**The Maximum Overlap Problem**

You are given as set of n time intervals . The interval has a start time of and an ending time of

You can think of each interval indicating that a “process” is active during that time. You may assume that . Or you can just think of them as horizontal line segments.

You want to find the maximum overlap among all of the given time intervals. Your algorithm simply determines this maximum value and reports it.

The diagram below illustrates an instance of the problem with 6 time intervals, each represented by horizontal line segments.

For this instance, the algorithm would report 4 as the maximum overlap.

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Devise an algorithm solving this problem in time.

Discussion/details:

* Time intervals are *inclusive* of their end points. As a result, if one interval ends at exactly the same time another begins, the two intervals are overlapping.
* The interval start and end times are given as floating point numbers.
* The intervals are given in an arbitrary order
* If your approach includes some kind of sorting operation, you can assume the existence of, for example, MergeSort (and its runtime). Exactly ***what*** you choose to sort and ***how*** you interpret the results are things you must explain and justify.