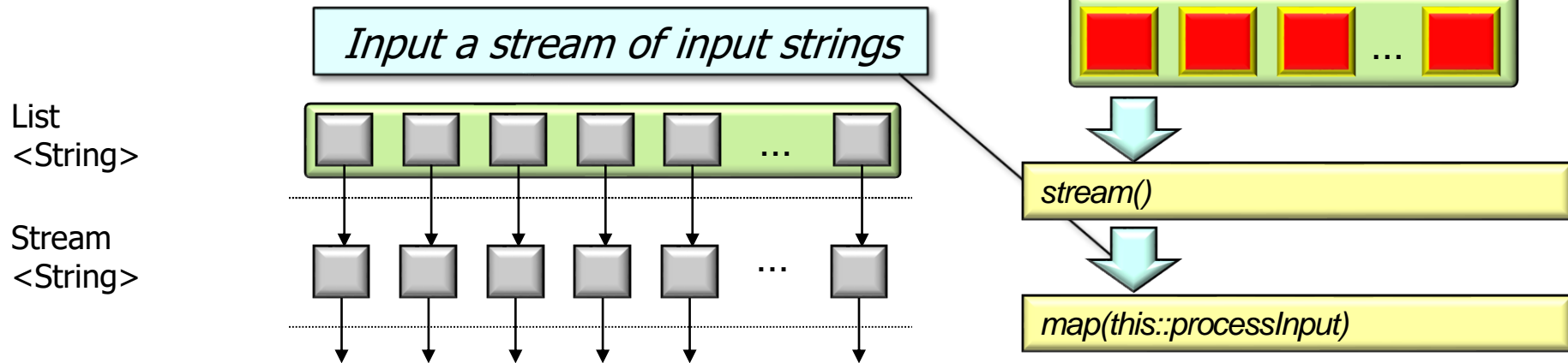
Visualizing the processStream() Hook Method

- processStream() searches a list of input strings



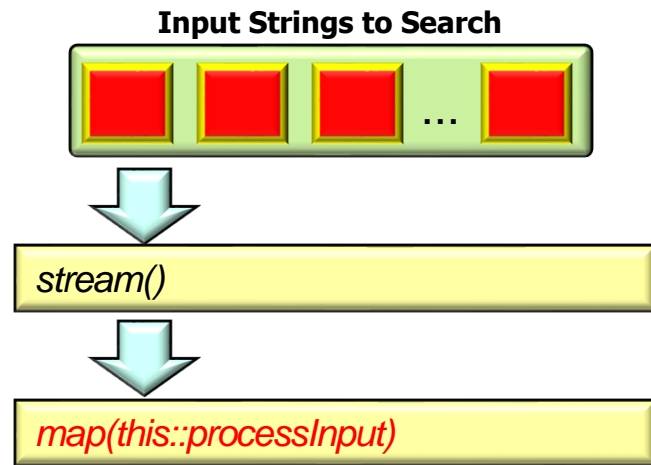
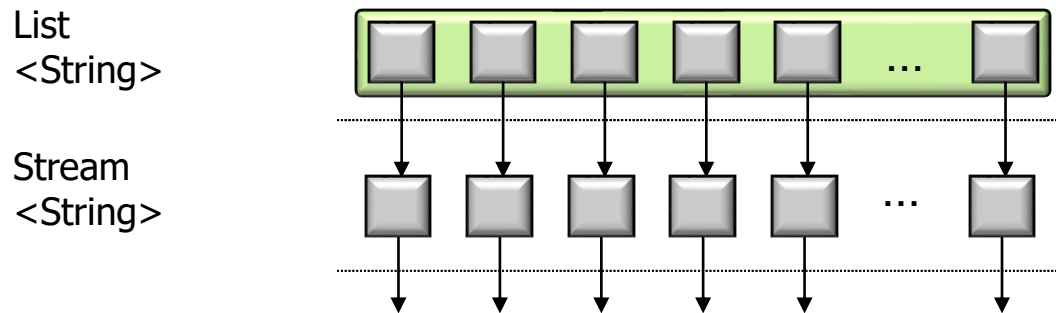
Visualizing the processStream() Hook Method

- processStream() searches a list of input strings



Visualizing the processStream() Hook Method

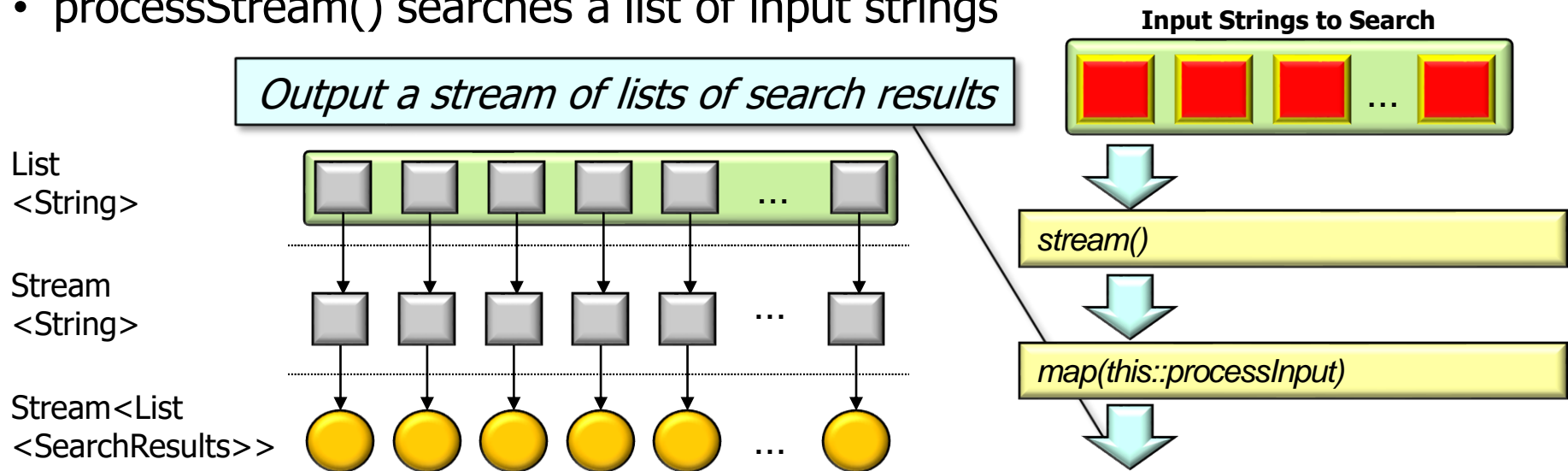
- processStream() searches a list of input strings



Call `processInput()` to search for phrases in each input string

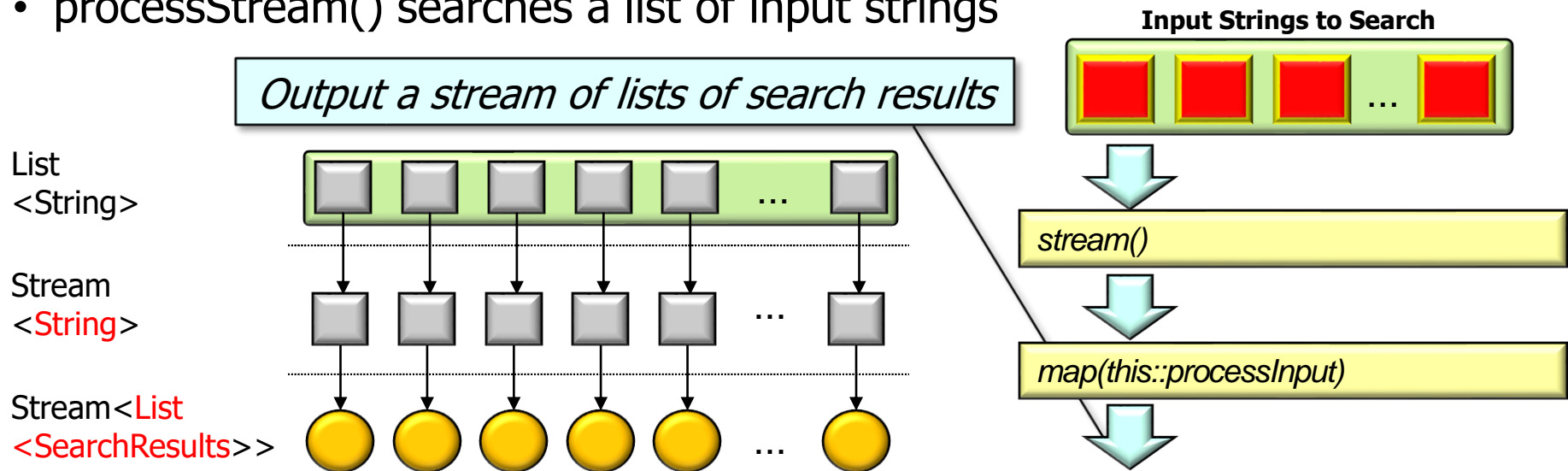
Visualizing the processStream() Hook Method

- processStream() searches a list of input strings



Visualizing the processStream() Hook Method

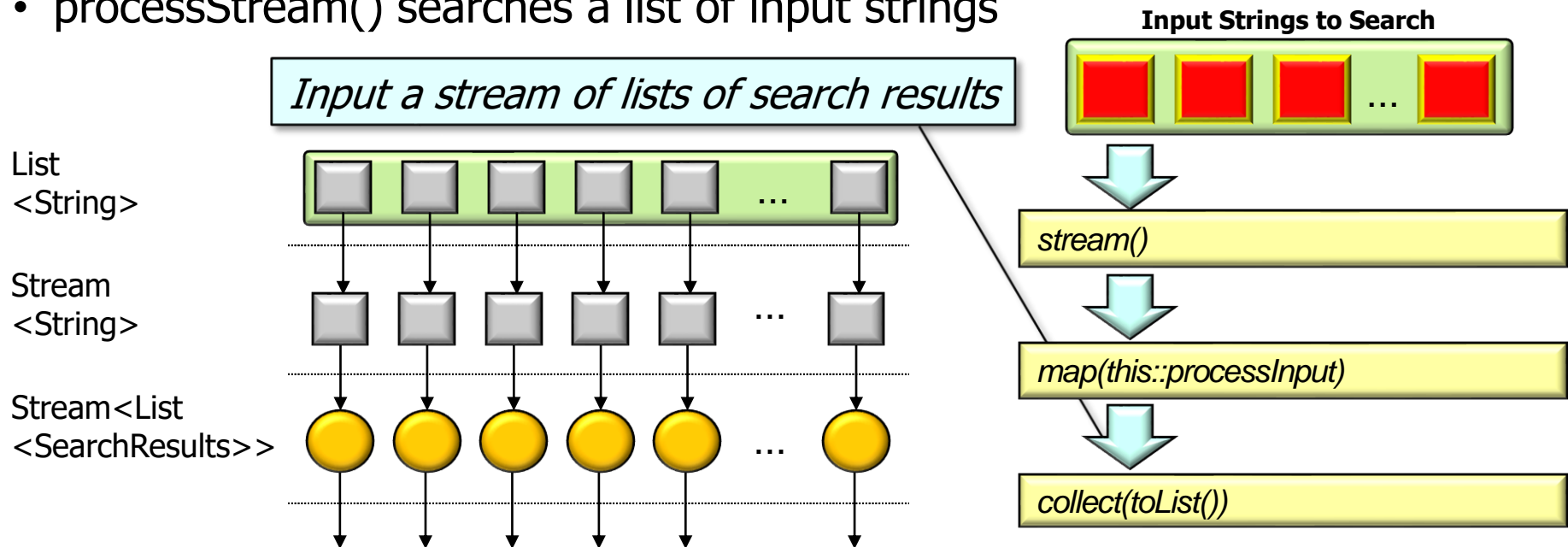
- processStream() searches a list of input strings



map() also transforms its input stream type into a different output stream type

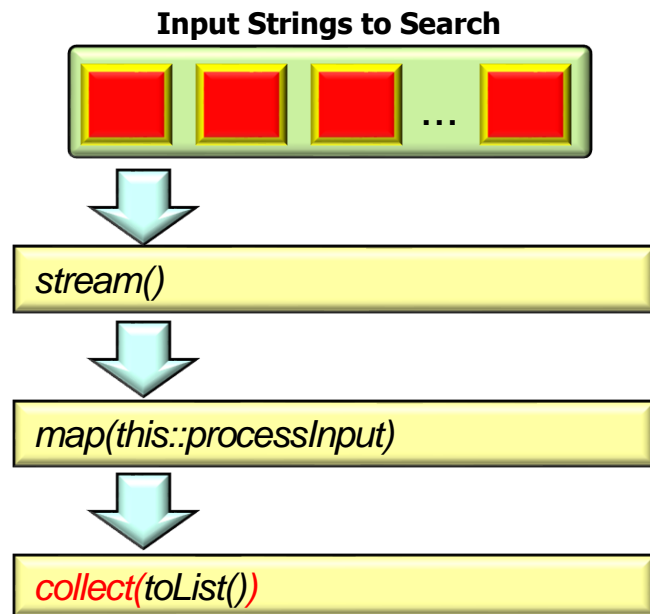
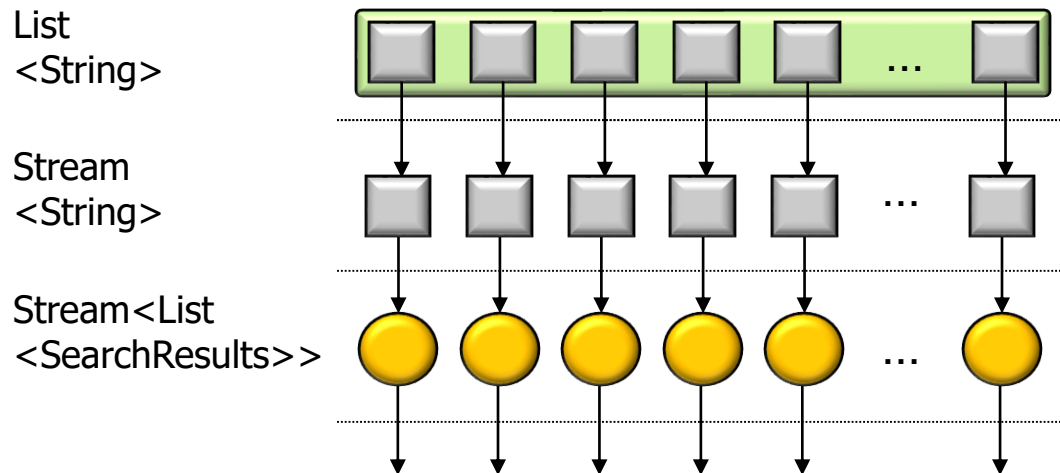
Visualizing the processStream() Hook Method

- processStream() searches a list of input strings



Visualizing the processStream() Hook Method

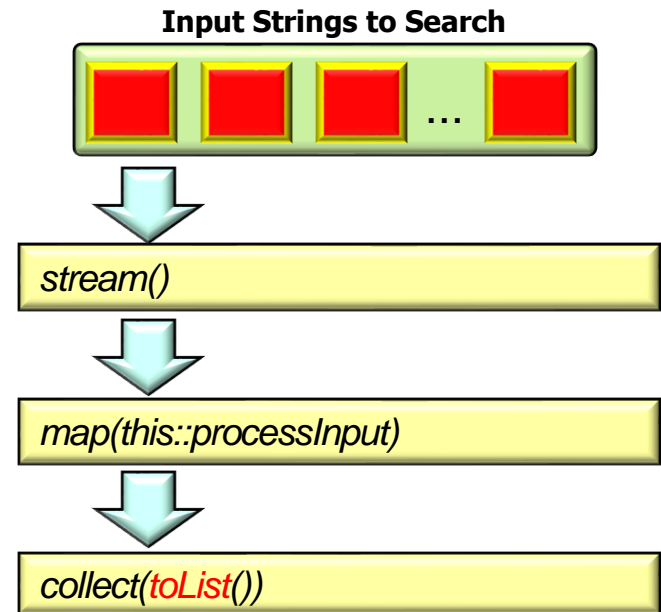
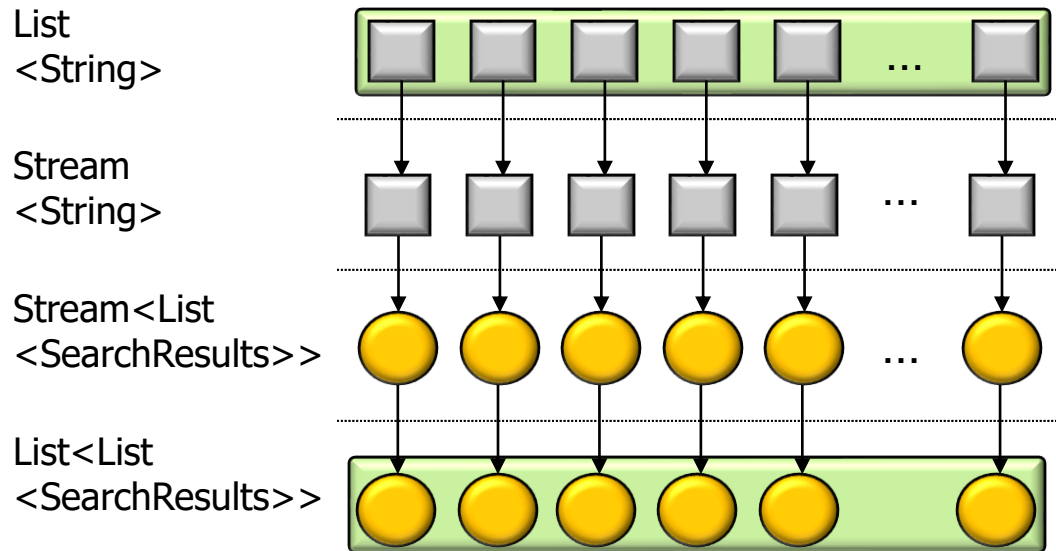
- processStream() searches a list of input strings



Trigger intermediate operation processing

Visualizing the processStream() Hook Method

- processStream() searches a list of input strings



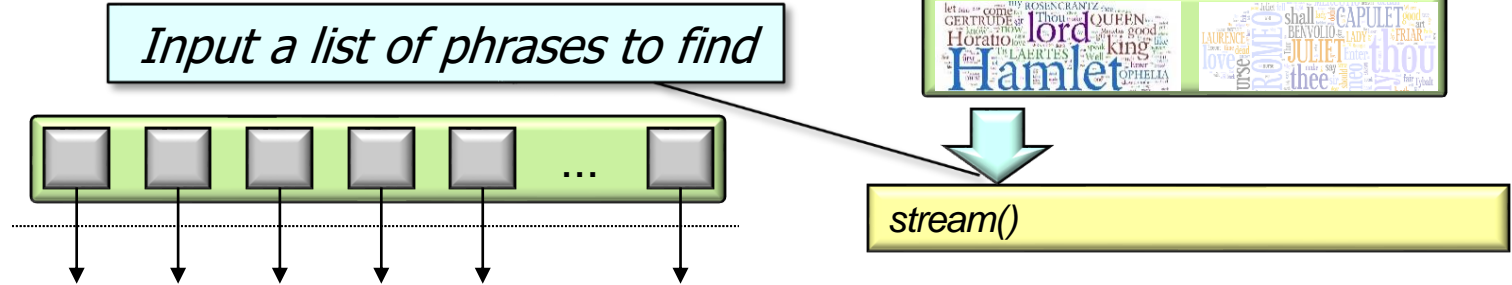
Return a list of lists of search results based on "encounter order"

Visualizing the processInput() Hook Method

Visualizing the processInput() Hook Method

- processInput() finds phrases in an input string

List
<String>



- `processInput()` finds phrases in an input string

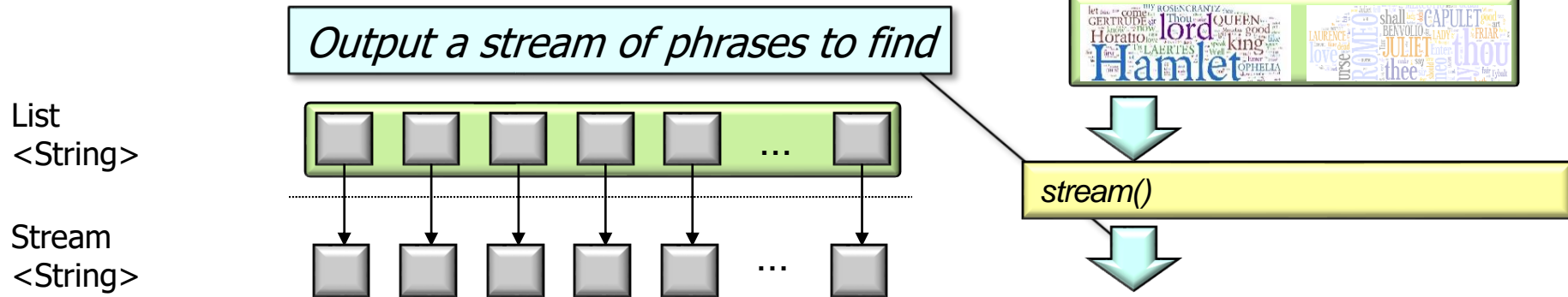
- `processInput()` finds phrases in an input string



Convert collection to a (sequential) stream

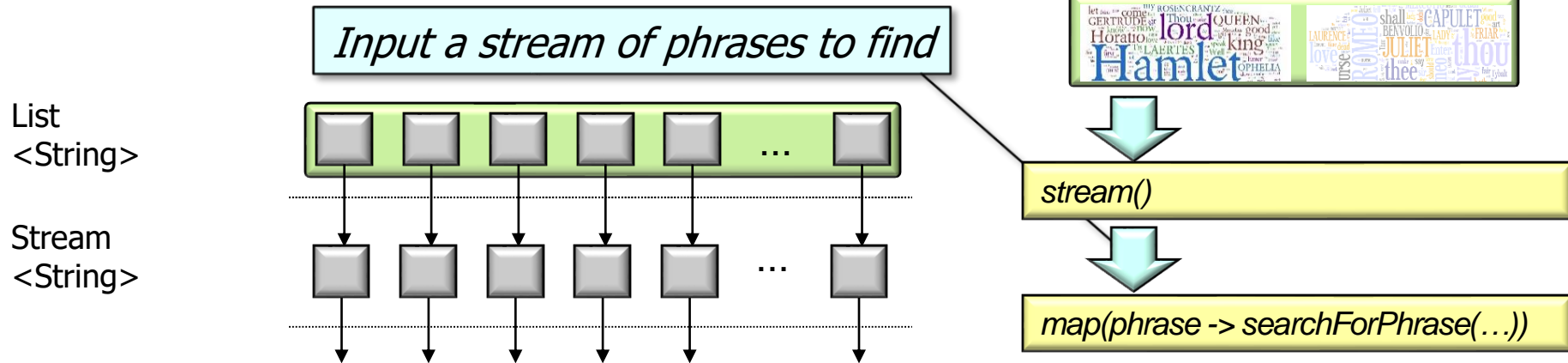
Visualizing the processInput() Hook Method

- processInput() finds phrases in an input string



Visualizing the processInput() Hook Method

- processInput() finds phrases in an input string

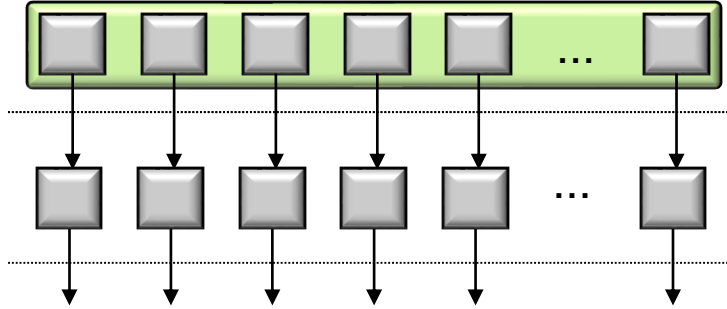


Visualizing the processInput() Hook Method

- processInput() finds phrases in an input string

List
<String>

Stream
<String>



Search Phrases



stream()



map(phrase -> searchForPhrase(...))

Search for the phrase in each input string

Visualizing the processInput() Hook Method

- processInput() finds phrases in an input string

Output a stream of search results

List

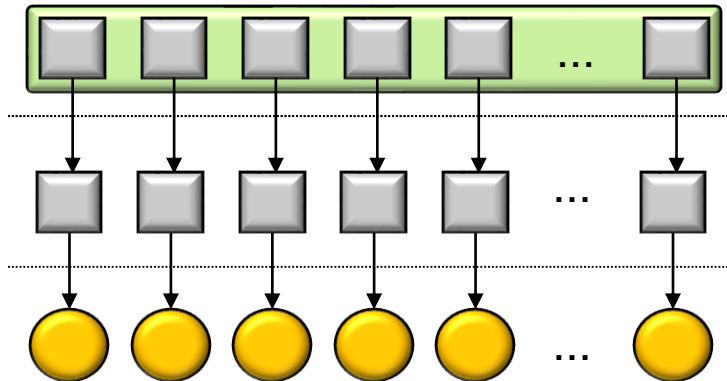
<String>

Stream

<String>

Stream

<SearchResults>



Search Phrases



stream()

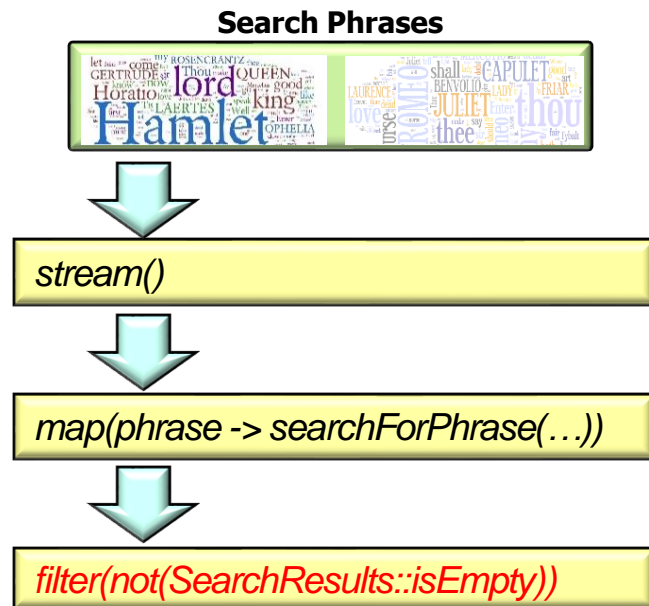
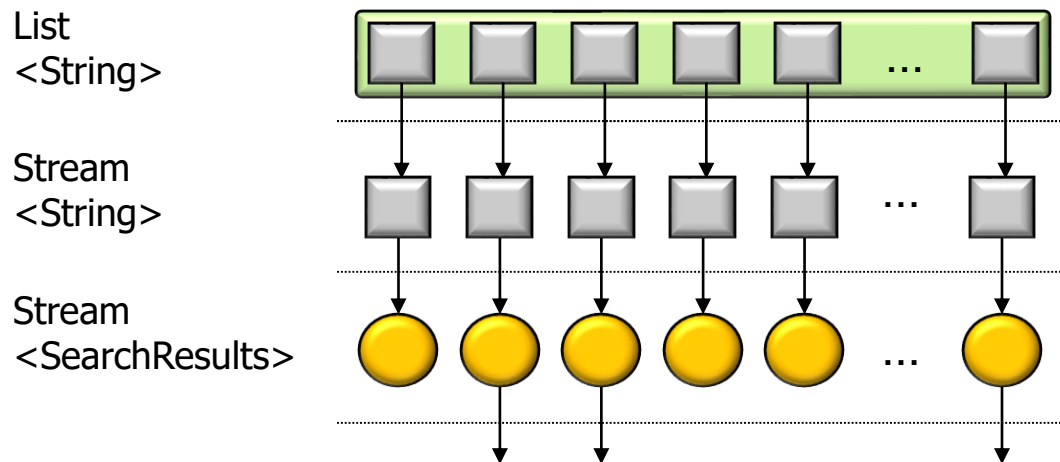
map(phrase -> searchForPhrase(...))

- `processInput()` finds phrases in an input string



Visualizing the processInput() Hook Method

- processInput() finds phrases in an input string

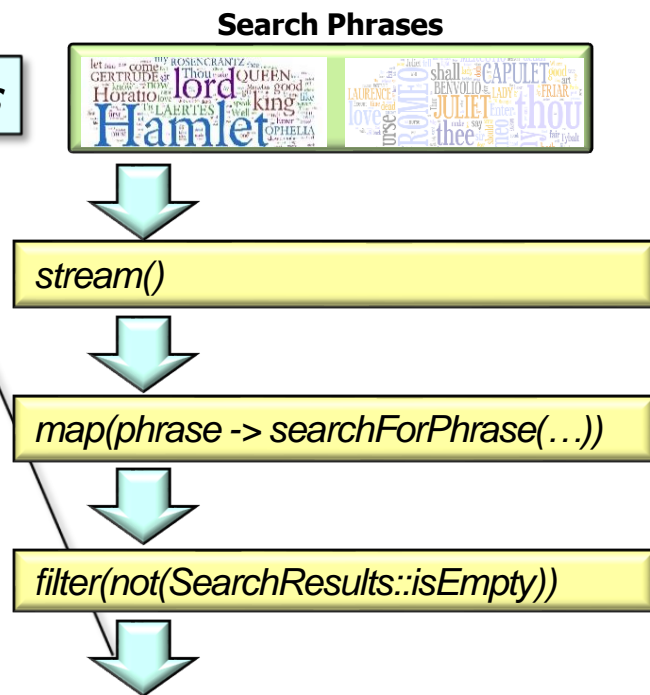
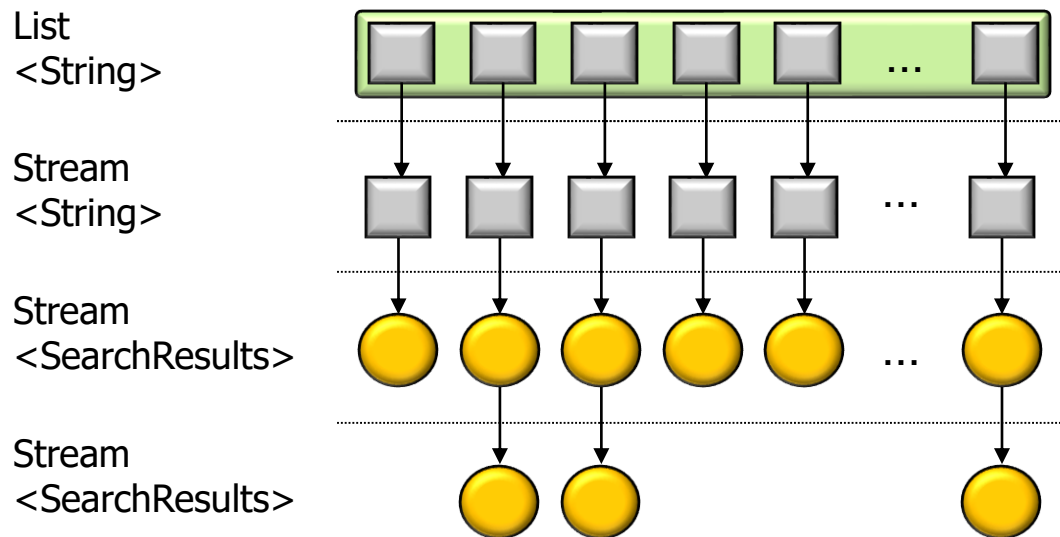


Remove empty search results from the stream

Visualizing the processInput() Hook Method

- processInput() finds phrases in an input string

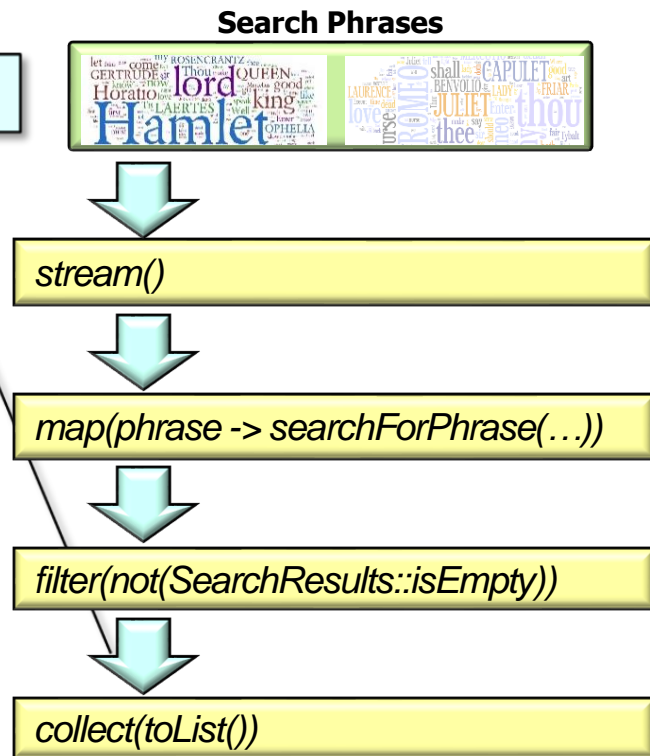
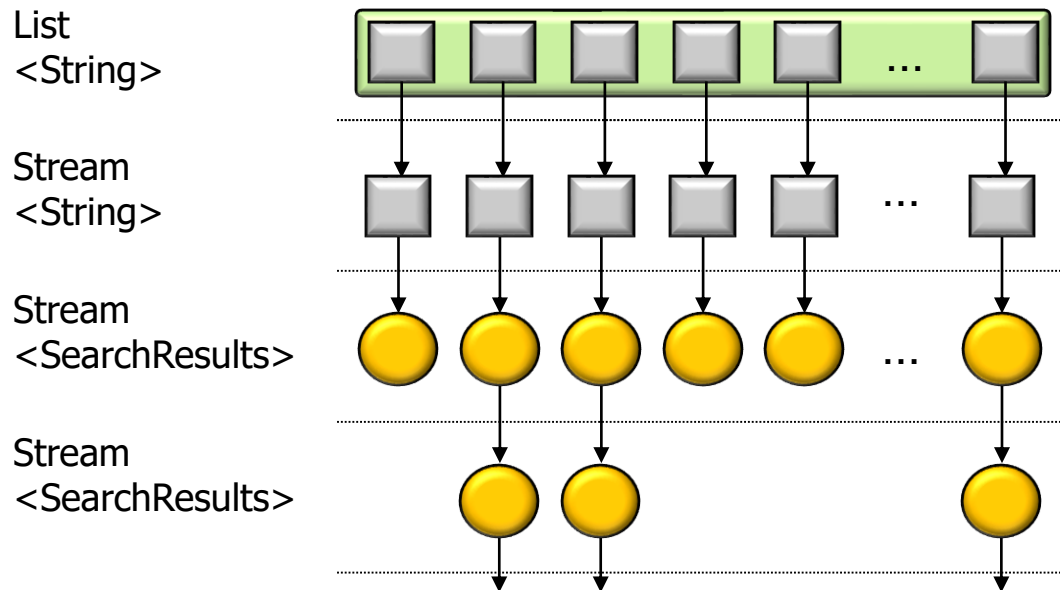
Output a stream of non-empty search results



Visualizing the processInput() Hook Method

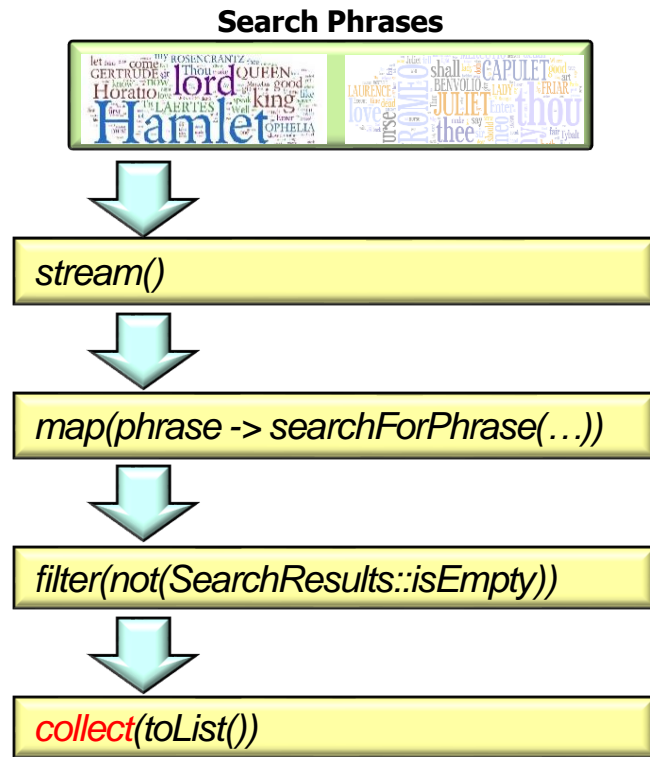
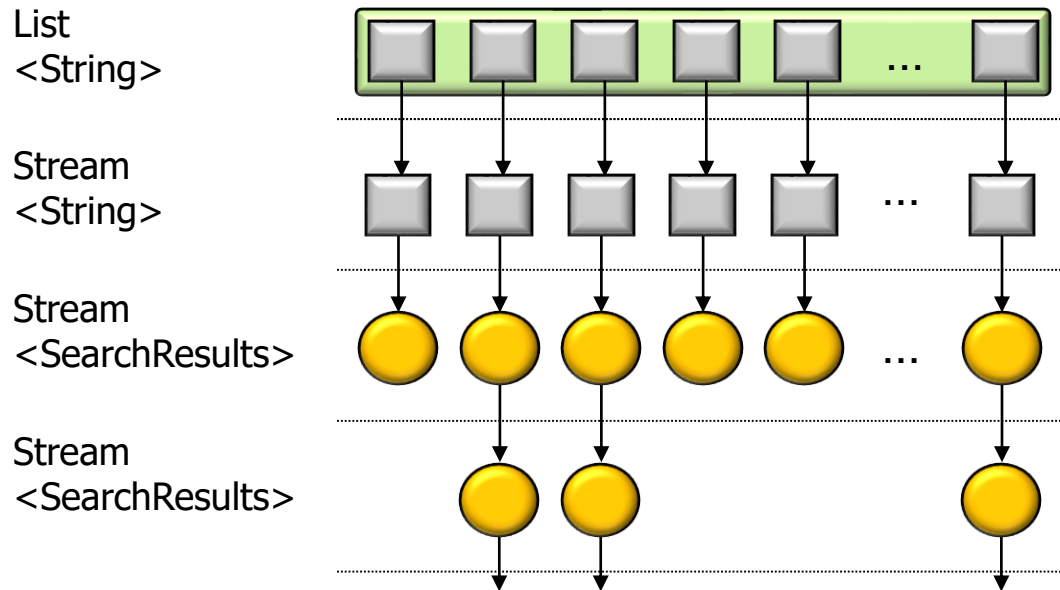
- `processInput()` finds phrases in an input string

Input a stream of non-empty search results



Visualizing the processInput() Hook Method

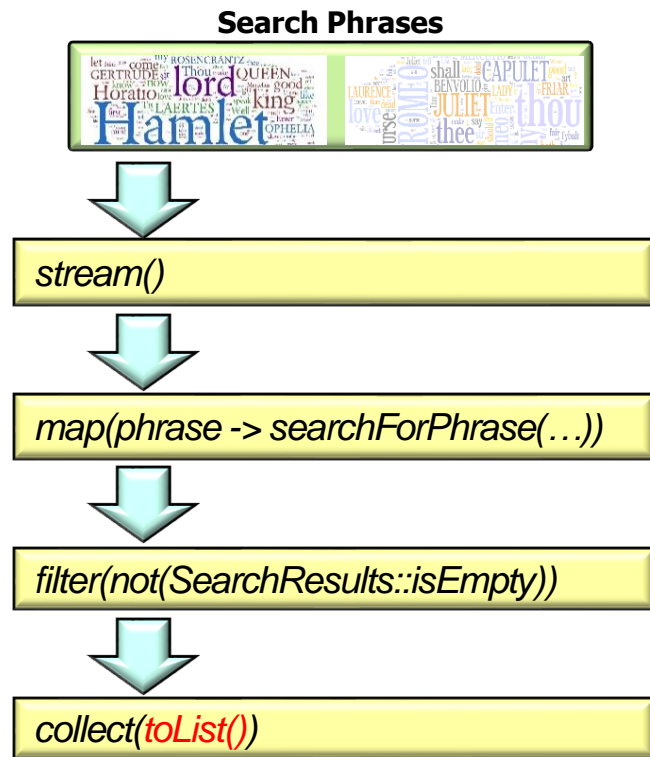
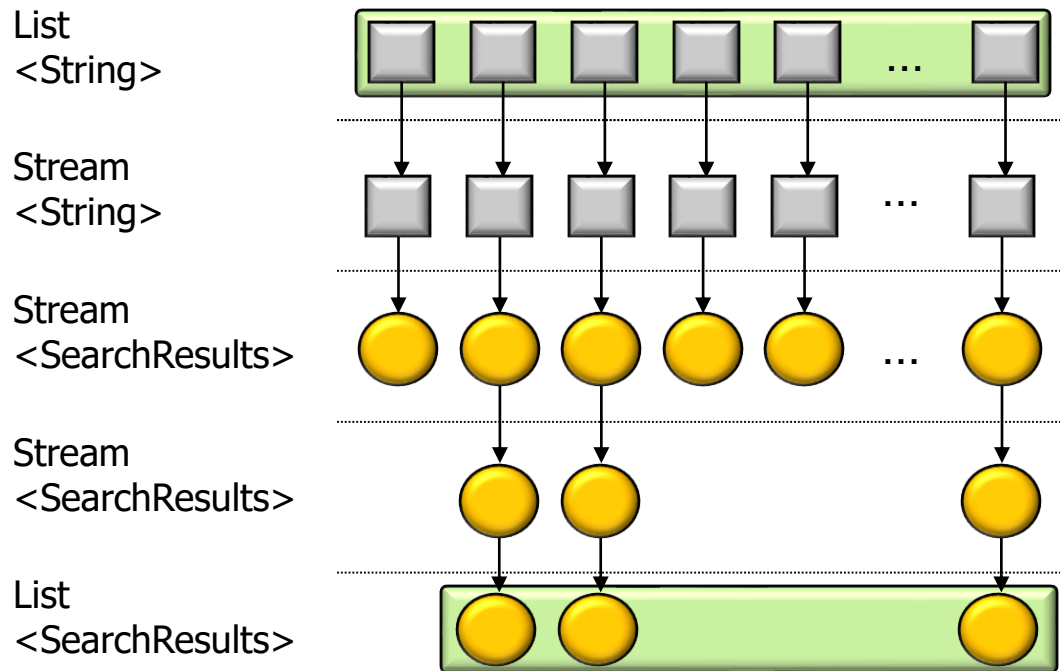
- processInput() finds phrases in an input string



Trigger intermediate operation processing

Visualizing the processInput() Hook Method

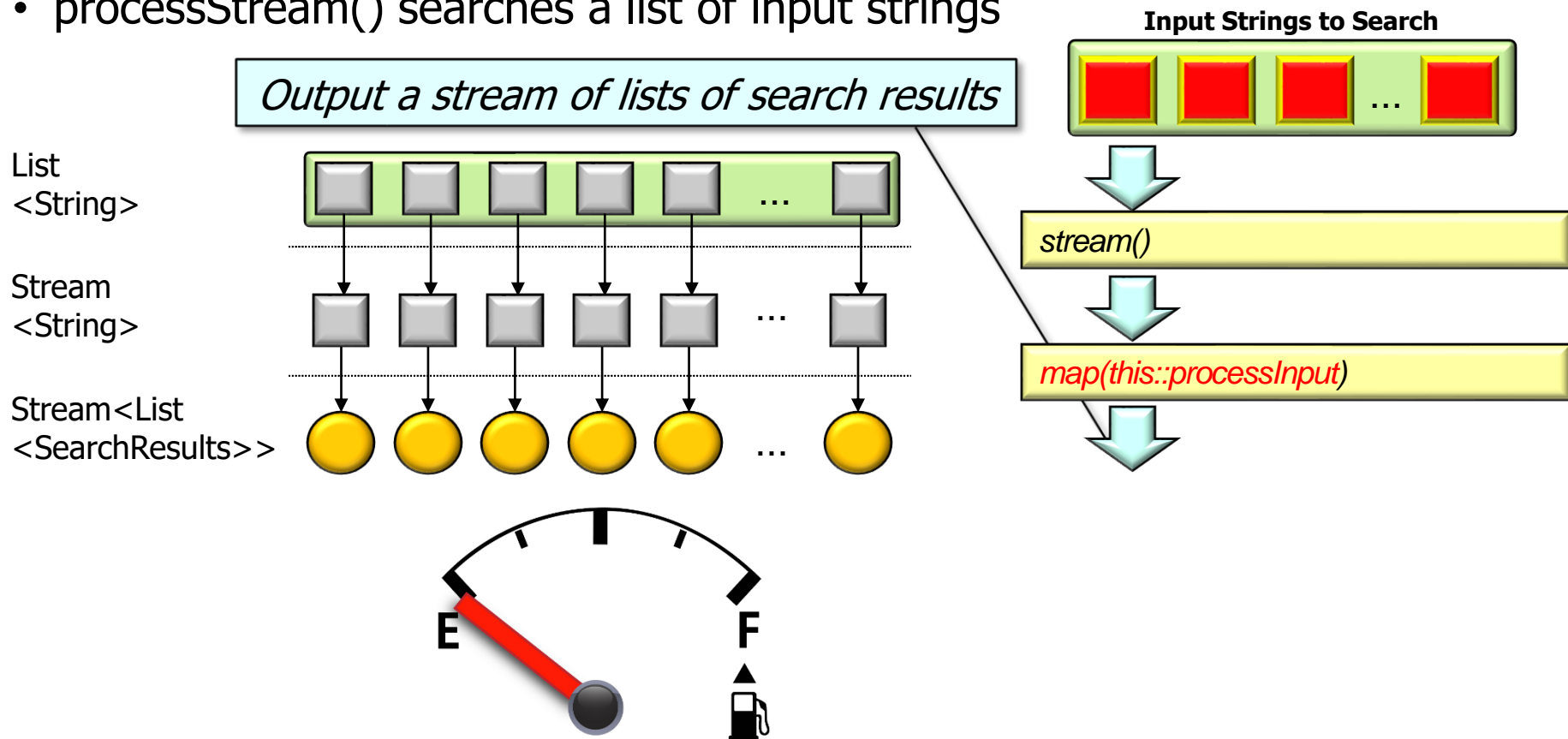
- processInput() finds phrases in an input string



Return a (possibly empty) list of search results in encounter order

Visualizing the processInput() Hook Method

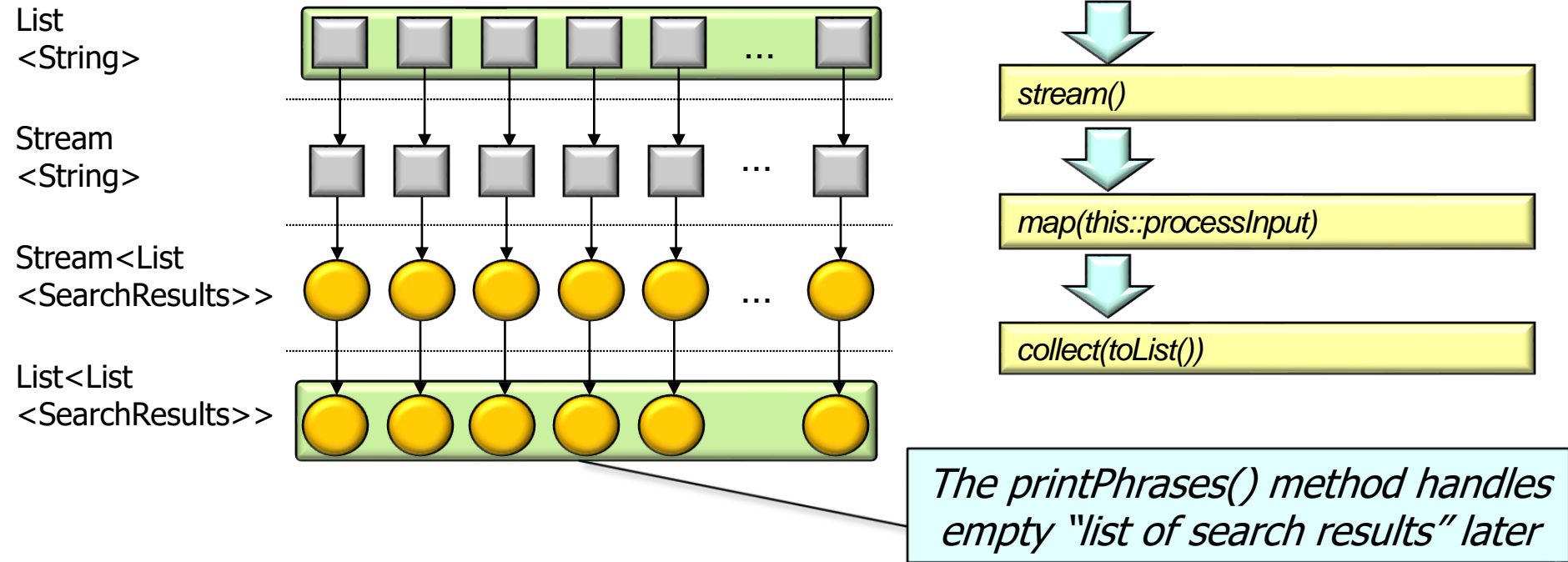
- processStream() searches a list of input strings



Some lists of search results may be empty if no phrases match an input string

Visualizing the processInput() Hook Method

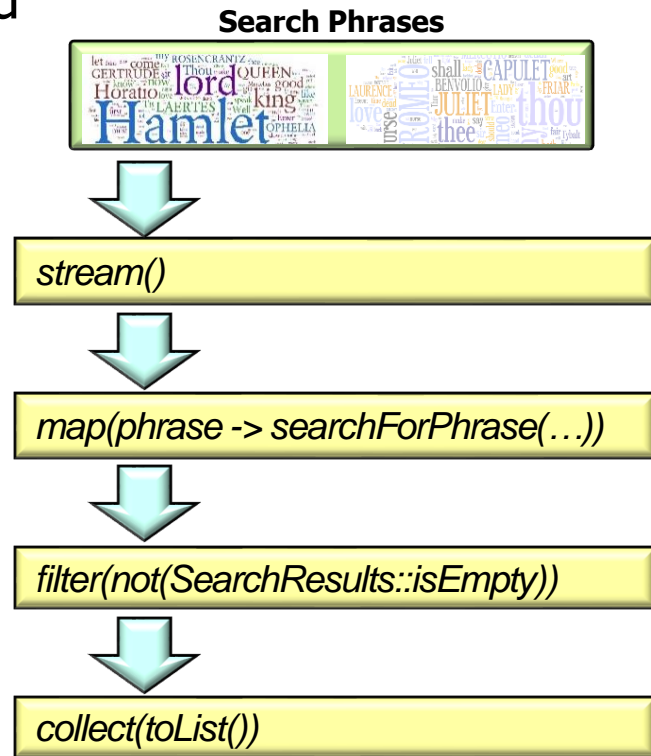
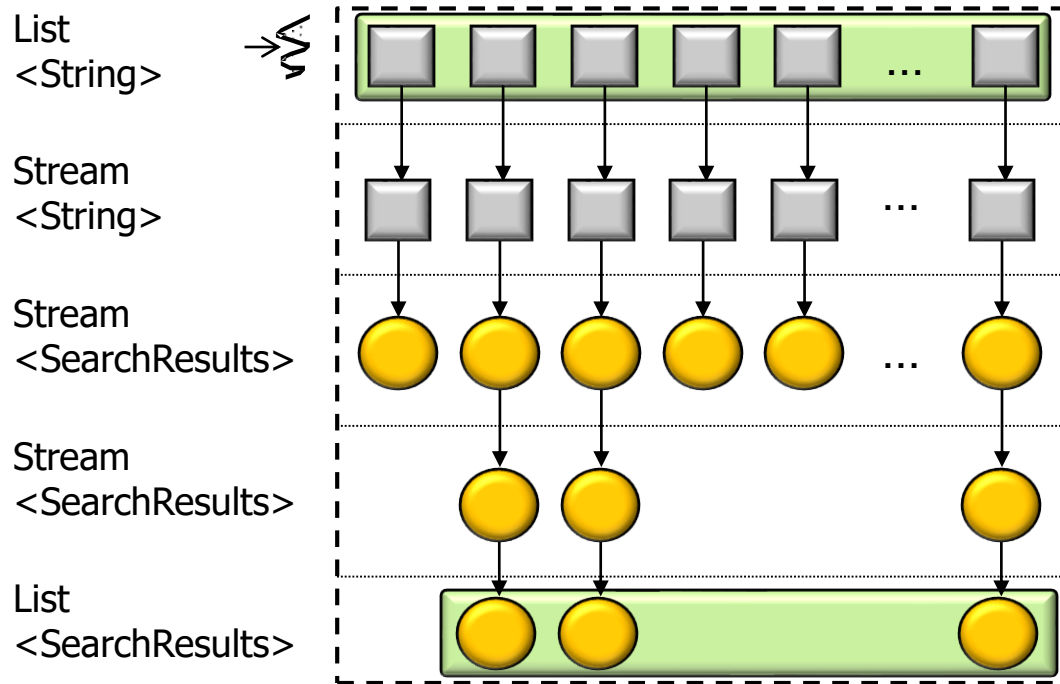
- processStream() searches a list of input strings



See "Java 8 Sequential SearchStreamGang Example (Part 2)"

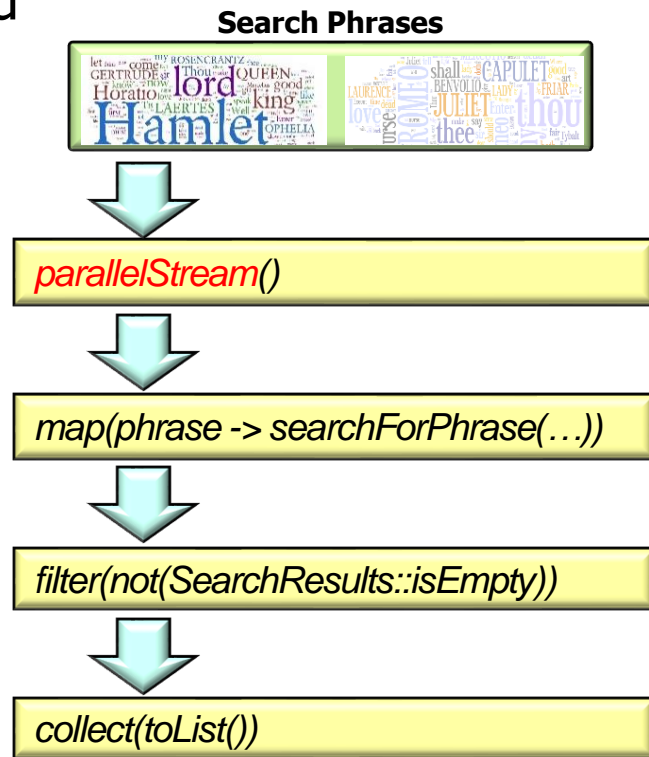
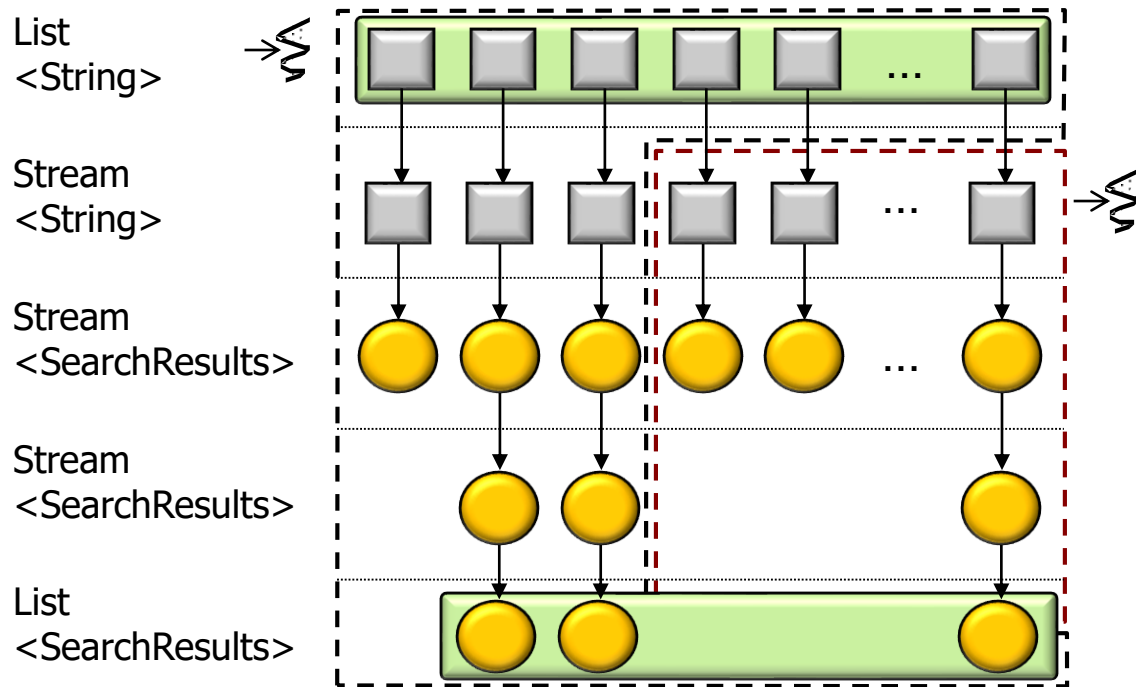
Visualizing the processInput() Hook Method

- We focus on sequential streams with one thread



Visualizing the processInput() Hook Method

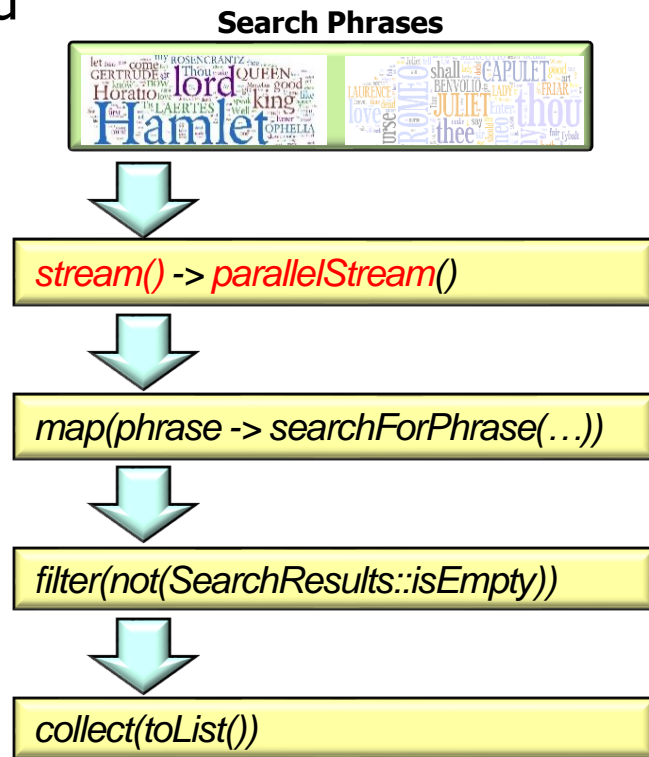
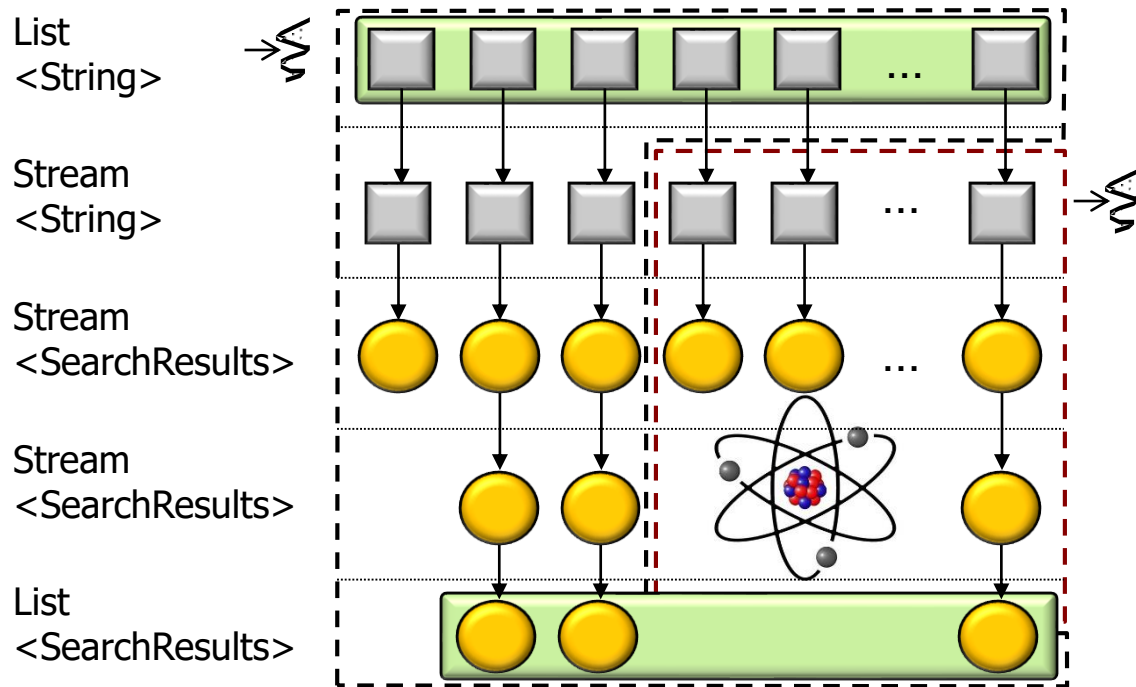
- We focus on sequential streams with one thread
- We'll cover parallel streams later



See "Overview of Java 8 Parallel Streams"

Visualizing the processInput() Hook Method

- We focus on sequential streams with one thread
- We'll cover parallel streams later



Minuscule changes are needed to transition from sequential to parallel streams!

End of Java Sequential SearchStreamGang Example: Visualizing Hook Methods