Overview of the Search TaskGangCommon Class

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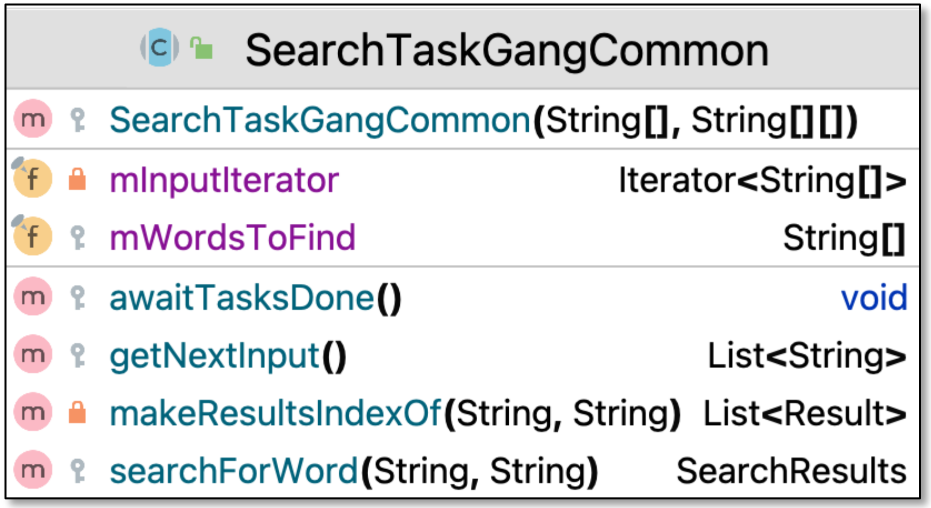
Learning Objectives in this Part of the Lesson

- Understand the SearchTaskGang case study
- Recognize the methods that are defined by the TaskGang framework
- Know the subclasses that extends TaskGang (directly or indirectly)
  - SearchTaskGangCommon



SearchTaskGangCommon

m	SearchTaskGangCommon(String[], String[][])	
f	mInputIterator	Iterator<String[]>
f	mWordsToFind	String[]
m	awaitTasksDone()	void
m	getNextInput()	List<String>
m	makeResultsIndexOf(String, String)	List<Result>
m	searchForWord(String, String)	SearchResults

See SearchTaskGang/src/main/java/tasks/SearchTaskGangCommon.java

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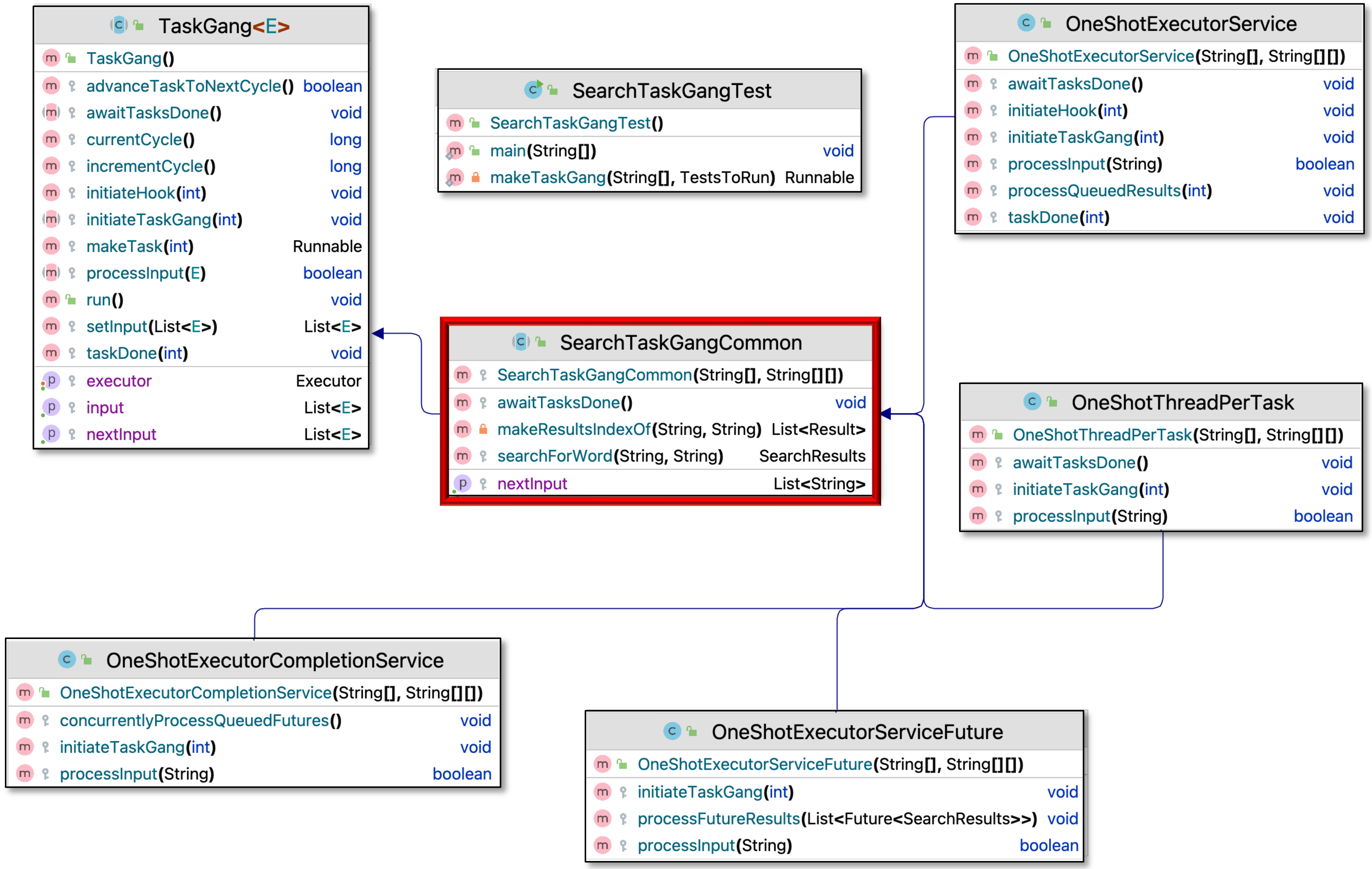
TaskGang<E>
TaskGang()
advanceTaskToNextCycle() boolean
awaitTasksDone() void
currentCycle() long
incrementCycle() long
initiateHook(int) void
initiateTaskGang(int) void
makeTask(int) Runnable
processInput(E) boolean
run() void
setInput(List<E>) List<E>
taskDone(int) void
executor Executor
input List<E>
nextInput List<E>
SearchTaskGangTest
SearchTaskGangTest()
main(String[]) void
makeTaskGang(String[], TestsToRun) Runnable
OneShotExecutorService
OneShotExecutorService(String[], String[][])
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OneShotExecutorServiceFuture(String[], String[][])
initiateTaskGang(int) void
processFutureResults(List<Future<SearchResults>>) void
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Begins to customize the TaskGang framework so it can concurrently search for keywords in List(s) of String objects

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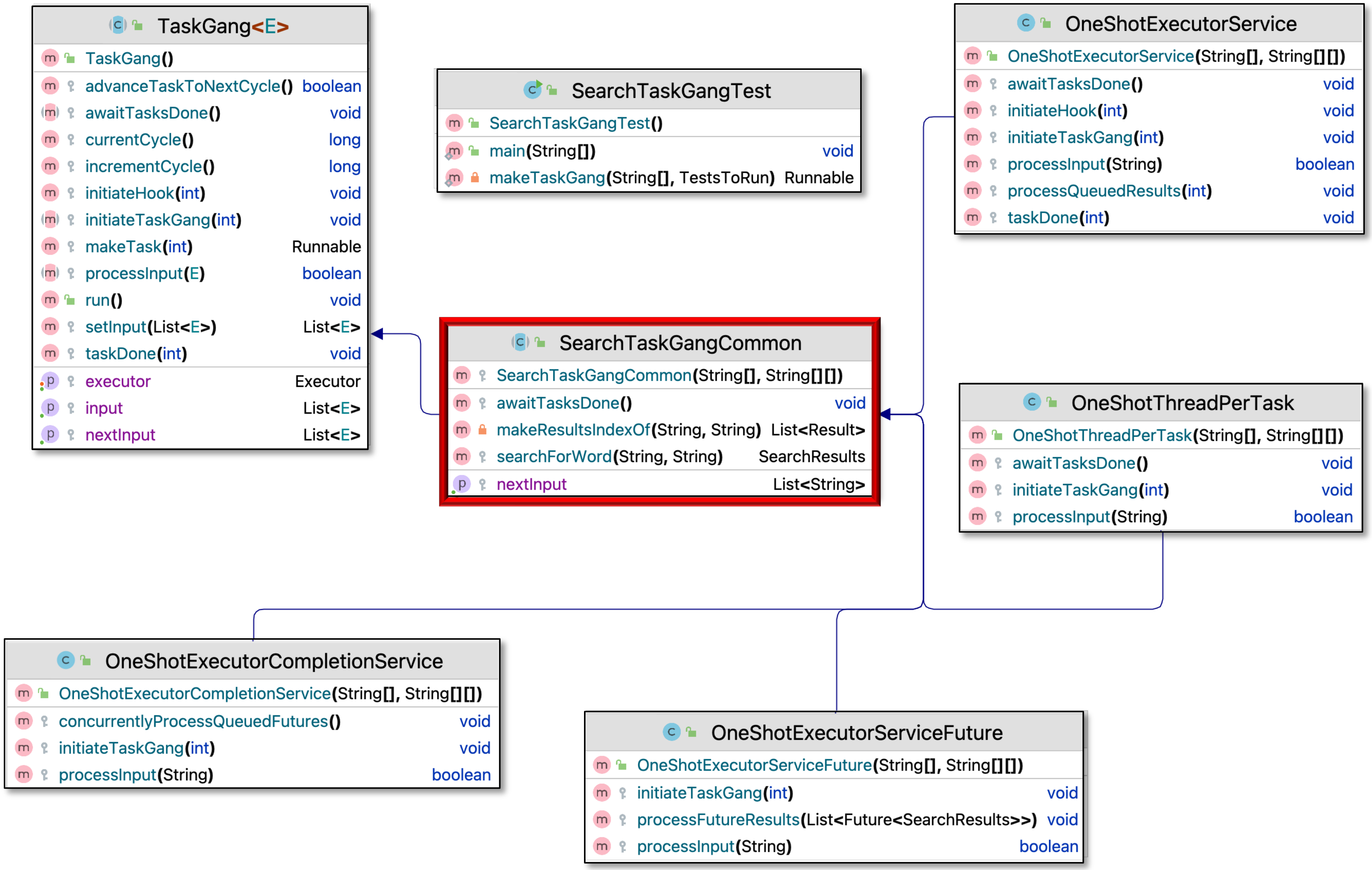
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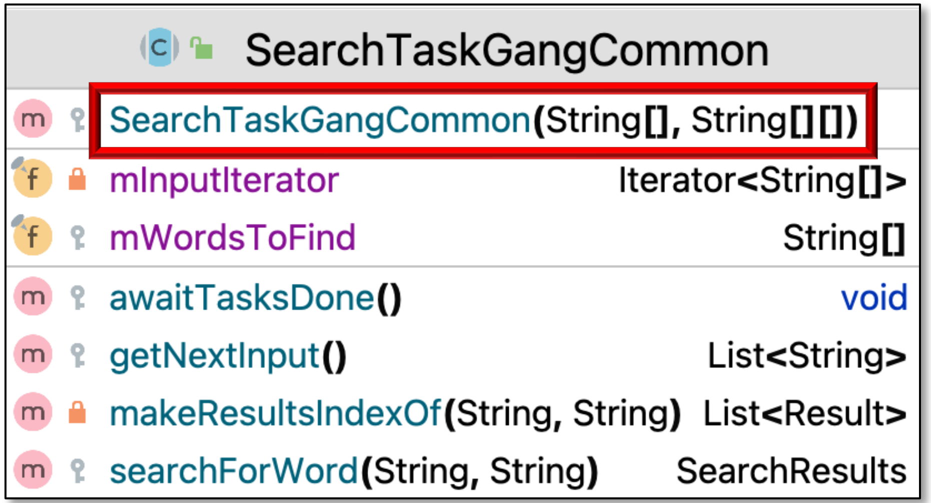
See SearchTaskGang/src/main/java/tasks/SearchTaskGangCommon.java

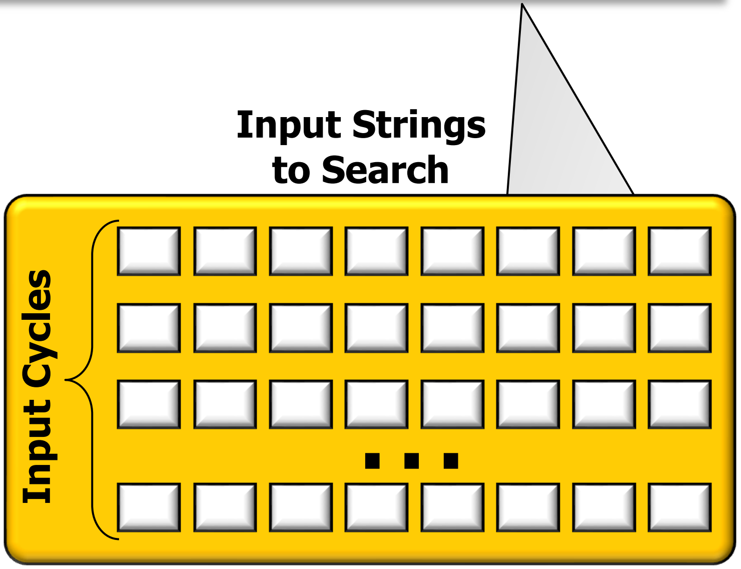
Overview of the SearchTaskGangCommon Class

- TaskGang subclass factors out code common to all the SearchTaskGang Test classes



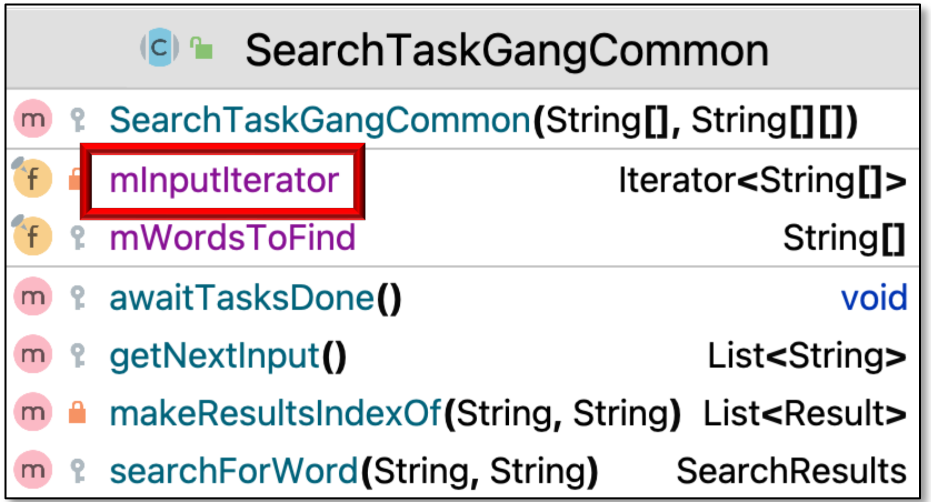
SearchTaskGangCommon

SearchTaskGangCommon(String[], String[][])	
mInputIterator	Iterator<String[]>
mWordsToFind	String[]
awaitTasksDone()	void
getNextInput()	List<String>
makeResultsIndexOf(String, String)	List<Result>
searchForWord(String, String)	SearchResults



Overview of the SearchTaskGangCommon Class

- TaskGang subclass factors out code common to all the SearchTaskGang Test classes
  - Uses an Iterator to systematically access the input



```
SearchTaskGangCommon
m  SearchTaskGangCommon(String[], String[][])
f  mInputIterator                         Iterator<String[]>
f  mWordsToFind                           String[]
m  awaitTasksDone()                       void
m  getNextInput()                         List<String>
m  makeResultsIndexOf(String, String)     List<Result>
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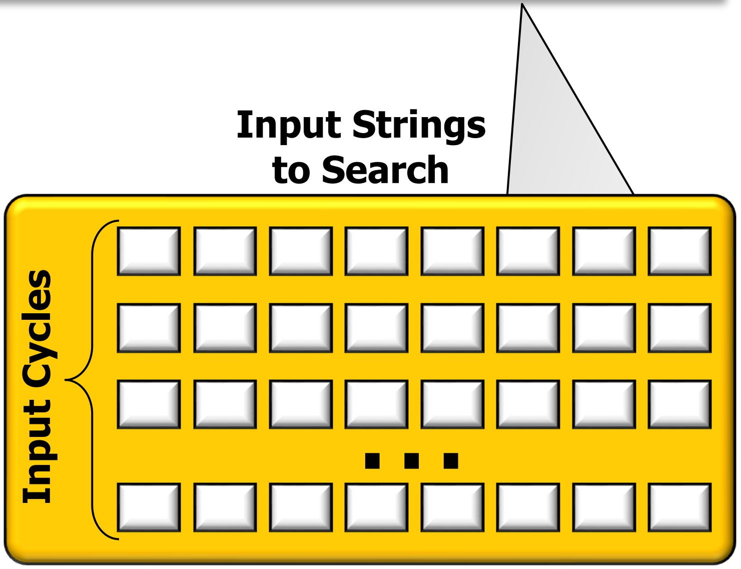
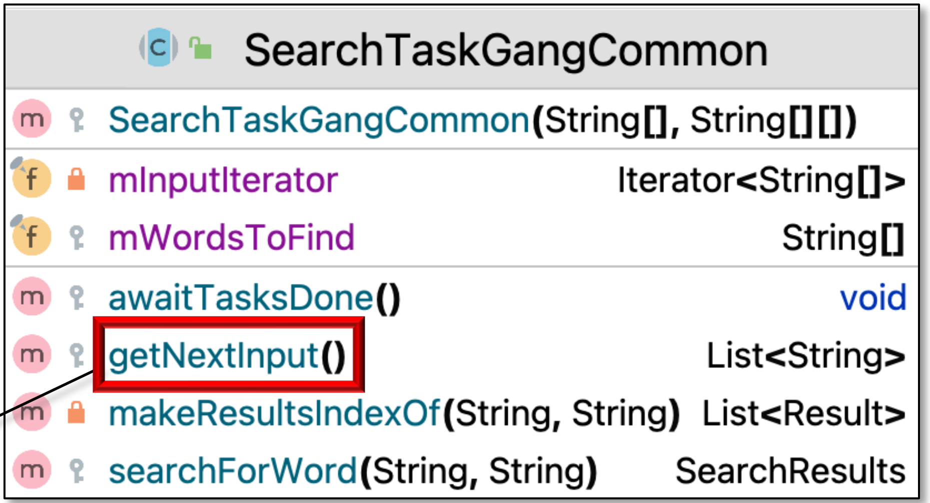


Overview of the SearchTaskGangCommon Class

- TaskGang subclass factors out code common to all the SearchTaskGang Test classes
  - Uses an Iterator to systematically access the input
    - Converts array into List



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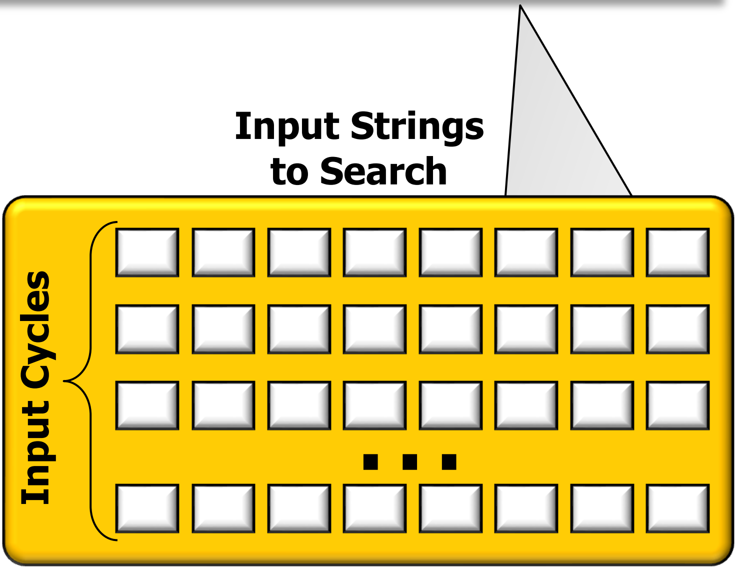
mWordsToFind	String[]
awaitTasksDone()	void
getNextInput()	List<String>
makeResultsIndexOf(String, String)	List<Result>
searchForWord(String, String)	SearchResults

```
if (mInputIterator.hasNext()) {
  mCurrentCycle.
      incrementAndGet();
  return Arrays.asList
      (mInputIterator.next());
} else
  return null;
}
```



The SearchTaskGang case study just uses a single set of input String objects

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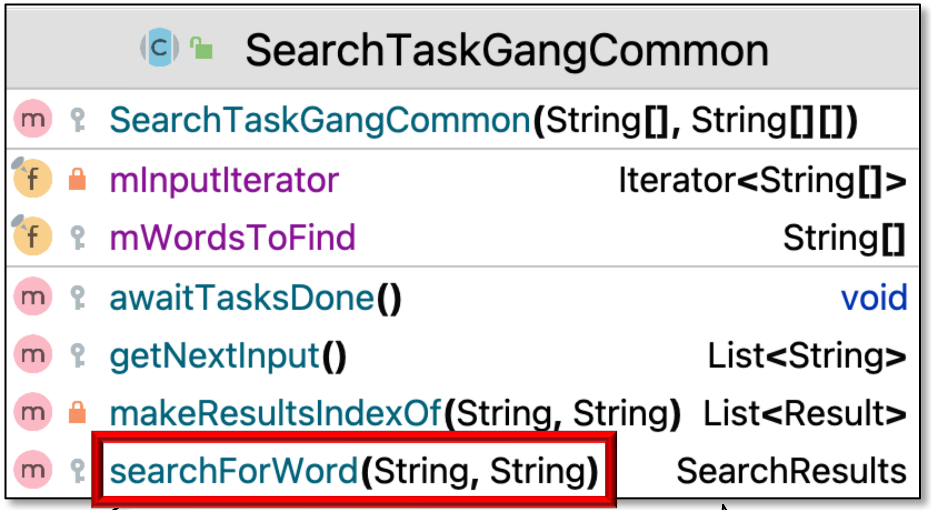
  - Uses an Iterator to systematically access the input
  - Each task runs same logic
    - i.e., returns search results



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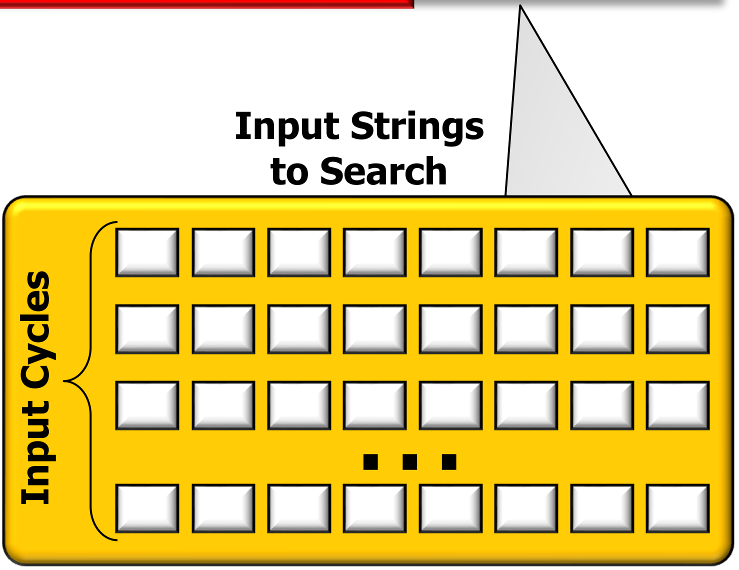
```
// Check to see how many times
// (if any) the word appears
// in the input data.
return new SearchResults(...);
```



These tasks are "embarrassingly parallel" since there are no dependencies

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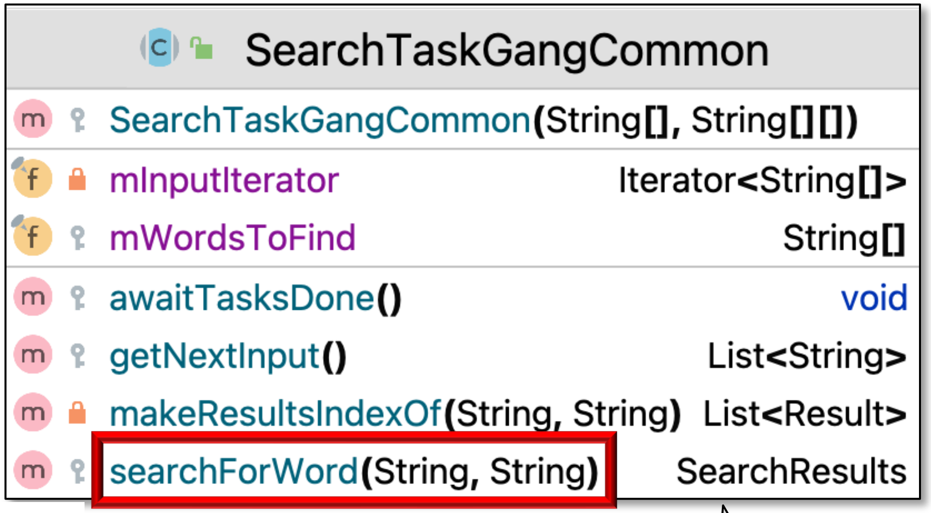
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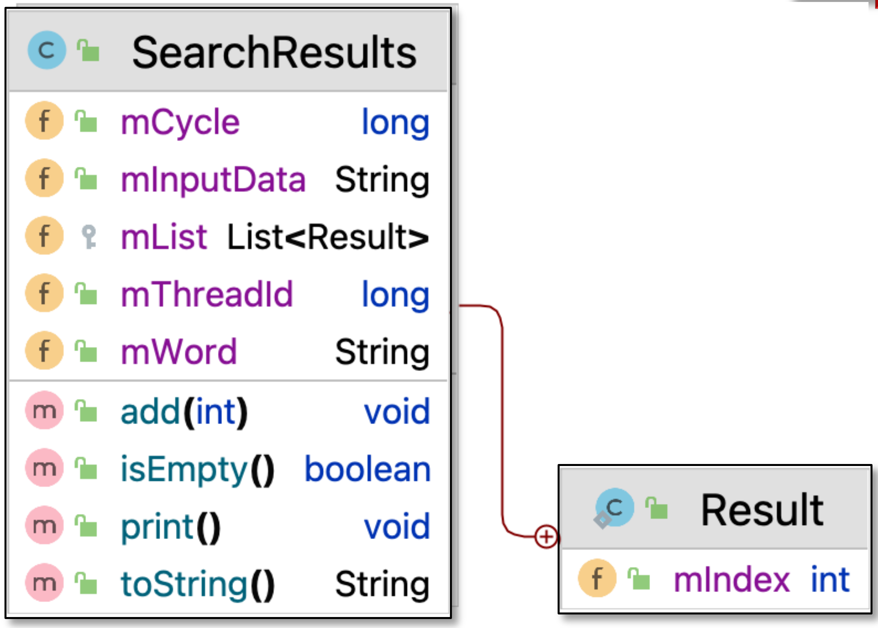
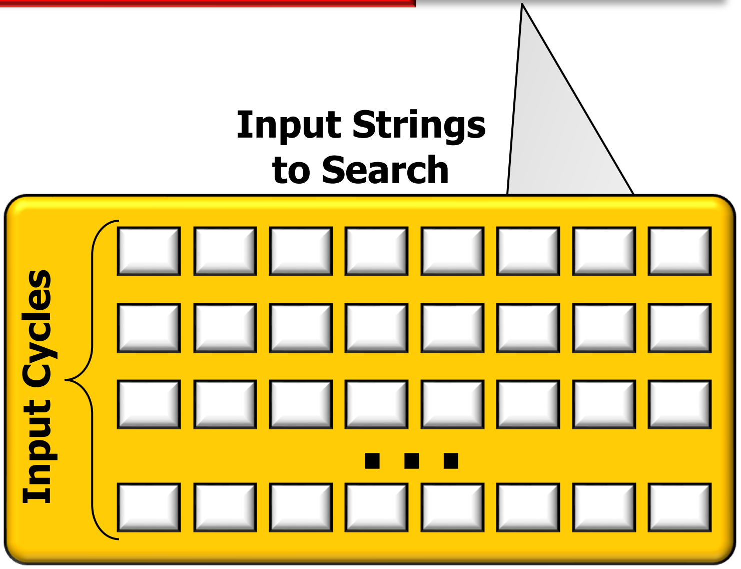

SearchResults

mCycle	long
mInputData	String
mList	List<Result>
mThreadId	long
mWord	String
add(int)	void
isEmpty()	boolean
print()	void
toString()	String

Result

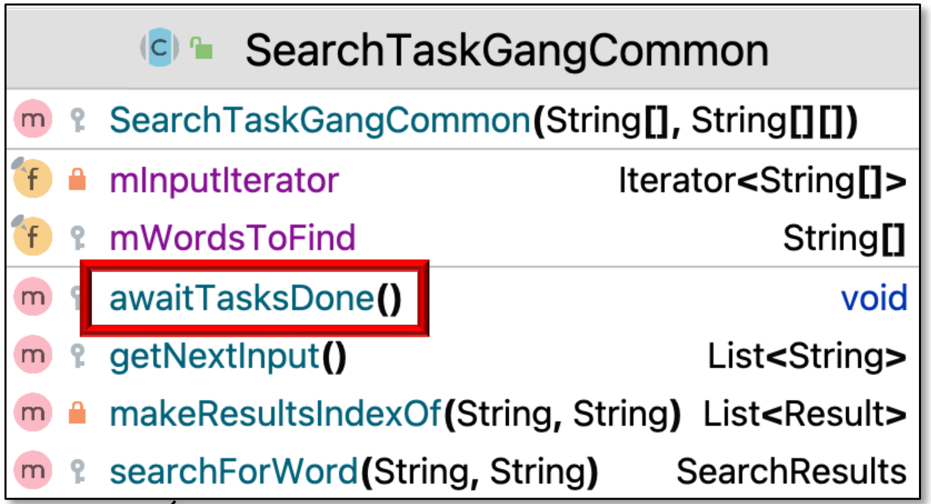
mIndex	int



See SearchTaskGang/src/main/java/utils/SearchResults.java

Overview of the SearchTaskGangCommon Class

- TaskGang subclass factors out code common to all the SearchTaskGang Test classes
  - Uses an Iterator to systematically access the input
  - Each task runs same logic
  - Barrier shutdowns the Executor & wait for the gang of Threads in the pool to exit



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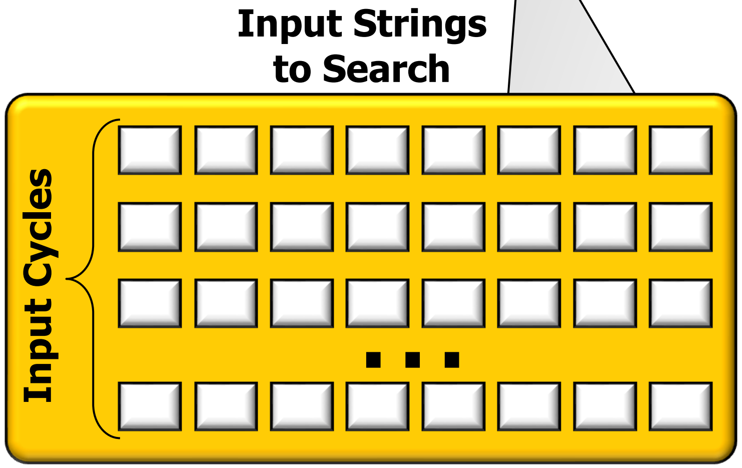
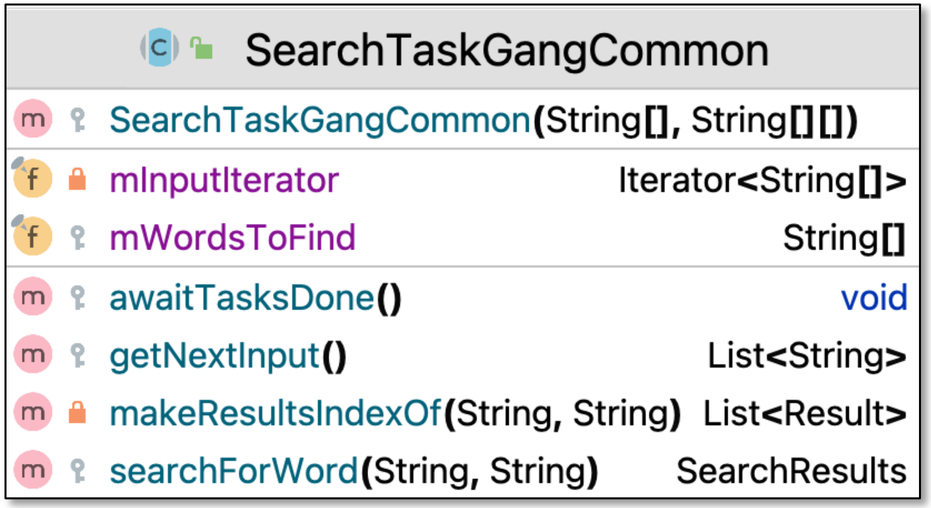
searchForWord(String, String)	SearchResults

```
getExecutor().shutdown();
...
getExecutor().
  awaitTermination(...);
```



Overview of the SearchTaskGangCommon Class

- There are no commitments (yet) to many of the hook methods defined by the TaskGang framework



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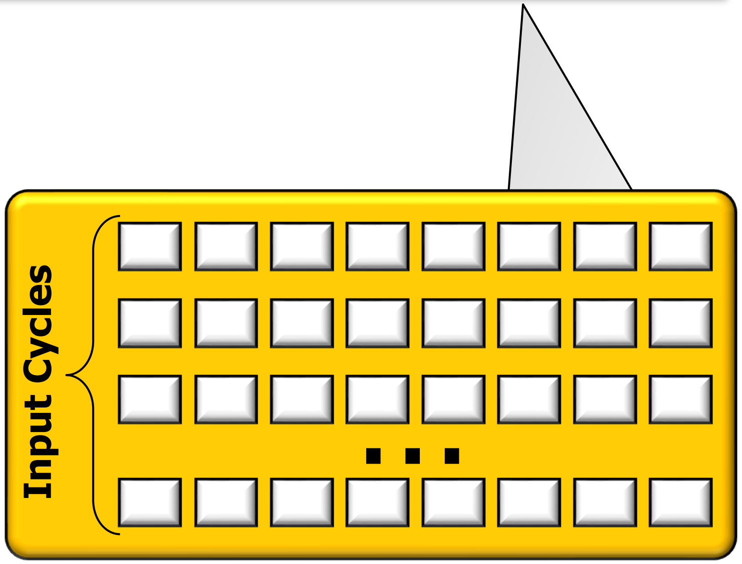
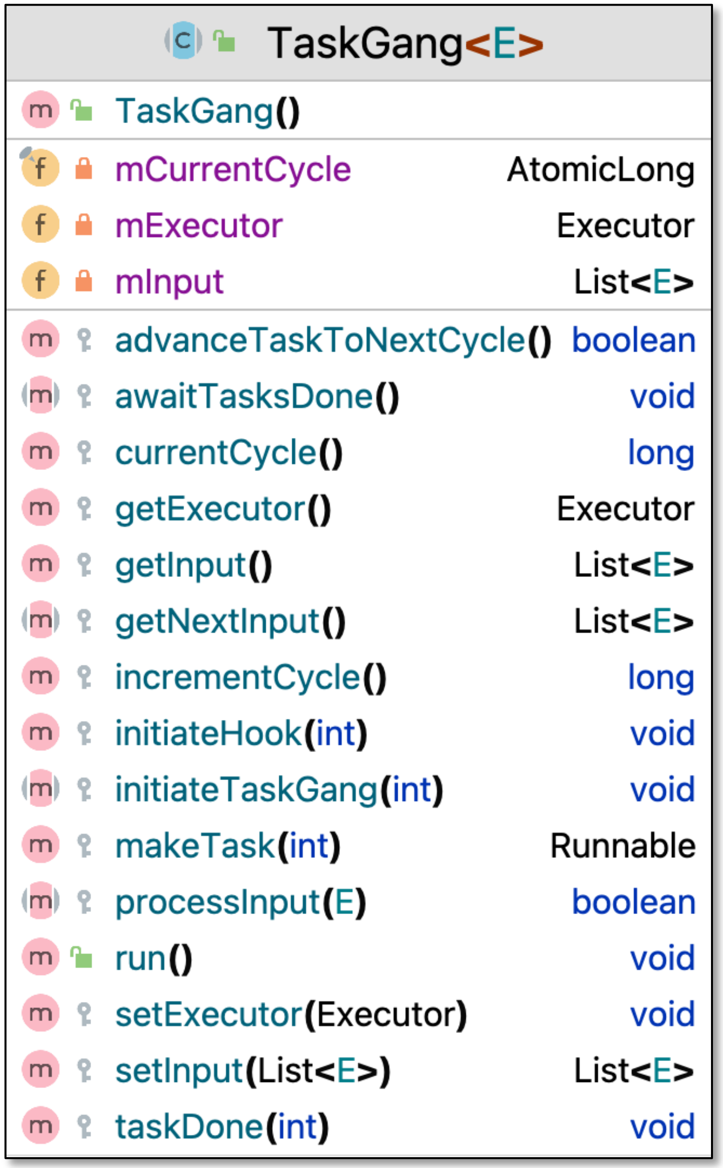


Overview of the SearchTaskGangCommon Class

- There are no commitments (yet) to many of the hook methods defined by the TaskGang framework
  - e.g., no Executor implementation, concurrency model, sync vs. async processing, specific source of input Strings, etc.

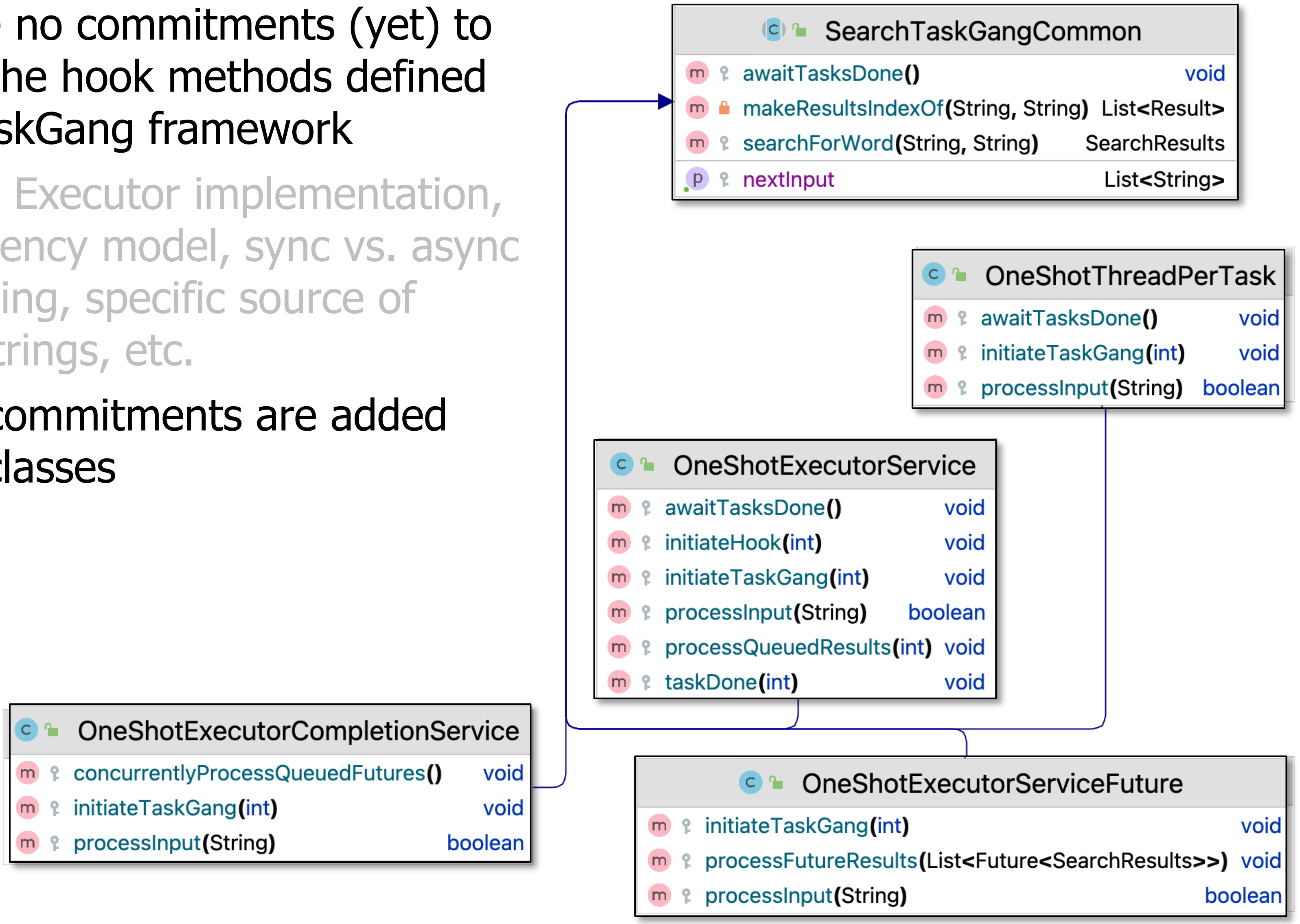


TaskGang<E>

TaskGang()	
mCurrentCycle	AtomicLong
mExecutor	Executor
mInput	List<E>
advanceTaskToNextCycle()	boolean
awaitTasksDone()	void
currentCycle()	long
getExecutor()	Executor
getInput()	List<E>
getNextInput()	List<E>
incrementCycle()	long
initiateHook(int)	void
initiateTaskGang(int)	void
makeTask(int)	Runnable
processInput(E)	boolean
run()	void
setExecutor(Executor)	void
setInput(List<E>)	List<E>
taskDone(int)	void

Overview of the SearchTaskGangCommon Class

- There are no commitments (yet) to many of the hook methods defined by the TaskGang framework
  - e.g., no Executor implementation, concurrency model, sync vs. async processing, specific source of input Strings, etc.
  - These commitments are added by subclasses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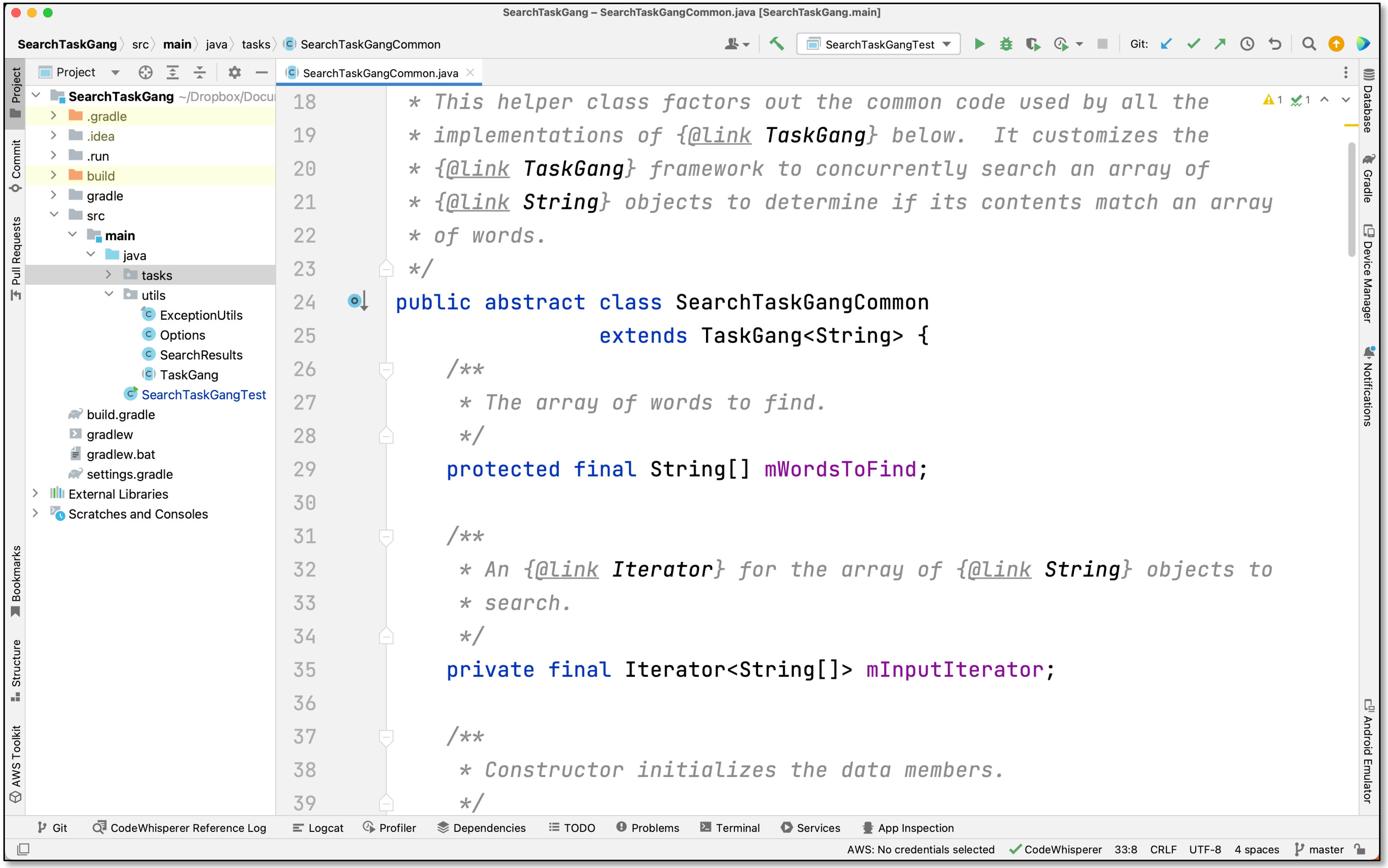
Walkthrough of the SearchTaskGangCommon Class



SearchTaskGang – SearchTaskGangCommon.java [SearchTaskGang.main]

SearchTaskGang 〉 src 〉 main 〉 java 〉 tasks 〉 SearchTaskGangCommon

```
SearchTaskGang ~/Dropbox/Docu
  .gradle
  .idea
  .run
  build
  gradle
  src
    main
      java
        tasks
        utils
          ExceptionUtils
          Options
          SearchResults
          TaskGang
        SearchTaskGangTest
  build.gradle
  gradlew
  gradlew.bat
  settings.gradle
External Libraries
Scratches and Consoles
```

```java
 * This helper class factors out the common code used by all the
 * implementations of {@link TaskGang} below.  It customizes the
 * {@link TaskGang} framework to concurrently search an array of
 * {@link String} objects to determine if its contents match an array
 * of words.
 */
public abstract class SearchTaskGangCommon
                      extends TaskGang<String> {
    /**
     * The array of words to find.
     */
    protected final String[] mWordsToFind;

    /**
     * An {@link Iterator} for the array of {@link String} objects to
     * search.
     */
    private final Iterator<String[]> mInputIterator;

    /**
     * Constructor initializes the data members.
     */
```

See SearchTaskGang/src/main/java/tasks/SearchTaskGangCommon.java

End of Overview of the Search TaskGangCommon Class