PROBLEM: Find 10 non-negative integers that sum to 100 and whose product is as big as possible.

Example: $5, 7, 20, 8, 10, 1, 19, 4, 6, 20$

How many sets of 10 numbers are there that sum to 100? 6,292,069

States: set of 10 non-neg. integers that sum to 100: $(n_0, n_1, \ldots, n_9)$

Function: maximize $f(n_0, n_1, \ldots, n_9) = n_0 n_1 \cdots n_9$

minimize $g(n_0, n_1, \ldots, n_9) = -n_0 n_1 \cdots n_9$

Frequency distribution: minimum $f(x)$ corresponds to max. $e^{-f(x)/\sigma^2}$ ← frequency

frequency: $e^{-g(n_0, n_1, \ldots, n_9)/\sigma^2} = e^{n_0 n_1 \cdots n_9/\sigma^2}$ Too big!

IDEA: Maximize the log of the product: $\log(n_0 n_1 \cdots n_9 + 0.1)$ ← avoid $\log(0)$

$$h(n_0, n_1, \ldots, n_9) = \log(n_0 n_1 \cdots n_9 + 0.1)$$

FREQUENCY: $e^{-h/\sigma^2} = e^{-\log(n_0 n_1 \cdots n_9 + 0.1)/\sigma^2}$

TRANSITIONS BETWEEN STATES:

EXAMPLE: $5, 7, 20, 8, 10, 1, 19, 4, 6, 20$

$5, 7, 20, 7, 10, 1, 19, 5, 6, 20$