# Key Terminal Operators in the Observable Class (Part 2)


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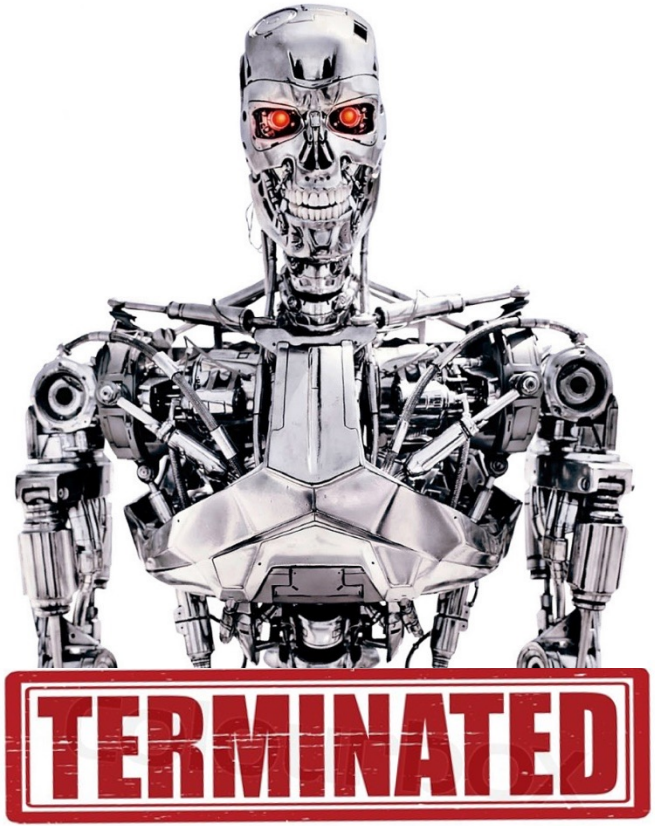
# Learning Objectives in this Part of the Lesson

- Recognize key Observable operators
  - Concurrency & scheduler operators
  - Factory method operators
  - Action operators
  - Suppressing operators
  - Terminal operators
    - Terminate an Observable stream & trigger all the processing of operators in the stream
      - e.g., subscribe()




The subscribe() operator is non-blocking, unlike blockingSubscribe()

# Key Terminal Operators in the Observable Class

# Key Terminal Operators in the Observable Class

- The subscribe() operator
  - Subscribe Consumers & a Runnable to this Observable

```
Disposable subscribe
   (Consumer<? super T> consumer,
    Consumer<? super Throwable>
      errorConsumer,
    Runnable completeConsumer)
```

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

# Key Terminal Operators in the Observable Class

- The subscribe() operator
  - Subscribe Consumers & a Runnable to this Observable
    - The params consume all elements in the sequence, handle errors, & react to completion

```
Disposable subscribe
   (Consumer<? super T> consumer,
    Consumer<? super Throwable>
      errorConsumer,
    Runnable completeConsumer)
```

**Interface Consumer<T>**

**Type Parameters:**

T - the type of the input to the operation

**All Known Subinterfaces:**

Stream.Builder<T>

**Functional Interface:**

This is a functional interface and can therefore be used as the assignment target for a lambda expression or method reference.

See reactivex.io/RxJava/3.x/javadoc/io/reactivex/rxjava3/functions/Consumer.html

# Key Terminal Operators in the Observable Class

- The subscribe() operator
  - Subscribe Consumers & a Runnable to this Observable
    - The params consume all elements in the sequence, handle errors, & react to completion
      - This subscription requests unbounded demand
        - i.e., Long.MAX_VALUE

```
Disposable subscribe
   (Consumer<? super T> consumer,
    Consumer<? super Throwable>
      errorConsumer,
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```

# Key Terminal Operators in the Observable Class

- The subscribe() operator
  - Subscribe Consumers & a Runnable to this Observable
    - The params consume all elements in the sequence, handle errors, & react to completion
      - This subscription requests unbounded demand
    - Signals emitted to this operator are represented by the following regular expression:

      **`onNext()*(onComplete()|onError())?`**

**subscribe**

```
@CheckReturnValue
 @SchedulerSupport(value="none")
 @NonNull
public final @NonNull Disposable subscribe(@NonNull @NonNull Consumer<? super T> onNext,
        @NonNull @NonNull Consumer<? super Throwable> onError,
        @NonNull @NonNull Action onComplete)
```

Subscribes to the current `Observable` and provides callbacks to handle the items it emits and any error or completion notification it signals.

**Scheduler:**

`subscribe` does not operate by default on a particular `Scheduler`.

**Parameters:**

`onNext` - the `Consumer<T>` you have designed to accept emissions from the current `Observable`
`onError` - the `Consumer<Throwable>` you have designed to accept any error notification from the current `Observable`
`onComplete` - the `Action` you have designed to accept a completion notification from the current `Observable`

**Returns:**

the new `Disposable` instance that can be used to dispose the subscription at any time

# Key Terminal Operators in the Observable Class

- The subscribe() operator
  - Subscribe Consumers & a Runnable to this Observable
    - The params consume all elements in the sequence, handle errors, & react to completion
    - A Disposable is returned, which indicates a task or resource that can be cancelled/disposed

```
Disposable subscribe
   (Consumer<? super T> consumer,
    Consumer<? super Throwable>
      errorConsumer,
    Runnable completeConsumer)
```

```
@FunctionalInterface
public interface Disposable
```

Indicates that a task or resource can be cancelled/disposed.

Call to the dispose method is/should be idempotent.

See reactivex.io/RxJava/3.x/javadoc/io/reactivex/rxjava3/disposables/Disposable.html

# Key Terminal Operators in the Observable Class

- The subscribe() operator
  - Subscribe Consumers & a Runnable to this Observable
    - The params consume all elements in the sequence, handle errors, & react to completion
    - A Disposable is returned, which indicates a task or resource that can be cancelled/disposed
      - Disposables can be accumulated & disposed in one fell swoop!

```
CompositeDisposable
  mDisposables
    (mPublisherScheduler,
     mSubscriberScheduler,
     mSubscriber);
...

mDisposables.dispose();
```

See reactivex.io/RxJava/3.x/javadoc/io/reactivex/rxjava3/disposables/CompositeDisposable.html

# Key Terminal Operators in the Observable Class

- The subscribe() operator
  - Subscribe Consumers & a Runnable to this Observable
  - This operator triggers all the processing in a chain

```
Observable
   .fromIterable
     (bigFractionList)
   .map(fraction -> fraction
      .multiply(sBigReducedFraction))
   .subscribe(fraction -> sb
                .append(" = "
               + fraction
                  .toMixedString()
               + "\n"),
               error -> { sb
                  .append("error"); ...
               },
               () -> BigFractionUtils
            .display(sb.toString()));
```

*Initiate processing & handle outputs*

See Reactive/Obervable/ex2/src/main/java/ObservableEx.java

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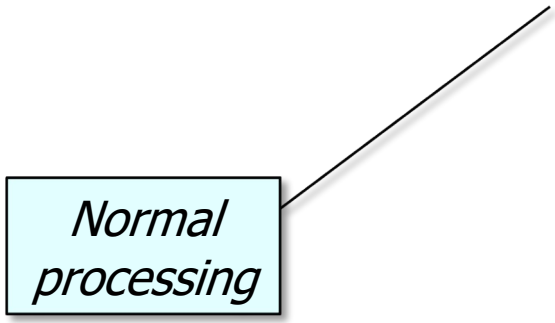

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```

*Error Processing*

# Key Terminal Operators in the Observable Class

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```

*Completion Processing*

# Key Terminal Operators in the Observable Class

- The subscribe() operator
  - Subscribe Consumers & a Runnable to this Observable
  - This operator triggers all the processing in a chain
  - Calling this operator will *not* block the caller thread
    - Until upstream terminates normally or with an error

**subscribe**

```
@CheckReturnValue
 @SchedulerSupport(value="none")
 @NonNull
public final @NonNull Disposable subscribe(@NonNull Consumer<? super T> onNext,
        @NonNull Consumer<? super Throwable> onError)
```

Subscribes to the current `Observable` and provides callbacks to handle the items it emits and any error notification it signals.

**Scheduler:**

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**Parameters:**

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`onError` - the `Consumer<Throwable>` you have desig… to a… …catio…
from the current `Observable`

**Returns:**

the new `Disposable` instance that can be used to disp… the …ription at …me

**Throws:**

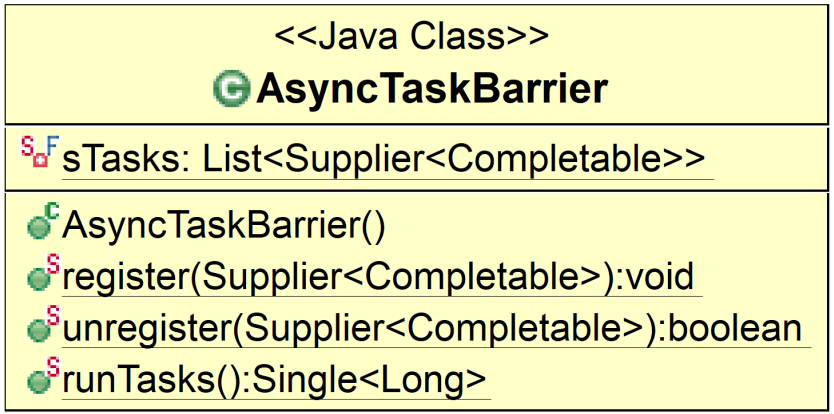
`NullPointerException` - if `onNext` or `onError` is `null`

**See Also:**

ReactiveX operators documentation: Subscribe

# Key Terminal Operators in the Observable Class

- The subscribe() operator
  - Subscribe Consumers & a Runnable to this Observable
  - This operator triggers all the processing in a chain
  - Calling this operator will *not* block the caller thread
    - Until upstream terminates normally or with an error
    - These semantics motivate the need for the AsyncTaskBarrier framework!




See Reactive/Single/ex1/src/main/java/utils/AsyncTaskBarrier.java

# Key Terminal Operators in the Observable Class

- The subscribe() operator
  - Subscribe Consumers & a Runnable to this Observable
  - This operator triggers all the processing in a chain
  - Calling this operator will *not* block the caller thread
  - Other versions of subscribe() support different capabilities

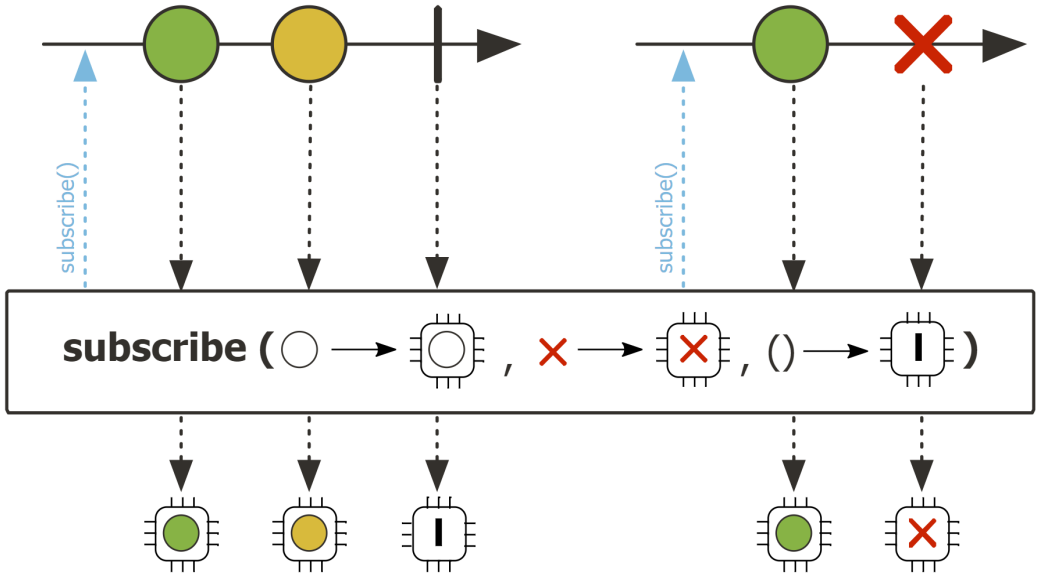
```
void subscribe
   (Observer<? super T> observer)
```

*Subscribes the given Observer to this ObservableSource instance, which provides additional capabilities for receiving push-based notifications*

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

# Key Terminal Operators in the Observable Class

- The subscribe() operator
  - Subscribe Consumers & a Runnable to this Observable
  - This operator triggers all the processing in a chain
  - Calling this operator will *not* block the caller thread
  - Other versions of subscribe() support different capabilities
  - Project Reactor's operator Flux .subscribe() works the same




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

# End of Key Terminal Operators in the Observable Class (Part 2)