

Chapter 7:

1. Illustrate the operation of PARTITION on the array A = <13, 10, 9, 5, 12, 8, 7, 4, 21, 2, 6, 11>. Show how the array would look like, step by step. You can assume array index starts at 1

$$\left\langle \underline{9 \ 5 \ 8 \ 7 \ 4 \ 2 \ 6} \right| \underline{\text{x}} \left| \underline{11 \ 21 \ 13 \ 19 \ 12} \right\rangle$$

$\leq x$ x $\geq x$

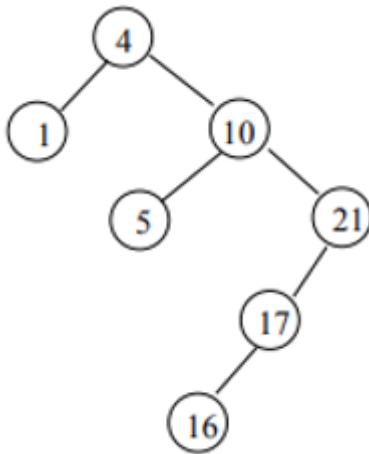
2. After running PARTITION on Problem #1, what value does the PARTITION method return? Assume array index starts at 1.

$$Q = 8$$

Chapter 12:

For questions 3 to 8, provide the resultant tree and explain what you did.

3. Delete node 21 from the below tree:



QuickSort(A, p..r)
 $\text{if } p < r$
 P = Partition(A, p..r)
 QuickSort(A, p..P-1) \downarrow $q = 3$
 QuickSort(A, P..r) \downarrow $2 : (q+1) : r-1$
 \downarrow $4 : \zeta : r$
To sort an entire array A, the initial call is QuickSort(A, 1, A.length).

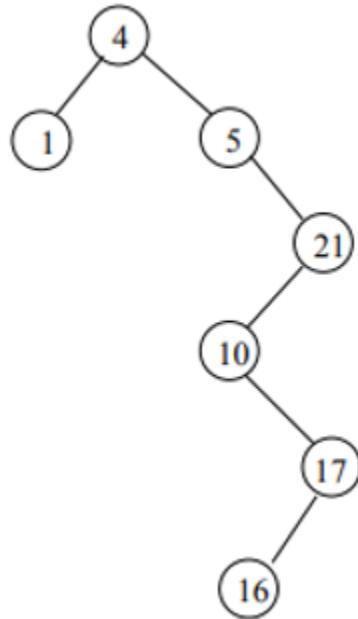
Partitioning the array

The key to the algorithm is the PARTITION procedure, which rearranges the subarray $A[p..r]$ in place.

PARTITION(A, p..r)
 $x = A[p]$
 $i = p + 1$
 for $j = p + 1$ to $r - 1$
 if $A[j] < x$
 $i = i + 1$
 exchange $A[i]$ with $A[j]$
 exchange $A[i]$ with $A[p]$
 return i

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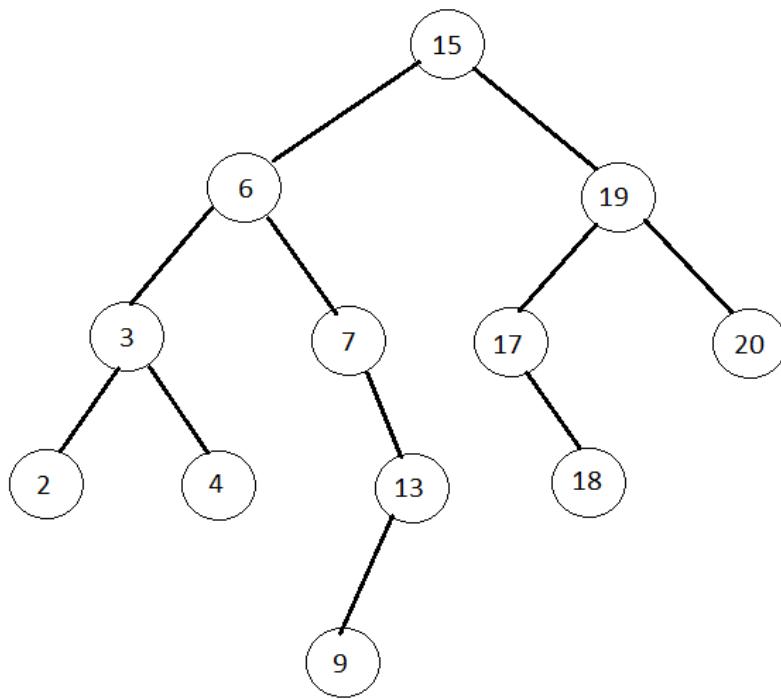
4. Delete node 4 from the below tree:



5. Delete node 15 from the below tree.

6. Then delete node 6 from the tree.

7. Then delete node 2 from the tree.



2, 3, 4, 6, 7, 9, 13, 15, 17, 18, 19, 20

8. Provide the In Order, Pre Order, and Post Order traversal of the above tree (without the deletions).