

Algorithm Quickselect ($A[l..r], k$)

Input : Array A with length n . Indices $1 \leq l \leq k \leq r \leq n$, such that for all $x \in A[l..r] : |\{j | A[j] \leq x\}| \geq l$ and $|\{j | A[j] \leq x\}| \leq r$.

Output : Value $x \in A[l..r]$ with $|\{j | A[j] \leq x\}| \geq k$ and $|\{j | x \leq A[j]\}| \geq n - k + 1$

if $l=r$ **then**

$_$ return $A[l]$;

$x \leftarrow \text{RandomPivot}(A[l..r])$

$m \leftarrow \text{Partition}(A[l..r], x)$

if $k < m$ **then**

$_$ return QuickSelect($A[l..m-1], k$)

else if $k > m$ **then**

$_$ return QuickSelect($A[m+1..r], k$)

else

$_$ **return** $A[k]$