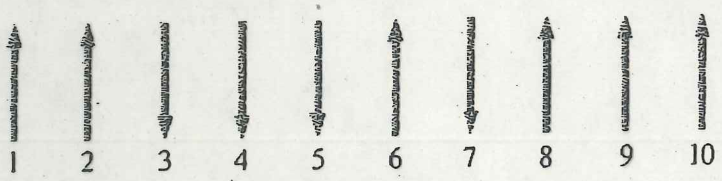

Figure 1.3 Model system composed of 10 elementary magnets at fixed sites on a line, each having magnetic moment $\pm m$. The numbers shown are attached to the sites; each site has its own magnet. We assume there are no interactions among the magnets and there is no external magnetic field. Each magnetic moment may be oriented in two ways, up or down, so that there are 2^{10} distinct arrangements of the 10 magnetic moments shown in the figure. If the arrangements are selected in a random process, the probability of finding the particular arrangement shown is $1/2^{10}$.

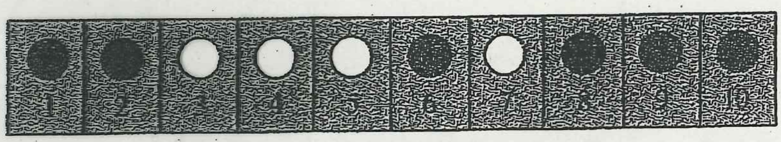

Figure 1.4 State of a parking lot with 10 numbered parking spaces. The ●'s denote spaces occupied by a car; the O's denote vacant spaces. This particular state is equivalent to that shown in Figure 1.3.

Now consider N different sites, each of which bears a moment that may assume the values $\pm m$. Each moment may be oriented in two ways with a probability independent of the orientation of all other moments. The total number of arrangements of the N moments is $2 \times 2 \times 2 \times \cdots 2 = 2^N$. A state of the system is specified by giving the orientation of the moment on each site; there are 2^N states. We may use the following simple notation for a single state of the system of N sites:

adalide fizikai magnetizmusa

– total number arrangement

N system

2^N mikroállapot

$$\uparrow\uparrow\downarrow\downarrow\downarrow\uparrow\downarrow\uparrow\uparrow\uparrow\cdots. \qquad (2)$$