Applying Java Structured Concurrency: Case Study ex3

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Learning Objectives in this Part of the Lesson

- Case study ex3 demos Java 19 structured concurrency features, which enable a main task to split into several concurrent sub-tasks that run concurrently to completion before the main task can complete.
- Java 19 supports structured concurrency via the StructuredTaskScope class, which supports AutoCloseable & defines several nested classes (e.g., StructuredTaskScope.ShutdownOnFailure)

```javascript
try (var scope = new StructuredTaskScope .ShutdownOnFailure()) {
  var results = ...
  for (var bf : generateRandomBigFractions (count))
    results.add (scopes.fork(...));
  scope.join();
  sortAndPrintList(results);
}
```
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```java
try (var scope = new StructuredTaskScope.ShutdownOnFailure()) {
    // Create a List of Future<BigFraction> to hold the results.
    var results = new ArrayList<Future<BigFraction>>();

    // Iterate through all the random BigFraction objects.
    for (var bigFraction : generateRandomBigFractions(count))
        results
            // Add the Future<BigFraction> to the list.
            .add(scope
                // Fork a new virtual thread to reduce and multiply the
                // BigFraction concurrently.
                .fork(task() ->
                    reduceAndMultiply(bf1: bigFraction,
                        bf2: sBigReducedFraction));

    // This barrier synchronizer waits for all threads to finish or the
    // task scope to shut down.
    scope.join();

    // Sort and print the results.
    BigFractionUtils.sortAndPrintList(list: results);
```

See [github.com/douglasraigschmidt/LiveLessons/tree/master/Loom/ex3](https://github.com/douglasraigschmidt/LiveLessons/tree/master/Loom/ex3)
End of Applying Java Structured Concurrency: Case Study ex3