43. There are 2 possible choices for each molecules: it can either be in side 1 or in side 2 of the box. Since there are a total of N independent molecules, the total number of available states of the N-particle system is

$$\mathcal{N}_{\text{total}} = 2 \times 2 \times 2 \times \cdots \times 2 = 2^N \ .$$

For instance, in the solution of problem #42, above, there are a total of $2^8 = 256$ states, as one can readily verify. It is possible to check this with the textbook example, too, but it is important to realize that there are three additional configurations beyond what are shown in Table 21-1: one with $n_1 = 0$ and $n_2 = 6$, another with $n_1 = 1$ and $n_2 = 5$, and so on. When all these are included, there are a total of $2^6 = 64$ microstates.