**🔹 Categories of Stream API Operations**

Stream operations fall into **two groups**:

1. **Intermediate operations** → return another Stream (can be chained).
2. **Terminal operations** → end the stream pipeline and produce a result (value, collection, etc).

**✅ Intermediate Operations (build the pipeline)**

These return a **Stream** (or specialized IntStream, DoubleStream, etc).

* **map()** → transform each element.
* **mapToInt() / mapToLong() / mapToDouble()** → convert to primitive streams.
* **flatMap()** → flatten nested streams.
* **flatMapToInt() / flatMapToDouble() / flatMapToLong()**.
* **filter()** → keep only elements that match a condition.
* **distinct()** → remove duplicates.
* **sorted()** → natural order or with Comparator.
* **peek()** → debug/inspect values in the pipeline.
* **limit(n)** → take first n elements.
* **skip(n)** → skip first n elements.

**✅ Terminal Operations (produce a result)**

These actually **trigger execution** of the pipeline.

* **collect()** → collect results (e.g., into List, Set, Map).
  + Collectors.toList(), Collectors.toSet(), Collectors.toMap(), Collectors.joining()…
* **toList() / toSet()** → Java 16+ shortcut collectors.
* **forEach()** → process each element.
* **forEachOrdered()** → maintain encounter order in parallel streams.
* **reduce()** → combine elements into one (sum, product, concat…).
* **count()** → number of elements.
* **min() / max()** → smallest/largest element.
* **anyMatch() / allMatch() / noneMatch()** → boolean checks.
* **findFirst() / findAny()** → optional single element.
* **toArray()** → convert to array.

**✅ Short-Circuiting Operations**

These are special: they may not process the whole stream.

* **limit(n)**
* **skip(n)**
* **findFirst() / findAny()**
* **anyMatch() / allMatch() / noneMatch()**

**✅ Primitive Stream Specializations**

For performance (no boxing/unboxing):

* **IntStream**, **LongStream**, **DoubleStream**
  + Methods like mapToInt, mapToLong, mapToDouble.
  + Extra numeric methods: sum(), average(), range(), rangeClosed() (for Int/Long).