Overview of the BigFraction Case Studies

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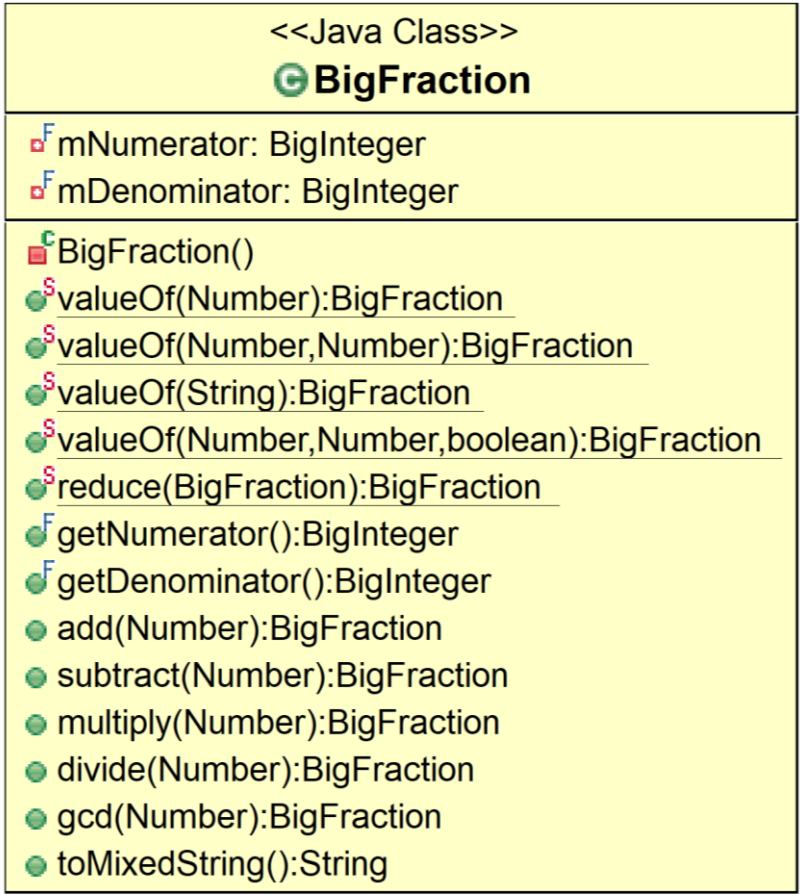
Learning Objectives in this Part of the Lesson

- Understand key classes in the Project Reactor API
- Understand key classes in the RxJava API
- Be aware of the structure & functionality of the BigFraction case studies



These case studies demonstrate *many* Project Reactor & RxJava features

Overview of the BigFraction Class

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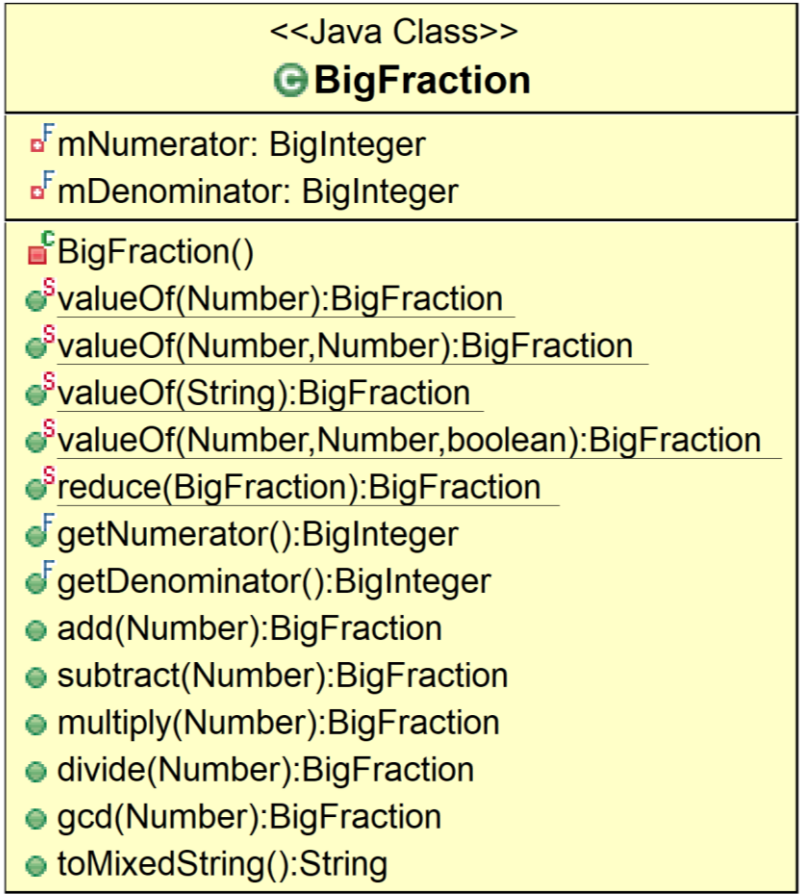
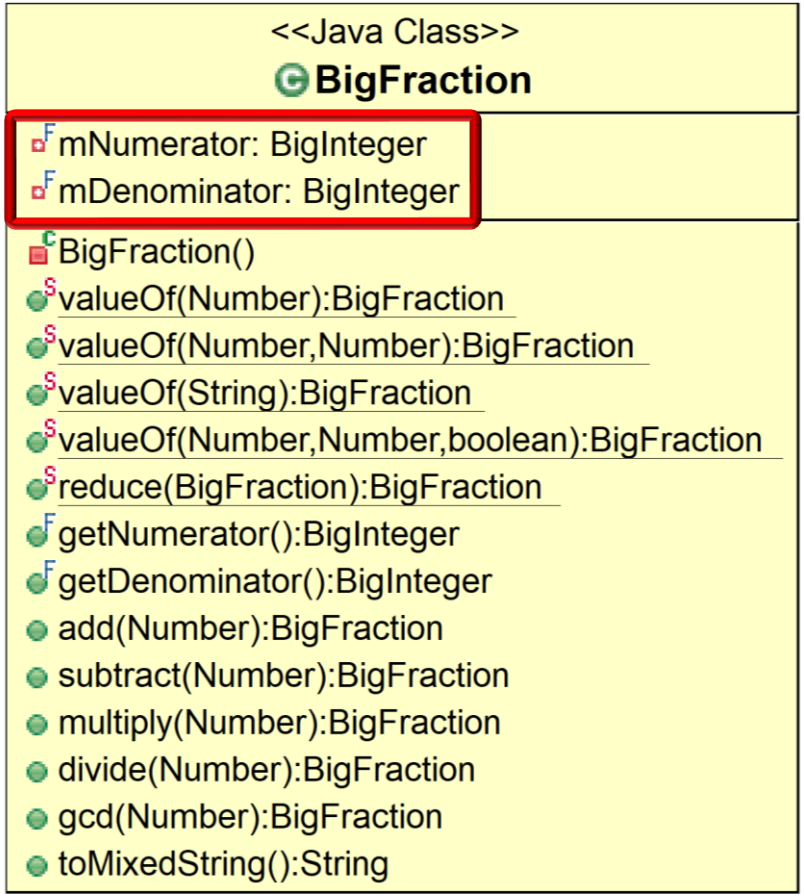
- Upcoming lessons show how to apply Project Reactor & RxJava features in the context of a BigFraction class



See LiveLessons/blob/master/Java8/ex8/src/utils/BigFraction.java

Overview of the BigFraction Class

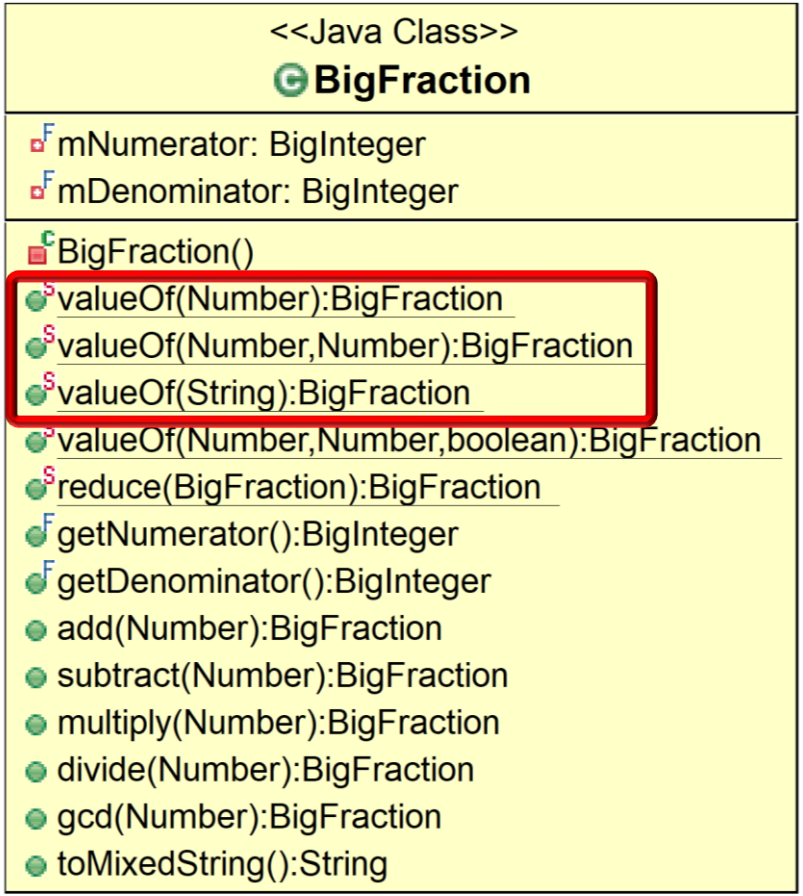
- Upcoming lessons show how to apply Project Reactor & RxJava features in the context of a BigFraction class
  - Arbitrary-precision fraction, utilizing BigIntegers for numerator & denominator



See docs.oracle.com/javase/8/docs/api/java/math/BigInteger.html

Overview of the BigFraction Class

- Upcoming lessons show how to apply Project Reactor & RxJava features in the context of a BigFraction class
  - Arbitrary-precision fraction, utilizing BigIntegers for numerator & denominator
  - Factory methods to "reduce" fractions
    - 44/55 → 4/5
    - 12/24 → 1/2
    - 144/216 → 2/3



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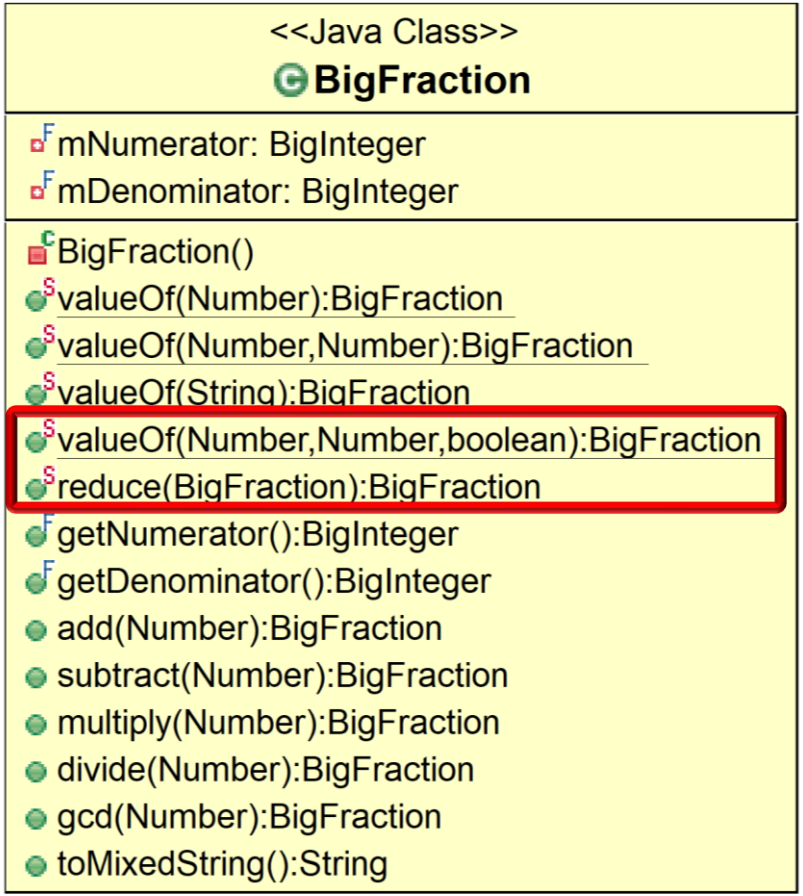
- Upcoming lessons show how to apply Project Reactor & RxJava features in the context of a BigFraction class
  - Arbitrary-precision fraction, utilizing BigIntegers for numerator & denominator
  - Factory methods to "reduce" fractions
  - Factory methods to create "non-reduced" fractions (& then reduce them)
    - e.g., 12/24 (→ 1/2)



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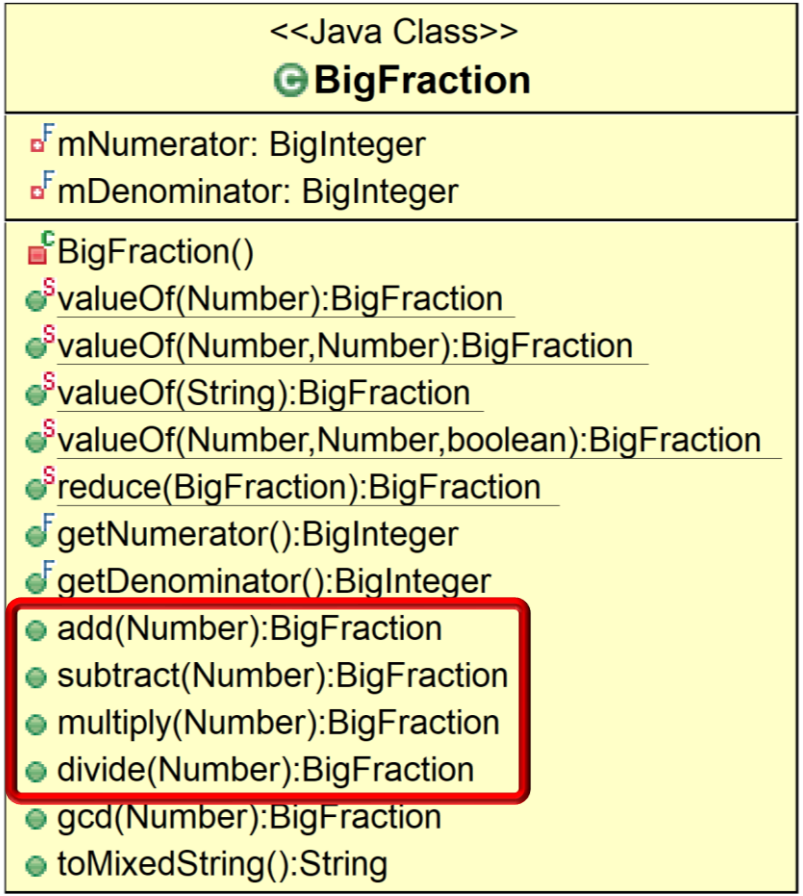
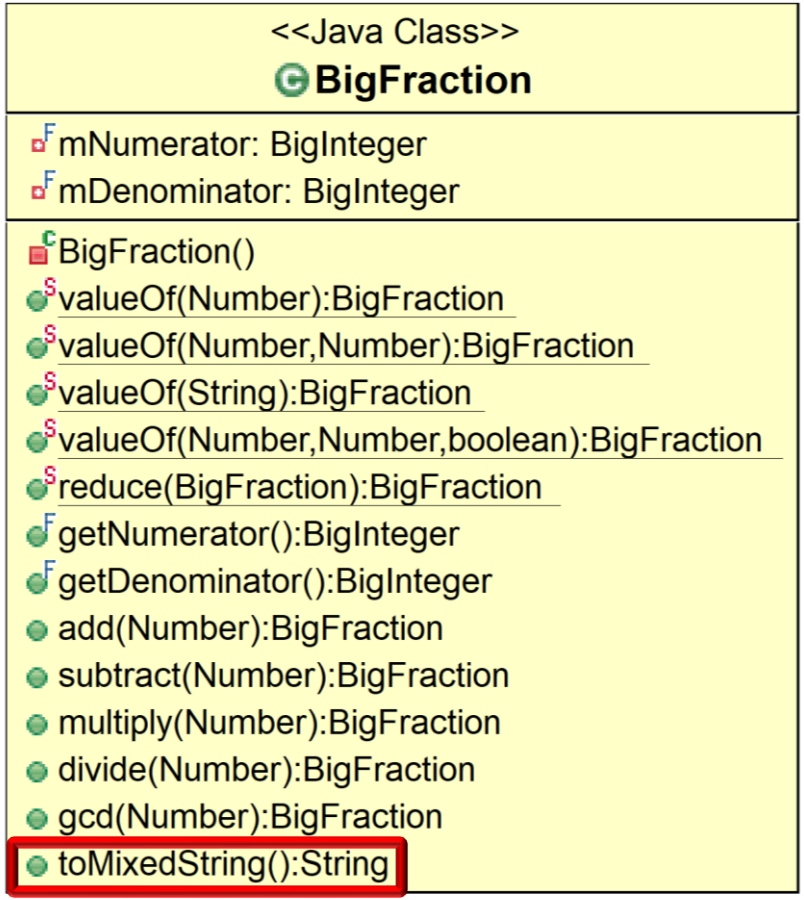
- Upcoming lessons show how to apply Project Reactor & RxJava features in the context of a BigFraction class
  - Arbitrary-precision fraction, utilizing BigIntegers for numerator & denominator
  - Factory methods to "reduce" fractions
  - Factory methods to create "non-reduced" fractions (& then reduce them)
  - Arbitrary-precision fraction arithmetic
    - e.g., 18/4 ×2/3 = 3



Overview of the BigFraction Class

- Upcoming lessons show how to apply Project Reactor & RxJava features in the context of a BigFraction class
  - Arbitrary-precision fraction, utilizing BigIntegers for numerator & denominator
  - Factory methods to "reduce" fractions
  - Factory methods to create "non-reduced" fractions (& then reduce them)
  - Arbitrary-precision fraction arithmetic
  - Create a mixed fraction from an improper fraction
    - e.g., 18/4 → 4 1/2



See www.mathsisfun.com/improper-fractions.html

Overview of the BigFraction Case Studies

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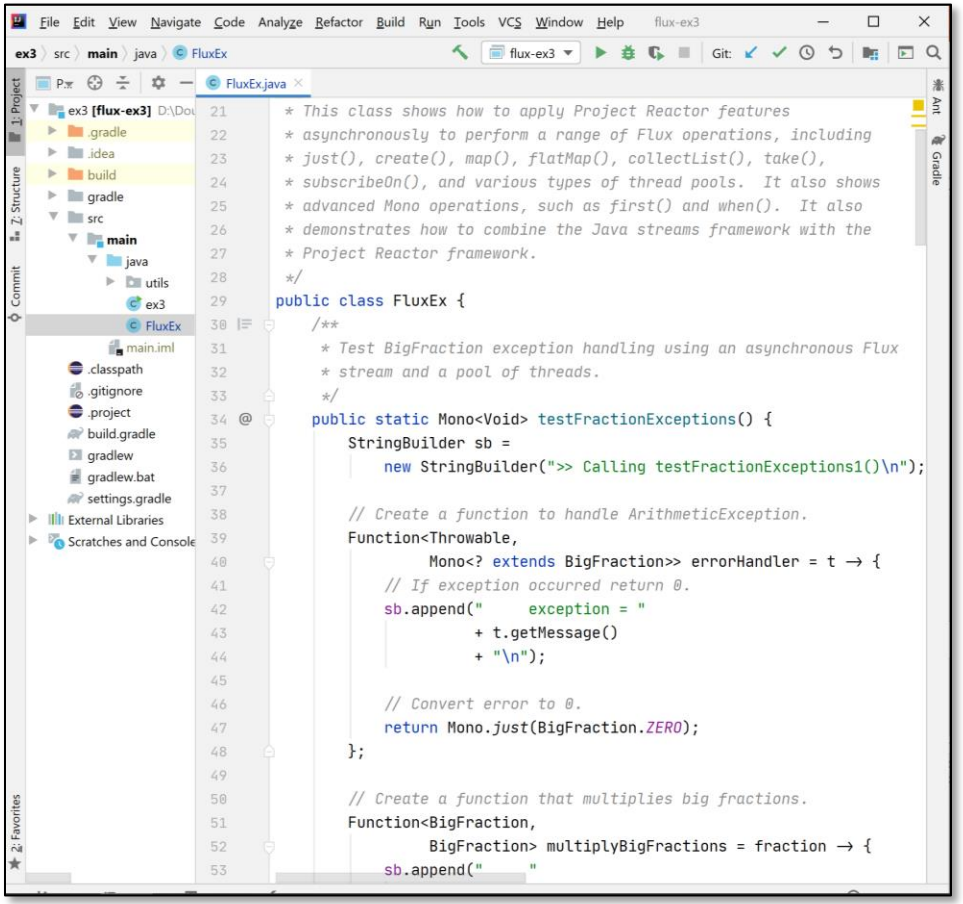
- These case studies show how to create, reduce, multiply, & display BigFraction objects synchronously, asynchronously, & concurrently using Project Reactor & RxJava framework features



Overview of the BigFraction Case Studies

- The Project Reactor Mono case studies show how to create, reduce, multiply, & display BigFraction objects using many Mono features
  - e.g., fromCallable(), just(), zip(), zipWith(), doOnSuccess(), first(), when(), then(), subscribeOn(), & various thread pools

```
BigFraction unreducedFraction =
  makeBigFraction(...);

return Mono
   .fromCallable(() -> BigFraction
        .reduce(unreducedFraction))
   .subscribeOn
       (Schedulers.single())
   .map(result ->
        result.toMixedString())
   .doOnSuccess(result ->
                System.out.println
                 ("big fraction = "
                 + result + "\n"))
   .then();
```

See github.com/douglascraigschmidt/LiveLessons/tree/master/Reactive/mono

Overview of the BigFraction Case Studies

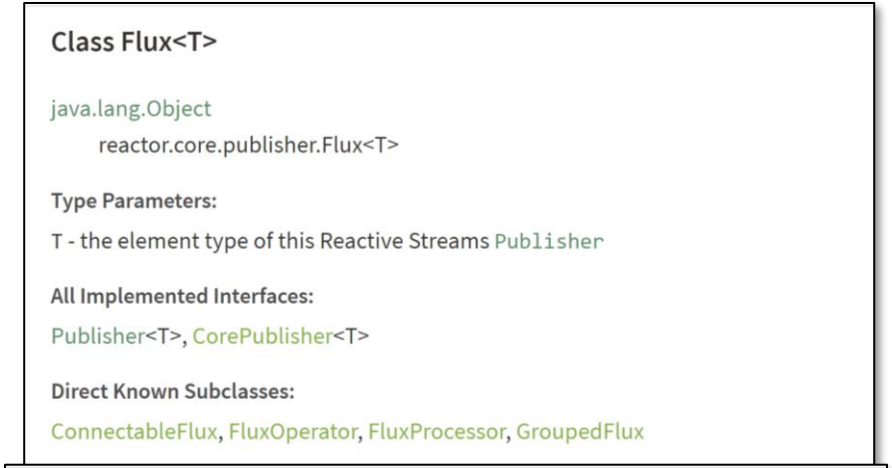
- The Project Reactor Flux case studies show how to create, reduce, multiply, & display BigFraction objects using many Flux features
  - e.g., fromIterable(), just(), map(), create(), doOnNext(), flatMap(), take(), interval(), subscribeOn(), collectList(), subscribe(), & various thread pools

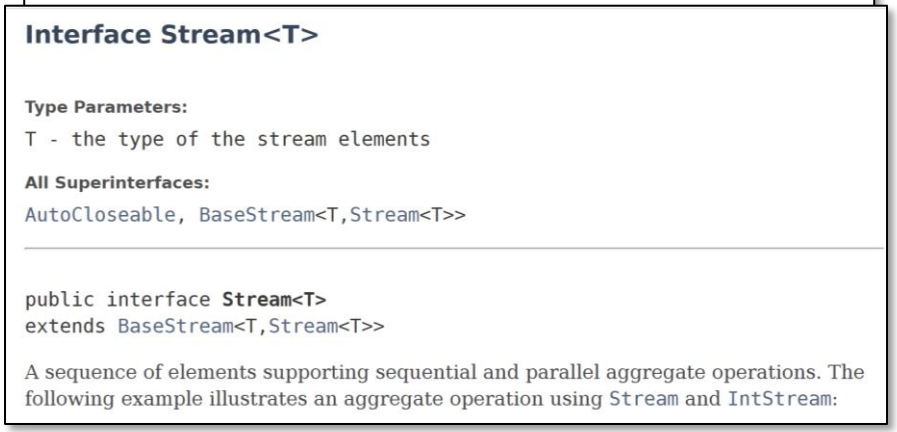
```
Flux
   .create
      (bigFractionEmitter)
   .take(sMAX_FRACTIONS)
   .flatMap(unreducedFraction ->
         reduceAndMultiplyFraction
          (unreducedFraction,
           Schedulers.parallel()))
   .collectList()
   .flatMap(list ->
            BigFractionUtils
              .sortAndPrintList
                 (list, sb));
```

See github.com/douglascraigschmidt/LiveLessons/tree/master/Reactive/flux

Overview of the BigFraction Case Studies

- The Project Reactor Flux case studies show how to create, reduce, multiply, & display BigFraction objects using many Flux features
  - e.g., fromIterable(), just(), map(), create(), doOnNext(), flatMap(), take(), interval(), subscribeOn(), collectList(), subscribe(), & various thread pools
  - They also demonstrate how the Java streams framework can be used together with the Project Reactor framework





Overview of the BigFraction Case Studies

- The RxJava Single case studies show how to create, reduce, multiply, & display BigFraction objects using many Single features
  - e.g., fromCallable(), zipWith(), zipArray(), doOnSuccess(), map(), ignoreElement(), subscribeOn(), ambArray(), & the parallel thread pool

```
BigFraction unreducedFraction =
  makeBigFraction(...);

return Single
  .fromCallable(() -> BigFraction
       .reduce(unreducedFraction))
  .subscribeOn
      (Schedulers.single())
  .map(result ->
       result.toMixedString())
  .doOnSuccess(result ->
                 System.out.println
                  ("big fraction = "
                  + result + "\n"))
  .ignoreElement();
```

See github.com/douglascraigschmidt/LiveLessons/tree/master/Reactive/Single

Overview of the BigFraction Case Studies

- The RxJava Observable case studies show how to create, reduce, multiply, & display BigFraction objects using many Observable features
  - e.g., just(), map(), create(), interval(), filter(), doOnNext(), blockingSubscribe(), take(), doOnComplete(), subscribe(), flatMap(), fromIterable(), subscribeOn(), observeOn(), range(), count(), collectList(), & various thread pools

```
return Observable
   .fromCallable(() -> BigFraction
           .reduce(unreducedFraction))

   .subscribeOn(scheduler)

   .flatMap(reducedFraction ->
      Observable
         .fromCallable(() ->
            reducedFraction.multiply
               (sBigReducedFraction))
         .subscribeOn
            (scheduler));
```

See github.com/douglascraigschmidt/LiveLessons/tree/master/Reactive/Observable

End of Overview of the BigFraction Case Studies