Walkthrough of the Java ShutdownOnSuccess Code

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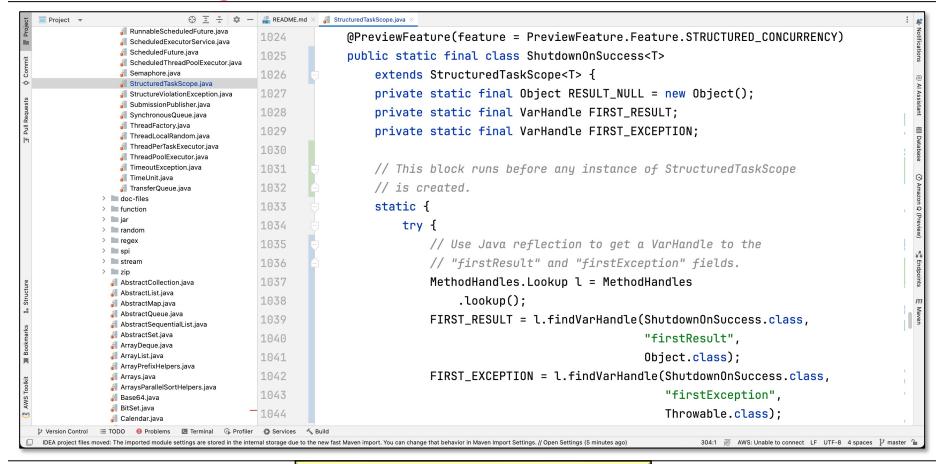Vanderbilt University
Nashville, Tennessee, USA

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

- Evaluate the design & performance of various Java concurrency models

- Learn how StructuredTaskScope is implemented

  - Focus on ShutdownOnSuccess

    - Implements "invoke-any" semantics

```java
@PreviewFeature(feature = PreviewFeature.Feature.STRUCTURED_CONCURRENCY)
public static final class ShutdownOnSuccess<T>
    extends StructuredTaskScope<T> {
    private static final Object RESULT_NULL = new Object();
    private static final VarHandle FIRST_RESULT;
    private static final VarHandle FIRST_EXCEPTION;
    static {
        try {
            MethodHandles.Lookup l = MethodHandles
                .lookup();
            FIRST_RESULT = l.findVarHandle(ShutdownOnSuccess.class,
                                           "firstResult",
                                           Object.class);
            FIRST_EXCEPTION = l.findVarHandle(ShutdownOnSuccess.class,
                                              "firstException",
                                              Throwable.class);
        } catch (Exception e) {
            throw new ExceptionInInitializerError(e);
        }
    }
    private volatile Object firstResult;
    private volatile Throwable firstException;
```

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Project files (left panel):

- RunnableScheduledFuture.java
- ScheduledExecutorService.java
- ScheduledFuture.java
- ScheduledThreadPoolExecutor.java
- Semaphore.java
- StructuredTaskScope.java
- StructureViolationException.java
- SubmissionPublisher.java
- SynchronousQueue.java
- ThreadFactory.java
- ThreadLocalRandom.java
- ThreadPerTaskExecutor.java
- ThreadPoolExecutor.java
- TimeoutException.java
- TimeUnit.java
- TransferQueue.java
- doc-files
- function
- jar
- random
- regex
- spi
- stream
- zip
- AbstractCollection.java
- AbstractList.java
- AbstractMap.java
- AbstractQueue.java
- AbstractSequentialList.java
- AbstractSet.java
- ArrayDeque.java
- ArrayList.java
- ArrayPrefixHelpers.java
- Arrays.java
- ArraysParallelSortHelpers.java
- Base64.java
- BitSet.java
- Calendar.java

```java
@PreviewFeature(feature = PreviewFeature.Feature.STRUCTURED_CONCURRENCY)
public static final class ShutdownOnSuccess<T>
        extends StructuredTaskScope<T> {
    private static final Object RESULT_NULL = new Object();
    private static final VarHandle FIRST_RESULT;
    private static final VarHandle FIRST_EXCEPTION;


    // This block runs before any instance of StructuredTaskScope
    // is created.
    static {
        try {
            // Use Java reflection to get a VarHandle to the
            // "firstResult" and "firstException" fields.
            MethodHandles.Lookup l = MethodHandles
                    .lookup();
            FIRST_RESULT = l.findVarHandle(ShutdownOnSuccess.class,
                                           "firstResult",
                                           Object.class);
            FIRST_EXCEPTION = l.findVarHandle(ShutdownOnSuccess.class,
                                              "firstException",
                                              Throwable.class);
```

README.md   StructuredTaskScope.java

End of Walkthrough of Java ShutdownOnSuccess Code