Recognize Common Java Streams Factory Methods

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Learning Objectives in this Part of the Lesson

- Recognize common factory methods used to create streams
Common Factory Methods for Creating Streams
Common Factory Methods for Creating Streams

- There are several common ways to obtain a stream

See [docs.oracle.com/javase/8/docs/api/java/util/stream/package-summary.html](docs.oracle.com/javase/8/docs/api/java/util/stream/package-summary.html)
There are several common ways to obtain a stream, e.g.

- From a Java collection

```java
List<String> wordsToFind =
    List.of("do", "re", "me", ...);

List<SearchResults> results =
    wordsToFind.stream()
    ...

or

List<SearchResults> results =
    wordsToFind.parallelStream()
    ...
```
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or

List<SearchResults> results = wordsToFind.parallelStream();
...
```

See docs.oracle.com/javase/tutorial/collections/streams
Common Factory Methods for Creating Streams

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      ...

or

List<SearchResults> results = wordsToFind.parallelStream()
      ...
```

We use this approach in the SimpleSearchStream program

See [github.com/douglascraigschmidt/LiveLessons/tree/master/SimpleSearchStream](https://github.com/douglascraigschmidt/LiveLessons/tree/master/SimpleSearchStream)
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See [docs.oracle.com/javase/tutorial/collectionsstreams/parallelism.html](docs.oracle.com/javase/tutorial/collectionsstreams/parallelism.html)
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  List<SearchResults> results = wordsToFind.stream()
                           ... 
                           .parallel()
  ```

  or

  ```java
  List<SearchResults> results = wordsToFind.stream()
                           ... 
                           .parallel()
  ```

  A call to `parallel()` can appear anywhere in a stream & will have same effect as `parallelStream()`

See docs.oracle.com/javase/8/docs/api/java/util/stream/BaseStream.html#parallel
Common Factory Methods for Creating Streams

- There are several common ways to obtain a stream, e.g.
  - From a Java collection
  ```java
  String[] a = {
      "a", "b", "c", "d", "e"
  };
  Stream<String> stream = Arrays.stream(a);
  stream.forEach(s -> System.out.println(s));
  
  or
  stream.forEach(System.out::println);
  ```
- From an array

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    };
    Stream<String> stream = Arrays.stream(a);
    stream.forEach(s -> System.out.println(s));
    ```
  - From an array
    ```java
    Stream<String> stream = Arrays.stream(a);
    stream.forEach(System.out::println);
    Or
    stream.forEach(System.out::println);
    ```

See [docs.oracle.com/javase/8/docs/api/java/util/Arrays.html#stream](docs.oracle.com/javase/8/docs/api/java/util/Arrays.html#stream)
Common Factory Methods for Creating Streams

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String[] a = {
    "a", "b", "c", "d", "e"
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Stream<String> stream = Arrays.stream(a);

stream.forEach(s ->
    System.out.println(s));

or

stream.forEach(System.out::println);
```

Print all elements in the stream
Common Factory Methods for Creating Streams

- There are several common ways to obtain a stream, e.g.
  - From a Java collection
  ```java
  String[] a = {
      "a", "b", "c", "d", "e"
  };
  Stream<String> stream = Stream.of(a);
  stream.forEach(s ->
      System.out.println(s));
  
  or
  stream.forEach(System.out::println);
  ```
  - From an array
  - From a static factory method
There are several common ways to obtain a stream, e.g.

- From a Java collection
- From an array
- From a static factory method

```java
String[] a = {
    "a", "b", "c", "d", "e"
};

Stream<String> stream = Stream.of(a);

stream.forEach(s ->
    System.out.println(s));

or

stream.forEach(System.out::println);
```

Create stream containing all elements in an array

See docs.oracle.com/javase/8/docs/api/java/util/stream/Stream.html#of
There are several common ways to obtain a stream, e.g.

- From a Java collection
- From an array
- From a static factory method

```java
String[] a = {
    "a", "b", "c", "d", "e"
};

Stream<String> stream = Stream.of(a);

stream.forEach(System.out::println);
```

Print all elements in the stream
There are several common ways to obtain a stream, e.g.

- From a Java collection
- From an array
- From a static factory method

```java
Stream.iterate(new BigInteger[]{BigInteger.ONE, BigInteger.ONE},
        f -> new BigInteger[]{f[1],
                f[0].add(f[1])})
        .map(f -> f[0])
        .limit(100)
        .forEach(System.out::println);
```

See docs.oracle.com/javase/8/docs/api/java/util/stream/Stream.html#iterate
Common Factory Methods for Creating Streams

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```java
Stream.iterate(new BigInteger[]{BigInteger.ONE, BigInteger.ONE},
    f -> new BigInteger[]{f[1],
        f[0].add(f[1])})
    .map(f -> f[0])
    .limit(100)
    .forEach(System.out::println);
```

Generate & print the first 100 Fibonacci #'s
Common Factory Methods for Creating Streams

- There are several common ways to obtain a stream, e.g.
  - From a Java collection
  - From an array
  - From a static factory method

Create the "seed," which defines the initial element in the stream

```java
Stream.iterate(new BigInteger[]{BigInteger.ONE, BigInteger.ONE},
    f -> new BigInteger[]{f[1],
    f[0].add(f[1])})
    .map(f -> f[0])
    .limit(100)
    .forEach(System.out::println);
```
There are several common ways to obtain a stream, e.g.

- From a Java collection
- From an array
- From a static factory method

```java
Stream.iterate(new BigInteger[]{BigInteger.ONE, BigInteger.ONE},
            f -> new BigInteger[]{f[1],
                                    f[0].add(f[1])}).map(f -> f[0]).limit(100)
            .forEach(System.out::println);
```

A lambda function applied to the previous element to produce a new element
Common Factory Methods for Creating Streams

• There are several common ways to obtain a stream, e.g.
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  • From an array
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```java
Stream.iterate(new BigInteger[]{BigInteger.ONE, BigInteger.ONE},
              f -> new BigInteger[]{f[1],
                                      f[0].add(f[1])})
      .map(f -> f[0])
      .limit(100)
      .forEach(System.out::println);
```

Convert the array to its first element
There are several common ways to obtain a stream, e.g.

- From a Java collection
- From an array
- From a static factory method

```java
Stream.iterate(new BigInteger[]{BigInteger.ONE, BigInteger.ONE},
    f -> new BigInteger[]{f[1], f[0].add(f[1])})
    .map(f -> f[0])
    .limit(100)
    .forEach(System.out::println);
```

Short-circuit operation limits the stream to 100 elements

See [docs.oracle.com/javase/8/docs/api/java/util/stream/Stream.html#limit](https://docs.oracle.com/javase/8/docs/api/java/util/stream/Stream.html#limit)
Common Factory Methods for Creating Streams

• There are several common ways to obtain a stream, e.g.
  • From a Java collection
  • From an array
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```java
Stream.iterate(new BigInteger[]{BigInteger.ONE, BigInteger.ONE},
               f -> new BigInteger[]{f[1],
                                      f[0].add(f[1])})
       .map(f -> f[0])
       .limit(100)
       .forEach(System.out::println);
```

*Print the first 100 Fibonacci #'s*
Common Factory Methods for Creating Streams

- There are several common ways to obtain a stream, e.g.
  - From a Java collection
  - From an array
  - From a static factory method

```java
Stream.iterate(new BigInteger[]{BigInteger.ONE, BigInteger.ONE},
              f -> new BigInteger[]{f[1],
                                    f[0].add(f[1])})
    .parallel()
    .map(f -> f[0])
    .limit(100)
    .forEach(System.out::println);

Avoid using iterate() in a parallel stream!
```
End of Recognize Common Java Streams Factory Methods