Learning Objectives in this Part of the Lesson

• Recognize the simple/single feature provided by the Java Executor interface

• Understand various implementation choices for the Executor interface

• Learn how to program a simple “prime checker” app using the Java Executor interface & a fixed-sized thread pool implementation

• Evaluate the pros & cons of the prime checker app & its use of the Java Executor interface & fixed-size thread pool implementation
Evaluating the PrimeChecker App
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• The Java Executor interface enables the transparent tuning & replacement of # & type of threads wrt the prime checker app logic itself.

```java
new Random().longs(count, sMAX_VALUE - count, sMAX_VALUE)
    .forEach(randomNumber -> mExecutor.execute
        (new PrimeRunnable(this, randomNumber)));
```

Fixed-sized Thread Pool  
Cached (Variable-sized) Thread Pool  
Work-stealing Thread Pool
Evaluating the PrimeChecker App

- However, Java Executor has some restrictions
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- One-way semantics of runnables tightly couple PrimeRunnable with MainActivity

```java
class PrimeRunnable implements Runnable {

    private final MainActivity mActivity;

    public PrimeRunnable(MainActivity activity) {
        mActivity = activity;
    }

    public void run() {
        mActivity.done();
    }
}
```

This tight coupling complicates runtime configuration changes.
However, Java Executor has some restrictions, e.g.

- One-way semantics of runnables tightly couple PrimeRunnable with MainActivity
- isPrime() tightly coupled w/PrimeRunnable

```java
class PrimeRunnable implements Runnable {
    ...
    long isPrime(long n) {
        if (n > 3) {
            for (long factor = 2; factor <= n / 2; ++factor)
                if (n / factor * factor == n)
                    return factor;
        }
        return 0;
    }
    ...
}
```

E.g., non-extensible & primality check is applied even if results are computed
Evaluating the PrimeChecker App

• However, Java Executor has some restrictions, e.g.
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  • isPrime() tightly coupled w/PrimeRunnable
  • The lack of lifecycle operations on Java Executor
Evaluating the PrimeChecker App

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    • Can’t shutdown the executor or interrupt/cancel running tasks
Evaluating the PrimeChecker App

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• The lack of lifecycle operations on Java Executor, e.g.
  • Can’t shutdown the executor or interrupt/cancel running tasks
  • Can’t handle runtime configuration changes gracefully
    • e.g., must restart processing from the beginning
However, Java Executor has some restrictions, e.g.

- One-way semantics of runnables tightly couple PrimeRunnable with MainActivity
- isPrime() tightly coupled with PrimeRunnable
- The lack of lifecycle operations on Java Executor, e.g.
  - Can’t shutdown the executor or interrupt/cancel running tasks
  - Can’t handle runtime configuration changes gracefully
- The Java Executor is often too simple for its own good!
End of Evaluating the Pros & Cons of the Java Executor Interface