a) n-dimensional grid $(L_1, L_2, \cdots, L_n)$
coordinate $x_i \in \{0, 1, \cdots, L_i - 1\}$

set $L_0 = 1$
for known coordinates x_i

$$index = \sum_{i=1}^{n} x_i L_{i-1}$$

for known $index = z$

$$x_n = int(z / (L_1 \cdot L_2 \cdots L_{n-1}))$$
$$x_{n-1} = int((z - x_n \cdot L_1 \cdot L_2 \cdots L_{n-1}) / (L_1 \cdots L_{n-2}))$$
$$x_{n-2} = int((z - x_n L_1 \cdots L_{n-1} - x_{n-1} L_1 \cdots L_{n-2}) / (L_1 \cdots L_{n-3}))$$
$$\cdots$$
$$x_i = int((z - \sum_{i+1}^{n} x_{i+1} L_1 \cdots L_i) / (L_1 \cdots L_{i-1}))$$