Introduction

This lesson introduces the Stream API.

We'll cover the following

The addition of the `Stream` API was one of the major features added to Java 8. A `Stream` in Java can be defined as a sequence of elements from a source that supports aggregate operations on them. The source here refers to collections or arrays that provide data to a stream.

A few important points about streams are:

1. A stream is not a data structure itself. It is a bunch of operations applied to a source. The source can be collections, arrays or I/O channels.
2. Streams don’t change the original data structure.
3. There can be zero or more intermediate operations that transform a stream into another stream.
4. Each intermediate operation is lazily executed (This will be discussed later).
5. Terminal operations produce the result of the stream.

Stream creation

Streams can be created from different element sources, e.g., a collection or an array with the help of `stream()` and `of()` methods. Below are the different ways to create a stream.

a) Stream.of(v1, v2, v3….)

In the below example, we are creating a stream of integers at **line** 7 using the `Stream.of()` method.

```
import java.util.stream.Stream;

public class StreamDemo {

    public static void main(String[] args)
    {
        Stream<Integer> stream = Stream.of(1,2,3,4,5,6,7,8,9);
        stream.forEach(p -> System.out.println(p));
    }
}
```

b) List.stream()

In the below example, we are creating a stream from a List at **line 14**.

```
import java.util.ArrayList;
import java.util.List;
import java.util.stream.Stream;

public class StreamDemo {

    public static void main(String[] args) {
        List<String> list = new ArrayList<>();
        list.add("a");
        list.add("b");
        list.add("c");
        list.add("d");

        Stream<String> stream = list.stream();
        stream.forEach(p -> System.out.println(p));
    }
}
```

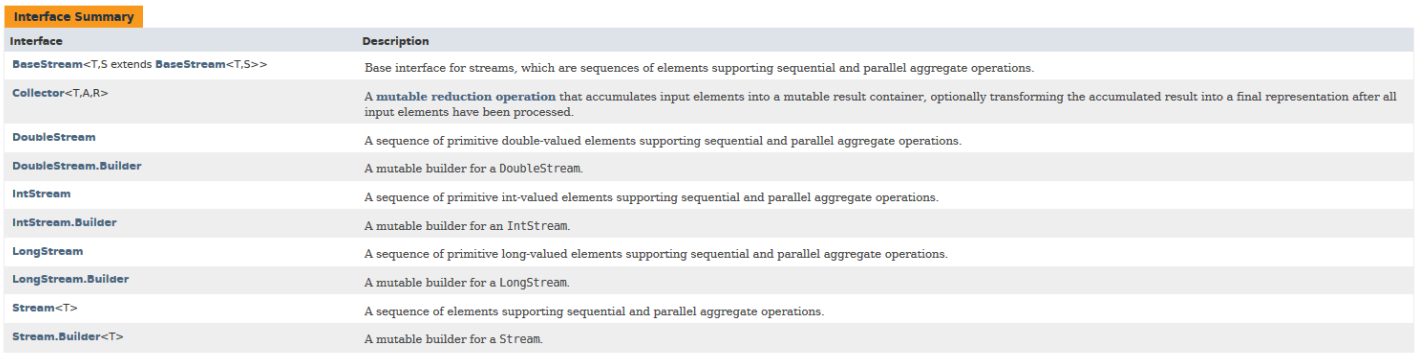
The Stream interfaces

The Stream API defines a few interfaces such as `Stream`, `IntStream`, `LongStream`, etc.

The `Stream<T>` interface is for object elements. For primitives, it defines `IntStream`, `LongStream` and `DoubleStream` interfaces.

It is a good practice to use primitive streams if you are dealing with primitives because wrapping primitives to objects and auto-boxing is a costly process.

Below is the complete list of methods defined in Stream API.



Interface Summary

Interface	Description
BaseStream<T,S extends **BaseStream**<T,S>>	Base interface for streams, which are sequences of elements supporting sequential and parallel aggregate operations.
Collector<T,A,R>	A **mutable reduction operation** that accumulates input elements into a mutable result container, optionally transforming the accumulated result into a final representation after all input elements have been processed.
DoubleStream	A sequence of primitive double-valued elements supporting sequential and parallel aggregate operations.
DoubleStream.Builder	A mutable builder for a `DoubleStream`.
IntStream	A sequence of primitive int-valued elements supporting sequential and parallel aggregate operations.
IntStream.Builder	A mutable builder for an `IntStream`.
LongStream	A sequence of primitive long-valued elements supporting sequential and parallel aggregate operations.
LongStream.Builder	A mutable builder for a `LongStream`.
Stream<T>	A sequence of elements supporting sequential and parallel aggregate operations.
Stream.Builder<T>	A mutable builder for a `Stream`.

The methods defined by these interfaces can be divided into the following two categories:

Intermediate operations

These methods do not produce any results. They usually accept functional interfaces as parameters and always return a new stream. Some examples of intermediate operations are filter(), map(), etc.

Terminal operations

These methods produce some results, e.g., `count()`, `toArray(..)`, and `collect(..)`.

The streams operations can be further classified as:

1. filtering
2. slicing
3. mapping
4. matching and finding
5. reduction
6. collect

This was the basic introduction to streams. In the next few lessons, we will explore each of these operations. We will also look at how these methods are combined together to process collections.

In the next lesson, we will discuss the filtering operations in Stream.