Quicksort

Quicksort(A, ℓ, r):

   1. if $\ell < r$ do   % if there are at least two elements in $A[\ell, \ldots, r]$

   2. $p \leftarrow$ Partition(A, ℓ, r)
                    % partition using $A[r]$ as the pivot element,
                    % p is the position the the pivot element

   3.   Quicksort$(A, \ell, p - 1)$

   4.   Quicksort$(A, p + 1, r)$

Partition(A, ℓ, r):

   1. $x \leftarrow A[r]$ % x is the pivot element

   2. $i \leftarrow \ell$ % all $A[j]$ where $j \leq i - 1$ will satisfy $A[j] \leq x$

   3. for k from ℓ to $r - 1$ do
           % at the beginning of the loop: $A[j] > x$ for every j such that $i \leq j \leq k - 1$

   4.   if $A[k] < x$ do

   5.   swap $A[i]$ and $A[k]$

   6. $i \leftarrow i + 1$

   7.   end if

   8. end for

   9. swap $A[i]$ and $A[r]$

  10. return i