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Java Stream API

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Stream API is used to process collections of objects. A stream in Java is a sequence of objects that supports various methods which can be pipelined to produce the desired result.

The uses of Stream in Java are mentioned below:

1)Stream API is a way to express and process collections of objects.
2)Enable us to perform operations like filtering, mapping,reducing and sorting.

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Java Stream Features

The features of Java stream are mentioned below:

1) A stream is not a data structure instead it takes input from the Collections, Arrays or I/O channels.
2) Streams don’t change the original data structure, they only provide the result as per the pipelined methods.
3) Each intermediate operation is lazily executed and returns a stream as a result, hence various intermediate operations can be pipelined. Terminal operations mark the end of the stream and return the result.

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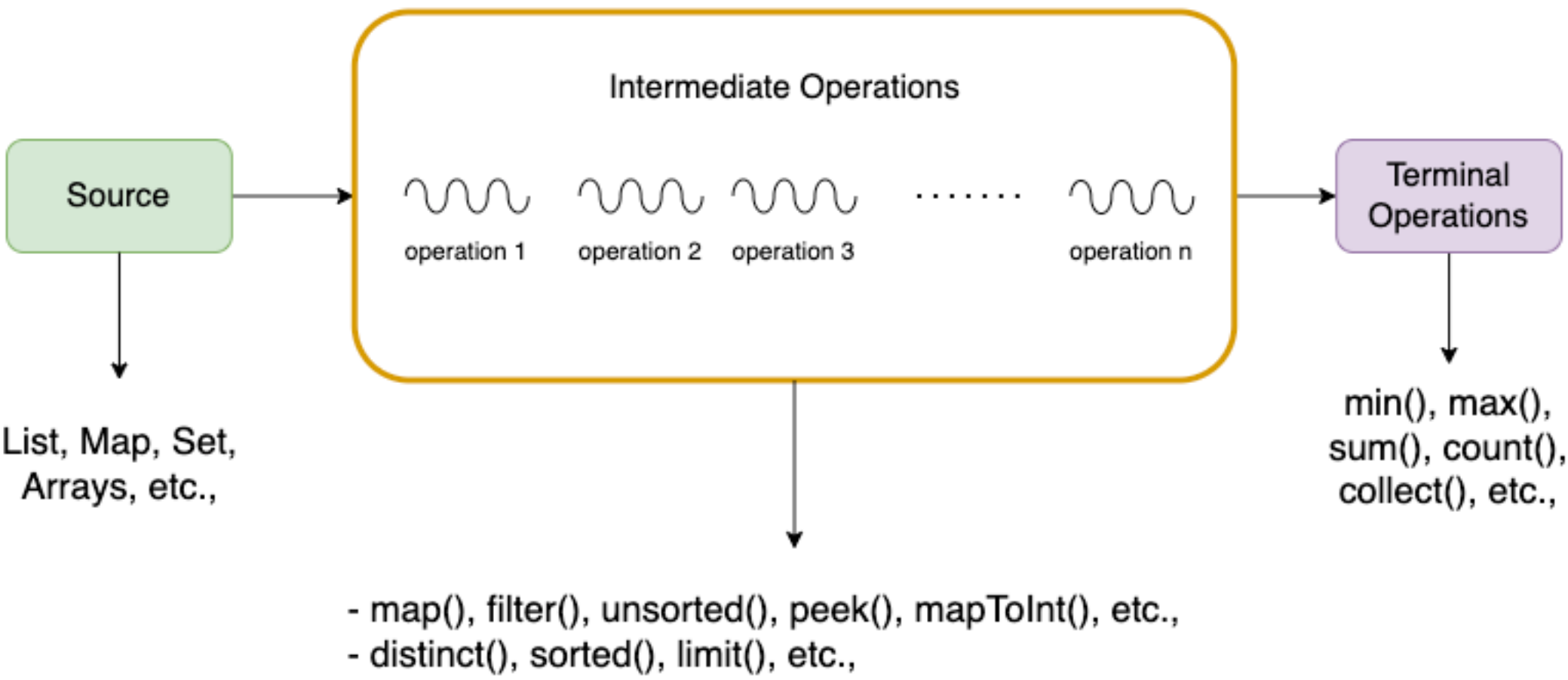

Different Operations On Streams

There are two types of Operations in Streams:

1) Intermediate Operations
2) Terminate Operations

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intermediate Operations are the types of operations in which multiple methods are chained in a row.

There are a few Intermediate Operations mentioned below:

1) Map

```
List number = Arrays.asList(2,3,4,5);
List square = number.stream().map(x->x*x).collect(Collectors.toList());
```

2) filter

```
List names = Arrays.asList("Reflection","Collection","Stream");
List result = names.stream().filter(s-
>s.startsWith("S")).collect(Collectors.toList());
```

Terminal Operations

1) collect

```
List number = Arrays.asList(2,3,4,5,3);
Set square = number.stream().map(x->x*x).collect(Collectors.toSet());
```

2) forEach()

```
List number = Arrays.asList(2,3,4,5);
number.stream().map(x->x*x).forEach(y->System.out.println(y));
```

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Examples

```
// create a list of integers
List<Integer> number = Arrays.asList(2, 3, 4, 5);

// demonstration of map method
List<Integer> square = number.stream().map(x -> x * x) .collect(Collectors.toList());

// create a list of String
List<String> names = Arrays.asList("Reflection", "Collection", "Stream");

// demonstration of filter method
List<String> result= names.stream() .filter(s -> s.startsWith("S")).collect(Collectors.toList())

// demonstration of sorted method
List<String> sho = names.stream() .sorted().collect(Collectors.toList());

// collect method returns a set
Set<Integer> squareSet = number .stream().map(x -> x * x).collect(Collectors.toSet());

// demonstration of forEach method
number.stream().map(x -> x * x).forEach(y -> System.out.println(y));

// demonstration of reduce method
int even = number.stream() .filter(x -> x % 2 == 0).reduce(0, (ans, i) -> ans + i);
```

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Modifier and Type	Method and Description
`boolean`	**`allMatch`**`(Predicate<? super T> predicate)` Returns whether all elements of this stream match the provided predicate.
`boolean`	**`anyMatch`**`(Predicate<? super T> predicate)` Returns whether any elements of this stream match the provided predicate.
`static <T> Stream.Builder<T>`	**`builder`**`()` Returns a builder for a `Stream`.
`<R,A> R`	**`collect`**`(Collector<? super T,A,R> collector)` Performs a **mutable reduction** operation on the elements of this stream using a `Collector`.
`<R> R`	**`collect`**`(Supplier<R> supplier, BiConsumer<R,? super T> accumulator, BiConsumer<R,R> combiner)` Performs a **mutable reduction** operation on the elements of this stream.
`static <T> Stream<T>`	**`concat`**`(Stream<? extends T> a, Stream<? extends T> b)` Creates a lazily concatenated stream whose elements are all the elements of the first stream followed by all the elements of the second stream.
`long`	**`count`**`()` Returns the count of elements in this stream.
`Stream<T>`	**`distinct`**`()` Returns a stream consisting of the distinct elements (according to **`Object.equals(Object)`**) of this stream.
`static <T> Stream<T>`	**`empty`**`()` Returns an empty sequential `Stream`.

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`Stream<T>`	**`filter`**`(`**`Predicate`**`<? super T> predicate)` Returns a stream consisting of the elements of this stream that match the given predicate.
`Optional<T>`	**`findAny`**`()` Returns an **`Optional`** describing some element of the stream, or an empty `Optional` if the stream is empty.
`Optional<T>`	**`findFirst`**`()` Returns an **`Optional`** describing the first element of this stream, or an empty `Optional` if the stream is empty.
`<R> Stream<R>`	**`flatMap`**`(`**`Function`**`<? super T,? extends Stream<? extends R>> mapper)` Returns a stream consisting of the results of replacing each element of this stream with the contents of a mapped stream produced by applying the provided mapping function to each element.
`DoubleStream`	**`flatMapToDouble`**`(`**`Function`**`<? super T,? extends DoubleStream> mapper)` Returns an `DoubleStream` consisting of the results of replacing each element of this stream with the contents of a mapped stream produced by applying the provided mapping function to each element.
`IntStream`	**`flatMapToInt`**`(`**`Function`**`<? super T,? extends IntStream> mapper)` Returns an `IntStream` consisting of the results of replacing each element of this stream with the contents of a mapped stream produced by applying the provided mapping function to each element.
`LongStream`	**`flatMapToLong`**`(`**`Function`**`<? super T,? extends LongStream> mapper)` Returns an `LongStream` consisting of the results of replacing each element of this stream with the contents of a mapped stream produced by applying the provided mapping function to each element.
`void`	**`forEach`**`(`**`Consumer`**`<? super T> action)` Performs an action for each element of this stream.
`void`	**`forEachOrdered`**`(`**`Consumer`**`<? super T> action)` Performs an action for each element of this stream, in the encounter order

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	of the stream if the stream has a defined encounter order.
`static <T> Stream<T>`	**`generate(Supplier<T> s)`** Returns an infinite sequential unordered stream where each element is generated by the provided `Supplier`.
`static <T> Stream<T>`	**`iterate(T seed, UnaryOperator<T> f)`** Returns an infinite sequential ordered `Stream` produced by iterative application of a function `f` to an initial element `seed`, producing a `Stream` consisting of `seed`, `f(seed)`, `f(f(seed))`, etc.
`Stream<T>`	**`limit(long maxSize)`** Returns a stream consisting of the elements of this stream, truncated to be no longer than `maxSize` in length.
`<R> Stream<R>`	**`map(Function<? super T,? extends R> mapper)`** Returns a stream consisting of the results of applying the given function to the elements of this stream.
`DoubleStream`	**`mapToDouble(ToDoubleFunction<? super T> mapper)`** Returns a `DoubleStream` consisting of the results of applying the given function to the elements of this stream.
`IntStream`	**`mapToInt(ToIntFunction<? super T> mapper)`** Returns an `IntStream` consisting of the results of applying the given function to the elements of this stream.
`LongStream`	**`mapToLong(ToLongFunction<? super T> mapper)`** Returns a `LongStream` consisting of the results of applying the given function to the elements of this stream.
`Optional<T>`	**`max(Comparator<? super T> comparator)`** Returns the maximum element of this stream according to the provided `Comparator`.
`Optional<T>`	**`min(Comparator<? super T> comparator)`** Returns the minimum element of this stream according to the provided

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boolean	**noneMatch**(**Predicate**<? super T> predicate) Returns whether no elements of this stream match the provided predicat
static <T> **Stream**<T>	**of**(T... values) Returns a sequential ordered stream whose elements are the specified values.
static <T> **Stream**<T>	**of**(T t) Returns a sequential Stream containing a single element.
Stream<T>	**peek**(**Consumer**<? super T> action) Returns a stream consisting of the elements of this stream, additionally performing the provided action on each element as elements are consum from the resulting stream.
Optional<T>	**reduce**(**BinaryOperator**<T> accumulator) Performs a **reduction** on the elements of this stream, using an **associati** accumulation function, and returns an Optional describing the reduced value, if any.
T	**reduce**(T identity, **BinaryOperator**<T> accumulator) Performs a **reduction** on the elements of this stream, using the provided identity value and an **associative** accumulation function, and returns the reduced value.
<U> U	**reduce**(U identity, **BiFunction**<U,? super T,U> accumulator, **BinaryOperator**<U> combiner) Performs a **reduction** on the elements of this stream, using the provided identity, accumulation and combining functions.
Stream<T>	**skip**(long n) Returns a stream consisting of the remaining elements of this stream aft discarding the first n elements of the stream.
Stream<T>	**sorted**() Returns a stream consisting of the elements of this stream, sorted accord