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05: ♦ Finding the 2nd highest number in an array

Posted on [March 19, 2015](#) by [Arulkumaran Kumaraswamipillai](#)

Requirements gathering

1. Does the array allow duplicates?
2. If duplicates are allowed, then do you need to report duplicates? For example, in {2,4, 6, 3, 6, 5}, is 6 or 5 the second highest?

Analysis

- If duplicates are not allowed, sort the array (`Arrays.sort(...)`) and get the second last element, which executes in $O(n \log n)$
- If duplicates are allowed, loop through each element have two variables to store highest & second highest values. which executes in $O(n)$

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Solution: duplicates are allowed

```

1 public class SecondHighest {
2
3     public static void main(String[] args) {
4
5         int[] numbers = {2,4, 6, 3, 6, 5};
6
7         int highest = Integer.MIN_VALUE + 1;
8         int sec_highest = Integer.MIN_VALUE;
9
10        for (int i : numbers) // b is array of i
11        {
12            if (i > highest) // new highest found
13            {
14                // highest becomes "second highest"
15                sec_highest = highest; // make current highest
16                highest = i; // make current value highest
17            }
18            // "i != highest" is to ensure duplicates are allowed
19            // highest & "second highest"
20            else if (i > sec_highest && i != highest)
21            {
22                sec_highest = i;
23            }
24        }
25
26        System.out.println("sec_highest=" + sec_highest);
27    }
28 }
29
30

```

Output:

sec_highest=5

Java 8 way

```

1 package com.java8.examples;
2
3 import java.util.Arrays;
4 import java.util.List;
5 import java.util.stream.Collectors;
6
7 public class SecondHighest {
8
9     public static void main(String[] args) {
10
11         List<Integer> numbers = Arrays.asList(2, 4, 6, 3, 6, 5);
12
13         List<Integer> sortedUniqueNumbers = numbers
14             .distinct() // remove duplicates
15             .sorted() // sort

```

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```

16         .collect(Collectors.toList()); //
17
18     System.out.println("sec_highest=" +
19         sortedUniqueNumbers.get(sortedUnique
20     }
21 }
22

```

Output:

sec_highest=5

So how about parallelizing the code?

In Java SE 8 it's easy: just replace stream() with **parallelStream()**.

```

1  package com.java8.examples;
2
3  import java.util.Arrays;
4  import java.util.List;
5  import java.util.stream.Collectors;
6
7  public class SecondHighest {
8
9      public static void main(String[] args) {
10
11          List<Integer> numbers = Arrays.asList(2,
12
13          List<Integer> sortedUniqueNumbers = numb
14              .distinct() // remove duplicates
15              .sorted() // sort
16              .collect(Collectors.toList()); //
17
18          System.out.println("sec_highest=" +
19              sortedUniqueNumbers.get(sortedUnique
20      }
21 }
22

```

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Arulkumaran Kumaraswamipillai

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developer in 3 yrs. Contracting since 2003,
and attended 150+ Java job interviews, and
often got 4 - 7 job offers to choose from. It
pays to prepare. So, published Java
interview Q&A books via [Amazon.com](#) in
2005, and sold 35,000+ copies. Books are
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Mechanical Eng to freelance Java developer in 3 yrs. Contracting since 2003, and attended 150+ Java job interviews, and often got 4 - 7 job offers to choose from. It pays to prepare. So, published Java interview Q&A books via [Amazon.com](https://www.amazon.com) in 2005, and sold 35,000+ copies. Books are outdated and replaced with this subscription based site. **945+** paid members. [join my LinkedIn Group](#). [Reviews](#)

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