HowToDoInJava

Java Stream – Find, Count and Remove Duplicates

Last Updated: March 10, 2022 By: Lokesh Gupta Java 8 Java Stream Basics

Few simple examples to find and count the duplicates in a *Stream* and remove those duplicates since Java 8. We will use ArrayList to provide a *Stream* of elements including duplicates.

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1.1. Remove Duplicate Strings

The `distinct()` method returns a *Stream* consisting of the distinct elements of the given stream. The **object equality is checked according to the object's `equals()` method**.

Find all distinct strings

```
List<String> list = Arrays.asList("A", "B", "C", "D", "A", "B", "C");

// Get list without duplicates
List<String> distinctItems = list.stream()
                                 .distinct()
                                 .collect(Collectors.toList());

// Let's verify distinct elements
System.out.println(distinctItems);
```

Program output:

Output

```
[1, 2, 3, 4, 5, 6, 7, 8]
```

1.2. Remove Duplicate Custom Objects

The same syntax can be used to remove the duplicate objects from *List*. To do so, we need to be very careful about the object's *equals()* method, because it will decide if an object is duplicate or unique.

Consider the below example where two *Person* instances are considered equal if both have the same *id* value.

```
public class Person
{
    private Integer id;
    private String fname;
    private String lname;
}
```

Let us see an example of how we can remove duplicate *Person* objects from a *List*.

Get Distinct Objects using Default Equality

```
//Add some random persons
Collection<Person> list = Arrays.asList(p1, p2, p3, p4, p5, p6);

// Get distinct people by id
List<Person> distinctElements = list.stream()
        .distinct()
        .collect( Collectors.toList() );
```

To **find all unique objects using a different equality condition**, we can take the help of the following *distinctByKey()* method. For example, we are finding all unique objects by Person's full name.

Get Distinct Objects using Custom Equality

```
//Add some random persons
List<Person> list = Arrays.asList(p1, p2, p3, p4, p5, p6);

// Get distinct people by full name
List<Person> distinctPeople = list.stream()
             .filter( distinctByKey(p -> p.getFname() + " " + p.getLname()) )
             .collect( Collectors.toList() );

//********The distinctByKey() method need to be created**********

public static <T> Predicate<T> distinctByKey(Function<? super T, Object> keyExtractor)
{
  Map<Object, Boolean> map = new ConcurrentHashMap<>();
  return t -> map.putIfAbsent(keyExtractor.apply(t), Boolean.TRUE) == null;
}
```

2. Collectors.toSet() – To Remove Duplicates

Another simple and very useful way is to store all the elements in a `Set`. **Sets, by definition, store only distinct elements.** Note that a *Set* stores distinct items by comparing the objects with *equals()* method.

Here, *we cannot compare the objects using a custom equality condition*.

```
ArrayList<Integer> numbersList
= new ArrayList<>(Arrays.asList(1, 1, 2, 3, 3, 3, 4, 5, 6, 6, 6, 7, 8));

Set<Integer> setWithoutDuplicates = numbersList.stream()
.collect(Collectors.toSet());

System.out.println(setWithoutDuplicates);
```

Program output:

```
[1, 2, 3, 4, 5, 6, 7, 8]
```

3. Collectors.toMap() – To Count Duplicates

Sometimes, we are interested in finding out which elements are duplicates and how many times they appeared in the original list. We can use a `Map` to store this information.

We have to iterate over the list, put the element as the Map key, and all its occurrences in the Map value.

```
// ArrayList with duplicate elements
ArrayList<Integer> numbersList
= new ArrayList<>(Arrays.asList(1, 1, 2, 3, 3, 3, 4, 5, 6, 6, 6, 7, 8));

Map<Integer, Long> elementCountMap = numbersList.stream()
.collect(Collectors.toMap(Function.identity(), v -> 1L, Long::sum));

System.out.println(elementCountMap);
```

Program output:

```
{1=2, 2=1, 3=3, 4=1, 5=1, 6=3, 7=1, 8=1}
```

Happy Learning !!

Sourcecode on Github

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Recommended Reading:

1. Java – Remove Duplicates from Array
2. Java Stream count() Matches with filter()
3. Java Stream reuse – traverse stream multiple times?
4. String indent(count) – Left indent lines in Java
5. Java program to count vowels and consonants in a String
6. Count Number of Lines in a File in Java
7. Spring Batch Count of Processed Records Example
8. Python String count()
9. Hibernate count, min, max, sum, avg Functions
0. Java remove trailing whitespaces from String

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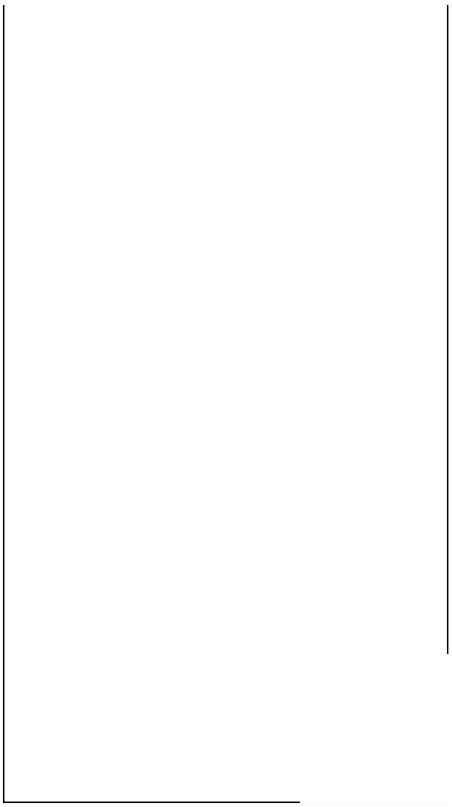

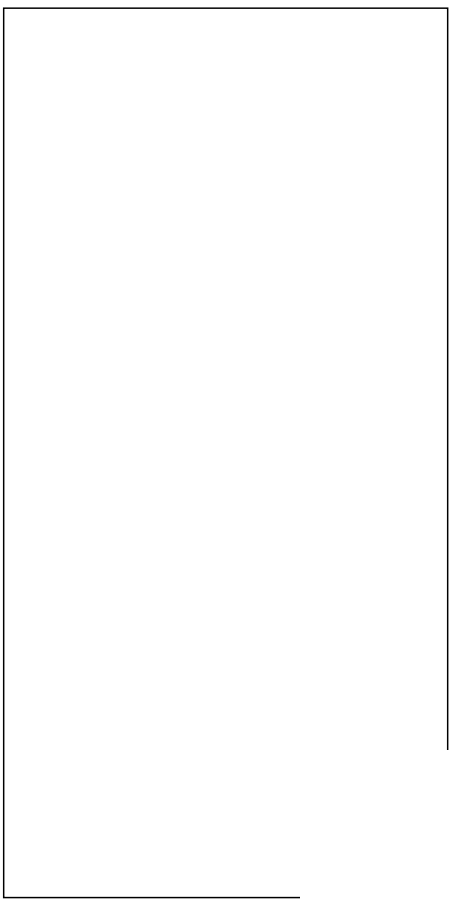

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