

Reasoning about the worst-case linear-time order statistic recurrence:

In each recursion, $T(n/5)$ runs FIRST and must return the pivot BEFORE $T(3/4 n)$ can run. This contrasts recurrences where subproblems are independent (no info from the solution of a subproblem is needed to solve another subproblem).

Because median is an order statistic, $\text{Select}(\text{median } i, n/5)$ is used for $T(n/5)$.

A large part of the recursion tree computes the median of medians as the pivot for the top i th statistic $T(3/4 n)$ call. In each recursion in this part of the tree, $T(n/5)$ returns the median of current medians as the pivot for $T(3/4 n)$, which then returns the median of upper-level medians.