# Applying the Java Fork-Join Framework's ManagedBlocker Interface


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# Learning Objectives in this Part of the Lesson

- Understand how the common fork-join pool helps to maximize processor core utilization
- Recognize how the ManagedBlocker interface helps avoid starvation & improve performance
- Be able to apply the ManagedBlocker interface on blocking synchronizers & queues

```
class ManagedLocker implements
      ManagedBlocker {
  final ReentrantLock mLock;
  boolean mHasLock = false;

  ManagedLocker(ReentrantLock
                lock)
  { mLock = lock; }

  public boolean block() {
    if (!mHasLock)
      mLock.lock();
    return true;
  }
  ...
```

# Applying the Managed Blocker Interface

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- This example applies a ManagedBlocker on a ReentrantLock (from Java docs)

```
class ManagedLocker implements ManagedBlocker {
  final ReentrantLock mLock;
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  ManagedLocker(ReentrantLock lock) { mLock = lock; }

  public boolean isReleasable()
  { return mHasLock || (mHasLock = mLock.tryLock()); }

  public boolean block() {
    if (!mHasLock) mLock.lock();
    return true;
  }
}
```

*Handles a blocking synchronizer*

See docs.oracle.com/javase/8/docs/api/java/util/concurrent/ForkJoinPool.ManagedBlocker.html

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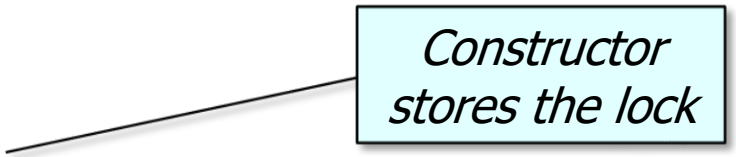
```



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```

*Tries to acquire the lock (non-blocking)*

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    return true;
  }
}
```

*Performs a blocking lock operation*

# Applying the ManagedBlocker Interface

- This example applies a ManagedBlocker on a ReentrantLock (from Java docs)

```
void testManagedLocker() throws InterruptedException {
    ManagedLocker locker = new ManagedLocker(sLock);
    sLock.lock();

    ForkJoinPool.commonPool().execute(() -> {
      rethrowRunnable(() -> ForkJoinPool.managedBlock(locker));

      System.out.println("acquired the lock");
    }

    Thread.sleep(1000);
    sLock.unlock();
}
```

*Performs a blocking lock operation*

# Applying the ManagedBlocker Interface

- This example applies a ManagedBlocker on a BlockingQueue (from Java docs)

```
class QueueTaker<E> implements ManagedBlocker {
  final BlockingQueue<E> mQueue;
  volatile E mItem = null;

  QueueTaker(BlockingQueue<E> q) { mQueue = q; }

  public boolean isReleasable()
  { return mItem != null || (mItem = mQueue.poll()) != null; }

  public boolean block() throws InterruptedException
  { if (mItem == null) mItem = mQueue.take(); return true; }

  public E getItem() { return mItem; }
}
```

*Handles a blocking queue*

See docs.oracle.com/javase/8/docs/api/java/util/concurrent/ForkJoinPool.ManagedBlocker.html

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}
```

*The blocking queue*

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  public boolean block() throws InterruptedException
  { if (mItem == null) mItem = mQueue.take(); return true; }

  public E getItem() { return mItem; }
}
```

*Try to get an item (non-blocking)*

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  { if (mItem == null) mItem = mQueue.take(); return true; }

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}
```

*Block until an item is available*

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  { if (mItem == null) mItem = mQueue.take(); return true; }

  public E getItem() { return mItem; }
}
```

*Call after pool.managedBlock() completes to get item*

# Applying the ManagedBlocker Interface

- This example applies a ManagedBlocker on a BlockingQueue (from Java docs)

```
void testQueueTaker() throws InterruptedException {
    QueueTaker<String> taker = new QueueTaker<>(sQueue);

    ForkJoinPool.commonPool().execute(() -> {
       rethrowRunnable(() -> ForkJoinPool.managedBlock(taker));

       System.out.println("Took item = " + taker.getItem());
    }

    Thread.sleep(1000);

    sQueue.put("hello");
}
```

*Block until an item is available*

# End of Applying the Java Fork-Join Framework's Managed Blocker Interface