# Applying Java Structured Concurrency: Case Study ex4 (Part 1a)

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# Learning Objectives in this Part of the Lesson

- Understand Java's structured concurrency model
- Recognize classes used to program Java's structure concurrency model
- Case study ex4 evaluates the design & performance results of various Java concurrency models

```
try (var scope = new
     StructuredTaskScope
     .ShutdownOnFailure()) {
  List<Future<Image>> images =
    new ArrayList<>();

  for (URL url : urlList)
    images.add(scope
      .fork(() ->
           downloadImage(url)));

  rethrowRunnable(scope::join);

  return images;
}
```

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  - Part 1 of this case study focuses on the Java structured concurrency StructuredTaskScope

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The tasks in this case study are largely I/O-bound

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    - This solution uses classic Java features

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## Applying Java Structured Concurrency to Case Study ex4

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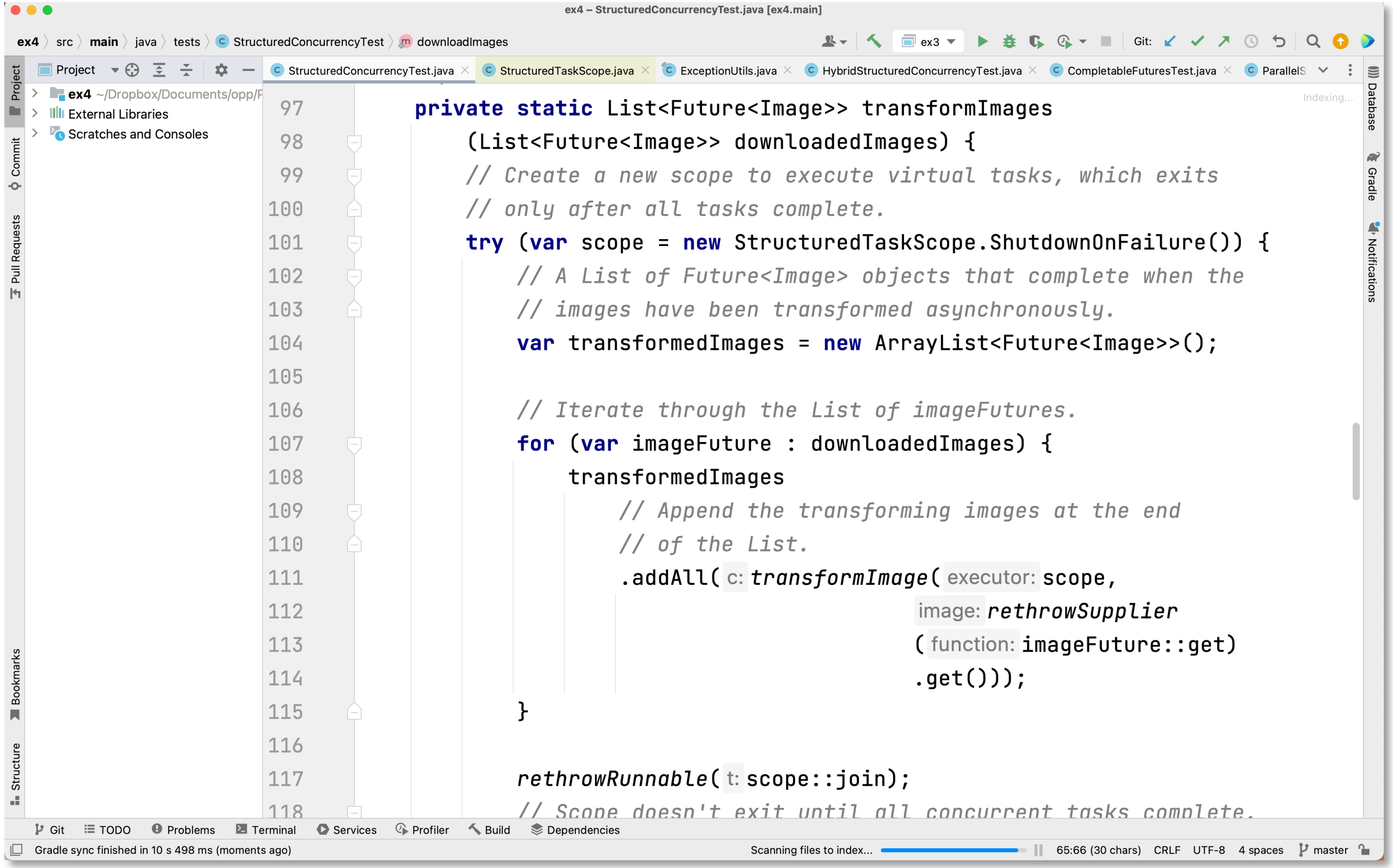

```
    private static List<Future<Image>> transformImages
        (List<Future<Image>> downloadedImages) {
        // Create a new scope to execute virtual tasks, which exits
        // only after all tasks complete.
        try (var scope = new StructuredTaskScope.ShutdownOnFailure()) {
            // A List of Future<Image> objects that complete when the
            // images have been transformed asynchronously.
            var transformedImages = new ArrayList<Future<Image>>();

            // Iterate through the List of imageFutures.
            for (var imageFuture : downloadedImages) {
                transformedImages
                    // Append the transforming images at the end
                    // of the List.
                    .addAll( c: transformImage( executor: scope,
                                                image: rethrowSupplier
                                                ( function: imageFuture::get)
                                                .get()));
            }

            rethrowRunnable( t: scope::join);
            // Scope doesn't exit until all concurrent tasks complete.
```

See github.com/douglascraigschmidt/LiveLessons/tree/master/Loom/ex4

# End of Applying Java Structured Concurrency: Case Study ex4 (Part 1a)