Key Factory Method Operators in the Flux Class (Part 3)

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Learning Objectives in this Part of the Lesson

- Recognize key Flux operators
  - Concurrency operators
  - Scheduler operators
  - Factory method operators
    - These operators create Flux streams in various ways in various Scheduler contexts
      - i.e., range() & interval()

See en.wikipedia.org/wiki/Factory_method_pattern

Key Factory Method Operators in the Flux Class

Key Factory Method Operators in the Flux Class

- The interval() operator
  - Create a Flux that emits long values starting with zero (0)

```
static Flux<Long> interval
   (Duration period)
```

See projectreactor.io/docs/core/release/api/reactor/core/publisher/Flux.html#interval

Key Factory Method Operators in the Flux Class

- The interval() operator
  - Create a Flux that emits long values starting with zero (0)
    - The param indicates when to increment a value at the specified time interval

```
static Flux<Long> interval
   (Duration period)
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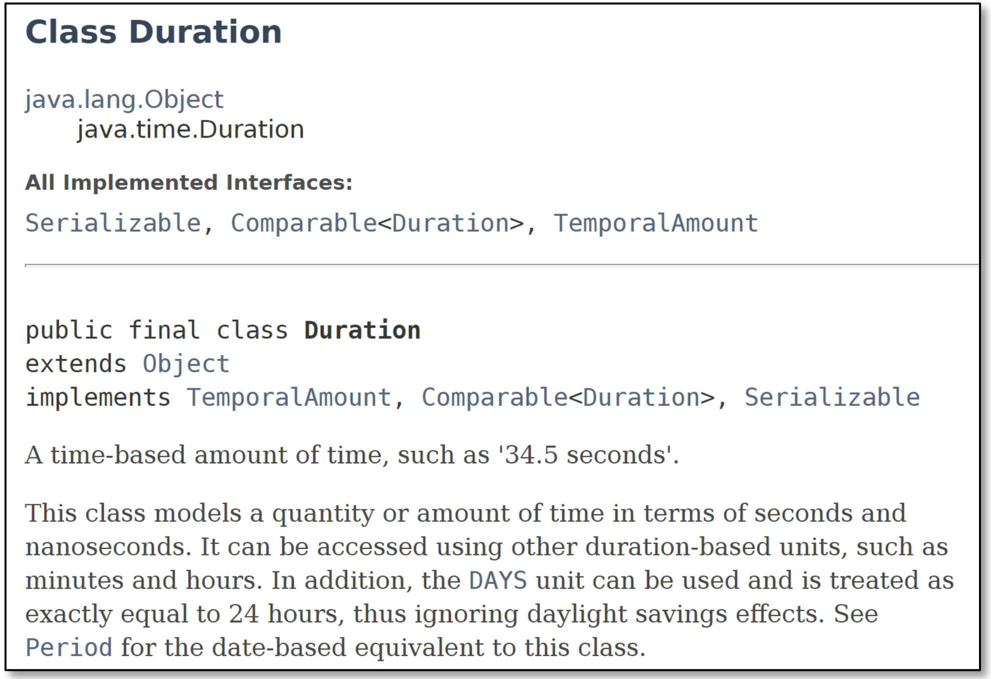


Class Duration

java.lang.Object
    java.time.Duration

All Implemented Interfaces:

Serializable, Comparable<Duration>, TemporalAmount

```
public final class Duration
extends Object
implements TemporalAmount, Comparable<Duration>, Serializable
```

A time-based amount of time, such as '34.5 seconds'.

This class models a quantity or amount of time in terms of seconds and nanoseconds. It can be accessed using other duration-based units, such as minutes and hours. In addition, the DAYS unit can be used and is treated as exactly equal to 24 hours, thus ignoring daylight savings effects. See Period for the date-based equivalent to this class.

See docs.oracle.com/javase/8/docs/api/java/time/Duration.html

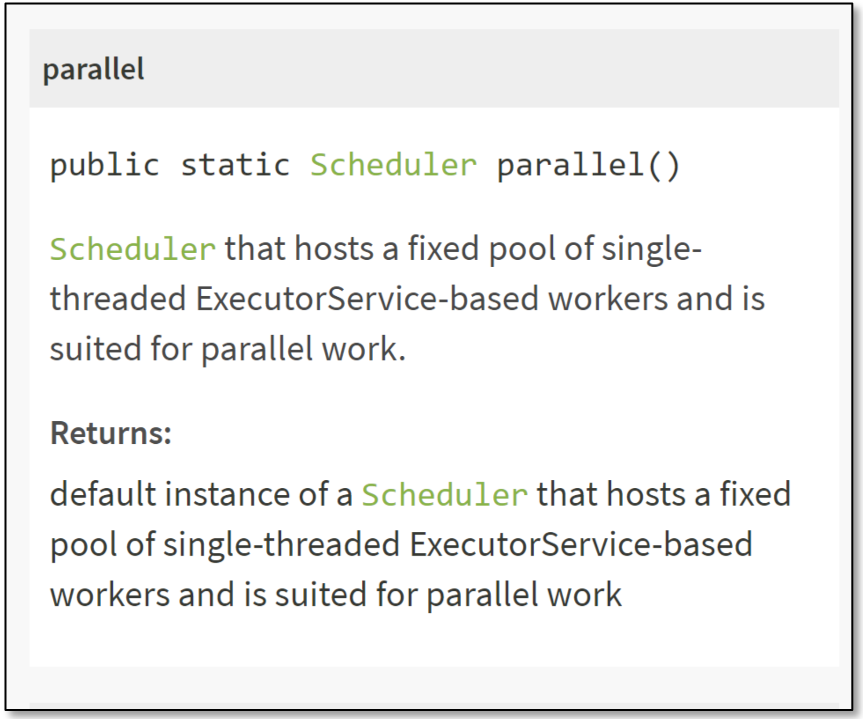
Key Factory Method Operators in the Flux Class

- The interval() operator
  - Create a Flux that emits long values starting with zero (0)
    - The param indicates when to increment a value at the specified time interval
    - Returns a new Flux emitting increasing #'s at regular intervals

```
static Flux<Long> interval
   (Duration period)
```

Key Factory Method Operators in the Flux Class

- The interval() operator
  - Create a Flux that emits long values starting with zero (0)
  - Emits values on the Schedulers .parallel() Scheduler



parallel

```
public static Scheduler parallel()
```

Scheduler that hosts a fixed pool of single-threaded ExecutorService-based workers and is suited for parallel work.

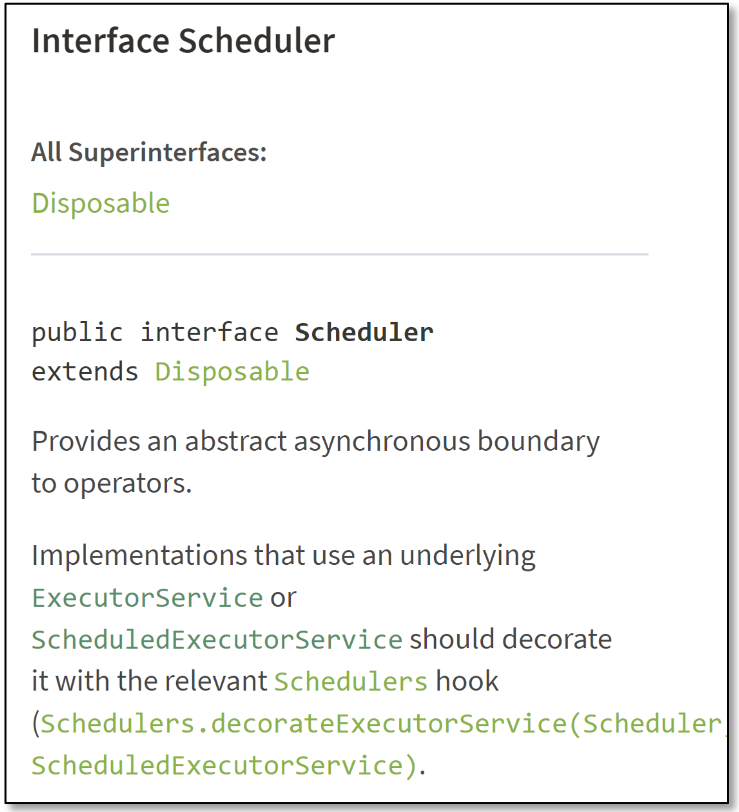
Returns:

default instance of a Scheduler that hosts a fixed pool of single-threaded ExecutorService-based workers and is suited for parallel work

See projectreactor.io/docs/core/release/api/reactor/core/scheduler/Schedulers.html#parallel

Key Factory Method Operators in the Flux Class

- The interval() operator
  - Create a Flux that emits long values starting with zero (0)
  - Emits values on the Schedulers .parallel() Scheduler
    - Other overloaded interval() methods can designate the Scheduler



Interface Scheduler

All Superinterfaces:

Disposable

```
public interface Scheduler
extends Disposable
```

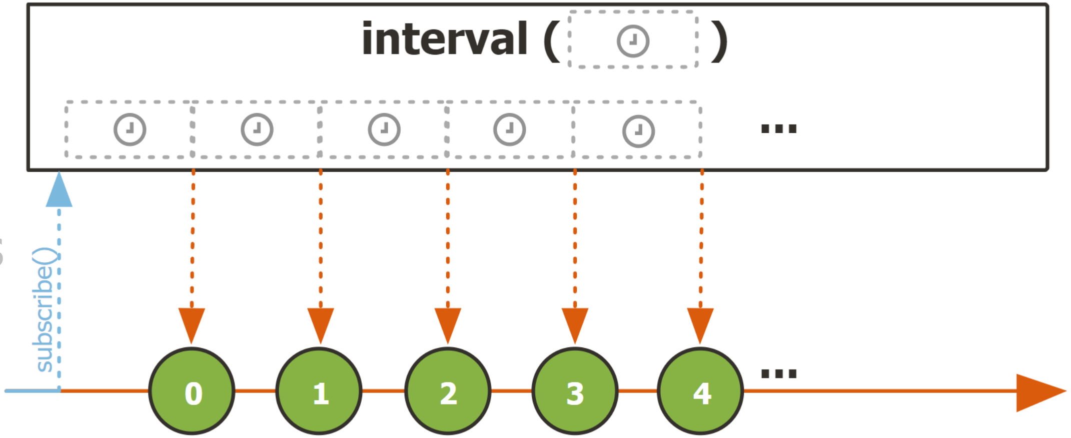
Provides an abstract asynchronous boundary to operators.

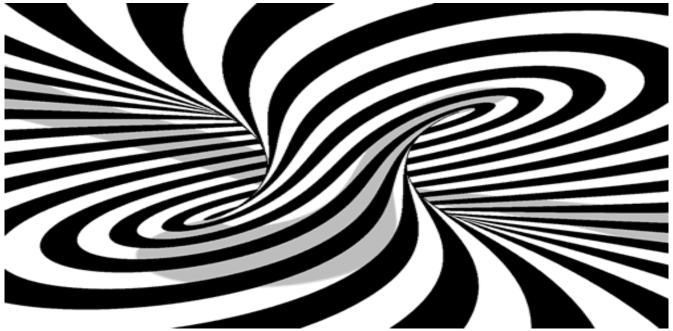
Implementations that use an underlying `ExecutorService` or `ScheduledExecutorService` should decorate it with the relevant `Schedulers` hook (`Schedulers.decorateExecutorService(Scheduler` `ScheduledExecutorService)`.

See projectreactor.io/docs/core/release/api/reactor/core/scheduler/Scheduler.html

Key Factory Method Operators in the Flux Class

- The interval() operator
  - Create a Flux that emits long values starting with zero (0)
  - Emits values on the Schedulers .parallel() Scheduler
  - In normal conditions, the Flux will never complete





```
...
Flux
   .interval(Duration.ofMillis(500))
   ...
```

Generate a stream of longs every .5 seconds in a background thread

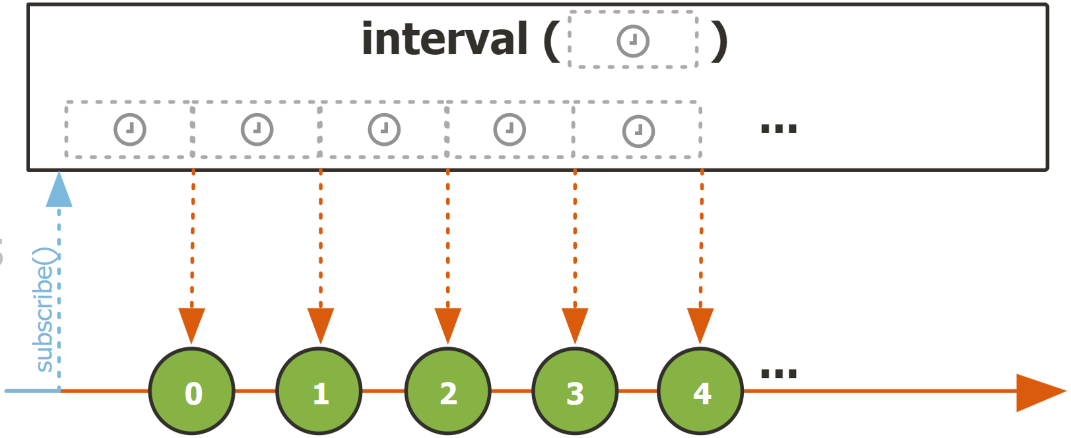
See Reactive/Flux/ex2/src/main/java/FluxEx.java

Key Factory Method Operators in the Flux Class

- The interval() operator
  - Create a Flux that emits long values starting with zero (0)
  - Emits values on the Schedulers .parallel() Scheduler
  - In normal conditions, the Flux will never complete

```
...
Flux
   .interval(Duration.ofMillis(500))
   ...
   .take(sMAX_ITERATIONS)
   ...
```

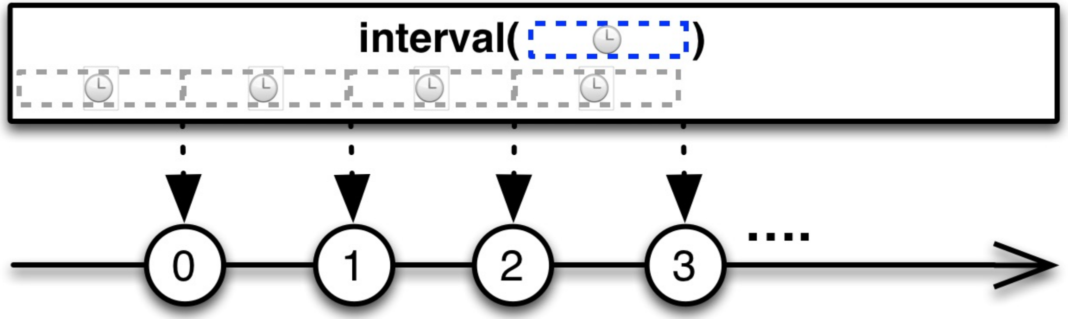
Use take() to only process sMAX_ITERATIONS # of emitted values from interval()



See upcoming discussion of the Flux.take() operator

Key Factory Method Operators in the Flux Class

- The interval() operator
  - Create a Flux that emits long values starting with zero (0)
  - Emits values on the Schedulers .parallel() Scheduler
  - In normal conditions, the Flux will never complete
  - RxJava's Observable.interval() works the same



```
Observable
   .interval(sSLEEP_DURATION)
   ...
   .take(sMAX_ITERATIONS)
   ...
```

Use take() to only process sMAX_ITERATIONS # of emitted values from interval()

See reactivex.io/RxJava/3.x/javadoc/io/reactivex/rxjava3/core/Observable.html#interval

Key Factory Method Operators in the Flux Class

- The range() operator
  - Build a Flux that will only emit a sequence of ‘count’ incrementing integers, starting from ‘start’

```
static Flux<Integer> range
   (int start, int count)
```

See projectreactor.io/docs/core/release/api/reactor/core/publisher/Flux.html#range

Key Factory Method Operators in the Flux Class

- The range() operator
  - Build a Flux that will only emit a sequence of 'count' incrementing integers, starting from 'start'
    - Emits integers between `start' & `start + count' & then completes

```
static Flux<Integer> range
   (int start, int count)
```

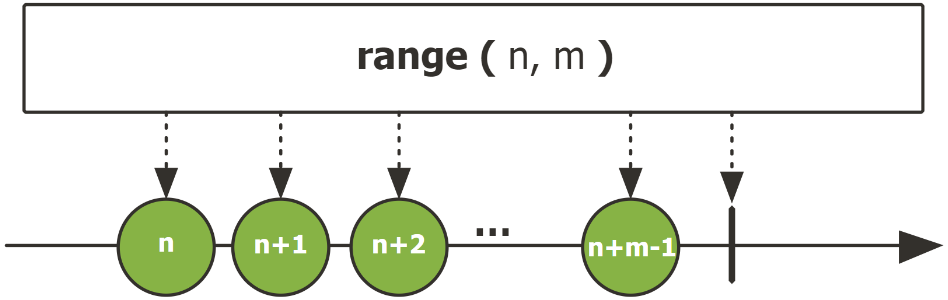
Key Factory Method Operators in the Flux Class

- The range() operator
  - Build a Flux that will only emit a sequence of 'count' incrementing integers, starting from 'start'
    - Emits integers between `start' & `start + count' & then completes
  - Returns a "ranged" Flux containing count elements

```
static Flux<Integer> range
  (int start, int count)
```

Key Factory Method Operators in the Flux Class

- The range() operator
  - Build a Flux that will only emit a sequence of 'count' incrementing integers, starting from 'start'
  - Works much like a "reactive" for loop



```
final int sMAX_ITERATIONS = 10;

...

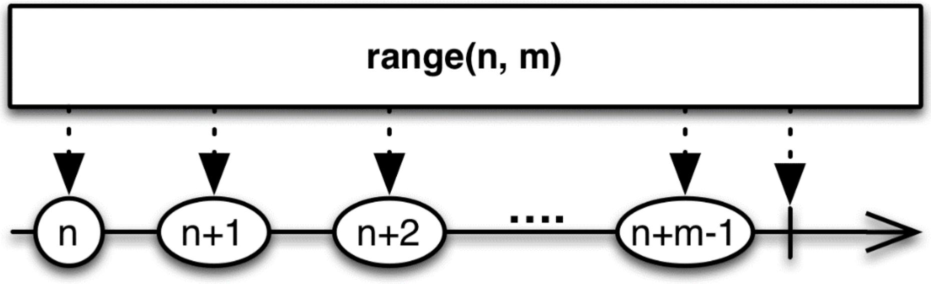
Flux
  .range(1, sMAX_ITERATIONS)
  ...
```

Emit sMAX_ITERATIONS integers starting at 1

See Reactive/Flux/ex2/src/main/java/FluxEx.java

Key Factory Method Operators in the Flux Class

- The range() operator
  - Build a Flux that will only emit a sequence of 'count' incrementing integers, starting from 'start'
  - Works much like a "reactive" for loop
  - RxJava's Observable.range() works the same



```
final int sMAX_ITERATIONS = 10;

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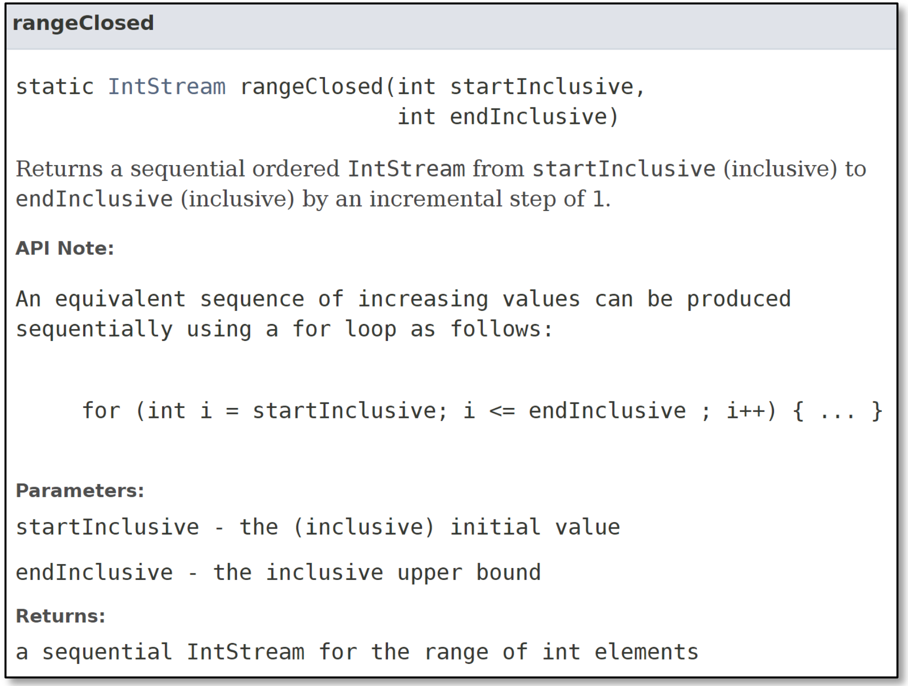
Observable
   .range(1, sMAX_ITERATIONS)
   ...
```

Emit sMAX_ITERATIONS integers starting at 1

See reactivex.io/RxJava/3.x/javadoc/io/reactivex/rxjava3/core/Observable.html#range

Key Factory Method Operators in the Flux Class

- The range() operator
  - Build a Flux that will only emit a sequence of 'count' incrementing integers, starting from 'start'
  - Works much like a "reactive" for loop
  - RxJava's Observable.range() works the same
  - Similar to IntStream.rangeClosed() in Java Streams



rangeClosed

```
static IntStream rangeClosed(int startInclusive,
                             int endInclusive)
```

Returns a sequential ordered `IntStream` from `startInclusive` (inclusive) to `endInclusive` (inclusive) by an incremental step of 1.

API Note:

An equivalent sequence of increasing values can be produced sequentially using a for loop as follows:

```
     for (int i = startInclusive; i <= endInclusive ; i++) { ... }
```

Parameters:

`startInclusive` - the (inclusive) initial value

`endInclusive` - the inclusive upper bound

Returns:

a sequential IntStream for the range of int elements

Emit sMAX_ITERATIONS integers starting at 1

```
IntStream.rangeClosed
    (1, sMAX_ITERATIONS)
    ...
```

See docs.oracle.com/javase/8/docs/api/java/util/stream/IntStream.html#rangeClosed

End of Key Factory Method Operators in the Flux Class (Part 3)