7.1-1.
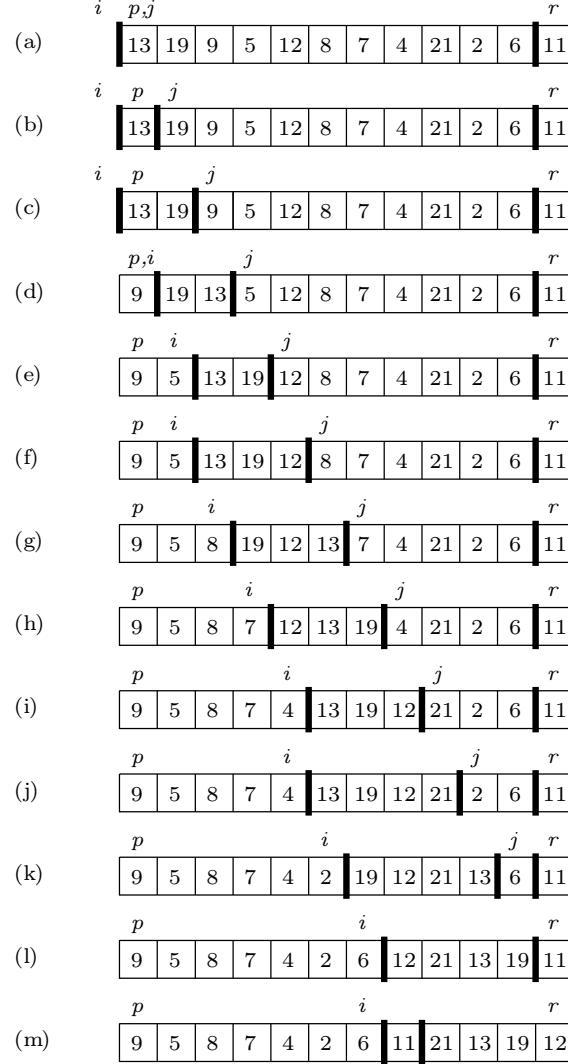
Using Figure 7.1 as a model, illustrate the operation of PARTITION on the array $A = \langle 13, 19, 9, 5, 12, 8, 7, 4, 21, 2, 6, 11 \rangle$.

Answer.

Figure 1 shows how PARTITION works on the array $A = \langle 13, 19, 9, 5, 12, 8, 7, 4, 21, 2, 6, 11 \rangle$.

Figure 1. The operation of PARTITION on array $A = \langle 13, 19, 9, 5, 12, 8, 7, 4, 21, 2, 6, 11 \rangle$. **(a)** The initial array and variable settings. None of the elements have been placed in either of the first two partitions. **(b)**–**(c)** The values 13 and 19 are added to the partition of larger values. **(d)** The values 13 and 9 are swapped, and 9 is added to the smaller partition. **(e)** The value 19 and 5 are swapped, and the smaller partition grows. **(f)** The larger partition grows to include 12. **(g)**–**(i)** 8, 7 and 4 are added to the smaller partition by swapping with 13, 19 and 12 respectively. **(j)** The larger partition grows to include 21. **(k)**–**(l)** The values 13 and 19 are swapped with 2 and 6 to make the latter ones add to the smaller partition, and the loop terminates. **(m)** In lines 7–8, the pivot element is swapped so that it lies between the two partitions.