Question 5: Advanced Sorting Algorithms

Question 1

Using Figure 7.1 as a model, illustrate the operation of PARTITION on the array
$A =< 13, 19, 3, 5, 12, 8, 7, 4, 21, 2, 6, 11 >$.

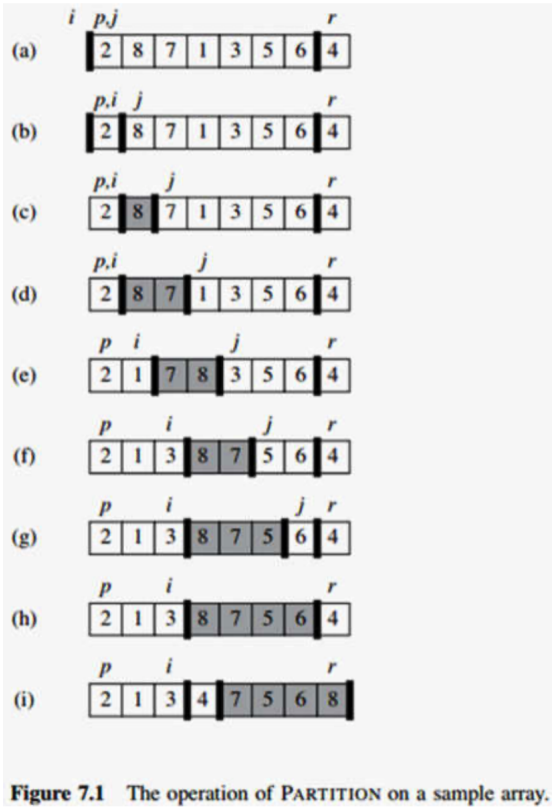

Figure 7.1 The operation of PARTITION on a sample array.

Question 2

Describe an algorithm that, given n integers in the range 0 to k, pre-process its input and then answers any query about how many of the n integers fall into a range $[a..b]$ in $O(1)$ time. Your algorithm should use $\Theta(n + k)$ pre-processing time.

Question 3

Using the Figure below as a model, illustrate the operation of RADIX-SORT on the following list of English words: COW, DOG, SEA, RUG, ROW, MOB, BOX.