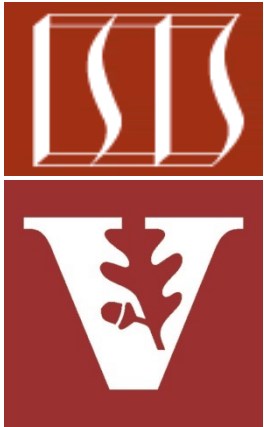


Overview of the OneShot ExecutorService Class



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Learning Objectives in this Part of the Lesson

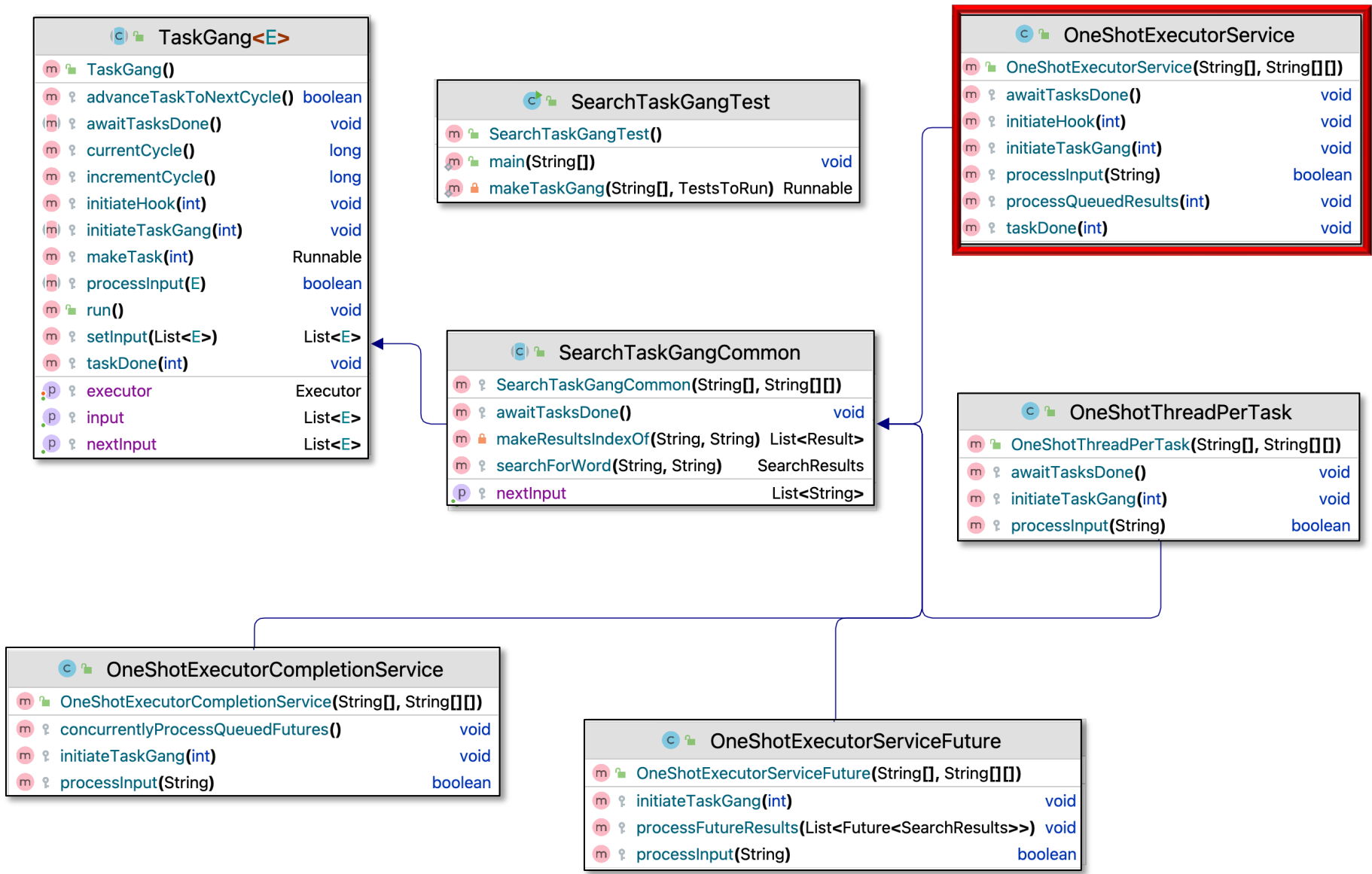
- Understand the SearchTaskGang case study
- Recognize the methods that are defined by the TaskGang framework
- Know the subclasses that extends TaskGang (directly or indirectly)
 - SearchTaskGangCommon
 - OneShotThreadPerTask
 - OneShotExecutorService

OneShotExecutorService	
m	OneShotExecutorService(String[], String[][])
f	MAX_THREADS int
f	mExitBarrier CountdownLatch
f	mResultsQueue BlockingQueue<SearchResults>
m	awaitTasksDone() void
m	initiateHook(int) void
m	initiateTaskGang(int) void
m	processInput(String) boolean
m	processQueuedResults(int) void
m	taskDone(int) void

See [SearchTaskGang/src/main/java/tasks/OneShotExecutorService.java](#)

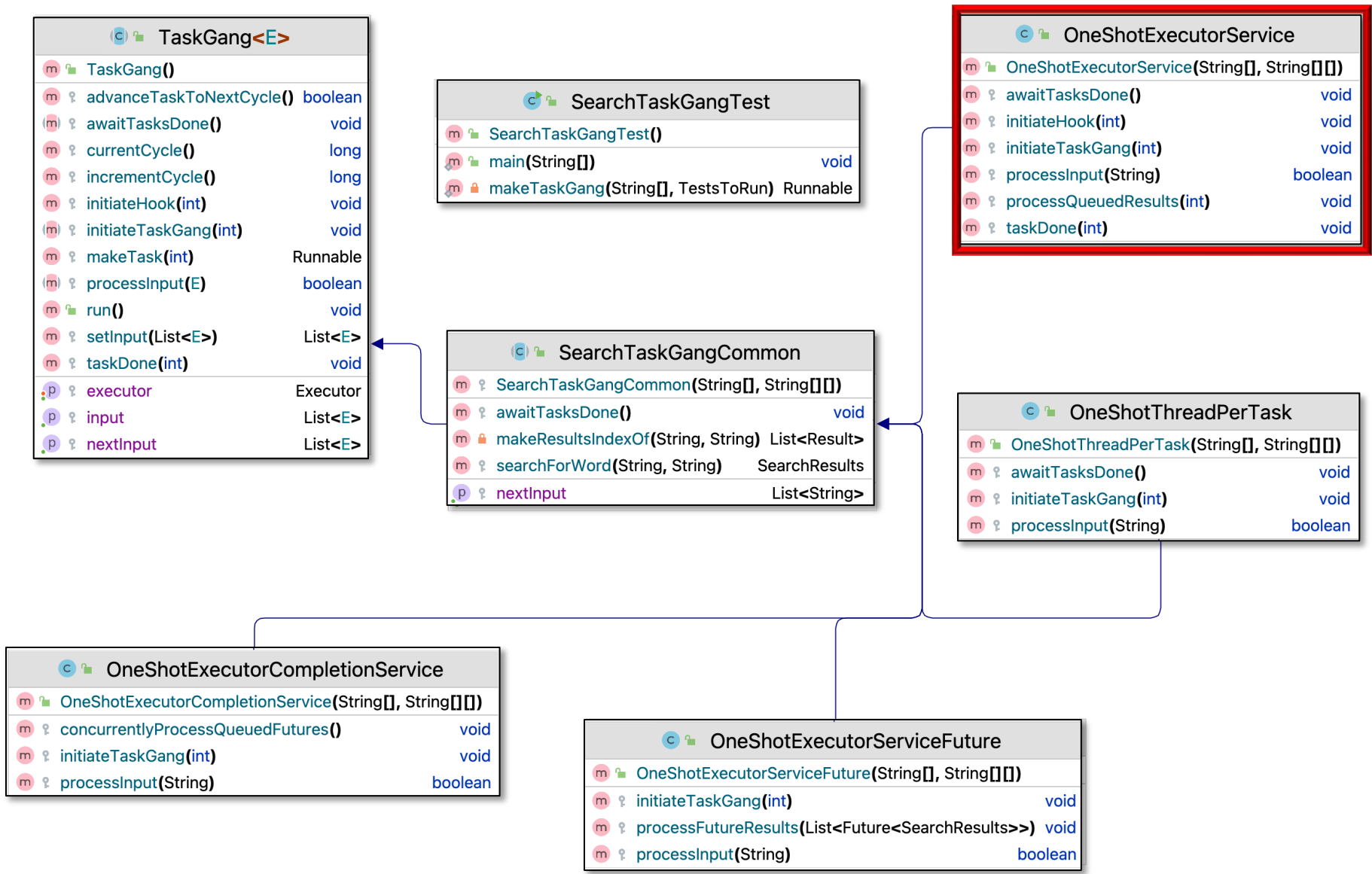
Overview of One ShotExecutorService

Overview of OneShotExecutorService



Customizes SearchTaskGangCommon to do a one-shot search for words in a List of String objects using a fixed-size pool of Thread objects

Overview of OneShotExecutorService

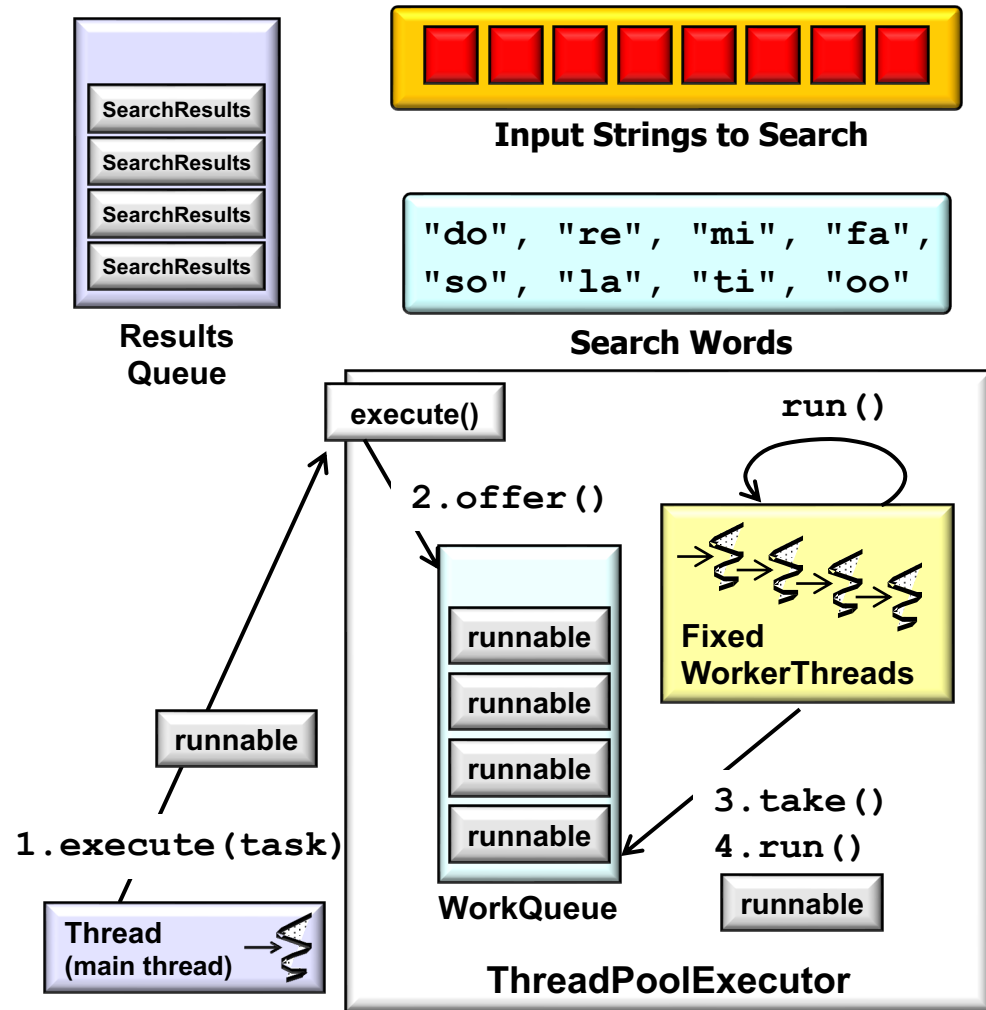


See [SearchTaskGang/src/main/java/tasks/OneShotExecutorService.java](#)

Overview of OneShotExecutorService

- Customizes SearchTaskGang
Common to search for words in a List of String objects

Strategy	Implementation
<i>Executor model</i>	Fixed-size Thread pool
<i>Unit of concurrency</i>	Task per input String
<i>Results processing model</i>	BlockingQueue stores results for immediate concurrent processing



Overview of OneShotExecutorService

- Customizes SearchTaskGang
Common to search for words
in a List of String objects

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Overview of OneShotExecutorService

- Customizes SearchTaskGang
Common to search for words
in a List of String objects
- Uses fixed-size Thread pool
 - Created by Executors
factory method

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setExecutor

```
(Executors.newFixedThreadPool(MAX_THREADS));
```


Overview of OneShotExecutorService

- Customizes SearchTaskGang
Common to search for words
in a List of String objects
 - Uses fixed-size Thread pool
 - Initialize the exit barrier

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```
mExitBarrier = new CountDownLatch(inputSize);
```

Overview of OneShotExecutorService

- Customizes SearchTaskGang
 - Common to search for words in a List of String objects
 - Uses fixed-size Thread pool
 - Initialize the exit barrier
 - Contains a BlockingQueue

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

Result	
f	mIndex int

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*Parameterized
w/SearchResults*

Overview of OneShotExecutorService

- Customizes SearchTaskGang
 - Common to search for words in a List of String objects
 - Uses fixed-size Thread pool
 - Initialize the exit barrier
 - Contains a BlockingQueue
 - Used to store & process search results concurrently wrt input processing

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```
for (int i = 0; i < resultCount; ++i)
    rethrowSupplier(mResultsQueue::take).get().print();
```

processQueuedResults() is discussed in more detail shortly

Overview of OneShotExecutorService

- Customizes SearchTaskGang
 - Common to search for words in a List of String objects
 - Uses fixed-size Thread pool
 - Initialize the exit barrier
 - Contains a BlockingQueue
 - Created tasks run in the Executor Thread pool

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```
for (int i = 0; i < inputSize; ++i)
    getExecutor().execute(makeTask(i));
```

makeTask() returns a task whose run() method calls processInput()

Overview of OneShotExecutorService

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```
for (int i = 0; i < inputSize; ++i)
    getExecutor().execute(makeTask(i));
```

execute() runs the task in the fixed-size Thread pool

Overview of OneShotExecutorService

- Customizes SearchTaskGang
 - Common to search for words in a List of String objects
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 - Created tasks run in the Executor Thread pool
 - Each input String is processed concurrently & enqueued for later processing

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```
for (String word: mWordsToFind)
    mResultsQueue.add(searchForWord(word, inputData));
```

Overview of OneShotExecutorService

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 - Created tasks run in the Executor Thread pool
 - BlockingQueue holds results
 - processQueuedResults() dequeues results & prints them immediately

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 - processQueuedResults() dequeues results & prints them immediately
 - take() may block

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 - Common to search for words in a List of String objects
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 - Created tasks run in the Executor Thread pool
 - BlockingQueue holds results
 - Main Thread waits on various exit barriers

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```
do {  
    processQueuedResults (...);  
    rethrowRunnable (mExitBarrier::await);  
} while (advanceTaskToNextCycle());  
  
super.awaitTasksDone();
```

advanceTaskToNextCycle() returns false by default, i.e., it's "one-shot"

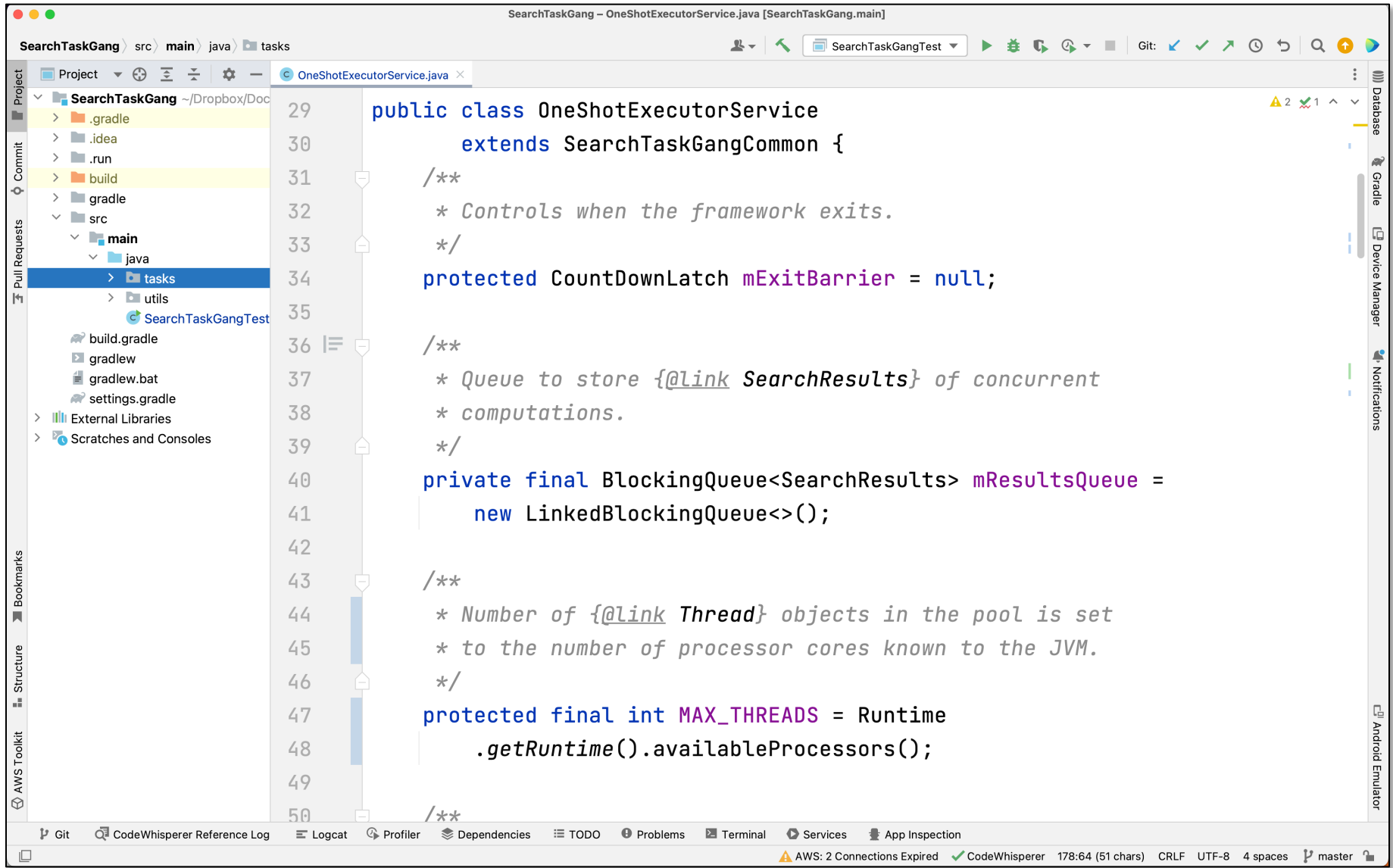
Overview of OneShotExecutorService

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 - Common to search for words in a List of String objects
 - Uses fixed-size Thread pool
 - Initialize the exit barrier
 - Contains a BlockingQueue
 - Created tasks run in the Executor Thread pool
 - BlockingQueue holds results
 - Main Thread waits on various exit barriers
 - Input processing tasks decrement exit barrier when done

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`mExitBarrier.countDown();`

Walkthrough of OneShotExecutorService



```
SearchTaskGang - OneShotExecutorService.java [SearchTaskGang.main]
SearchTaskGang src > main > java > tasks
OneShotExecutorService.java
29 public class OneShotExecutorService
30     extends SearchTaskGangCommon {
31     /**
32      * Controls when the framework exits.
33      */
34     protected CountdownLatch mExitBarrier = null;
35
36     /**
37      * Queue to store {@link SearchResults} of concurrent
38      * computations.
39      */
40     private final BlockingQueue<SearchResults> mResultsQueue =
41         new LinkedBlockingQueue<>();
42
43     /**
44      * Number of {@link Thread} objects in the pool is set
45      * to the number of processor cores known to the JVM.
46      */
47     protected final int MAX_THREADS = Runtime
48         .getRuntime().availableProcessors();
49
50     /**
```

See [SearchTaskGang/src/main/java/tasks/OneShotExecutorService.java](https://github.com/GoogleCloudPlatform/CloudSearch/blob/master/src/main/java/tasks/OneShotExecutorService.java)

End of Overview of OneShotExecutorService