Applying Java Structured Concurrency: Case Study ex2

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Learning Objectives in this Part of the Lesson

- Understand Java's structured concurrency model
- Recognize the classes used to program Java's structure concurrency model, e.g.
  - ThreadPerTaskExecutor
    - Case study ex2 shows how Java Executors is updated with new factory methods that create a (virtual) Thread per task

```
try (ExecutorService
      executor = Executors
     .newVirtualThreadPerTaskExecutor())
{
  return integers
    .stream()

    .map(primeCandidate ->
         checkPrimality
           (primeCandidate,
            executor))

    .toList();
}
```

The tasks in this case study are all CPU-bound

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    - Case study ex2 shows how Java Executors is updated with new factory methods that create a (virtual) Thread per task
    - It also shows how to combine Java Streams with the new Java Executors features

```
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      executor = Executors
     .newVirtualThreadPerTaskExecutor())
{
  return integers
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     .map(primeCandidate ->
          checkPrimality
            (primeCandidate,
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```

Applying Java Structured Concurrency to Case Study ex2

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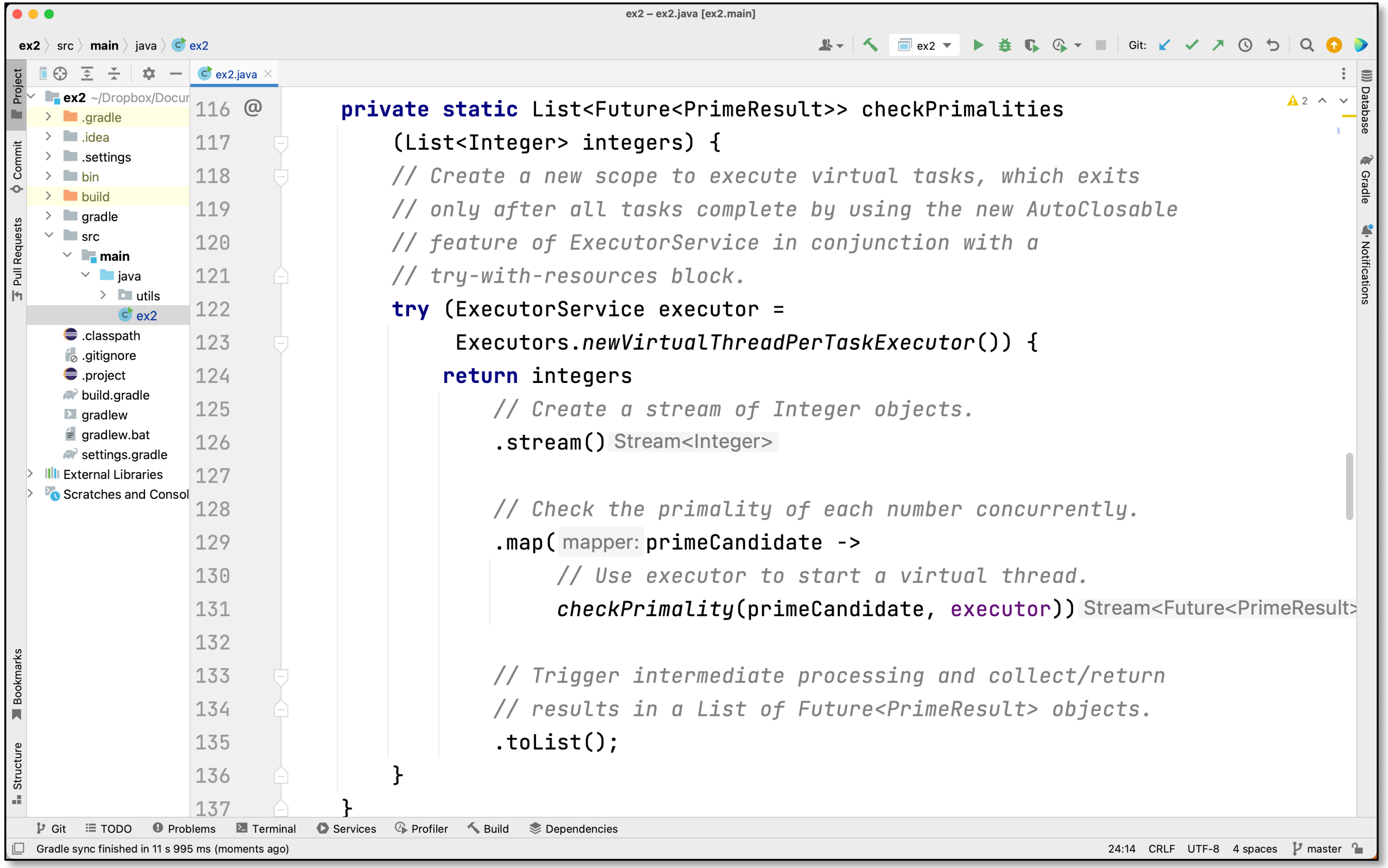
ex2 – ex2.java [ex2.main]
ex2 〉 src 〉 main 〉 java 〉 ex2
ex2.java
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src
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External Libraries
Scratches and Consol
Git TODO Problems Terminal Services Profiler Build Dependencies
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24:14 CRLF UTF-8 4 spaces master

```java
    private static List<Future<PrimeResult>> checkPrimalities
        (List<Integer> integers) {
        // Create a new scope to execute virtual tasks, which exits
        // only after all tasks complete by using the new AutoClosable
        // feature of ExecutorService in conjunction with a
        // try-with-resources block.
        try (ExecutorService executor =
              Executors.newVirtualThreadPerTaskExecutor()) {
            return integers
                // Create a stream of Integer objects.
                .stream() Stream<Integer>

                // Check the primality of each number concurrently.
                .map( mapper: primeCandidate ->
                    // Use executor to start a virtual thread.
                    checkPrimality(primeCandidate, executor)) Stream<Future<PrimeResult>

                // Trigger intermediate processing and collect/return
                // results in a List of Future<PrimeResult> objects.
                .toList();
        }
    }
```

See github.com/douglascraigschmidt/LiveLessons/tree/master/Loom/ex2

End of Applying Java Structured Concurrency: Case Study ex2