
Medians and Order Statistics

Chapter 9

Order Statistics

- Select the i_{th} smallest of n elements (the element with rank i).
 - Minimum: $i =$
 - Maximum: $i =$
 - Median: $i =$
- What is a naive algorithm for this problem?
- What is its worst-case running time?

Minimum and Maximum

- MINIMUM(A, n)
- How many comparisons are needed?

Max and Min

- How many comparisons are needed to find Max and Min independently?
- Can we do better?

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Simultaneous Max and Min

- At most $3n/2$ comparisons are needed

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Analysis

- Total number of comparisons when:
 - n is odd:
 - n is even:

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Example

- $n = 5, A = \langle 2, 7, 1, 3, 4 \rangle$

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Example

- $n = 6, A = \langle 2, 5, 3, 7, 1, 4 \rangle$

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Order Statistics

- $\text{RANDOMIZED-SELECT}(A, p, r, i)$

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Example

- A: <6, 10, 13, 5, 8, 3, 2, 11>
