

Chapter 9: Medians and Order Statistics

The **selection problem** is the problem of computing, given a set A of n distinct numbers and a number i , $1 \leq i \leq n$, the i^{th} **order statistics** (i.e., the i^{th} smallest number) of A .

We will consider some special cases of the order statistics problem:

- the **minimum**, i.e. the first,
- the **maximum**, i.e. the last, and
- the **median**, i.e. the “halfway point.”

Medians occur at $i = \lfloor (n + 1)/2 \rfloor$ and $i = \lceil (n + 1)/2 \rceil$. If n is odd, the median is unique, and if n is even, there are two medians.

*How many comparisons are
necessary and sufficient for
computing both the minimum
and the maximum?*

Well, to compute the maximum $n - 1$ comparisons are necessary and sufficient. The same is true for the minimum. So, the number should be $2n - 2$ for computing both.

Actually you can do better by processing the input numbers in pairs