Understand Java Parallel Streams Internals: Demo’ing How to Configure the Common Fork-Join Pool

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Learning Objectives in this Part of the Lesson

- Understand parallel stream internals, e.g.
- Know what can change & what can’t
- Partition a data source into “chunks”
- Process chunks in parallel via the common fork-join pool
- Configure the Java parallel stream common fork-join pool
- Know the performance impact of configuring the common fork-join pool size

Entering the test program with 12 cores
ex20: testDefaultDownloadBehavior() downloaded and stored 42 images using 12 threads in the pool
ex20: testAdaptiveMBDownloadBehavior() downloaded and stored 42 images using 43 threads in the pool
ex20: testAdaptiveBTDownloadBehavior() downloaded and stored 42 images using 43 threads in the pool

Printing 3 results from fastest to slowest

- testAdaptiveBTDownloadBehavior() executed in 3598 msecs
- testAdaptiveMBDownloadBehavior() executed in 3910 msecs
- testDefaultDownloadBehavior() executed in 4104 msecs

Leaving the test program

See github.com/douglascraigschmidt/LiveLessons/tree/master/Java8/ex20
Demo’ing Impact of Configuring Common Fork-Join Pool
Demo’ing Impact of Configuring Common Fork-Join Pool

- The common fork-join pool size can be controlled programmatically.

See prior lesson on “Java Parallel Stream Internals: Configuring the Common Fork-Join Pool”
Demo’ing Impact of Configuring Common Fork-Join Pool

- The common fork-join pool size can be controlled programmatically
- This demo applies the Managed Blocker interface to adaptively add new worker threads to the Java common fork-join pool

```java
File downloadAndStoreImageMB(URL url) {
    final Image[] image = new Image[1];
    ...
    ForkJoinPool.
    .managedBlock(new ForkJoinPool.
    .ManagedBlocker() {
        public boolean block() {
            image[0] =
            downloadImage(url);
            return true;
        }
    });

    return image[0].store(); ...
}
```

Demo'ing Impact of Configuring Common Fork-Join Pool

- This program shows the performance difference of using ManagedBlocker versus not using ManagedBlocker for an I/O-intensive app

```java
void testDownloadBehavior(Function<URL, File> downloadAndStoreImage,
                           String testName) {
...

    List<File> imageFiles = Options.instance()
                   .getUrlList()
                   .parallelStream()

                   .map(downloadAndStoreImage)

                   .collect(Collectors.toList());

   printStats(testName, imageFiles.size()); ...
```
Demo'ing Impact of Configuring Common Fork-Join Pool

- This program shows the performance difference of using ManagedBlocker versus not using ManagedBlocker for an I/O-intensive app

```java
void testDownloadBehavior(Function<URL, File>
   downloadAndStoreImage,
   String testName) {

   ...  

   List<File> imageFiles = Options.instance()
      .getUrlList()  
      .parallelStream()

      .map(downloadAndStoreImage)

      .collect(Collectors.toList()));

   printStats(testName, imageFiles.size()); ... 
```

This function param is used to pass different strategies for downloading & storing images from remote websites

Demo'ing Impact of Configuring Common Fork-Join Pool

• Results show increasing worker threads in the pool improves performance

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Leaving the test program

See upcoming lessons on "The Java Fork-Join Pool: the ManagedBlocker Interface"
Demo'ing Impact of Configuring Common Fork-Join Pool

See [github.com/douglascraigschmidt/LiveLessons/tree/master/Java8/ex20](https://github.com/douglascraigschmidt/LiveLessons/tree/master/Java8/ex20)
End of Understand Java Parallel Streams Internals: Demo’ing How to Configure the Common Fork-Join Pool