11.4
Selecting in Unsorted Lists

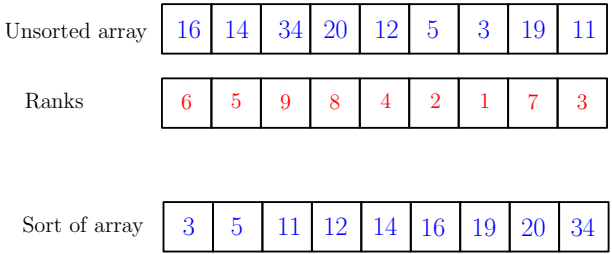
11.4.1
Problem definition and basic algorithm

Rank of element in an array

A: an unsorted array of n integers

Definition

For $1 \leq j \leq n$, element of rank j is the jth smallest element in A.



Problem - Selection

Input Unsorted array A of n integers **and** integer j

Goal Find the jth smallest number in A (rank j number)

Median: $j = \lfloor (n+1)/2 \rfloor$

Simplifying assumption for sake of notation: elements of A are distinct

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Algorithm I

1. Sort the elements in A
2. Pick jth element in sorted order

Time taken $= O(n \log n)$

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Algorithm II

If j is small or $n - j$ is small then

1. Find j smallest/largest elements in A in $O(jn)$ time. (How?)
2. Time to find median is $O(n^2)$.

THE END

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(for now)